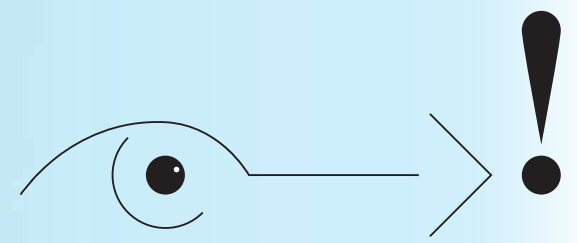


Visible Language

51.3 + 52.1

the journal of visual communication research

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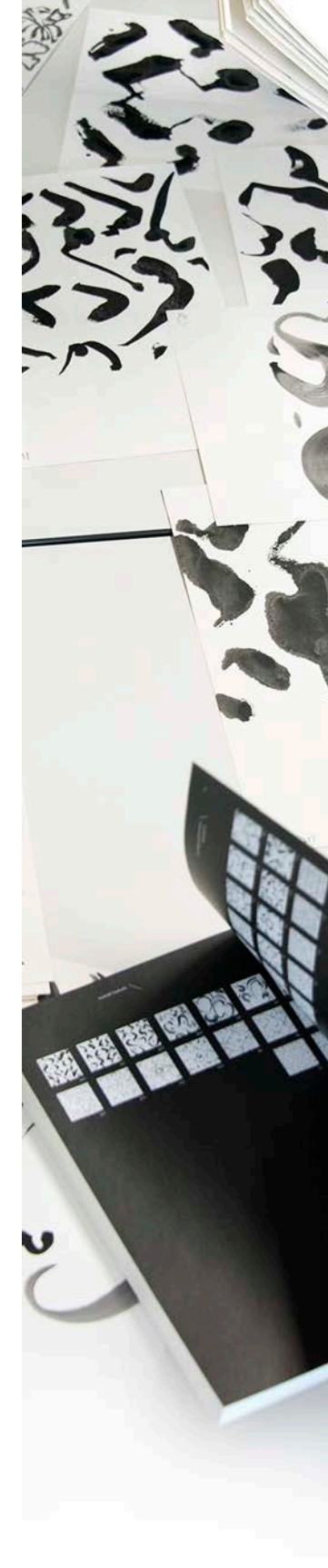
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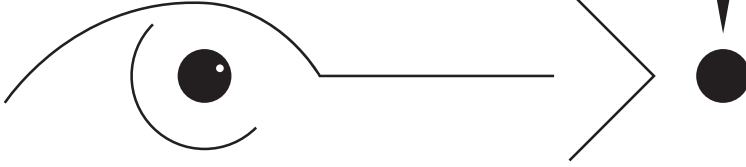
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the journal of  
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**special issue:**

**Practice-led Iconic Research**

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**Contents**


---

framing texts


---

**Practice-led Iconic Research: Towards a Research Methodology for Visual Communication**

Michael Renner

**8 – 33**

---

**The Practice of Practice-led Iconic Research**

Arno Schubbach

**34 – 55**

---

research into the design process


---

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

Jinsu Ahn

**56 – 73**

---

**Identifying Design Processes in Photography by Analyzing Photographic Strategies**


---

**in the Documentation of Public Places: "It's hard to be down when you're up."**

Helga Aichmaier

**74 – 95**

---

research about an image category:

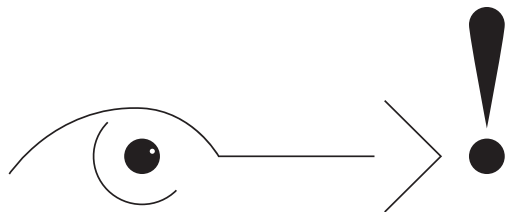

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**Documentary Image Sequences**

Susanne Käser

**96 – 123**

*continued...*



**The Image as Unstable Constellation:** Rethinking Darwin's Diagram from the Perspective of Practice-led Iconic Research

Paloma López Grüninger

124 - 147

**Premises for Interaction between Images**

Claire Reymond

148 - 173

**Making Things Visible:** Visual Strategies for the Representation of Objects in Collections

Michael Hübner

174 - 201

Book Reviews

*Taking a line for a walk: Assignments in design education*

Jorge Frascara

202 - 203

*Fire Signs, A Semiotic Theory for Graphic Design*

Sharon Poggenpohl

204 - 207

## 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.

## Premises for Interaction between Images

Claire Reymond

When images are seen in pairs, the viewer seeks the perceivable features shared by the two images, to compare them. The aim of this process is to understand why they stand next to each other and also, if possible, to understand the images as a unity. Studies in the field of art history (see the method of 'comparative seeing') and psychology (as an example 'visual metaphors') investigate—in the field of image-juxtaposition—different aspects of this phenomenon. Nevertheless, the premises that are needed for images to be interpreted as belonging together have yet to be examined on the image-level. This study analyzes the basic conditions that should be given for image connection processes to occur and tries to answer the following question: "Which pictorial elements can be detected as premises for a relation between two images?". The investigation is an explorative study using the method of practice-led iconic research to detect the premises that allow connection processes between images to occur. The analysis documents the relevance of different image-features, as for example, the analogy of the directional positions within the images or the width of the stroke in line drawings. An eye-tracking study, that was conducted as a subsequent step, strengthens the findings of the practical research.

.....  
keywords

*image-based research*  
*meaning of images*  
*design research methods*  
*interaction processes between images*



## 1. Introduction

Images are never perceived by a viewer in isolation; rather, they are practically always seen in a context. This manifests itself in various forms, whether it is the recipient's socio-culturally conditioned bank of experiences, or the short-term conditioning by visual impressions before an image is received, or the combination of individual images that are taken into view simultaneously – as when two posters are incidentally hanged next to each other on an advertisement board. It is evident that images interact with one another and this leads to a connection in the process of perception that generates meaning. Furthermore, it can reasonably be supposed that there are many patterns of interaction between images that alter the meaning of individual images in different ways. This study pursues the basic question of how a cohesion between two images can be recognized since such a connectedness can be understood as the fundamental condition for interaction. The focus of this examination involves which iconic/formal conditions for the perception of a connection between two images can be differentiated.

