

A Historic Perspective on Hanzi Stroke Order: its Development, Evolution and Importance for Contemporary Research

Weiwei Zhang

College of Literature, Fuyang Normal University, Anhui, 236037, China
200607048@fynu.edu.cn

Abstract: The order or strokes for writing Chinese Hanzi (汉字) characters has a long historical existence. However, research efforts devoted to studying stroke order are limited, leaving limited results and published books on this topic. Available previous research relevant to stroke order only discussed it as a subsidiary of the writing standard for Hanzi characters or only focused on the detailed rules of stroke order. There was little prior research focusing on the origin, development and evolution, as well as the historical and cultural basis of stroke order. Similarly, it is poorly known as to how evolution of Hanzi characters drives the changes of stroke order. Here, I conducted a longitudinal summarization of the development and evolution of stroke order from a historic perspective, since the maturation period of Regular Script for Hanzi characters. I provided historical and cultural underpinnings that influence the development and evolution of stroke orders, offering insights into the research focuses of historical eminent scholars on relevant topics. These results have provided an important historic overview of stroke order. I further discussed the contemporary significance of conducting in-depth and systematic research of Hanzi stroke order for a better understanding of Hanzi characters in forging and influencing Chinese literature and culture.

Keywords: Hanzi Stroke Order; Historical Perspective; Development Summary; Research Significance

1. INTRODUCTION

An important foundation for the studies of Hanzi stroke order is to clarify its definition. What does it really represent? A few representative viewpoints in this field can provide this clarification. Yizhan Wen (文以战) considered that: “for every Hanzi character we write, there is a standard way, rather than a random order, to put down every stroke, and this standard of order should be defined as stroke order” (Gao, 1999). The view by Yonghe Fu (傅永和) is that stroke order of Hanzi is simply the way how every stroke of a complex character should be written down (Xu, 1995). Fengqi Xu (许凤奇): “(stroke order is) the appropriate sequence of putting down every stroke for completing a Hanzi character” (Zhao, 2005).

A relatively more specific and fuller definition was made by Jingchang Fei (费锦昌), which contains two aspects (Zhao & Baldauf, 2008). The first aspect of stroke order describes the direction of writing for every type of stroke, for example, a horizontal stroke is routinely completed rightwards, while vertical stroke is routinely written downwards. The second aspect describes the order of putting down every stroke for a character with multiple strokes (which is the case for most Hanzi characters). For example, for the character “三” (meaning “three”), the routine is to first put down the horizontal stroke on top, then the one in the middle, and the bottom one at last. These two aspects together constitute the definition of stroke order of Hanzi [4]. The opinion by Gong Qi (启功) is: “stroke order denotes how one writes every stroke in a specific, non-random order for a Hanzi character”(Zhao & Richard Jr, 2007). These viewpoints on what stroke order is, regardless of being brief to extensive or the differences in wording, express a similar core opinion. In my viewpoint here, I define stroke order as the standard sequence for writing every stroke to complete a Hanzi character. My focus here is on the sequential order of every stroke for writing a character.

2. THE DEVELOPMENTAL HISTORY OF STROKE ORDER

In contemporary China, the first step to learn how to write Hanzi characters is often to begin with learning strokes. In terms of stroke order, the routine is to write horizontal strokes first, followed by vertical strokes; commonly one writes strokes from left towards right, and one starts from outer radicals of a character and then finishes the strokes of the internal radicals. There are specific formulas organized like short poems to help beginners remember the appropriate order of writing strokes. However, in ancient times, it is more common that people learn to write Hanzi character based on “realization” (悟), which aims to follow the natural process of learning, in a manner fits the “rule of nature” (i.e., 道), rather than forcing beginners to follow a specific method (i.e., 法).

As a result of this common belief, a famous quote in ancient times goes: “it is more appreciated that an outstanding writer of Hanzi character learn to excel at it through a deep comprehension of the meaning of each character, rather than by simply following a well-defined specific method (Bakris & Weber, 2024). Because of this, the skills of writing Hanzi were

often passed down inside a family or scholar group through personal interactions and shared comprehension of characters, which were rarely written into detailed methods. These evaluation criteria result in the fact that most Chinese people do not have a clear concept of stroke order in the period prior to Tang (618-906 A.D.) dynasty. Indeed, in these early times in Chinese history, there was not any specific literature devoted to dissecting the structures and orders of strokes. However, in writing practices, there had been records in this period of history that specific Hanzi characters should have their strokes written in well-accepted sequential orders(Chou et al., 2007).

