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Abstract

The purpose of the present article is to provide an overview of gifted education in China, by tracing the social and cultural roots of the education system, and to review recent research that relates to current practices in gifted education. As a starting point, I will analyse conceptualisations and definitions of the key terms *talent* and *giftedness* in a Chinese cultural context, along with society's understanding of talents and giftedness, and show how these concepts are different from and similar to Western conceptions and beliefs. Following standard educational practice, I will introduce the important research findings of the last decade and analyse major articles according to whether they follow an educational or psychological approach. Finally, I will provide an overview of education efforts for gifted students, including difficult issues that need more attention, and discuss China's contribution to gifted education in domestic and international contexts.

Keywords: talent, giftedness, gifted education, supernormal children, China

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Public Interest Statement

In the last several decades, China has experienced a profound development. Talented individuals, as the driving force behind this progress, are playing an increasingly important role in various fields, both at home and abroad. What are the education efforts that support and nurture gifted and talented individuals in China? What are the cultural and societal perceptions and beliefs about giftedness and how are they different from Western conceptions? Understanding these issues will give domestic and international researchers and educators an updated view of the present situation of gifted education in China, as well as some of the cultural background behind it.

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Introduction

China has a long and illustrious history, with documents and literary works dating back at least 3,000 years, yet only in the last three decades has China achieved rapid modernisation. By the year 2011, China became the second-largest economy in the world, with a population of 1.3 billion and the second-largest world's land area (The World Bank, 2017). This rapid growth in many areas, including economic, social, and educational development, has aroused a great deal of international interest, and during the dramatic development process, *talents* were regarded a primary driver of empowering the nation. If *talents* are regarded as the primary driving power, what position do *gifted individuals* have in the education system and how are they nurtured? More specifically, how do China's educational practices, which aim to support and nurture gifted and talented individuals, create a "talents pipeline" (Dai, 2016)?

In order to answer these questions, we must first attempt to understand Chinese conceptions and beliefs regarding gifted and talented individuals, as well as what constitutes giftedness and talent. What is the society's understanding of gifted and talented individuals—both historically and today? Cultural conceptions and traditions about these matters have a profound influence on who is identified as gifted and talented, and on how gifted and talented individuals are nurtured in the education system. Clarifying how policies and practices in gifted education work in China is critical to understanding how to improve it, how to build on its strengths, and how to compare and contrast our system with others in order to expand horizons both domestically and internationally. From the domestic perspective, it is desirable to build the 'beliefs and values supporting gifted education' (Dai, 2016) because they are based on, and uniquely suited to, Chinese cultural and society. However, the step before *building up* the beliefs and values supporting gifted education is to explore the *existing* beliefs and values. From an

international perspective, educators and researchers abroad can get a better understanding of gifted education in China when they are aware of the cultural and social background.

Concepts of Talent and Giftedness in the Chinese Language

As Chan (2007) has pointed out, ‘different languages facilitate different forms of thinking.’ Understanding the meaning of the terms *talent* and *giftedness* in the Chinese language (here refers to Mandarin) will serve to introduce a cultural perspective on how the education system addresses the issues of gifted and talented students, and, ultimately—by contrasting these terms with correlative Western conceptions—we can look for a multi-cultural approach to how education systems can best nurture talented and gifted children.

The Concept of Talent

Though there are several terms that correspond in some way to *talent* in Chinese, the Chinese character 才 (Cai) is commonly used for expressing the concept of talent as a personal skill or special gift. It serves as a consistent translation of the word *talent* in a Western linguistic context, where *talent* was originally used to describe a unit of mass, value, weights, or money, especially to describe the worth of gold or silver (Kerr, 2009). Later in history, this same word was widely used to describe an average person’s weight in one of these precious metals and became associated with human performance (Kerr, 2009). At present, *talent* has mostly come to use referring to a person’s special ability for doing something in Western contexts. As discussed below, these depend on the ‘value’ that different societies place on different skills, but ‘talents’ are commonly drawn from examples in academics, science, mathematics, athletics, music, etc.

