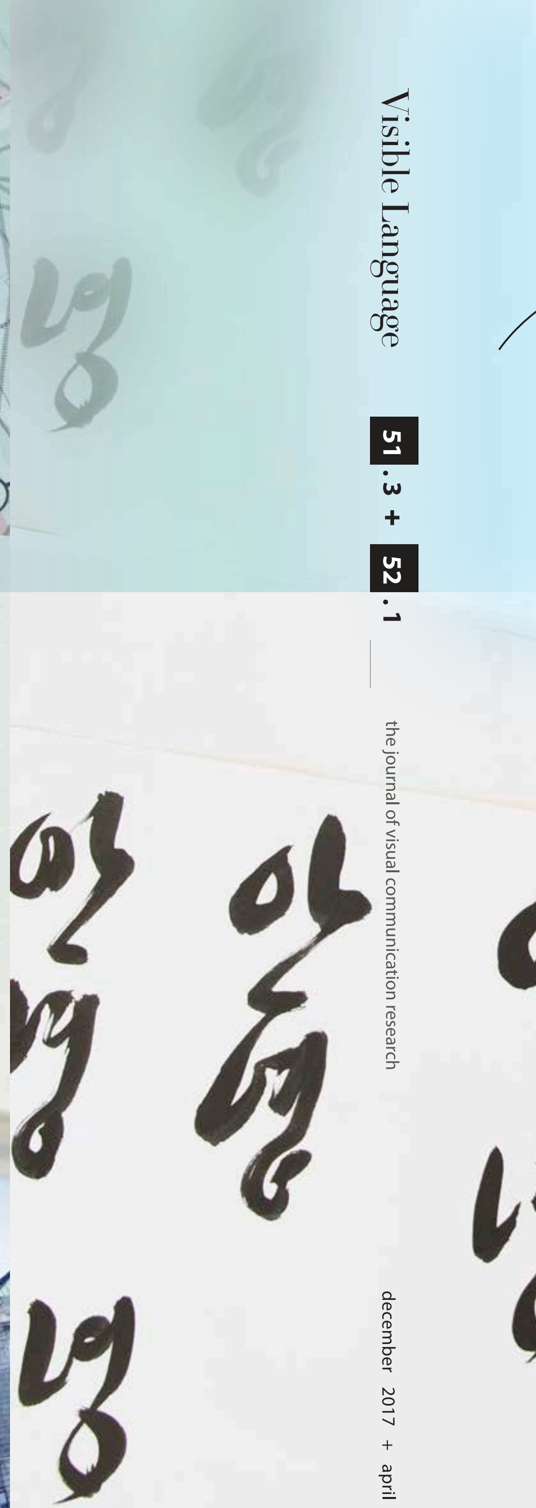

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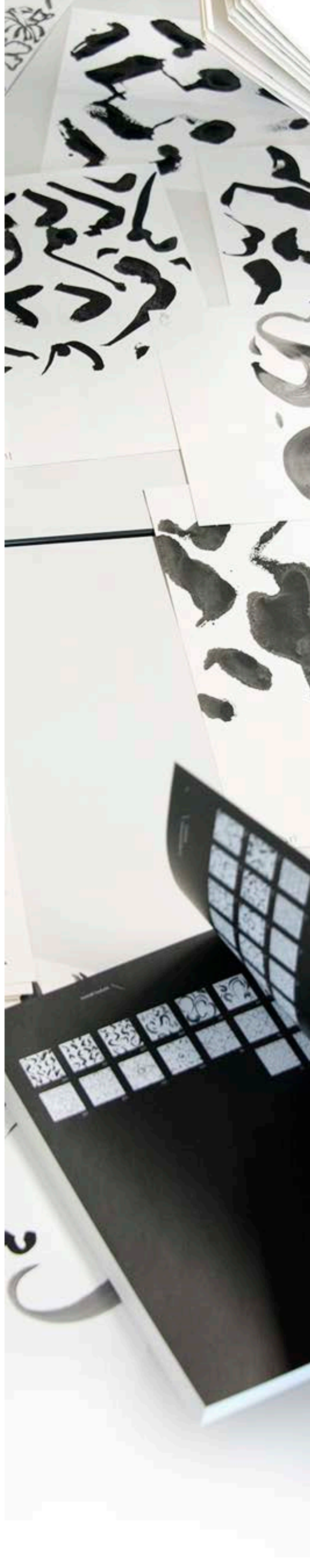

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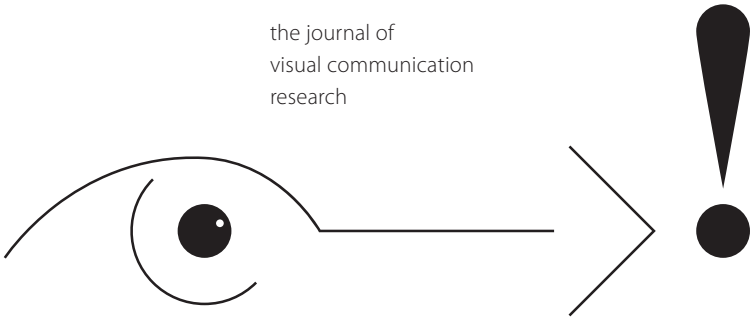

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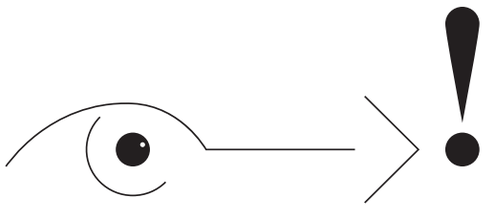


Introduction

The thematic issue of *Visible Language* on hand introduces 'practice-led iconic research' as a methodology developed over the past decade. 'Iconic Research,' an interdisciplinary field of scientific inquiry into all kinds of images, emerged from the description of the 'iconic turn' (Boehm 1994) and the "pictorial turn" (Mitchell 1995) in the mid-1990s within the scope of art history. In reference to the linguistic turn – a term coined in the 1960s in philosophy (Rorty 1967) – the lack of reflection on how images create meaning was pointed out in comparison to the analytical reflection on language starting in antiquity. This lack of a scientific analysis of images is especially significant considering the exponential increase of image production and dissemination caused by digitalization. Based on this argumentation, a number of interdisciplinary research clusters have been established in Europe (cf. page 14 of this issue). Philosophers, art historians, linguists, theoreticians, and historians of science, anthropologists, psychologists, and other disciplines from the humanities and the sciences became involved in the "alphabetization" of images, contributing to the question on how images generate meaning within the context of social exchange. The Swiss National Center of Competence in Iconic Research, *eikones*, was founded with the support of the Swiss National Science Foundation at the University of Basel in 2005. Considering the tradition of Swiss Graphic Design and Visual Communication, as well as the relevance these fields have in shaping the flood of images in daily life, the Visual Communication Institute, The Basel School of Design HGK FHNW was involved in the project ever since the preparatory phase.The large-scale project, involving around 30 PhD candidates and Post Docs, was initiated by Gottfried Boehm, who had coined the term 'Iconic Turn' in 1994.