2.1. Implications of Stroke Orders Before or During the Tang and Song Dynasties

As early as the East Han dynasty (25-220 A.D.), Yong Cai (蔡邕) has written a Hanzi calligraphy book named “Nine Momentums of Writing” (九势), in which his idea of “momentum” of writing is essentially the directional force of moving ink brush in calligraphy. While he did not specifically describe stroke order, such a “momentum” could be interpreted as the order of writing. Xi-Zhi Wang (王羲之) is one of the most regarded calligraphers in Chinese history, who lived in the East Jin dynasty (317-420 A.D.). He has once commented in his eminent book “About Character Writing” (书论) that: “one should write a character by first establishing the overall structure, and then put on decorations” (Han, 2012). This sentence denotes that a character often has specific strokes that are important to be written down first (i.e., the structure), prior to additional strokes that are less important.

While this comment mainly pertains to calligraphy, it implies that the order of strokes is critical to complete a character properly. In the ninth chapter of another eminent book by him “Twelve Chapters Commentary on Calligraphy” (笔势论十二章), he also commented on stroke order and indicated that stroke order has an important foundational role in calligraphy (Kwong, 2001). There are several interesting stories about stroke order recorded in The History of North Qi Dynasty (北齐书, one of the twenty-four best known history books of Chinese history). There is one chapter describing the life of Di-Gan She (庾狄干 · ? — 553 B.C.), an eminent official in this dynasty, who lacked skills in writing Hanzi

characters. His name “Gan” (干) contains a vertical stroke that was supposed to be written downwards, but Mr. She did it unconventionally - from the bottom to the top.

This feature was described by his peers as “awl piecing” to mock the similarity between writing this stroke and using an awl to piece objects (note: Hanzi was written by ink brush and therefore this order reversal by Mr. She makes the top of the vertical stroke appear narrower than the bottom, thus resembling awl). In another case in this history book, a general Zhou Wang (王周) was also mentioned because of his unconventional use of stroke order in writing his own name, i.e., he often wrote name “Zhou” (周) by first completing the “吉”, the internal part of the character. This was opposed to the common stroke order at that time in writing this character, which completes the outer part first. Regardless of the details of the stroke orders *per se*, the fact that these two examples were recorded in The History of North Qi Dynasty is strong evidence that unconventional uses of stroke order were peculiar and memorable behaviors. This is because that this history book is highly official and was extremely selective in terms of the stories it will include. The two stories showed that people in this period of time had a well-agreed way of writing vertical stroke downwards, rather than the other way around; and they wrote a character with outer-internal structure by starting with the outer part. Despite these two persons being eminent official and general respectively at that time, who must have many other important achievements, their unconventional uses of stroke orders become their remarkable features to be recorded in official history, resulting in them being referred to as “incompetent in writing” by scholars in the subsequent history. These recorded stories in South-North period of China (420-589 B.C.), for which North Qi dynasty belongs to, demonstrated that appropriate stroke orders already existed in these early days in history. Huai-Guan Zhang (张怀瓘), a famous calligraphy theorist active in the Tang dynasty, had written an impactful calligraphy book “Ten Prominent Methods for Character Writing Characters” (论用笔十法). He stated: “if one aims to complete a character well, every single stroke should be put in the proper order and position” (Yang, 2017). This is an important comment he made about stroke order. A common metaphor in nowadays Chinese literally goes : “one has not written the left-falling of the character eight (八)”, meaning that a specific job has not even started or in an

extremely early stage of its entire progress. This metaphor originated from the Zen (or Chan) School of Buddhism in the Song dynasty (960-1,279 A.D.), the record of which can be found in the twenty-ninth volume of “Xu Deng Lu (续灯录)”. This example clearly demonstrated that in Song dynasty, people have already established a common practice that left-falling stroke should be written in prior to the right-falling in a character.