Tracing the Chinese linguistic context in a similar vein, 才 (Cai, also written as 材) originally meant the wood for building houses. Cai (材) is generally used to differentiate different kinds of wood, signifying both ‘which kind of wood (材料)’ and ‘the qualities of wood

(材质).’ In the historical development of 才 (Cai), it came to be widely used to differentiate different kinds of persons. For example, a talented person could be described as ‘the wood that can be further developed’ (可造之才). Thus, the Chinese term meaning *talented*, or person with talent (有才华的), has a basic meaning very similar to its Western linguistic counterpart, meaning a person who has a special ability to do something.

Valued Talents in China

Talents are valued across domains. The ancient Chinese saying *Hang hang chu zhuang yuan* (‘there will always be a number one for every trade’) reflects that the Chinese people affirm that talent and excellence are not limited to one domain. This same idea runs through the Chinese educational system, from 3,000 years ago to today. A good example of the value Chinese culture place on talent across domains comes from the Zhou Dynasty (1046–256 BC), when students were required to develop talents in six domains, named the Six Arts: courtesy, music, shooting, riding, reading, and calculation. At present, the official educational system integrates disciplines to allow students to build many different talents by encouraging development of their general character in morality, intelligence, physique, sociability, and aesthetics. In addition, after-school programs such as the Youth Palace offer ‘a variety of academic and artistic enrichment activities’ such as mathematics, writing, sports, painting, chess, calligraphy, and playing musical instruments (Chan, 2007).

Valued talents serve a national interest from a historical perspective. Based on the idea of nurturing a well-rounded person, Chinese cultural traditions treasure individuals talented in diverse domains. However, within this huge and diverse talent pool, certain valued talents in the society are relatively centralised. Due to a history of centralisation of authority over thousands of years, the valued talents are commonly elicited, nurtured, or even controlled by the

will of the authority. In other words, while the personal talents that arise in nature are diverse, the premiums placed on specific valued talents may be driven by institutional or societal goals.

Historically, for instance, since the Sui Dynasty (AD 581–618), the authority identified talents mainly for the purpose for selecting officials. The main solicitation program for the civil services system were the *Keju* (Imperial Examinations), a system which lasted in China for 1,300 years overall. During this time, generally speaking, the talents necessary to excel in the *Keju* and to be a qualified official were highly valued and encouraged in the society. These skills included ‘memorisation of other people’s work (for example, the classic works by Confucius), recitation of poems and prose written by the ancient scholars, and recalling factual knowledge’ (Chan, 2007). The talents related to rote memorisation and literacy were highlighted as the most important abilities, if not the only sort of abilities. Moreover, other related personal attributes such as ‘hard work, great effort, perseverance, good will [moral status], [obedience]’ (Wu, 2005) are still highly valued and encouraged.

The *Keju* and the aligned education system in China served as the ‘important avenue for the rank-and-file people to move up the social ladder and improve their social status and living conditions’ (Dai, 2016). These values and the system that promotes these values and that rewards those who display these talents have endured so long in China and are so influential that the valued talents mentioned above are deeply set in the Chinese culture, even today.

The First Opium War (1839–1842) was a significant turning point for China. Deficiencies in science and technology were enormous disadvantages for China and played a role when the nation was reduced almost to the status of a semi-colonial dependency (Li, 1990). Subsequently, China called urgently for talented individuals in science and technology. After the founding of People’s Republic of China in 1949, and the end of the Cultural Revolution in 1976,

China gradually rebuilt a formal and stable education system. At almost the same time, the *Gaokao* (National College Entrance Examination) started serving as a main way of identifying and selecting talent in the country. For nearly four decades now, the skills most highly valued are mainly related to intellectual abilities, as reflected in academic performance. Within numerous academic fields, the government authority highlights the STEM field (science, technology, engineering, and mathematics), in the form of supportive policies and disbursement of abundant resources.