Through their co-operation, it became gradually clear, that the visual communication designers involved in the project brought other aspects to the discourse about images through their understanding of the very process of image generation. With the ability to generate visual variations and the interpretation of a field of visual alternatives, the informed communication designer can, in this context, develop a unique approach complementing existing scientific methodologies.This finding led to the development of the methodology we call today 'practice-led iconic research' (Renner 2010). In short, this term means the systematic creation of visual variations as a methodology to describe a specific effect images cause in a beholder. The verbal description is based on the comparative analysis of visual alternatives created beforehand.

We can distinguish two major trajectories within the described methodology. The first trajectory is focusing on the understanding of the image generation processes and differentiates the description of how decisions in processes lead to an unpredictable visual result. The second trajectory is focusing on the understanding of a specific image category or a specific situation we encounter images in, e.g. diagrammatic images, documentary images, ornamental images, typography and image, etc.

The articles published in this issue describe and demonstrate what distinguishes the design of images for communication in a design office from the design of images to contribute to a scientific question related to iconic research. The articles present projects which were developed in the context provided through the co-operation of the Visual Communication Institute, The Basel School of Design HGK FHNW with eikones from 2005 till 2013 as well as research projects which were developed independently at the Visual Communication Institute since the turn of the Millennium until today.

The publication is structured into three parts.

Part 1 consists of two texts framing the methodology of practice-led iconic research applied to the concrete projects described in Parts 2 and 3. Michael Renner's article introduces the concept of practice led-iconic research. It provides a brief background on the relation between 'text and image.' The article introduces practice-led iconic research as an approach starting from the making of images and distinguishes the two trajectories described above. Both trajectories of iconic research aim to provide evidence perceived by the visual sense that augments the evidence provided by language. Arno Schubbach's contribution argues that the opposition of theory and practice is outdated and not adequate to conceive practice led-iconic research. That rather, it should be understood as a specific research practice based on the production of images. In order to characterize this kind of practice-led research, Schubbach compares it to a theory-driven approach to images and its use of visual examples as well as to the ways in which the natural sciences and artistic research deal with pictures.

Part 2 presents two inquiries into an image-generation process describing the process of taking a photographic picture and writing the Korean alphabet Hangeul. Jinsu Ahn's contribution investigates the design properties of Hangeul that appear in the process of practical writing. They are in contrast to the first publication of the script in 1446 by King Sejong the Great, which introduced letters based on basic geometric shapes. Basic writing experiments and the analysis of their outcome were performed to find answers to the questions of what formal properties Hangeul strokes have, and what role they play in connecting letters to form a fluid vertical line of text. Helga Aichmaier's article explores, based on her dissertation, how taking pictures within a research context enables the analysis and verbalization of strategies that are employed in photographic design processes. Despite a growing body of knowledge on image creation, little research has been conducted into photographic design processes. Viable contact sheets, sketches, proofs, or notes have not been available yet for proper research. Thus practice-led iconic research is adapted as a method for photography – possibilities of photographic practice and its strategies are explored as an instrument of research.

Part 3 presents four articles addressing the image category of the documentary image, the diagrammatic image, the interaction between two pictures, as well as the representation of objects for accessing those objects in an archive. Susanne Käser approaches the question of how a documentary image sequence has to be designed to convey a temporal development. Using the method of practice-led iconic research, aspects such as the scope of the sequence, temporal distances between the images, gradations between the difference and similarity of the image material, light situation, color palette, and image section are investigated and discussed with the help of practical examples. Paloma López's paper, is based on her PhD thesis, and starts with the observation that the visual process is formed by a broad variety of choices. The knowledge about and the practical experience of these options are at the very core of a particular manner of looking at images. A famous diagram that Charles Darwin drew, is used to show how a different understanding of images can allow us to uncover new insights on the intrinsic meaning of the diagram itself. Claire Reymond's article presents an explorative study using the method of practice-led iconic research to detect the premises that allow connection processes between two images. The analysis documents the relevance of different image features such as, for example, the analogy of the main vectors within the images or the width of the stroke in line drawings. A pilot study using eye-tracking, that was conducted as a subsequent step, strengthens the findings of the practical research. Michael Hübner's contribution presents a practice-led investigation on a diversity of visual strategies to represent objects, and their effects on the perception of the latter. How and what kind of knowledge can be gained from the representation of objects? Series of photographs as well as hand and digital drawings alternate with analytical observations, thus formulating diverse findings and opening up further perspectives not only applicable to the practice of object archives.

We hope that the articles in this issue demonstrate an approach of inquiry and research closely related to the practice of visual communication and representing a relevant contribution to the interdisciplinary field of iconic research. It is our understanding that the basic nature of the research approach presented in this issue is different to applied research, which is oriented towards its direct applicability. Besides, the basic nature of the practice-led methodology presented here is not comparable to a purely theoretical or historical approach. Therefore, we should like to describe the methodology of practice-led iconic research as basic practice-led research in the hope that the outcome of these research activities will help establish a community of communication designers and improve the recognition of design in the research community and in society in the long run.

We should like to thank all the authors contributing to this issue, and all the reviewers of the articles, who have contributed with their constructive criticism to the actual form of this issue. In particular however, we should like to thank the editor of *Visible Language*, Mike Zender, for his outstanding efforts as to the realization of this issue.

The team of guest editors,
Michael Renner, Claire Reymond, Arno Schubbach

Boehm G. (1994). Die Wiederkehr der Bilder, in: Boehm, G. (1994) (ed.). Was ist ein Bild?, München: Wilhelm Fink Verlag, pp. 11 – 38.