2.2. Development of Stroke Orders After Song Dynasty

More definitive and systematic description of stroke orders started to be clearly recorded from the Yuan Dynasty (1,271-1,368 B.C.). Many literatures since then have included detailed instructions on the orders of strokes in complex characters. For example, a well-known calligraphy book in Yuan Dynasty: “Three Methods about Calligraphy” (书法三昧, for which the author’s name cannot be identified) has meticulously provided detailed instructions on how to order the strokes for twenty-seven characters in Regular Script style (**Table 1**). Ying-Zuo Mei (梅膺祚) from the Ming dynasty (1,368 – 1,644, B.C.) has written a book named “Collection of Characters (Zihui, 字汇)”, in which he devoted a chapter “proper writing” to describe the stroke orders of seventy-eight well-used characters in Regular Script style (**Table 1**). Similarly, another influential scholar from the Ming Dynasty, Zi-Cong Pan (潘之淙) has written a book “Calligraphy Aesthetics”(书法离钩), in which he emphasized the importance of proper stroke orders by demonstrating those for twenty-five example characters.

In two reputable calligraphy books by He Jiang (蒋和) from the Qing Dynasty (1,636-1,912 B.C.), which are “Secrets of Eminent Calligraphy (习字秘诀)” and “Authentic Calligraphy (书法正宗)”, respectively, the author illustrated appropriate stroke orders of 81 and 80 key characters, respectively. Other prominent examples in subsequent historical periods include Biao Tang (唐彪)’s book:” Children Calligraphy Guide for Parents and Teachers (父师善诱法)” in Qing dynasty. In the past century, there were several other famous calligraphy instruction books by scholars during the time of Republic of China (1,911-1,949 B.C.) or more lately (Table 1).

Table 1: Calligraphy Literature that Instructed in Details How to Properly Use Stroke Orders in Periods Later than Song Dynasty

Dynasty	Author	Book	Characters included
Yuan	Unidentifiable	Three Methods about Calligraphy (书法三昧)	27
Ming	Ying-Zuo Mei (梅膺祚)	Collection of Characters (字汇)	78
Ming	Zi-Cong Pan (潘之淙)	Calligraphy Aesthetics (书法离钩)	25
Qing	He Jiang (蒋和)	Secrets of Eminent Calligraphy (习字秘诀)	81
Qing	He Jiang (蒋和)	Authentic Calligraphy (书法正宗)	80
Qing	Biao Tang (唐彪)	Children Calligraphy Guide for Parents and Teachers (父师善诱法)	47
Republic of China	Yang-Feng Liu (刘养锋)	The Entry Level Instructions on Calligraphy (习字入门)	51
Republic of China	Fei-Mu Han & Yun-Sheng Gao (韩非木, 高雲滕)	Characters and Calligraphy (字学及书法)	48
Republic of China	Zong-Yuan Zhu (诸宗元)	Principles of Chinese Calligraphy (中国书学浅说)	15

Careful examination of these calligraphy books showed that they have all provided definitive orders to write the characters. However, it is interesting that they only instructed the orders for radicals, but rarely discussed orders for each single stroke. In terms of the functions of these books, they were mainly prepared for children in early stages of school to learn the basic principles of writing characters, providing convenience and standard for practical uses. This function is similar to that of the modern dictionaries of stroke orders for Hanzi characters. Neither these early books nor current stroke order dictionaries introduced the origin or history of stroke orders. They also do not conduct in-depth analysis of stroke orders.