The study is based on findings about mechanisms of image connection in two disciplines: image studies, which concerns itself with the image as medium, and cognitive psychology, which focuses on the investigation of human processes of perception. In its method, the study is anchored in practice-led iconic research and, in a second step, gives an outlook on how the findings can be used as an originator of empirical research on perceptual processes.

An important instigator of the analytic approach to the question of configurations of images was provided by research in image theory whereby the image is considered not only in its singularity, but also in its multiplicity and plural configuration (Thürlemann 2013; Pratschke 2008). Felix Thürlemann and David Ganz edited the book *Das Bild im Plural* (The Image in Plural, Ganz Thürlemann 2010), in which various essays are published that consider artistic images in their multiple forms. Thürlemann describes “that the connection of multiple images possesses unique potentials of meaning that are not equivalent with those to which the image in the singular lays claim. As well, the meaning of complex configurations of images cannot be understood as the sum of the meaning of their constituents” (Thürlemann 2010, 8; translated here).

In the course of systematic art-historical examinations of recurring pictorial motifs, Aby Warburg assembled reproductions of artworks, advertisements, postage stamps, and press photographs in his *Mnemosyne Atlas*, in order thus to study the hidden connections of the images' motifs. He was interested in image models that can be observed from antiquity onward across different eras, and that repeatedly appear in new forms. The analytical potential of image configurations and image comparison is a central building block of the methodology of image theory that draws from art

history (Voll 1907; Wölflin 1915). The juxtaposition of images aims to arrive at a clear analysis of an image through certain formal parallels or differences. In art history, the method of “comparative seeing” (Bader Gaier Wolf 2010) describes the comparison of two images as a tool with the help of which the meaning of a single image can be recognized. Here, comparison serves the analysis of an image; the effects of this search for analogies or differences upon the juxtaposed images is not thematized.

The studies by Max Wertheimer, Wolfgang Köhler, and Kurt Koffka should be cited as early works in the field of perceptual research that founded gestalt theory at the beginning of the twentieth century and formulated various “gestalt laws.” Gestalt laws follow the thesis that “the whole is more than the sum of its parts,” and indicates that perception can be described as a process of joining individual parts into an experienced totality. According to this, individual lines, colors, and forms are not seen separately; instead, these are assembled into unified sense-generating entities and perceived as differentiated against a spatial context. “The consolidation occurs in such a way that the wholes that emerge are favored in some way against other conceivable arrangements, so that the simplest, most unified, . . . closed, . . . symmetrical, . . . similar structural wholes emerge” (Metzger 1954, 108ff; translated here). To prove their theory, which is based on experimental research, the gestalt psychologists compose simple visual forms that allow the viewer to experience the particular laws at a single glance. Some more recent works in the field of cognitive psychology consider pairs of images under the aspect of visual metaphor. Bipin Indurkha and Amitash Ojha examine the influence of similarities between photographs on the possibility to connect two images into a whole metaphorically (Indurkha Ojha 2013). The work of Teresa-Maria Hloucal observes the influence of emotionally charged image material on pictures of forests and fields presented later. With this work, she demonstrates a temporally displaced potential influence between images (Hloucal 2010).

## 2. Method of Practice-led Iconic Research

Starting from the theory of gestalt psychology, Rudolf Arnheim developed it further and used it as a method and an explanatory model for his work in the field of art research. Likely his most significant work, *Art and Visual Perception*, expresses criticism of contemporary perceptual habits. Arnheim observes a considerable impairment of human visual faculties and advises us to understand things with our senses again and to take in the world by means of the eyes: “The inborn capacity to understand through the eyes has been put to sleep and must be reawakened. This is best accomplished

by handling pencils, brushes, chisels, and perhaps cameras” (Arnheim 1974, 1). With this statement, Arnheim can be understood as a pioneer of practical image studies, in which the approach of ‘practice-led iconic research’ (Renner 2010) can be located. The method devised by Michael Renner assumes that through the production of images, knowledge about this medium can be gained that is not achievable through language. The contribution presented here employs the method of image production as an “acquisition of knowledge about images through their genesis.” The design process shows that the genesis of an image is marked by a constant alternation between reflection in the area of conscious thought and design actions beyond what can be consciously controlled. Pre-conscious knowledge guides action and simultaneously enables, as the result of this action, an insight that can, in turn, be verbalized and analyzed explicitly (Brandes Erloff Schemmann 2009, 88 ff; Grave Schubbach 2012). This interaction makes it possible, in the course of producing an image, to arrive at insights that are not possible on a purely theoretical level, in verbal discourse.

The method of ‘practice-led iconic research’ contains different phases of analysis. The formulation of a definite and precise question describes the starting point of the research. Following that, different images, where the formulated question is addressed, are generated. From these images, the one that offers the best-required qualifications to analyze the research-problem, is then selected to take the analysis further. One image parameter after the other is extracted to be evaluated regarding its influence on the meaning of the image and the research question. As a consequence, a large number of images are made that differ in only one precise influencing variable at a time such as angle, size, perspective, stroke-thickness, color-shade, etc. while keeping the rest of the image constant. The differences need to be precise, clearly discernable and the change of one parameter has to increase or decrease gradually. The aesthetic qualities of the images are not relevant in this setting: the single image functions as an object of investigation and is regarded according to its potential to show a certain image property. The production of images is one of the three fundamental phases of the process. Arranging the produced artifacts in different sequences is the second elemental part of the procedure. For this practice, it is inevitable that the images are physically existent (printed out individually) and that they can be seen simultaneously. Ordering, categorizing the images through differentiating groupings in which the analyzed factor increases or decreases, changing the sequence, rearranging the images according to another aspect is the crucial phase of the process because it allows different, hidden image properties to become visible. The third part of the method is the comparison of the images. The act of relating the images in the series allows detecting what effect a defined parameter has on the meaning of the image. The process of image production is often an act that is done by the researcher alone. Arranging, comparing, and questioning the images,

however, is made in cooperation with other experts. Shared discussions and contemplations of image-series allow developing a precise and accurate judgment about relevant images-parameters and their influence on the meaning of an image.

In this process, the designer is the researcher and the first subject that perceives and evaluates the images at the same time. In different ways, this can be challenging. Although the aspect of subjectivity remains, the essence of the method must be found in the images themselves. The answer to the research question lies in the comparison of the produced images that allows every onlooker to question him or herself and to decide, whether he or she agrees with the author’s argument or not. The experiments can be evaluated by everyone and the insights of the analysis can move swiftly from the author’s personal experience to a knowledge shared by others.