Mitchell, W.J.T. (1995). The Pictorial Turn, in: Mitchell, W.J.T. (1995) (ed.). Picture Theory, Chicago: The University of Chicago Press, pp. 11 – 34.

Renner, M. (2010). Practice-led Iconic Research, in: diid, disegno industriale industrial design, 41: pp. 76 – 82.

Rorty, R. ((1967) 1992). The Linguistic Turn; Essays on Linguistic Method. Chicago US: University of Chicago Press.

The Dynamism of Hangeul's Vertical Strokes and the Flow of Its Lines of Writing

Jinsu Ahn

The Korean script, Hangeul, did not have its starting point as a written script: it was created based on simple geometric design principles and was first introduced through a publication as printed type. Since this publication focused on educating people how to combine letters and read them, not on demonstrating the writing in practice, this first edition of Hangeul did not reveal how the writing instrument involves building a letter or making the vertical lines of writing.

The purpose of this study is to investigate the design properties of Hangeul that appear in the process of practical writing, which stands in contrast to the printed version. Simple writing experiments and the analysis of their outcome were performed to find answers to the following questions: What formal properties do Hangeul strokes have, and what role do they play in connecting letters to form a fluid vertical line of text? What formal correlations exist between the form of Hangeul characters and the vertical writing culture?

keywords

design research methods
icons, pictograms, symbols
user-drawing
user-centered

Introduction

Scripts are created to document and deliver messages and, thus, should be widely used with little difficulties and challenges throughout daily life. Hangeul is a script that was designed to articulate the Korean language in a written format and for convenient everyday use. For this purpose, it was promulgated by King Sejong the Great during the Chosun Dynasty (1392 – 1897) in 1446. *Hunminjeongeum* ("the true sounds that educate the people"), a document named after the original name of Hangeul, explains that Hangeul was based on a clear principle: while the consonants were designed according to the forms or status of speech organs, the vowels visualize the concept of the human, the earth, and the universe. This publication defined how to combine the consonants and vowels to compose letters.

With its first introduction based on a publication, Hangeul had a unique starting point as a script. It was not developed naturally, but was created by a king and later introduced to the people. While it takes training to learn how to read, the consonants and vowels of Hangeul were designed to be simple and easy to memorize. And, since a script needs to be used in a variety of daily contexts, it should be based on the premise that it is not only easy to read but also easy to write. *Hunminjeongeum* indeed presents an introduction and theory of how to build a letter; however, it does not focus on demonstrating *how to write* with writing tools. For instance, whereas the Latin alphabet does not require a complicated composition of strokes for an individual letter and, thus, can be written almost at once with a few strokes, Hangeul letters consist of combinations of consonants and vowels. Since Hangeul has more strokes for each letter, it is essential to have a detailed guideline on the writing sequence of the strokes. Therefore, it is quite surprising that *Hunminjeongeum* offered limited information on the aspect of the stroke sequence, which is directly related to writing in practice. The form of a script is not instantly created within a short period, but evolves over time. One of the most potent influences on the creation of script is writing behavior originating in gesture and the constraints of the writing tool. These components not only affect the creation of letterforms but also influence the process of connecting letters in developing words and lines of writing. In most notation systems, the written forms of letters are transferred into printing type. In contrast, Hangeul did not have its starting point as a written script, but was introduced as a set of printed type in the finalized form. Therefore, the writing practice had to be developed from the printed form introduced in *Hunminjeongeum* and it is not possible to infer the printed form from the practice of writing.

Before the creation of Hangeul, the spoken Korean language had been transcribed in Chinese letters (Ryu 2015, 131 and Taylor 2015, 21).[1] Thus, the instrument and method for writing Chinese script were prevalent throughout Korean society at that time. This writing culture manifested itself in writing tools such as the calligraphy brush, ink stick, and paper; the writing direction from top to bottom; and the composition of the lines of writing from right to left. All types of written and printed media, from letters to official documents and publications, were executed in the vertical writing culture. Therefore, it can be presumed that it was optimal and sufficient to continue the conventional writing practice, although Hangeul was created with an utterly inventive design concept. A question to raise at this point would be: does this indicate a lack of fundamental considerations regarding the formal correlation between Hangeul and the vertical writing culture? On the contrary, one cannot rule out that an adequate connection was made beforehand to the writing culture or to habits that had already been widespread in Korean society during the reign of King Sejong – and this knowledge was considered in the process of designing Hangeul. Unfortunately, the printed version of Hangeul that was first introduced in *Hunminjeongeum* does not provide any possible answers to this question. While enough studies are analyzing Hangeul's functionality and its originality, research on the figurative characteristics of Hangeul is scarce, especially from the perspective of the act of writing. What are the formal features we can find when Hangeul letters are written, and they create lines of text? The following contribution started from this set of questions.

The purpose of this study is to investigate the design properties of Hangeul that appear in the process of practical writing, which stands in contrast to the printed version. Simple writing experiments and the analysis of their outcome were performed to find answers to the following questions: What formal properties do Hangeul strokes have, and what role do they play in connecting letters to form a fluid vertical line of text? What formal correlations exist between the form of Hangeul characters and the vertical writing culture?

Stroke and Line of Text of Hangeul in *Hunminjeongeum*

In the first version of Hangeul, in *Hunminjeongeum,* it can be quickly recognized that the forms of consonants and vowels had characteristics different from those in Chinese characters. Even though the Chinese characters are printed type, it is evident that the shape and characteristics of the letters are rooted in and inspired by writing with brushes, the usual writing instrument at that time. By contrast, Hangeul does not contain any apparent trace of a writing tool. Instead, simplified lines construct the geometrical frame to build the basic elements [Figure 1]. Hangeul consists of graphic elements such as vertical, horizontal, and diagonal strokes and basic shapes includ-

1 King Sejong expressed his intention for the creation of Hangeul in the first sentence in *Hunminjeongeum*: "The language of [Korean] people is different from that of China, and thus it [the spoken Korean] does not match the written script of Chinese." (translated by the author)

Figure 1

The Haerye version of Hunminjeongeum: this edition was published as the first introduction of Hangeul, to present basic principles behind the creation of the script and offer instruction to the public. The Haerye version includes a detailed explanation of elements of Hangeul along with texts in Chinese characters.

ing the circle, triangle, and dot, whereas Chinese characters show a wide range of variations in stroke direction, serif shapes and stroke endings with upward, downward, diagonal direction, or even curved stroke. All these properties in Chinese characters are expressed utilizing the brush. Korea had borrowed Chinese characters for an extended period, and hence the brush was the standard writing tool of society. The organic stroke created by a brush was a familiar element for everybody. It was strictly taught and trained at school how to use a brush to create proper forms and how to write letters with precise shapes and strokes in the correct style. Seen from this aspect, the simple geometric design concept of Hangeul can be understood as a fresh and unique starting point to introduce the new script system. The following deduction can be made as to why Hangeul was developed in a simplified graphic form in its early stage.