However, the many generations that strove for academic excellence through the *Gaokao*, which could be achieved solely by rote memorisation, recitation, hard work, and many hours of study, proved unsatisfactory to fulfill the country's need for innovation. The famous question by Qian Xuesen—‘The Chinese are so smart and hardworking; why are we not producing innovative talent?’—pinpointed this deficiency of talented citizens who could make innovative contributions worldwide. In the year 2010, with the publication of ‘Long-Term Programming for the National Education Reform and Development, 2010–2020’ (MOE), the government authority clearly raised the issue of the need to identify and nurture ‘creative talent.’ Numerous education reforms and programs were launched, including an attempt to reform the *Gaokao* itself. It is true that with such a huge population and complicated situations in different districts, and with such high stakes, it will take a long time to bring the *Gaokao* up-to-date. Nevertheless, for meeting the national need for and interest in ‘outstanding creative talent,’ the education system and the methods for identifying need to be and will be gradually modified.

Overall, with its huge and diverse talent pool, China possesses abundant resources and gifted individuals in numerous domains. However, from the *Keju* to the *Gaokao* to today, the political authority has led the important debate over which talents are valued in Chinese society

and the result is that valued talents are centralised in certain domains such as literacy and academic performance. However, there seems to be a shift away from valuing talents based on mastering the existing knowledge, and towards those that can make innovative contributions. Indeed, talents in certain domains do make great contributions for the benefit of modern China's growth in science, technology, and the economy. Yet it is necessary to consider the price that is paid in terms of failing to cultivate diversity of talent in various domains. A question remains, and it is an important consideration for the public and the political authority alike: Should talents be valued and developed for their own merit or must they be fostered only insofar as they serve the nation's interest?

The Concept of Giftedness

Giftedness as an inborn superior talent. Compared to *talent*, which implies high ability due to the interaction of factors such as effort, education, and environment, *giftedness* has been described as 'God's bestowal upon man' (Shi, 2000), placing more emphasis on special inborn abilities. Originally, the Chinese term corresponding to *giftedness* (Tiancai 天才) means the 'superior talent (Cai 才) given by heaven (Tian 天)'. For example, gifted children are commonly called 神童 (Shentong), which means god-like children. Furthermore, there is a differentiation between heaven-like talent (天才), and earth-like talent (地才). The former ('heaven-like children') refers to individuals born with some superior ability (commonly understood as 'genius'), while 'earth-like' individuals are high achievers through much effort, diligence, and perseverance. Though both kinds of talent may lead individuals to achieve excellence and success, 'giftedness' (a heaven-like gift) acknowledges inborn superior abilities, whereas 'talent' (earth-like attributes) emphasizes the virtues of individual effort and strength of character.

‘Supernormal’ children. Although originally, from the linguistic viewpoint, giftedness signified an inborn superior ability, ‘the Chinese psychologists don’t believe that giftedness is totally inborn’ (Shi, 2000). At present, the common view of giftedness in the Chinese literature is that it is a result of the interaction between individual and environmental factors. In other words, gifted children and adolescents are the result of both hereditary factors and the early environment in which they grew up.

Since 1978, researchers in China started using the term *supernormal* to express giftedness, reflecting the idea that supernormal children are superior to ‘normal’ children. This term avoids differentiating between nature and nurture, inborn and environmental factors, and instead evaluates children according to their performance by statistical measures. The standard for identifying supernormal children is according to the following formula, based on their performance (Shi, 2000), in which performance can be IQ score, academic performance, creativity, or any other talent:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

The formula is based on the normal distribution of the population, where μ stands for the expected value (mean performance of all measured students) and σ for the standard deviation (which quantifies the amount of variation in the set of measured students). Generally, supernormal children are identified when their performance (x) is at least two standard deviations (2σ) higher than the mean performance (μ ; i.e., normal children).

An understanding of giftedness and supernormal children develops along with increasingly various facets in the definition of terms and identification of gifted/supernormal children. According to the current Chinese education and psychological literature, the concept of supernormal children can be summarised as: *Children and adolescents with superior*

performance or potential on cognitive ability, non-cognitive traits, creativity, and outstanding talent in a specific domain (such as math, physics, art, music, leadership, etc.), when compared with normal children.