---

### 3. Experimental Setup and Production of Image Material

As an initial setting in the present study, two images were repeatedly placed side by side. Each time, two reduced line drawings bounded by a square frame (10 x 10 cm) were placed on an A4 sheet of paper. All the lines of the drawings have the same thickness of 0.3 pt, the frame 0.25 pt. The image on the left shows a drawing of a dandelion that is visibly in the seed stage; on the right, the image varies. The image on the left is kept constant to be able to make the changes in the conditions of connection observable in comparison with other pairs of images. The depiction of a dandelion was chosen because of its mostly neutral connotation but apart from this plays no essential role for the thesis of this study; a picture of another object could lead to the same conclusions or ones that take these further. The use of forms drawn with the computer enables, on the one hand, to form the pictures in a constant way and, on the other hand, to be able to vary specific aspects intentionally. As was shown in a previous analysis on image interaction (Reymond 2013), the use of photographic images makes it difficult to analyze specific parameters of image relationships because of the uncontrollable amount of influences like narrative, emotional reaction to subject and color, personal connotation, etc. It is also complicated to depict inexistent objects or to vary distinct aspects of one artifact. For that reason, it was attempted to create an as neutral image as possible that still has a recognizable meaning but to exclude confounding variables like color, texture, shade, spatiality, surface, and background. Against this backdrop, the present analysis concerning the premises for a connection between two images examines five specific characteristics of the line drawing on the right and asks, for which



pair of images it is possible to recognize the form in the square on the right as a continuation of the drawing on the left. In which pairs of images can the lines of the image on the right be seen as a stem form and thus, can a connection between the two images be perceived? The following, practical analyses of the pictures show five series of tests concerning possible premises of connection. The series are built on one another in the sense that the findings gained from the preceding examinations are included in the new series and are established as a new constant. The analysis was conducted using the three phases of 'practice-led iconic research,' image production, categorization, and comparison, as described above.

Although knowing that the interpretation of an image is influenced by several aspects regarding the viewer (his/her age, education, cognitive ability, emotional state, etc.), the context in which the image is seen, and the purpose of the image itself (is it a decorative element, a scientific visualization, or does it have to provoke action?) the aim of the study is to exclude those facets and to look at pictorial mechanisms on a very basic level. According to that, the research presented is examining elementary representation factors that encourage a connection between images. Five formal image characteristics like line thickness, line characteristic or orientation of the image where chosen to be shown in this exploration. The last experiment on 'Botanical Correctness' can be seen as an exception to that focus. For reasons of length, neither all the analyzed parameters nor all the image pairs of a series have been shown here. Those pairs are shown in which the formal examinations can be seen most clearly.

#### 4. Connections Between Images

A review of the state of research shows that patterns of interaction between images (and between individual elements within images) can be recognized. Upon closer observation, it is possible to assign these to various categories of connection between images. In the following, to exemplify the great diversity of types of connection, three fundamental ones are demonstrated.

##### 4.1 Connection by Formal Similarity

The clearest and most intuitive level of connection is given through a formal analogy in the image pair. Are there vectors of form or movement that can be recognized in both pictures? The intuitive search for similarities or differences between pictures involves a process of seeing and comparing, as can also be found in the art-historical method of picture comparison (Bader Gaier Falk 2010). The unprompted search for correspondences during the viewing of two neighboring images allows it to be inferred that the process of comparison is a spontaneous course of action in the recipient. Even if the semantic statements of the two objects do not relate, there exists a visual connection between the images. This purely formal congruence of the two

Figure 1

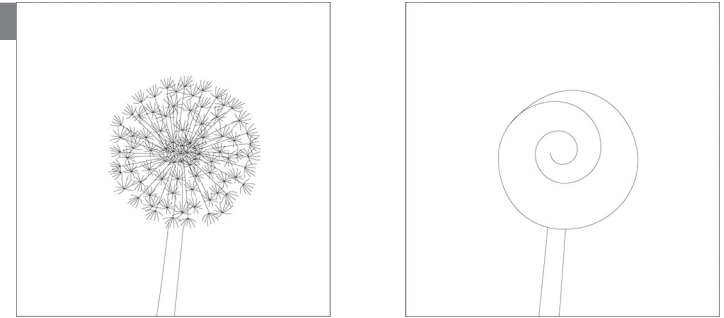
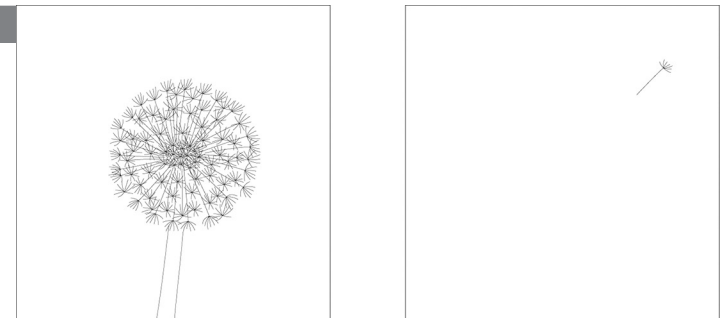


Figure 2



depicted objects can effect a blending of the meanings of the individual images. Such a shift is expressed, for example, in the form of the viewer's wondering how a furry/hairy sweetness feels on the tongue (Figure 1).

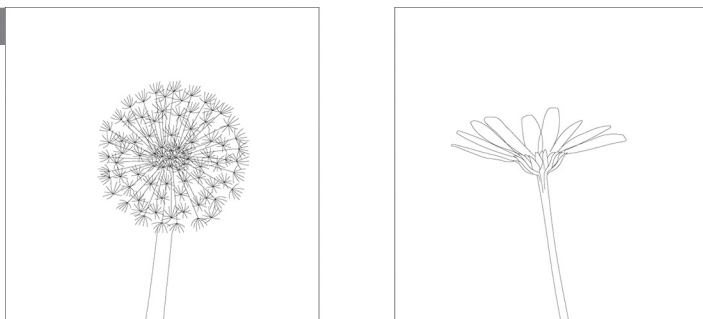
##### 4.2 Linkage by Narration

Another possibility for assigning meaning to a connection between images can be summarized with the term "narration." This includes image configurations that imply a before/after situation or function through the construction of a story. In the example presented here, the viewer is prompted to imagine two temporally successive situations (Figure 2). The picture on the right suggests, by depicting a single seed, that it has separated from the plant on the left and is being carried away by the wind. The two pictures show two semantically related objects in a temporal relation.