As the purpose of *Hunminjeongeum* was the introduction of a new script system, it can be assumed that the design concept of the individual Hangeul elements focused on enabling people to learn the new script *visually* at first. The basic elements of the consonants are the rectangle, the triangle, and the circle. In particular, the triangle and circle were unique graphic forms and not found in Chinese characters, with a few exceptions in illustrations of mathematical theory, cultural or philosophical symbols, or pattern design. The first version of Hangeul can be seen as the outcome of this experimental design research for introducing familiar sounds (the Korean language) through unfamiliar new forms (Hangeul), as printed type.

Now this remarkable achievement of creating shapes for a new script will have to be proved in the practice of reproducing them, e.g., how to write. The Chinese characters used in *Hunminjeongeum* next to Hangeul convey that they have been handwritten.

Figure 2

The flow of vertical text lines of Chinese characters and Hangeul – a combination of letters from Figure 1, arrangement by the author.

By paying close attention to how the strokes connect to each other and in which direction they flow, it can be inferred how the ductus of the strokes appears. It is also understandable how the order of strokes was developed, and how much pressure and speed were applied to the hand and arm in the process. Unlike these Chinese characters, in which multiple testaments to the writing tool and writing behavior can be seen, the early Hangeul does not include information on how the new script can be written. There is no serif visible created by the tip of brush at the beginning or the end of each stroke; both have the same termination with a rounded shape.[2] Where strokes are connected or bent, the angles are either 45 or 90 degrees. Therefore, it is difficult to read the trace and gesture executed by the hand holding the writing tool. The apex of the triangle shape is pointed, and the stroke thickness remains constant overall, even mathematically (Park 2013, 63), which is far from the properties found in brush strokes. Through these visual features, it can be surmised that this early version of Hangeul was not introduced with the objective of educating people how to write. In other words, it was presented as a demonstrating model for *visual training,* using a simplified geometric form.

Following the analysis of the formal features of each letter and stroke, I would like to focus now on how the lines of text are constructed by connecting the letters. If we closely look at the vertical line of text formed by Chinese characters, it is clear that the alignment of letters did not have its baseline on the left or right of the text lines, but in the middle of the characters' width. As shown in the first four letters in Figure 2, some vertical strokes that pass through the center of letters emphasize a robust central axis. The diagonal strokes extending symmetrically from this central axis also establish a clear principle of the vertical alignment of Chinese characters. However, this arrangement along a central axis cannot be found in the vertical text alignment of Hangeul. Because all the letters of Hangeul seen in *Hunminjeongeum* artificially fill the full width of the vertical grid, and each character has the same height as its width, each letter will fit into the outer frame that appears in square proportion. The size of this rectangular structure, in other words, the size of each character, is identical, regardless of the number of strokes. It seems to be a good starting point for creating vertical lines of text without balancing the letters on a particular axis, by simply arranging the type from top to bottom. Thus, unlike the central axis of Chinese characters, which create the visual flow of vertical text lines, Hangeul in *Hunminjeongeum* appears to be based on the width of the letters – both on the left and right side.

However, this vertical flow of the line of text is not a formal arrangement based on a consideration of stroke composition and the balance of individual letters as seen in Chinese characters. In a strict sense, it appears as the borderlines of the areas created by the physical width of the printing types of Hangeul. A question was raised in the introduction as to whether there was a design correlation between Hangeul and the vertical writing culture; however, in the printing type of *Hunminjeongeum*, evidence supporting

2 Some Hangeul calligraphy studies assume that this kind of stroke was made by a brush with a round ending (Yoon 2002, 6). However, it has to be understood as the engraving style for producing woodcut types called Pan-bon Style, rather than as a written style (Yoon 2002, 5).

a fundamental observation of such a correlation is not explicitly revealed.

Stroke and Line of Writing of Hangeul as Found in Writing Experiments

To further investigate the unanswered question from the previous examination, a simple writing experiment was conducted to explore how the lines of writing flow and what design correlations exist between the shape and writing direction of the characters. Seven Korean participants were asked to write the prepared manuscript in both writing directions, horizontal and vertical, one after another. For this experiment, the participants were asked to use a pen or a pencil so that they could write with the writing tool they are most familiar with and use their writing rhythm and speed. Of course, the brush is apparently one of the best writing tools to reveal the ductus of strokes. However, the purpose of this experiment was neither researching the quality of the brush stroke or historical writing practice, nor investigating the artistic aspects of calligraphy. Calligraphy using a brush requires different writing circumstances and settings: it needs to be written on large thin paper using an amount of ink, and consequently, the letters are written in a bigger size and with an unfamiliar, slow writing speed. The pen or pencil is better optimized for modern writing practice; the letters can be written in a smaller size at a fast pace on durable paper. The pen can be considered as suitable for the elimination of other elements and to reveal the straightforward and clearest writing gesture and the resulting traces. In contradistinction to the conventional understanding that Hangeul is learned vertically, participants were selected from those who did not have experience in vertical writing or traditional calligraphy, although they were all born in Korea. They learned to write horizontally through general Korean school education and did not have an additional lesson for vertical writing. For an optimum observation of the writing process, the creation of shapes and the connectivity of letters, a manuscript with adequate length was chosen.

The first step in the experiment was taken in the most common writing environment. The participants wrote the given manuscript in the horizontal direction, which is widely used in daily life, with the usual writing speed they felt comfortable to use [Figure 3]. They were not requested to demonstrate good writing, but rather to write in the most familiar rhythm and speed. In the analysis of the results of the experiment, the focus was placed on finding any peculiarity in maintaining the flow of the lines of writing.