In this broad sense, the concept of supernormal children in China not only includes their actual performance but also considers their potential; and evaluation is not limited to cognitive skills (referring mainly to intellectual abilities and academic talent), but is extended to non-cognitive traits such as personality, motivation, and creativity and talents in various domains.

People's Beliefs about Giftedness

People's beliefs about giftedness can be categorised through reference to one of three prevailing schools of thought: nature versus nurture; domain-general versus domain-specific; and intellectual versus non-cognitive.

Nature versus nurture. At present, 'The prevailing consensus is that giftedness is an interaction between innate characteristics and the environment.' (Kerr, 2009) Yet in the Chinese literature, there is a practice of 'deemphasising giftedness as an innate ability' (Wu, 2005). Based on a Confucian cultural outlook, the Chinese put a high value on learning and factors in a child's education such as self-effort, family, and environmental support, and this belief system influences society in two main ways.

First, instead of accepting that children are born with different personal attributes, Chinese people tend to believe that children can be nurtured to be 'gifted' regardless of whether they have an innate ability. One main reason is that giftedness is regarded as synonymous with academic talent, and in this view, high academic achievement is possible for anyone who will put in extra learning time, much effort, and deliberate practice. Thus, children are nurtured to be 'gifted' in the belief that even children with inferior innate intellectual abilities can achieve the

same skills and expertise as gifted individuals—or, as the saying goes, ‘Diligence can supplement inadequacy (勤能补拙).’ For example, being accepted by one of the top universities in China such as Qinghua and Peking University is understood by the general public as a sign of being ‘gifted.’ Some secondary schools even serve as ‘*Gaokao* factories’ with military-style regulations, aimed at nurturing top academic performers. From this perspective, nurturing giftedness is a way of developing talent, especially in academic areas.

Second, even for child prodigies, learning and environment play a crucial role in leading to excellence and success. As the famous story ‘Pity Zhong Yong,’ written by Wang Anshi (1021–1086), describes, a child genius who was good at composing poems gradually became a ‘normal child’ due to inadequate learning and education. The attitude regarding gifted children is usually a blend of high expectations and attentive watchfulness—equally for success and for failure.

Overall, with the profound cultural influence of Confucian teachings as a background, regardless of children’s natural gifts, the nurturing processes of learning and environment are of key importance. And considering that talent development ‘seems to reflect hard work over time, whereas giftedness suggests unearned largesse’ (Kerr, 2009), historically, the Chinese understanding of giftedness resembles the way of talent development.

Domain general versus domain specific. In the Chinese education and psychological literature, some conceptions of giftedness distinguish it from talent in terms of being domain general or domain specific. For some, giftedness is defined as the overall ability of the person, whereas talent refers to special abilities in certain domains, whether artistic/creative, athletic, or intellectual/academic. The belief underlying this concept of giftedness is that it acts as a foundation, a fundamental ability that has the potential to lead to excellence and achievement in

numerous areas. Therefore, gifted individuals are usually pictured as ‘well-rounded’ people who can achieve excellence in various domains. The role model of this kind of gifted individual is Leonardo da Vinci, who exhibited great creativity and innovations in painting, architecture, medicine, technology, and more. Talent, by contrast, is seen as involving personal aptitude in a specific domain that can be developed by time, practice, effort, and experience. Compared with (domain-general) gifted individuals, a talented individual is expected to make great achievements in specific domains, which fit into established and conventional categories of artistic talents, scientific talents, political talents, and so on.

Chinese general beliefs about which domains represent the recognised areas in which individuals can attain success and excellence reveal cultural differences compared with Western countries. Although there are only a few empirical studies relating directly to Chinese conceptions of gifted individuals, we can see some of these differences from cross-cultural studies about implicit theories of creativity. For instance, several studies exploring Chinese perceptions of the most creative individuals showed that Chinese students tend to ascribe high creativity to achievers in politics and science, but rarely to artists and musicians, whereas these domains are named frequently by Western students from Germany and the United States, among others. (Rudowicz & Yue, 2000; Yue, Bender, & Cheung, 2011). These data indicate that in Chinese culture, high achievement is linked to attributes of ‘meritorious salience,’ as compared with the value placed on ‘aesthetic salience’ in Western cultures. Moreover, in Chinese culture, gifted individuals are mostly recognised in domains that related to high social status, reputation, and prestige.