2.3. The Stroke Order in Modern China: Official Standard and Practical Guides

In a consistent manner, modern scholarly research of stroke orders follows the same goal of these previous books: to provide practical guide to write characters. In 1965, the Ministry of Culture of China together with Chinese Character Reformation Committee have published an official National Stroke Standard for using Hanzi characters in print and for publication uses, which included 6,196 characters in total. Yong-He Fu (傅永和), previously the vice Director of the National Language Committee of China and an recipient of Outstanding National Contribution Award to China, is one of the main scholars who played key roles in establishing and standardizing stroke orders of modern characters. He commented that this book is the first official book of our country (China) that has determined stroke orders of Hanzi characters. However, he acknowledged that despite that the National Stroke Standard was highly comprehensive and has continued to include more characters, the basis for the committee to determine the stroke orders was not reported, and the standard did not clarify the origin of stroke orders. Therefore, it is likely that due to time constrain in making the first official stroke standard for China in 1965, systematic work has not been done to identify the origin of stroke orders. Indeed, reviewing of literature and research progress in this area found very limited study of stroke orders in depth and in details. Rarely can one identify research that devoted to study the origin, historical development and evolution of stroke orders. Recent work often focused on policy making for stroke order standards, how to enforce these standards, and how to guide people to follow the standards, but almost never examined the history of stroke orders used by ancient Chinese people. For example, Yong-He Fu (傅永和) has published a paper in 1992 (Zhang, 2023) to provide many examples with meticulous explanation of eleven common principles of stroke orders, e.g., that a horizontal stroke should be written in prior to a vertical stroke, or left-falling should go in prior to right-falling, or a character should be written from the left to the right, etc.. He also provided examples of some unusual stroke orders or exceptions that may not fall into these eleven principles. Despite so, this excellent work still did not ask the fundamental question that where did all these stroke orders come from? Why should a specific stroke be written in prior to another, but not the other way around? Geng-Sheng Gao (高更生) (Zhang, 2023)] raised an important problem about the chaotic uses of stroke orders in recent years in writing Hanzi characters. He provided many excellent

examples of such chaos, and categorized the misuses, with a goal to draw attention of the society to eliminate such chaos; indeed, he advocated that a universal standard for stroke orders should be enforced. While this work is important, it still dwells on practical standard of stroke order, or what way is correct or wrong to write a character. Similarly, Shu-Ren Ji (吉树仁) (Hou & Jiang, 2022) illustrated the confusion and misuses of stroke orders in modern China in the society or in school teaching. He analyzed the underlying reasons of such problems, but did not touch on the basis that generated the stroke order. In a paper by Ze-Sheng Yang (杨泽生) (Nadezhda, 2018), he provided a few new perspectives in thinking of the principles of stroke orders. He considered that the first-tier standards of stroke order include that one should write downward and rightward; whereas the second-tier standards include that one should write larger and longer strokes first before smaller and shorter ones. While these points by Yang are novel, they essentially are still discussing standards, but not the cause or origin of such standards. Gui-Sheng Lin (林桂生) has focused on a single character “mother” (母) to discuss the stroke uses (Nadezhda & Storozhuk). Once again, this work aims to identify the correct way of writing. Many recent works in the similar area started by showing examples of characters, illustrating which stroke should go first or later. Almost none attempted to ask the in-depth question as to why one stroke should go first or later.

2.4. Studies that Scratched the Surface of Stroke Order Origin and Development.

There are a few recent studies that mentioned the origin, cause and development of stroke orders, although they did so mainly as discussions subsidiary to their other main goals. These studies still did not investigate the origin of stroke orders in depth, nor did they do so systematically. In a paper by Gong Qi a recent leader of Chinese calligraphy, he considered that stroke order is the well-accepted habit in writing Hanzi characters. He implied that pre-existing habit is the basis for stroke order, and this habit has been there since ancient times. In an important work, Xue-Feng Sun (Li, 2010) aimed to provide a novel direction to understand reasons that generated the stroke orders. He suggested that stroke orders developed in a dynamic manner in Hanzi character writing. He proposed that there was not a pre-existing standard of stroke order, nor was it due to any arbitrary personal choices. Rather, stroke order is determined by writing practices.