This experiment shows how the area in which characters are combined often forms a frame in a square shape. Because the difference in height or width of each character is not so large, the characters display little difference in size. When these characters in the frame are brought together to build lines of writing, most of them look separated from each other, although specific instances of slight connectivity are detected when writing at a fast pace. In the quick writing gesture, the last strokes often go over to the beginning of the next letter. In other words, when a vowel such

Figure 3

Horizontal writing from one of seven participants. Duration of writing: 1 minute 28 seconds.

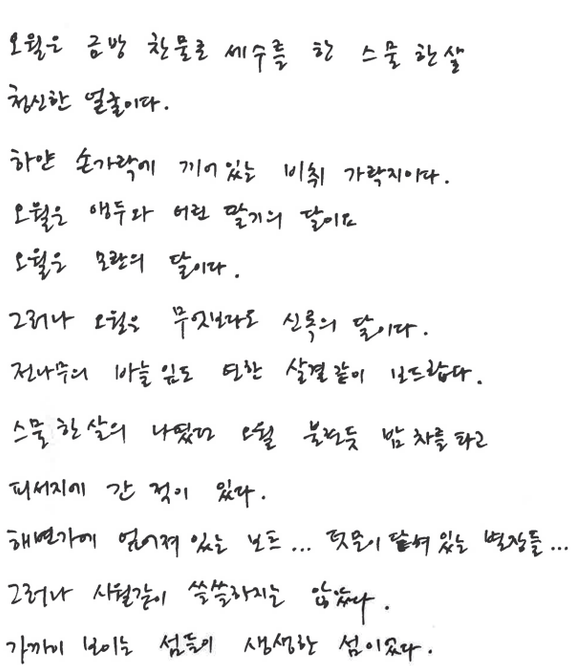
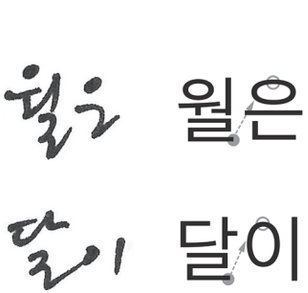


Figure 4

Connectivity between characters found to some extent in horizontal writing. The example on the left is handwritten excerpted from Figure 3, and the one on the right is set in one of the common sans serif Hangeul font. Arrangement by the author.



as ㄴ or ㄹ appears in the last position of a character, the final stroke with the completely horizontal ending moves to the starting point of the next character and shows a diagonal movement upwards [Figure 4]. These connections between characters appear in certain situations, but even though the letters are connected physically, they do not establish a single horizontal baseline. The lines created by writing show a visual order that is created when characters are composed in the most natural writing direction. But in this experiment, it cannot be seen at a glance how the flow of strokes establishes a dominant line of writing. In other words, the influence of the stroke connecting the letters is marginal in developing a dominant baseline of the composition. In fact, the situation in which strokes are physically connected due to the speed of writing and the location of each element is often seen in individual characters, not in lines of writing. For example in Figure 4,

the strokes in each single letter such as 월 or 달 are connected more closely than two characters next to each other, such as 달 and 이. Because the connectivity within single letters is much more dominant than between letters, the lines of writing do not look fluent. The lines do not provide the impression of a close and seamless connection among written characters; instead, it feels like the letters are just arranged horizontally.

In the second experiment, the same manuscript was written in the vertical direction. An attempt was made to keep to the usual writing speed as employed in horizontal writing, even though the writing direction may have been unfamiliar (Figure 5). In analyzing the results from both horizontal and vertical writing, we can describe the following differences:

The first difference is the proportion of the individual letters. The previous experiment showed that the visual frame of the letter, where the strokes are combined to build a letter, is close to a square shape and, therefore the width and height of the characters did not significantly differ. However, it can be observed in the vertical writing that the characters are stretched slightly vertically over the square frame and are given elongated proportions in comparison to those in the horizontal writing experiment. With a closer look at the changes in proportions, it can be found that the height of individual characters increased, rather than the widths being condensed. As shown in the example in Figure 6, the density of the combined strokes in several letters is loosened in the vertical direction, which demonstrates that it is affected by the movement and speed of the vertical writing gesture.

Secondly, the physically connected characters that were seen in

Figure 5

Vertical writing from the same participant as in Figure 3. Duration of writing: 1 minute 45 seconds.

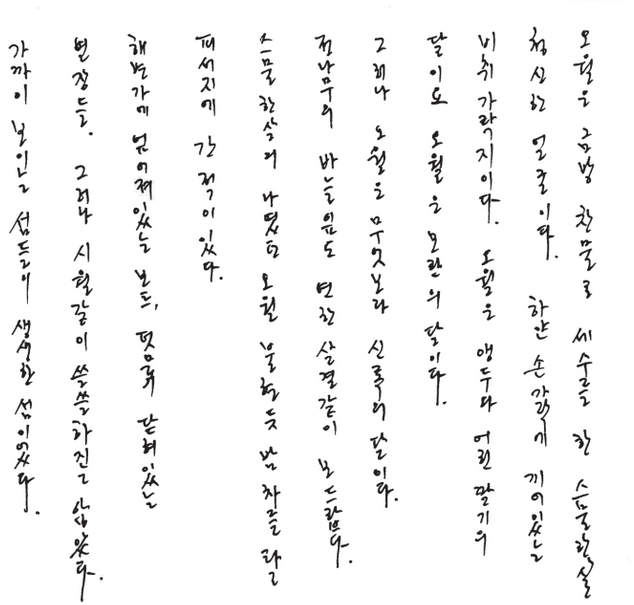


Figure 6

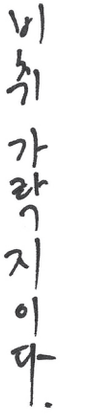
Comparison of the proportion of characters in horizontal writing (left) and vertical writing (right), arrangement by the author. It can be seen that the height of the individual characters increases in vertical writing.

the horizontal writing experiment are hardly noticeable in this experiment. Compared to the horizontal writing experiment, in which the last stroke of an individual character proceeds to the beginning of the next in an upright direction, the vertical writing does not show this dynamic change of stroke direction between letters. It was interesting to find in the horizontal writing experiment that, although some of the characters appear to be physically connected, the connectivity of these strokes did not significantly affect the horizontal direction of the writing. In this experiment, however, the vertical flow of the lines of writing runs more naturally than in the first experiment, even though a physical connection of characters is not often found. The question of what creates this difference leads us to the next analysis.