##### 4.3 Semantic Connection

Along with the formal similarity of the depicted objects, a connection between two images can also arise if the objects that can be seen in them belong to the same family of significance. The alignment of a formal correspondence does not succeed, and the viewer is obliged to build another bridge between the images. In contrast to the purely formal structure of connection suggested above (Figure 1), a linkage through the meaning of the image uses the construction of mental models (Wenninger 2001, 49) in

Figure 3



order to be able to recognize a shared context of meaning between the depicted objects (Figure 3). As could be observed in an earlier study on typologies of image connection, such possibilities of connection are only activated if those located on a purely formal level do not succeed (Reymond 2013).

### 5. A Differentiation of Formal Preconditions Conducive to a Connection Between Images

As was illustrated in several examples, the possibilities for linkage between images are many. But the fundamental question remains open as to what the pictorial conditions must be so that such a connection becomes perceivable for the viewer. As was previously stated, many studies in the field of image theory and the cognitive sciences concern themselves with various forms of linkage between images. Among them, similarity is regarded as an important factor in connection. But it remains largely unspecified which aspects of analogy are responsible for a linkage. This contribution places the focus on an examination of formal possibilities of connection through image practice, and pursues the question, "which formal premises for a connection between two images can be differentiated?"

#### 5.1 Orientation

The examination on the premises of connections between images begins with the fundamental question of the role of the orientation of the drawing within the picture format. Does the orientation and position within the frame of the form on the right play a role, or is this aspect irrelevant for the possibilities of a connection between the images?

Figures 4, 5, and 6 show, in the image on the right, different orientations and positions of two parallel lines within a frame. In Figure 5, the 45° orientation of the lines largely disallows a connection to be made with the drawing of the plant. Instead, the diagonal lines merge with the lines of the frame, and together they form an abstract, geometric form that has no similarity with the plant image. With a horizontal orientation of the drawing on the right, as in Figure 4, the two images likewise remain unconnected. The vertical orientation of the parallel lines in Figure 6 most readily enable

Figure 4

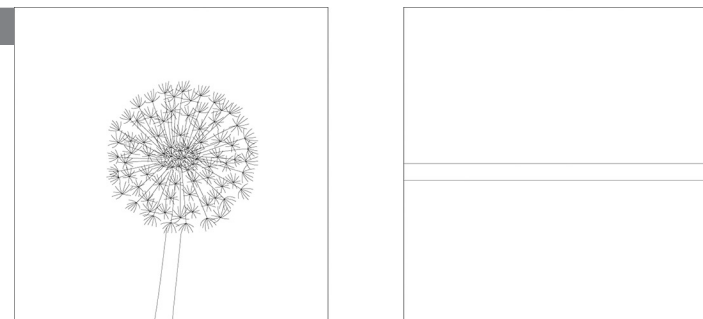


Figure 5

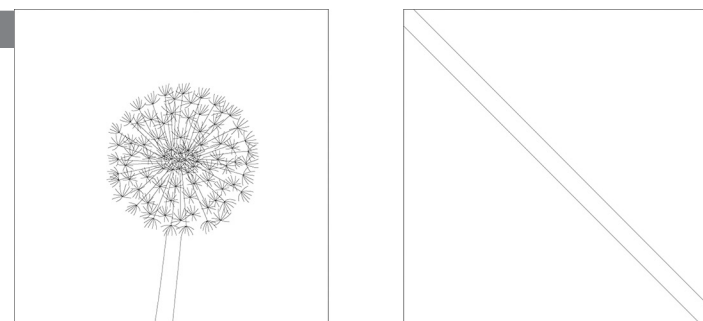
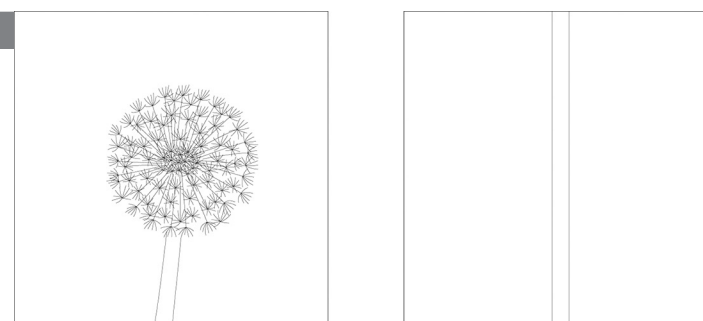


Figure 6



a connection in the form of a stem-like extension of the plant, but here, too, the symmetry of the square stands in the way of a clear connection.

Building on the assumption that the analogy of vectors of movement within the two images plays a role, image pairs were created that show a similar direction of forms. Two of them, Figures 7 and 8, in comparison to Figure 6, reflect the relevance of a similar orientation of objects within the images. If the vectors of movement of the two drawings are identical, this significantly increases the capacity for connection between the two images. Whether the two parallel lines in the image on the right appear at the same location as the dandelion stem in the image on the left plays a subordinate role. These findings go along with the concept of SOA (Symmetric Object