Specifically, stroke order is largely influenced by the common uses of right hand to write characters, and how to effectively connecting the strokes in completing a complex character, as well as the natural move of writing tools (ink brush or modern pen). The correct stroke orders should allow one to use writing tools with ease, to move smoothly with less abrupt turns and with smaller angles of such turns when necessary. The move of writing tools is in general going to a consistent direction, following a rhythm, which permits the pen-holding hand to move across a relatively short distance. This work by Sun illustrated the impact imposed by the way of writing, the natural connection between strokes and the move of writing hands/tools, providing a novel and inspiring perspective to contemplate the cause and origin of stroke orders. Some studies discussed the uses of different types of script and how stroke orders used in one type may influence the uses in others. Focusing on the stroke orders in writing semi-cursive or cursive script, Pan Xu's (Zhu, 2010) work has provided some useful discussions to study the influence of semi-cursive or cursive script on the formation of stroke order standard later used in regular script. Xue-Ren Wan (Cao et al., 2021) first elucidated the names of each stroke and principles of stroke orders, and then discussed the relationship between stroke orders used by regular script versus those in cursive script. He considered that stroke order is highly relevant to character writing in cursive script, and the shortest distance between two strokes likely determines that they should be written subsequently to the other. Geng-Sheng Gao (Kai, 2023) compared the differences of stroke orders used by the China Mainland and Taiwan region, including careful examination of how to start writing, to connect strokes or to finish characters. This paper emphasized on three main areas: the convenience of different stroke orders, the systematic uses of strokes, and the differences of stroke orders used in regular and cursive scripts. These three main areas served as the basis for him to judge which specific stroke order best serves high-quality character writing. It also briefly mentioned the deep basis that generated stroke orders. Zhong Yang has published a paper to elaborate the importance of stroke order, as well as the principles and the basis that made such orders. In the section about reasons determine the origin and development of stroke orders, the author mentioned four main ones: the habit of writing, the convenience of writing, the common way of reading, and calligraphy aesthetics. These reasons were also considered to be the inherent basis determines the stroke standard. While these studies started to scratch the surface of the origin and development of stroke orders, they are anecdotal and remain limited in scale and comprehensiveness. Therefore, in both ancient and modern

history, the studies of the origin of stroke orders are far from extensive, and are often subtle. Scholars from Taiwan China have some fruitful results in their studies of Hanzi stroke orders. The representative ones are work by Da-Wo Gu and Jing-Ying Huang. In Gu's two-section book analyses of regular script, the first section comprehensively reviewed the concepts of stroke order and its historical development from Tang dynasty's classic "The Eight Principles of Yong" until modern days, with an emphasis on introducing the nomenclature of strokes. The second section mainly illustrated various theories of stroke orders in and subsequent to the Qing dynasty. Examples include Biao Tang(唐彪)'s fifty characters' style described in "Children Calligraphy Guide for Parents and Teachers (父师善诱法)", Jing-Shu Ying (阴景曙)'s "Seven Principles in Using Ink Brush for Character Writing(七类运笔条例图)", Shun-Qi Chen (陈舜齐)'s "Guidance to Stroke Order (笔顺指导手册)", Yi-Tong Lin(林以通)'s "Research on Teaching Stroke Order(笔顺教学研究)", and ultimately the author summarized his own standard of stroke orders into ten principles that belong to four major categories, collectively known as "Stroke Order Standard in Regular Script (楷书笔顺通则)". However, there are extremely few examples included in this book to comprehensively illustrate the standard of stroke order, precluding its extended uses to most characters, and thus reduced the broad contribution of this work. Another scholar Jing-Ying Huang (黄静吟) has written a book with five chapters to summarize the stroke order origin of characters, including stroke order theories in various dynasties and in China Mainland or Taiwan. It also compared the stroke order differences in Mainland and Taiwan. This book emphasized the importance of stroke order, and suggested principles that should be followed to make government policies and to standardize stroke order uses. This book was published in Taiwan in 2005 but was not commonly seen in Mainland China. Although it has a broad title of "Hanzi Stroke Order Research", it actually only discussed stroke orders in Ming/Qing dynasties or in the Republic of China period. This book further compared several historical books on stroke orders, commenting on the advantages or disadvantages of each, which concluded that the earliest origin of stroke order only took place after Tang dynasty. This book considered that "Collection of Characters" (Zihui, 字汇) is the earliest

scholarly literature on stroke order in Chinese history. However, this may not be considered to have strong support by evidence. Additional efforts on comparing stroke order differences used in China Mainland and Taiwan were spent to provide rationale to identify a correct way of writing. This book did not focus on stroke orders in more recent historical times or how stroke orders were inherited or evolving in history. It also did not discuss the stroke orders used by different script styles.