Thirdly, another factor that cannot be overlooked in the natural flow of the vertical lines is the appearance of a new characteristic of vertical strokes with a noticeable difference as compared with the horizontal writing. When taking a look at the formal features of Hangeul, the consonants are closed geometrically or close to a semi-open shape (area), but the vowel has the character of straight strokes (line). In the horizontal writings of the first experiment, the horizontal and vertical strokes do not stand out, because the complex stroke composition within a letter appears visually more dominant. However, in the experiment with vertical writing, the flow of the vertical strokes became unexpectedly prominent. In particular, consider the seven letters on the third line from the right side of Figure 5, each of which contains a vertical stroke on its right side that plays an essential role in visually connecting the letters [Figure 7]. Unlike the results of the previous experiments, in which the characters seemed just to be arranged horizontally without any specific order, the characters now seem to have been intentionally aligned. It is one of the strongest visual components found in vertical writing, which runs parallel to the direction of the lines of writing. This finding can be regarded as a premise that the vertical strokes of Hangeul can work as a *baseline* for vertical writing. At least, one thing becomes more evident by analyzing the structure of Hangeul: When individual Hangeul characters are composed, the vertical stroke is located in a constant position at the right edge of the letter. The horizontal strokes can be located either in the middle or at the bottom of the letter height. This means it can work as a natural vertical axis for composing text lines of vertical writing.

Figure 7

Vertical strokes on the right side of each character build a dominant vertical axis in the vertical writing movement. An excerpt from Figure 5.



If we look more precisely at the formal features of the vertical stroke revealed through the vertical writing experiment, we can find that

it is fundamentally different from the vertical stroke in the horizontal writing experiment. In the outcome of the horizontal writing experiment, the vertical strokes do not draw our visual attention. They look like one of the common Hangeul components in a letter. However, if we take a close look at the vertical strokes in the vertical writing experiment, the image of the stroke is very conspicuous. This difference becomes evident by comparing the seven letters of the horizontal and the vertical writing experiment introduced in Figure 7. The vertical strokes of the vertical writing experiment are further extended downward than those of the horizontal writing experiment. This feature was not revealed in the early Hangeul types, including in *Hunminjeongeum*. The formal feature of the vertical stroke in *Hunminjeongeum,* which was unremarkable because of the composability of the strokes of printing type, is now revealed by the act of writing with the appropriate writing direction. The difference that the vertical strokes are extended is an important clue that defines the nature of the strokes in writing. The previous analysis explained that the fixed position of the vertical strokes on the right edge of the character became a device for clarifying the flow of lines of writing. However, along with the position and length of the vertical stroke, the third element that makes the flow of the vertical lines of writing more prominent is the ending shape of the vertical stroke. We can observe that the vertical strokes in the vertical writing experiment not only have increased their length but also have a different ending shape from those of the printing type of Hangeul in *Hunminjeongeum*. As shown in Figure 8, it can be seen that the ending of the vertical stroke is stretched downward and makes a *pointier* ending than in the horizontal writing. It is a formal feature that reveals the way the stroke was created by a fast vertical downwards gesture.

What can be read in these vertical strokes, along with the downward movement, is the writing speed. As seen in Figure 9, three distinct brush movements can be described. (1) Ending a stroke with a full stop (Figure 9, left); (2) flicking the stroke upward (Figure 9, middle), which is often found in Chinese characters; (3) vertical stroke without a pause or change of direction. However, there is no need to make a complete stop to shape the ending if the vertical stroke keeps the movement and runs downward. If you do not stop the vertical movement of the writing tool and keep the writing speed at the end of the stroke, and you want to write the next letter just after this vertical stroke, the ending of it naturally makes a sharp pointy ending (Figure 9, right). So, this pointy ending of the vertical stroke became an essential component for revealing *how Hangeul letters are connected in lines of vertical writing*. This finding – that the vertical strokes function as a design instrument supporting the connectivity of vertically written letters – becomes more evident if we look at the stroke order of individual Hangeul characters. If a Hangeul character includes a vertical stroke, this stroke is, in most cases, written either last or penultimately. This stroke as the last stroke is often connected to the next letter. This is a formal and structural feature of Hangeul that has been in appearance since Hangeul was introduced in a printing type in 1446, and was developed through vertical writing activities for more than 500 years until horizontal writing proliferated at the end of the nineteenth century (Ku 2012, 5).[3]

Figure 8

The difference in endings of vertical strokes of horizontal writing (left) and vertical writing (right), arranged by author. Whereas the vertical strokes in horizontal writing display relatively more rounded ends, those in vertical writing are stretched downward and have pointy ends.

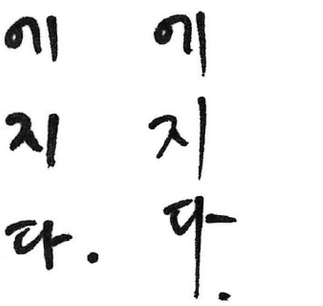


Figure 9

Different vertical stroke endings, written with a water-based pen by the author: ending with a full stop of the writing tool (left), ending with a direction change, flicking upward to the left (middle), and ending directly downward without a change of movement or pause (right).

The most apparent difference between the two experiments described above is the direction of the lines of writing. In the third experiment phase, horizontally written letters from the first experiment were cut out individually and then rearranged vertically by the author (Figure 10). During rearrangement, the tracking was adjusted to be similar to that of the second experiment, so that the density of both texts stays homogeneous. This attempt shows a different output from the analysis made in the second experiment, with vertical writing. The flow of the vertical lines made of characters that maintain the proportions of the horizontal writing experiment is not as natural as the experiment with initially vertical writing. It provides the impression that the characters are more separate and just are arranged vertically. In other words, there is less connectivity of the letters in the vertical text line compare to the originally vertical writing. If we consider the first seven characters of the third line on the right, which were analyzed in the second experiment, we can look at the difference in more detail (Figure 12). As we have seen in the vertical writing experiment, a steady position of vertical strokes on the right edge of each character is an important element that reveals the principle of lines of vertical writing. Based on that, the same seven characters from the horizontal writing are now cut out and rearranged vertically according to the same principle: they are aligned along the right-hand side of the character. However, in this comparison, the flow of the lines of writing created by the connectivity of letters is not visible as in the

3 A Korean-French dictionary, *Dictionnaire français-coréen*, published in 1868 by Stanislas Férron (1827–1903), is considered the first publication to be printed in Korea with a horizontal Hangeul typesetting (Ku 2012, 5).