Intellectual versus non-cognitive. In addition to widely recognised intellectual factors such as high IQ, working memory, and fast learning ability, some Chinese scholars also include

non-cognitive factors in the definition of gifted individual, such as personality, motivation, and domain interest (Shi, 2000). In this view, for example, when children show a strong interest in a certain domain, theoretically they could be categorised as gifted, regardless of their innate intellectual ability as measured by their IQ. Non-cognitive factors are deemed as essential for the potential of giftedness, because ‘one’s intellectual potential may be directed and controlled by one’s personality traits, consciously, unconsciously or both’ (Zha, 1997). However, though Chinese psychologists theoretically understand non-cognitive factors as components of giftedness, the identification of giftedness is still largely defined by intellectual performance. Moreover, non-cognitive factors of giftedness remain inadequately researched.

Gifted Education in China

During decades of development of gifted education in China, two main schools of thought have guided discussion about who should receive services for the gifted and talented individuals. One position stresses the importance of *nature*, acknowledging that gifted and talented students are different from others and that they are a group with special educational needs. The aligned approach is to offer special provision for a select group of students that are identified as supernormal (or gifted) children. The commonly used name for this approach is 超常教育, ‘education for supernormal children.’ The other school of thought stresses *nurture*, and supports the idea that every child has the potential to develop certain talents. The aligned approach here is to offer education that allows all students to develop their potential talent(s). The commonly used name for this approach is 资优教育, meaning ‘education for students with superior talent performance.’

In terms of their educational objectives, ‘education for supernormal children’ targets mostly pre-school, primary, and secondary education, whereas ‘education for students with

superior talent performance' targets students across all education levels, from pre-school to higher education.

Difficult Issues and Prospects

Gifted students' rights. Gifted students have the legal right to access the special education that could meet their needs. Though gifted education in China has been developed for more than three decades, there is still no formal document or law to articulate the legal rights for gifted students. Since the first Special Class for the Gifted Young (SCGY) was established in 1978, the main purpose of the nurturing of gifted students has been 'serving a national interest of providing a pipeline of talent' (Dai, 2016), rather than serving gifted students' special needs in an educational context. With the lack of legislation or regulation of gifted students' rights, special programs for gifted students are regarded more as a *privilege* than as a *right*, and furthermore, these programs are available to only a limited number of students, who usually live in economically developed areas such as Beijing, Tianjin, and Shanghai; therefore, they are not open to every possible subgroup of students who deserve the benefit of gifted education programs.

In addition, there is no clear national and regional policy to support the provision of gifted education in China, and so the associated institutions, programs, and academic research can hardly be developed, due to insufficient priorities and resources. In China at present there is only one research institute for gifted education with official backing, and that is the Research Center for Supernormal Children, Institute of Psychology, Chinese Academy of Science, located in Beijing. In all, fewer than ten schools offer gifted education programs targeting supernormal children. With the large population base and potential talent pool of China, the organisations, programs, and research currently devoted to gifted children are far from sufficient.

Therefore, there is an urgent need in China to adopt supportive policies regarding the rights of gifted students on a national and regional basis, and to offer special educational programs and services. Well-articulated policies promoting the legitimacy of gifted students' rights are essential for the development of a healthy and sustainable system of gifted education in way. An example of an effort in this direction is the 1993 report prepared for the Office of Educational Research and published by the U.S. Government Printing Office called 'National Excellence: A Case for Developing America's Talent.'