2.5. Studies of Stroke Order Origin and Development Outside of China

In regions outside of China, there is extremely limited research work on stroke order of Hanzi characters. In Japan, because Kana, the phonetic writing system in Japanese, originated from Hanzi characters, understandably the stroke order of Kana has close relevance to and is largely consistent with that of Hanzi. Several eminent scholars in Japan were known for their work on stroke orders, such as Kenji Emori (江守賢治) and Junichi Yokoyama (横山淳一). Their books are mainly in the areas of Hanzi dictionary, guidance and copybooks. Consistent with the situation in China, little was conducted by them on the origin and basis of stroke order development. It is noteworthy that two other books by Japanese scholars have clearly illustrated the stroke orders of Hanzi characters. These are shown below in two figures, which were adopted from “Hanzi Character Dictionary” by Chikudo Takatsuka (高塚竹堂) and from “Kogoziten” (meaning National Ancient Language Dictionary,) by Akira Matsumura (松村明)、Akio Yamaguchi (山口明穂)、and Toshimasa Wada (和田利政), respectively. In Chikudo Takatsuka’s work on Hanzi characters, he provided numbers for every character to indicate the order of each stroke (right upper corner in Fig.1). Then he used examples of representative calligrapher’s masterpieces to clearly demonstrate the differences used by different calligraphers and in different script styles.

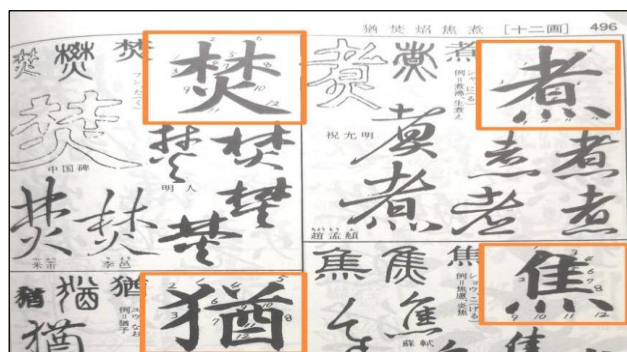


Figure 1: Stroke Order Illustration by Chikudo Takatsuka, Adopted from Reference

From “Kogoziten” by Matsumura, Yamaguchi and Wada, the authors provided a more detailed instructions on stroke order, showing the exact sequential order of putting every stroke to complete a character (red circled regions in Fig.2). This book provided an important resource, because it recorded Hanzi stroke order for every single character that this book included, serving as a pivotal Hanzi character dictionary in Japan.

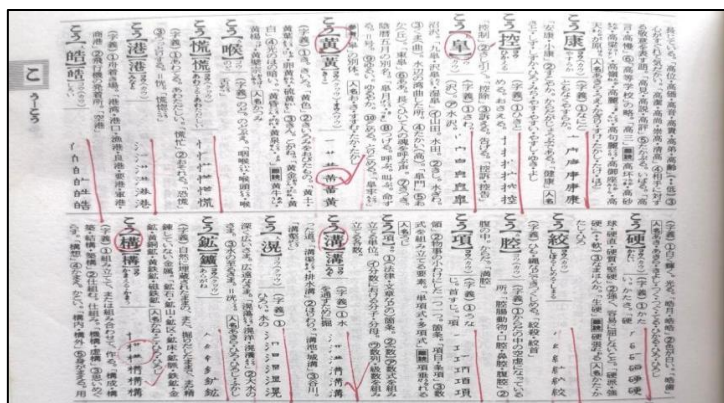


Figure 2: Stroke Order Illustration Adopted from Reference

As shown above, I have summarized the research of Hanzi stroke orders from a historical perspective that included research conducted both inside or outside of China. One finding is that the research so far was mostly confined to either description of stroke orders or the detailed standards and rules, aiming to provide guidance for optimal calligraphical convenience or aesthetics. There is rarely any work attempting to understand the origin of stroke orders, the reasoning for stroke order to appear in its current form rather than alternative forms, the influence of character evolution on writing and stroke order, or the impact from standardization of stroke order on Hanzi development. Even for the extremely rare cases that may have touched on these points, the relevant discussions scattered throughout the books or chapters that were actually written to focus on other topics. None of the previous literatures specifically focused on the origin, evolution, development and significance of stroke order. Therefore, this remains a minimally explored but highly significant area for current and future scholars to further study.