Figure 7

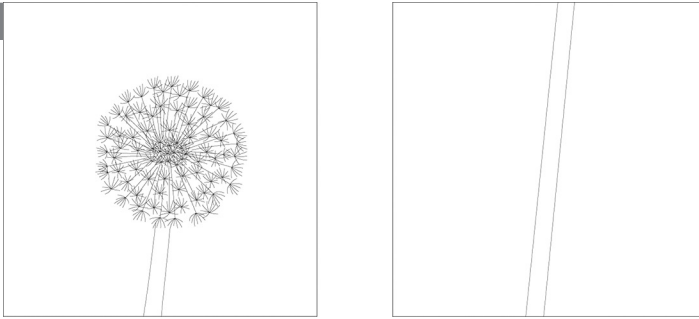


Figure 8

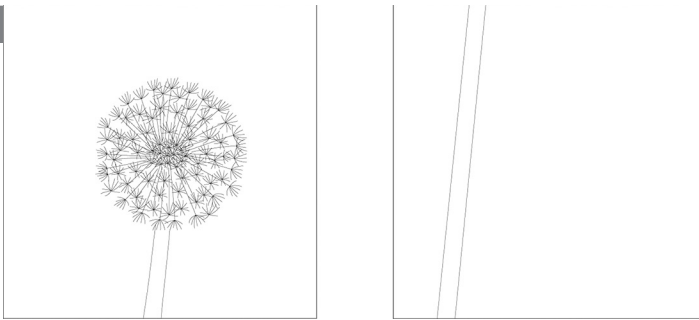


Figure 9

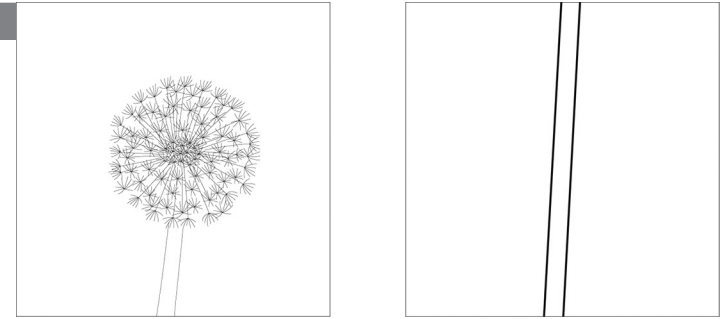


Figure 10

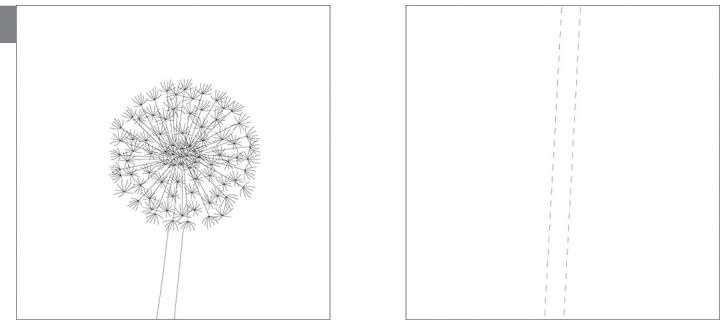
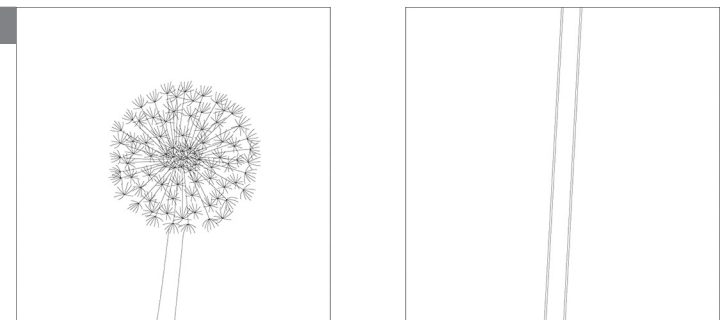


Figure 11



Alignment) (Schilperoord 2009), that describes the similarity of image vectors to be the basis of metaphorical connections between two objects within an image.

In observing this series of image pairs, it becomes clear that a similar orientation of the objects in the images is conducive to a connection. A contrary or distinctly different orientation significantly impedes a connection. This is of interest insofar as the distance between the two lines in the image on the right remains identical to the space between the lines in the image on the left and that's why the form on the right can readily be interpreted as a section of the dandelion stem. A fundamental analogy of the forms can be recognized – even with an orientation of the objects that does not correspond (Figure 6). The more exact the congruence of the orientation, the clearer the connection.

## 5.2 Line

The examinations of a line aim to examine the prerequisites for connection between images that can be attributed to the characteristics of a line. Under examination are the quality of the line and change in the line trajectory.

### 5.2.1 Line Quality

The series on the character of lines observes the effect of different types of lines under the aspect of possibilities for connection between the two

images. Under examination are point strength, regular interruptions, and doubling of the line.

The lines of the form on the right in Figure 9 cannot be made to resonate with the image on the left side. The difference of 0.9 pt line thickness is too dominant and gives the two lines an otherness that is too great for a connection between the drawings to be recognized. The attempt to make the line even thinner than 0.1 pt yielded no results worth mentioning. The regular interruption in the lines on the right side led, as with Figure 10, to a decreased connectability of the two pictures. It therefore could be reasonably supposed that a doubling of the line would also impede correspondence between the pictures. As Figure 11 shows, however, this is not the case. In precise terms, it can be asserted that it is not the manner of line or