Identification/selection. Based on psychological research and education practice developed over decades, Chinese researchers and educators have adopted procedures and methods to identify and select gifted students. Two key features have emerged: first, academic performance is of dominant importance; and second, multiple methods are used for selecting well-rounded students. Due to the primary goal of secondary education, which aims at nurturing more students being accepted by the top-tier university in China and abroad, academic performance for gifted students is a key component, compared to creative and performative talents such as art, music, sports, and so on. In addition to the emphasis on academic achievement, schools and other institutions tend to use a multifaceted way to identify gifted individuals, which includes intellectual ability, personality, motivation, creativity, and other attributes. For example, all the secondary schools in China targeting supernormal children use 'a combination of intelligence tests, academic achievement, interviews, and behavior observations' (Dai, 2016) for admitting students to the special program. As there is a shortage of institutional mechanisms for identifying gifted students, as well as limited chances to join the special programs, the identification procedure has become highly selective and tends to select the most-well-rounded students, those who are best of the best in a diverse set of domains, across all

academic subjects, in physical fitness, as well as moral characteristics. Although this approach is based on the advanced and comprehensive understanding of ‘who are gifted students,’ the highly selective identification process certainly leaves out certain kinds of gifted students, including gifted students with learning or physical disabilities and students with other types of disadvantages. Overall, there is a need for more institutions and methods to identify and served gifted students of all kinds.

Curriculum

The curriculum for gifted students follows usually the approach of ‘acceleration,’ which means ‘children are exposed to new content at an earlier age than other children or when they cover the same content in less time’ (Townsend, 1996). In this approach, supernormal children usually need a shorter time to finish their studies and they sit for the college entrance exam at a younger age. A classic education plan for supernormal children is ‘spending 4 years to finish primary school, spending 4 years to finish middle school, attend college at the age of 14 or 15 years, 4 years for bachelor study, 2 years for master study, two years for Ph.D. study’ (Jiao, 2008). By contrast, the regular education system consists of five or six years of primary education, three to four years of junior secondary education, and three years of senior secondary education (KPMG, 2010). Therefore, not only do supernormal children finish their studies before higher education four to five years earlier than the normal children, they also are required to finish their higher education as soon as possible.

The acceleration approach is the one used most often in China. To some extent, this approach meets the nation’s need for talents in the short term, especially in science and technology. However, many researchers and educators have concerns about this approach, citing several drawbacks, and two in particular: First, due to the ‘big fish in a little pond’ effect, gifted

students may feel extreme pressure from their peers and experience social and emotional problems as a consequence. Second, the educational purposes for gifted students in the acceleration approach are limited to high academic performance and thus do not offer a multifaceted approach. Although these issues are widely mentioned and are matters of concern, the real effects of acceleration programs remain to be examined in the light of educational and psychological research. Gifted students may also benefit from basking in the reflected glory effect, which would counteract the negative experiences.

Besides normal acceleration programs aiming at high performance on the college entrance exam (*Gaokao*), only a few educational programs are designed to offer 'enrichment,' which means 'learning activities providing depth and breadth to regular teaching according to the child's abilities and needs' (Townsend, 1996). One example is the High School Affiliated to Renmin University of China, which does not shorten (accelerate) the school year of gifted students but instead offers additional learning materials and activities (enrichment) for supernormal children. However, more enrichment programs are needed in China, especially in rural and underdeveloped regions. A combination of the enrichment and acceleration approaches, when designed to suit the schools' planning and program implementation, would benefit gifted students and develop their potential.

Main Research Findings about Supernormal Children

The research field in China regarding gifted education consists of two approaches. One is the psychological approach, which supports the nature and development of supernormal children; the other is the educational approach, which concerns the special needs of gifted students and serves them with appropriate education programs and services. I will introduce the most

important research findings of the past ten years (between 2006 and 2016) on the topic of supernormal children from both psychological and educational perspectives.

Psychological approach. Gong and Lei (2015) reviewed the research on supernormal children from 2004 to 2014 in five key psychology journals in China. In general, the total number of publications about supernormal children is very limited. Between 2004 and 2010, there were only 14 articles related to empirical psychological studies of supernormal children. Between 2010 and 2014, the number of articles decreased non-proportionally to four. They found that the content of the articles could be identified according to three categories: 1.) Studies of *cognition* (including cognitive skills, thinking skills, and self-concept) accounted for 77.8% of the total articles; 2.) three articles focused on *personality*, including motivation and the influence of cognitive factors on personality; and 3.) one article discussed the mental health of gifted children. Regarding the research subjects, most articles targeting a broad concept of supernormal children (12 out of 18); whereas six articles targeted special kinds of supernormal children, including children with learning disabilities, prodigies at the Chinese board game Go and in mathematics, and migrant supernormal children.