3. THE SIGNIFICANCE OF STUDYING HANZI STROKE ORDER

The systematic research of Hanzi stroke order will facilitate the progress in the entire field of Hanzi research. To some extent, Hanzi characters carry unique importance for Chinese history and culture that only if we can

deeply understand the historical development of Hanzi characters (including the rules and rationale of using proper radicals and strokes), then we can gain a more comprehensive, precise and in-depth understanding of China and Chinese civilization. Stroke order has existed since the early phases of Hanzi characters during the long history of their evolution, but such an order became more notable only when characters evolved to the stage of regular script. As time goes by, the landscapes of stroke orders continue to evolve due to various reasons, such as the need from calligraphy aesthetics, the habit of writing, or due to changes of script styles from cursive to regular; they can even be impacted by ancient script style such as the seal script or by the overall organization of every single stroke. The specific stroke order by which a character should be written not only has to be optimized to facilitate the ease of writing practice, but also it has to follow governmental needs and official standard, and even sometimes was influenced by personal preferences of eminent individuals. A comprehensive description of the landscapes of Hanzi stroke orders will allow us to conduct effective analyses and research of them by applying advanced concepts and methods from semiotics, standardization, calligraphy, psychology and aesthetics. These innovative researches will pave way for new discoveries of the rules and basis of Hanzi characters, advancing our comprehension and utilization of Hanzi writing standards, which in the meantime permits our correct judgement of the origin and causes underlying the appropriate stroke orders used both in history in modern days. In particular, despite progresses were made by recent scholars in studying stroke order of simplified Hanzi characters, much less has been done for those of ancient Hanzi characters, ranging from the landscapes of ancient stroke orders, causes of their formation and evolution, as well as how Hanzi character evolution may have influenced the way of writing and stroke orders. In this sense, my current research aims to fill these gaps, by summarizing the comprehensive landscapes of stroke orders, by explaining the standard of stroke order and its evolution, and by attempting to answer the “why” – the rationale of stroke order origin and causes of their changes. These efforts will benefit stroke order studies, facilitating the progress of the entire field of Hanzi research. The research of stroke order is not only important for proper standardization of Hanzi writing, but also important for appropriate organization of Hanzi characters in dictionary or digital databases, both of which have critical impact for appropriate character uses. On March 5, 2021, the prime minister of China, Ke-Qiang Li has commented in his annual government report that we should extend additional efforts to enforce the national

standardization of languages and characters. An important possibility is that appropriate stroke orders of all Hanzi characters should be established as a national database, which can offer a more comprehensive landscape of stroke orders and their development, can improve the analyses of stroke order rationale and formation, and can also help determine the official rule of stroke order. This database, if established, will not only provide important resource to interpret the development of every type of Hanzi stroke order, but also help individual citizen to better discern the correctness of stroke orders in daily uses, providing a reference for the stroke order used in our modern society. This is one of the most crucial significances of our research on Hanzi stroke order. Without a uniform standard for stroke order, many of our daily work will be adversely affected, including search of characters, literature, organization of character books, construction of character databases for digital uses, and the proper development of the print and publication industry. Therefore, stroke order normalization is critical for the nation-wide normalization of the languages and characters in China, and it fulfills the needs for character research, information processing, print and publication, dictionary codification as well as education and teaching of Hanzi. Textbooks for elementary and middle school education, if without proper stroke order instructions by nation-wide standards, will not only cause chaotic uses of stroke orders, leaving long term negative impact on student's future development, but also bring about confusion in the daily work of teachers. Therefore, the second crucial significance of Hanzi stroke order research is to correct the mistakes in stroke order uses in educational materials and reference books to ensure we left a properly instructed standard of Hanzi strokes for our children of the many generations to come.

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