Figure 12

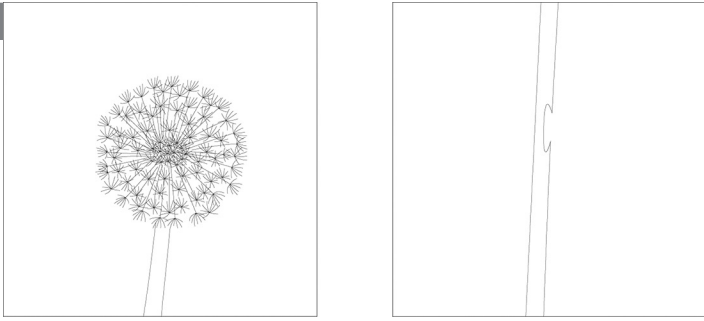


Figure 13

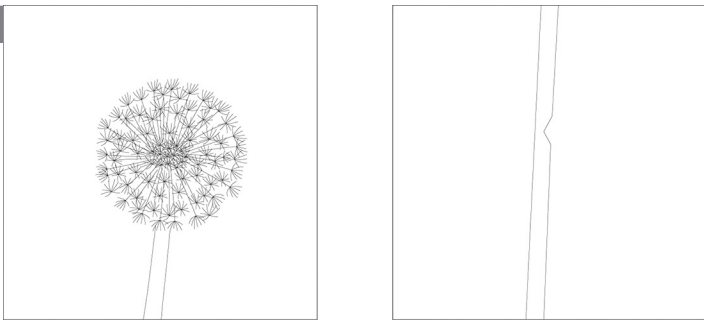


Figure 14

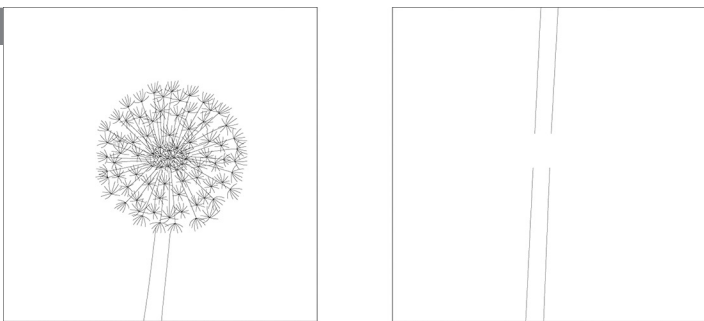


Figure 15

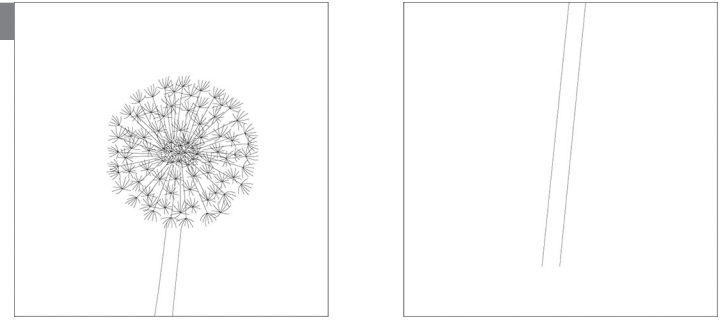


Figure 16

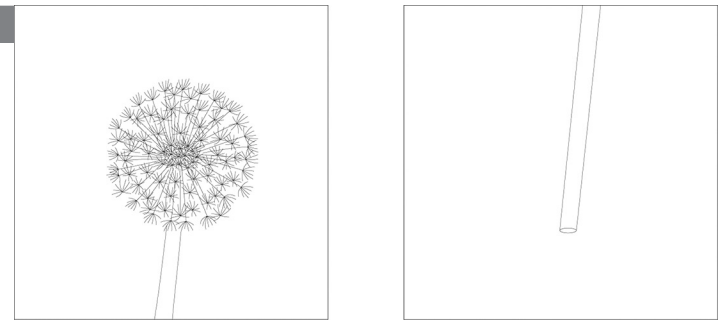


Figure 17

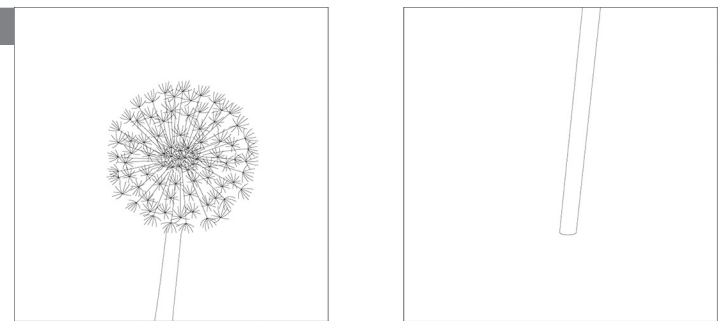
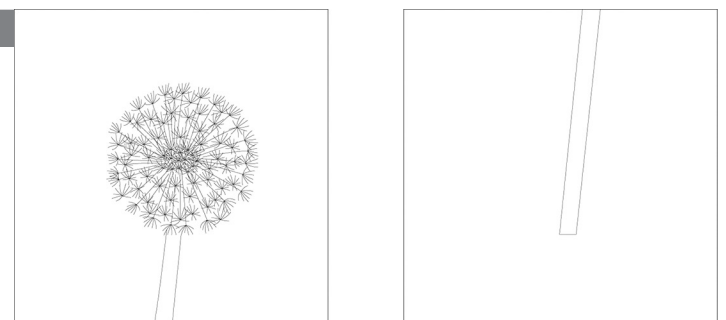


Figure 18



its thickness that plays the essential role; rather, the grey scale value of the line in the image on the right must agree with that in the image on the left. It is interesting to note that the corresponding orientation and also an equal distance between the two lines that ought to be able to suggest a section of the plant stem cannot make up for an incoherence in the grey-scale value.

5.2.2 Changes and Interruptions in the Lines

In the next step, the orientation, the line width, and the identical distance between the two lines are kept constant and the stem-like form the image on the right is examined further. The series observes various disruptions in the stem form in the image on the right (Figures 12, 13, and 14).

In the examination of these pairs of images, it becomes obvious that an “unnatural” indentation or even interruption of the stem form is largely tolerated and does not significantly impair the perception of the stem. A more interesting aspect reveals itself: if the form on the right side can be clearly recognized as a stem form and if it otherwise agrees (for example in orientation, line width) with the image on the left, then non-corresponding and unnatural line trajectories within the form are tolerated or even overlooked in order to be able to perceive a signifying whole in the neighboring images.

In assessing these examinations, it becomes clear that with respect to the character of the drawing line, the tolerance for a different grey-scale value is quite low; but this is not the case when the two lines that suggest a plant stem display an unnatural interruption that occurs only once.

### 5.3 Termination of the Form Inside the Frame

The following series observes different situations in which the two lines in the image on the right end inside the frame.

Figure 15 presents the situation in which the two parallel lines end in the lower third of the frame without a visible termination. In Figures 16, 17, and 18, the lines end differently in each case. In these four terminations of form, differences in perception are revealed that are relevant in the process of a linkage of images. In that Figures 16 and 17 involve a curved termination and thereby suggest a three-dimensionality of the form, they can be categorized as a continuation of the plant in the picture on the left. Noteworthy differences arise in the comparison between Figures 15 and 18: the form that is terminated with a straight line at the bottom prevents the recognition of a three-dimensional form, whereas the form that is left open allows the possibility for such an interpretation to remain open in the space. From these observations, two tendencies may be noted: on the one hand, it is significant for the connection between the two images being examined here that the illusion of spatiality remains intact. On the other hand, it can be observed that an undefined end of the form leaves the perception of three-dimensionality open, which the rectilinear termination, as can be seen in Figure 18, prevents.