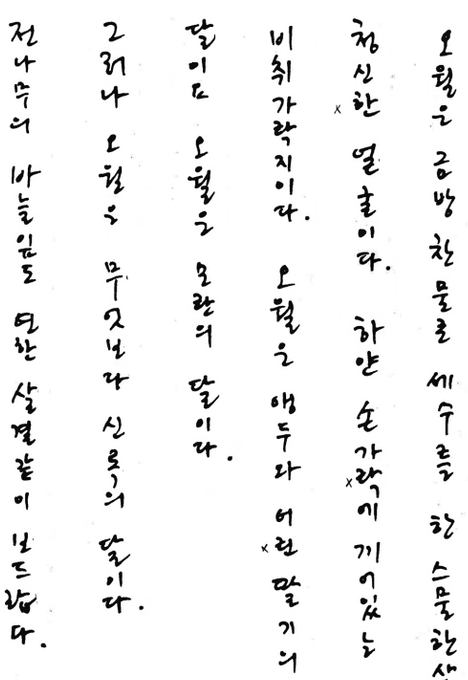


Figure 10

The text initially written horizontally by a participant and converted into vertical writing. Individual characters from the text of Figure 3 were cut out and rearranged in a vertical direction by the author.

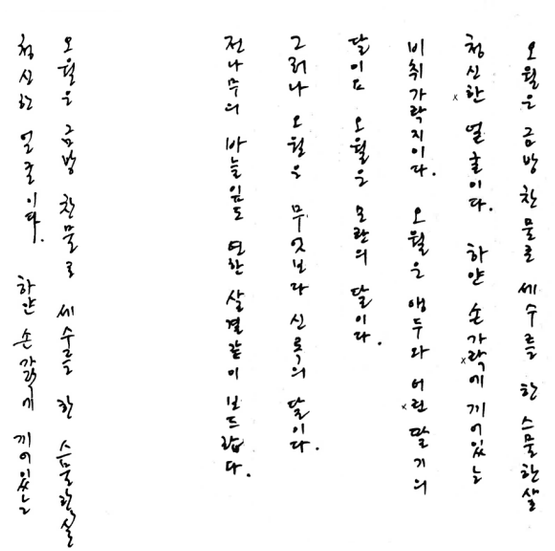


Figure 11

The direct comparison of Figure 5 (natural vertical writing) and 10 (initially horizontal writing, vertically rearranged).

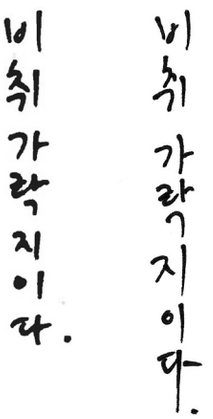


Figure 12

The difference displayed in vertical strokes that form lines of writing. The left line is an excerpt from Figure 10, and the right line, from Figure 5.

original vertical writing. This means the rearrangement and re-alignment of letters is itself not a significant feature to understand how the lines of the vertical writing of Hangeul flow.

Conclusion

Written characters are fixed and defined on the paper, but the process of writing is dynamic; the writer constantly controls the hand and individual writing tool with a subtle gesture by reacting reflexively to the trace on the paper. The stroke is the single track of a tool; its characteristics can only be preserved by handwriting (Noordzij 2005, 9). In this context, the stroke is not merely the trace of the writing tool: it is the medium and visual evidence that carries out the dynamics of the writing process and reveals it in concrete form – the letter – at the same time. Also, the stroke plays an important role not only as the critical component of a single letter but also in creating a flow of lines of writing, as we have seen in the analysis of the outcome of the experiments.

At least in *Hunminjeongeum,* the first form of Hangeul did not reveal how the writing tool was involved and how the dynamism of the stroke was revealed. It was presented as printing type with an already reduced and constructed stroke;[4] this limitation led this research to the practice of writing to explore how the stroke affects the composition of lines of text, especially at the moment of writing. Of course, we need to admit to skepticism as to the lapse of time since the first printing of Hangeul was created more than five centuries removed from these practical writing experiments, and the handwriting has been developed in several styles using different writing tools, whereas there were just a few changes of the printing letter form between the first edition and modern Hangeul. Therefore, the result of this practical experiment delivers only speculative answers to the research

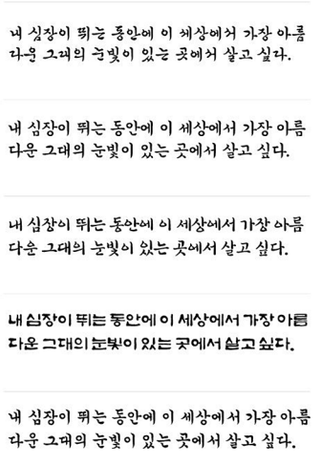
4 It is assumed that the Chinese characters in *Hunminjeongeum* were written by Anpyong-daegun, a renowned calligrapher and third son of King Sejong, and the Hangeul characters were *drawn* by Kang Hee-an, a painter and calligrapher (Park 2013, 63).

questions asked in the introduction. On this premise, one of the important outcomes of the study is that the dynamism of the vertical stroke, which was discovered from the writing experiments, became a crucial clue to understand the formal properties of Hangeul and the essence of the vertical writing culture. Its straightness and the pointy ending shape made by the quick movement of the writing tool not only define how the form of the vertical stroke in Hangeul is different from that in Chinese characters; it also builds the unique connectivity among Hangeul characters in vertical lines of text.

Since Hangeul began to be printed with modern printing techniques in parallel with the modernization of Korean society in the late nineteenth to early twentieth centuries, some modern printing types were developed in response to the demands of the times. Many of these types represented the traditional formal principle of Korean calligraphy and thought with a vertical typesetting (Park 2012, 28); however, this development was hastily shifted to horizontal writing without looking at the details of the tradition of vertical writing. For instance, in 2010, over 3,000 digital Hangeul fonts from 17 font foundries were registered at the *Institute of Hangeul font development and research* (Yoo 2010, 272). However, all these fonts were designed and optimized for horizontal typesetting. In 2011, under contract from the same institute, five prominent calligraphers' handwritten Hangeul letters were digitized as a font collection (FontBank). It is remarkable to see that these fonts were optimized for horizontal writing as well, even though the forms of those letters are strictly digitized from the traditional Hangeul calligraphy in vertical writing (Figure 13).