Between 2006 and 2016, the majority of the empirical psychological studies conducted in China explored the differences between supernormal and normal children in terms of cognition and other aspects.

The overall findings showed that supernormal children show higher cognitive abilities. For example, Xu (2006) conducted a study on the counting strategies of supernormal children and normal children between the ages of two and five. Gifted children showed an earlier grasp of the counting principle (one-to-one) and also used better counting strategies than the normal children did. Li (2009) used the Chinese Wechsler Intelligence Scale for Children 4th Edition

(WISC-IV) to analyse the four index scores of supernormal children's performance. The study showed that gifted children's most ascendant abilities are abstract thinking and processing with visual information (i.e., Fluid Intelligence). A study by Zhang (2014) on the developmental differences between supernormal and normal children in problem-solving ability showed that supernormal children were significantly superior to normal children in the areas of cognition, metacognition, and efficiency.

However, as relates to factors such as childhood development and environment, supernormal children are not always superior to normal children. A longitudinal study by Zhang (2014) showed that supernormal and normal children followed different developmental patterns. Specifically, the development of the supernormal children accelerated between ages 11 and 12.5 and slowed down between 12.5 and 14; in contrast, normal children developed slowly between ages 11 and 12.5 and accelerated between the ages of 12.5 and 14. Moreover, differences between the groups in problem-solving ability gradually diminished as they grew older. This finding has important implications for educational aims to improve cultivation of supernormal children by making full use of their advantages during their early years.

In non-cognitive respects, the key researches focused on self-concept. Luo (2008) conducted a study on the differences in self-concept between supernormal and normal children. The research showed that normal children showed more positive development trends in self-concept than supernormal children of the same age. This study showed the latent problems of gifted children when they are in a class environment with highly competitive peers and feel pressure to succeed in academic performance.

When considering environmental aspects such as classroom factors and parenting styles, several studies showed that supernormal children's self-concept results from the interaction

between themselves and others. Su (2010) showed that IQ has a positive relation with the academic self-concept, and that class type (whether the class consists only of supernormal students or mostly normal students) had a significant effect on the self-concept of gifted high school students. Specifically, equal-level social interactions (with students of a similar level intelligence and academic performance) were most beneficial for the development of gifted students' self-concept. In a study on the effect of parenting style on urban or migrant gifted children's self-concept, Cheng (2010) showed the positive influence of emotional warmth and understanding on self-concept, in both academic and non-academic contexts.

Educational approaches. Studies and articles related to the educational approach describe and evaluate the educational programs supernormal children receive. In general, there is a lack of empirical research or program evaluation studies about the practice of gifted education in China. Most of the articles published in the educational area are introductory or position papers. For example, Liu (2013) introduced the education program for supernormal children in the High School Affiliated to Renmin University of China. She traced the history and reviewed the model of gifted education in this school, including the identification and selection of gifted students, the system of schooling and curriculum for these students, teacher team building efforts, and the achievements acquired by the students. Similarly, Wang (2013) introduced the gifted education program at Beijing No. 8 High School, including data on the educational background, identification, curriculum, and achievements of the students. These papers introduced educational practices as the products of experience. Dai (2015) conducted the only empirical study, which analysed the outcome of the Special Class for the Gifted Young (SCGY). The article described the early entrance program in mathematics and science in China, which had been implemented for 34 years, and included interviews with graduates of SCGY. This research

serves as an effective response to the influence of the education programs on gifted students—in the form of support—and also points out existing problems that need to be solved.

In summary, the total number of empirical studies regarding supernormal children and gifted education is still very limited, compared with other Asian countries such as Singapore, South Korea, and India, let alone some Western countries with advanced gifted education such as the United States and other countries and regions. Moreover, most studies pursue the psychological approach, so there is a shortage of illustrations in educational practice to articulate the effects of programs for fostering gifted and talented individuals. It is argued that Asian countries tend to adopt Western countries' theories and practice, especially in the case of China. It is easier to replicate the result of psychological theories and make comparison studies than to observe and study differences in practice. However, it is most important for Chinese psychologists to identify and address practical problems that emerge typically in China, and these questions cannot be approached through Western theories.