### 5.4 The Lower and Upper Part of the Form

In order to continue to investigate the aspect of form tolerance, in the following image series attention is devoted to the places in the picture on the right where the form is bounded by the frame.

While the Figures shown above (series 4.3) suggest the termination of the form on the right within the format, in Figure 19 the lower termination of the form is directed out of the format and is taken in an unrealistic direction. Here, again, the tolerance of a signifying connection is observable. In the above experiments, it became evident that the illusion of a spatiality must be preserved and that this can also be recognized when the form has no termination and thus remains in the realm of the possible. With the ex-

Figure 19

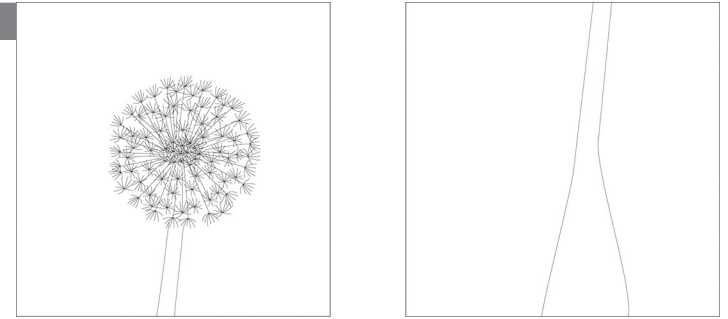
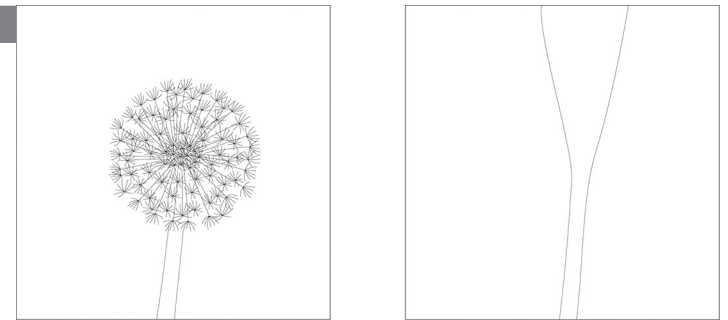


Figure 20



aminations of series 4.4, an initial assumption can, therefore, be that the lower termination of the form plays no relevant role, provided that it remains in the realm of the ambivalent and suggests a spatiality. Accordingly, in Figure 19 it is highly conceivable that the lower part of the plant in the image on the left displays a widening of the stem.

The situation is totally different when the widening is located in the upper part of the form. Figure 20 shows the same right-hand form as Figure 19, except rotated 180°. In an instant, the possibility of a connection between the two images is extinguished: the recognition of a continuation of the plant underneath is not possible. If unification by means of a similar quality of the form in the upper area of the image is possible, the result is a perceivable shared context between the images (Figure 19). If the right-hand form ends distinctly wider than the beginning of the left-hand image, a linkage is prevented (Figure 20).

### 5.5 Botanical Correctness

Following on the results of the previous examinations, the experiments were now taken in another direction. If the previous analyses remained in the realm of the formal, the question is now raised as to how the insights thus acquired affect the realm of the botanically correct. As was previously recognized, simple formal aspects such as orientation, the perception of three-dimensionality, and the grey-scale value of lines play a fundamental role in the perception of a connection between images, in this case, two line

Figure 21

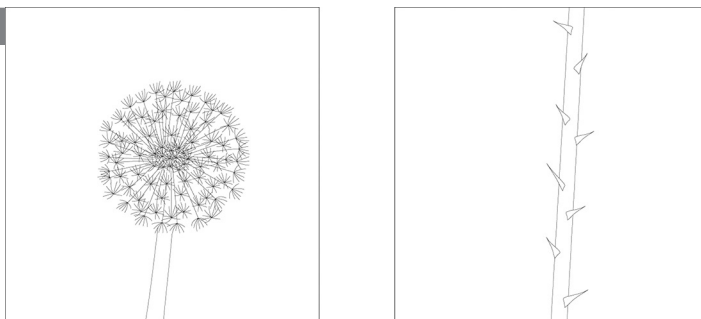


Figure 22

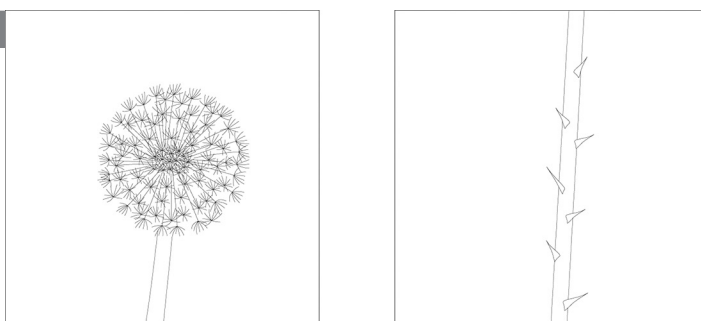
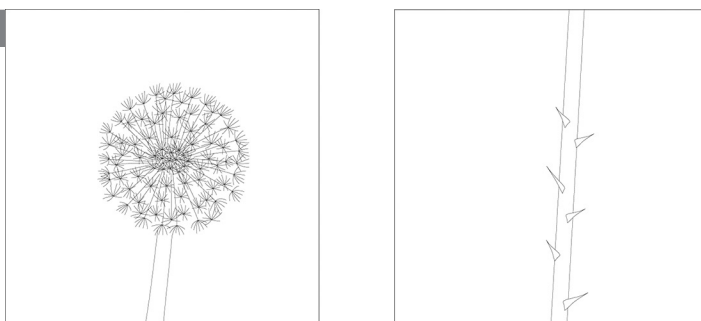


Figure 23



drawings. But how do these aspects behave when the connection extends beyond the purely formal and touches on a factor of content? In other words, how do formal aspects behave with respect to botanical aspects? In order to be able to observe this, situations were created that make use of the formal premises that had been ascertained but simultaneously suggest a botanically incorrect situation.