Figure 13

A font collection released by FontBank, digitized from five calligraphers' hand-written letters.

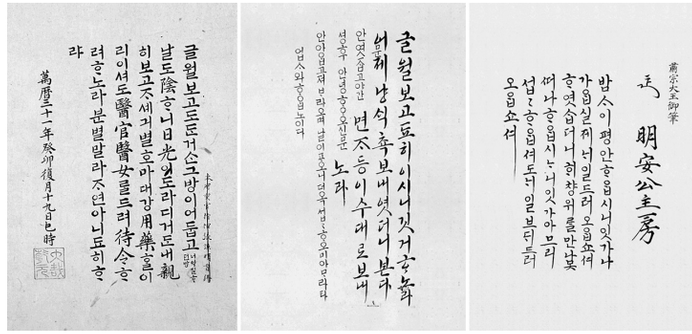


On the other hand, since 2000, a few independent type designers have started to develop Hangeul fonts, which are focused on typesetting in vertical directions. Yong-je Lee, one of the leading Hangeul type designers for vertical typesetting, explains the weight balance of his typeface *Baram* designed for vertical setting:

"*Baram* is designed for the vertical typesetting, so there is a

Figure 14

The Letters were written by Kings of the Chosun dynasty in 1603, in the mid-seventeenth century, and between the end of the seventeenth and the beginning of the eighteenth centuries (from the left, respectively).



certain awkwardness if it is set horizontally. Since the position of the weight balance is put slightly on the right side of each letter, the spacing between letters looks irregular if set horizontally (Lee 2014, 17)."

For another sketch for the vertical typesetting font *Kotgil*, he said about the physical alignment of the letters:

"In the second phase of the sketch, I physically aligned the letters vertically along the vertical stroke | […] The text line looked now aligned on the right side, but then the left side looked untidy (Lee 2013)."

This indicates that the vertical stroke appearing on the right side of some Hangeul letters plays a significant role in vertical typesetting, and is at the same time a missing key, which shall have to be intensively explored in practice. Neither arguing which writing direction is ideal for Hangeul nor criticizing a specific writing direction in Hangeul typography is the object of this study. But observing this recent movement, the findings from this study can be applied for further research on the modern Hangeul type design for the vertical typesetting to find possible answers to the following questions: What was missing during this transition of the writing direction of Hangeul and what role does the vertical stroke play? A potential area that could be looked at intensively is Hangeul calligraphy, which is not covered in this investigation. There are abundant and productive developments as to its form and style, and they have provided numerous artistic inspirations for printing type even until now. This could also be an interesting field of study if an approach can be made regarding a formal analysis of strokes, rather than seeing the changes of brushstrokes in a fragmentary way from an artistic and historical perspective. The examples from Figure 14 also show some features of vertical strokes and vertical flow that are shared with the writing experiments of this investigation; these features can provide an important formal basis to develop digital Hangeul types for vertical writing. In this context, some recent studies in this field suggest that digital Hangeul types have to be designed with a different formal concept for each writing direction (Lee 2011, 1051). Thus, even though the printing type of Hangeul in *Hunminjeongeum* shows an unusual and fresh design concept with geometric shapes, and does not include the properties of handwriting, it is hard jump to the conclusion that Hangeul simply inherited the tradition of vertical writing without a critical review regarding design. As this research indicates,

the vertical stroke in written Hangeul reveals several important features for understanding the relationship between the newly designed script and vertical writing culture at that time. Therefore, the assessment that Hangeul was developed to have the formal principles appropriate for vertical writing is believed to be sufficient for further inquiries into Hangeul.

References

FontBank. "FB Calligrapher font collection 2." fontbank.co.kr. http://www.fontbank.co.kr/goods/view?no=28 (accessed October 15, 2017).

Ku, Ja Eun. 2012. "A Chronological Study on Horizontal-writing Hangeul." PhD diss., Hongik University.

Lee, Yong-je. 2011. "A relationship between direction of writing and Hangul letter-form." *LetterSeed* 3 (2): 1026–1053.

Lee, Yong-je. 2013. "The reason for the vertical typesetting." Lee, Yong-je. February 15, 2013. http://www.leeyongje.com/post/43160805004/ 세로쓰기를-만든-이유 (accessed October 30, 2017).

Lee, Yong-je. 2014. "Usability assessment for the Baram font." Hiut 7: 16–25.

Noordzij, Gerrit. 2005. *The Stroke. Theory of writing*. London: Hyphen Press.

Park, Byung-cheon. 2013. "The formal change of Hangeul fonts." *New Korean Life* 23 (3): 55–94.

Park, Ji-hoon. 2012. "New Hangeul typefaces and their specimens." *Hiet* 1:24–40.

Ryu, Hyun Guk. 2015. *Birth of the Korean type 1820 – 1945*. Seoul: Hongsi.

Taylor, I. & Taylor, M. M. 1995. *Writing and Literacy in Chinese, Korean and Japanese*. Amsterdam, Philadelphia: John Benjamins Publishing Company.

Yoo Jungsook. 2010. "A Study on the Change in the Formative Elements and the Characteristics of Typography of Digital Dodum Typeface in Hangul – Focus on Traditional Square Typeface –." *Journal of Basic Design & Art* 11 (1): 268–280.

Yun, Jeong-rae. 2002. "A Study on the Calligraphy Education in Elementary School Using Panbon-Style." Master diss., Chonnam National University.

Image References

Figure 1
https://image.artrescape.com/artwork/32682/2014-03-28/간송문화_훈민정음_해례본.jpg (accessed May 27, 2016) edited by the author.

Figure 13
http://fontbank.co.kr/goods/view?no=28 (accessed June 3, 2016) edited by the author.

Figure 14
From left, respectively, edited by the author.
http://static.campaign.naver.com/0/hangeul/2012/img/img_letter.gif (accessed December 1, 2016)
http://hangul.typographyseoul.com/files/attach/images/630/751/313/001/fd5fc7572bcc781588895c68c958063b.png (accessed December 1, 2016)
http://hangul.typographyseoul.com/files/attach/images/630/751/313/001/fd5fc7572bcc781588895c68c958063b.png (accessed December 1, 2016)

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