All in all, the proposed next steps in research would be 1.) Educational practitioners and experts need to share their experiences and method with their peers in other cities and regions in China, as well as to present their findings to an international audience. 2.) Psychologists should focus more attention on the problems in gifted education in China and support gifted education from a psychological research perspective.

China's Contribution to Gifted Education

Even without clear policy support and inadequate capital devoted to gifted education in China, we can point to identifiable features and notable developments in the last three decades.

Theoretical contribution: a mixture of 'nature' and 'nurture.' Deeply rooted in Confucian tradition, Chinese cultural traditions emphasise the role of effort and environmental

influence in success and high achievement. In its entire history of formal education, the Chinese system shows a marked emphasis on qualities which contribute to the development of all children, such as 'great effort, hard work, perseverance, or good will' (Wu, 2005), rather than on the special gifts of some students. And education in China targeting supernormal children shows the same focus on 'nurture' that is a feature of mainstream education. For example, Chinese psychologists and educators tend to regard giftedness more like a 'dynamic and developing' process rather than 'a static and permanent quality' (Yun, 1993). Moreover, the selection of gifted students is not based only on their intellectual ability but also includes broad components relating to personality, motivation, and work ethic which together contribute to the complete picture of talent.

To some extent, this tendency to treasure *nurture* converts the Western tradition of treasuring nature over nurture. For example, British primary schools, in an effort to improve their very poor international rankings in mathematics by capitalising on Chinese concepts of hard work and practice, recently implemented a program to teach mathematics using Chinese methods and textbooks (BBC, 2015). As stated by Wu (2005), 'This subtle convergence of the two great and ancient educational traditions may be attributed to the improvement of scientific research and understanding of human development.'

Moreover, gifted education in China is beginning to be more accepting of the 'nature' approach and of the idea that supernormal children differ innately from other children. The current gifted education in China features a mixture of 'nature' and 'nurture.' Theories and research on talent have influenced educational practices by moving from a focus on 'nature' towards a mixture of 'nature' and 'nurture,' and this development can also be attributed to a convergence of Eastern and Western educational traditions (Wu, 2005). As compared with the

Western view of treasuring nature over nurture, the Chinese approach offers a force that converts the combined energies of nurture and nature. There are always advantages and disadvantages to every approach; however, Chinese students and teachers can share their approaches, achievements, and experiences and learn from each other.

Practical contribution: The role of talented individuals. The original functional intention in the 1970s for China's gifted education and talent development was to serve a national interest in advancing science, technology, and the economy, and the achievements of most graduates of the gifted programs fulfilled this purpose. In general, the talent development programs regarding general academic performance gave rise to outstanding performances by Chinese students on several international ability assessments such as PISA and TIMSS. Moreover, according to a study by Dai (2015) about the evaluation of the Special Class for the Gifted Young (SCGY), which was in place for 34 years, many graduates gained remarkable achievements in academic fields as well as in technical and professional fields, both in China and abroad. Overall, gifted education in China has played a leading role in nurturing gifted and talented students in science, technology, engineering, and mathematics, known as the STEM fields.

Conclusion

Gifted and talented individuals who benefit from targeted education programs are playing an increasingly important role at home and abroad, in many different areas. As the high performers and achievers of the society, they make a large contribution to the human capital of the nation. Though the scale of gifted education in China is small, in respect to the huge population base as well as compared to other countries, yet Chinese practices offer theoretical and practical contributions, both in the past and in the present day. By exploring unresolved issues and sharing

positive experiences in the field of gifted education, the aim of this study is to assist educators and researchers in China and other countries to learn from each other's strong points and to overcome the weaknesses. With more research and larger-scale study of education practices, it can be expected that these collaborative efforts will lead to more influence and beneficial implications for gifted education in China and the world at large.

ACCEPTED MANUSCRIPT

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