Figure 21 shows, on the right side, a thorny section of the stem. The drawing makes use of all previously determined specifications that seem necessary to be conducive to a connection between images. The line thickness of the images is identical; the orientation of the stem form corresponds; the illusion of a three-dimensionality can be recognized in a comparable

Figure 24

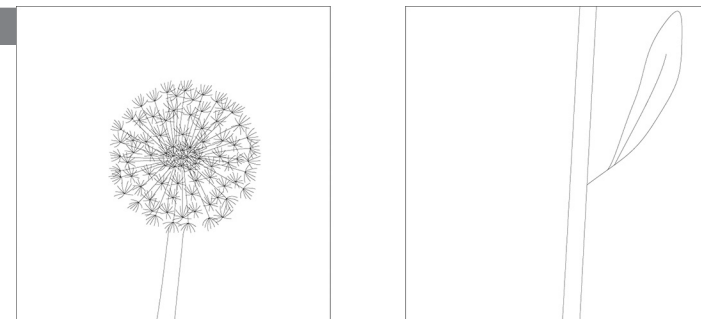
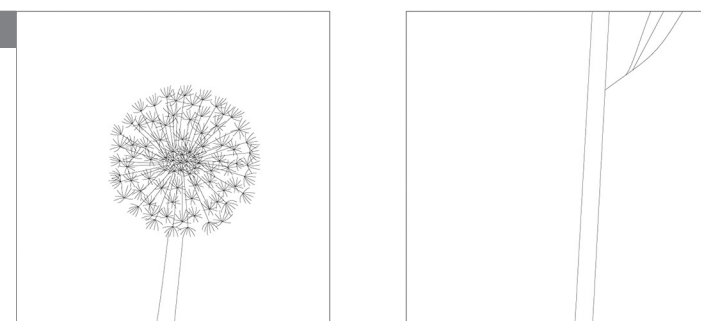


Figure 25



way in both images. Only the knowledge that a dandelion does not have thorns speaks against a connection between the images. The two drawings of Figure 21 nevertheless suggest a connection, and the assumption is possible that both drawings are part of the same plant.

Figures 22 and 23 observe this aspect further by moving the initiation of thorns further toward the bottom. The lower down it goes, the more easily a perceivable connection between the two pictures seems to be achieved. It becomes clear yet again how important the termination at the top of the drawing on the right is. If it is formally coherent with the stem form of the dandelion in the drawing on the left, an agreement between the two images can be perceived – even if this is not possible from a botanical point of view.

Figure 24 observes this matter from another perspective using a plant form that is unnatural for a dandelion. Here, the same phenomenon can be recognized as also became visible in the previous examinations with the thorny stem: if the upper end of the form is correct and consistent with the lower end of the dandelion drawing, a connection can be recognized. Unlike with the thorns on the stem of the experiment above, the stem in Figure 25 is only different through the slender attachment of a leaf. The connectability thereby seems even easier. Here, the fact that the leaf that is cut off by the format does not appear in the image on the left – and therefore a seamless transition is not possible – does not seem disruptive. Instead, a section that is not visible between the two images is assumed.

## 6. Qualifications

The present study enables a first impression into inter-image processes and shows differentiable conditions that enable mechanisms of connection between images, knowing that only a small number of image parameters have been observed here. Additional iconic characteristics were considered in the frame of the study – for example, the distance between the lines in the picture on the right, also the parallelism of the two lines or the flatness and three-dimensionality of the depiction – which however were not illustrated here. The present observations allow inferences to be made that go beyond the scope here, for instance, what an important influence color could have on possible connections between images. During the study, new questions likewise became visible: for example, whether the premises under examination here are valid for all types of connection. If one assumes differentiable mechanisms of image linking as are sketched in section 4, the question is raised as to which prerequisites a connection requires that arises because of a mental construct. It can be supposed that the presence of formal analogies likely prevent a connection by a mental construct since this subliminal connection possibility inhibits a cognitively more demanding action.

The present study involves an artificially created situation that explicitly seeks, or even forces, a connection between the images that would not be encountered in this way in reality. Most often, images that coincidentally appear side by side differ from one another in many respects. Image technology, image structure, coloration, etc., frequently show no analogy whatsoever. And nevertheless, surprising connections repeatedly arise due to simple, formal iconic factors. Therefore, this examination creates a frame to make iconic mechanisms visible on an iconic level, which, in an applied situation – such as two pictures appearing in a two-page spread of a textbook or in browser windows that are open simultaneously – and therefore, a much more complex composition, cannot be discovered. The strength and the influence of combined aspects of images upon the mutual influence of image meaning becomes observable in an artificial constellation in which the mechanisms are changed individually and can be compared.

It must be said in qualification that in an experimental setting, where the images (here, the simple line drawings) present the translation of a real object into an illustration, formal pictorial characteristics can appear more dominant than botanical correctness. In such a context it is conceivable that visually recognizable aspects of the image are weighted more strongly than those that elicit a cognitive processing action. Priming also plays a role. If, in the study, the question is repeatedly raised as to whether a part of the dandelion or a stem-like form can be recognized in the picture on the right, it becomes easier to see it this way over time.

## 7. Eye-Tracking Study

The study in iconic practice that is presented here has an explorative character, which searches for fundamental mechanisms of connection between images and analyzes them using the methodology of 'practice-led iconic research'. By means of this approach, image phenomena are discovered that are generally not yet verbally graspable. Building on the insights of the practical examinations, hypotheses can be formulated as a starting point for further research.

The subjectivity of the observations in the context of practice-led iconic examinations remains an important factor that is subject to controversial discussion. In a situation in which the pictorial experiments are analyzed by the person performing the study, the question about subjectivity remains and cannot be excluded. The present practical study makes no claim to objectivity, but rather encourages the viewer to test the presented pictorial mechanisms on him or herself, to experience and question them in a similar way as can be practiced when looking at the "gestalt laws" formulated by Max Wertheimer and his colleagues (see above).

An objectivization of the results of the practice-led iconic analysis can be attempted through empirical study with test subjects. Based on the results of the presented practice-led work, different hypotheses could be posited for a consequential study, of which an outline is presented here as an example: "If an analogy of directional vectors exists between the images, a connection between the images becomes visible" (H1) and "The upper end of the target image has to match with the corresponding part of the initial image to make a linkage between the images perceivable" (H2) can be described as two different hypotheses. In a pre-test using eye-tracking, 12 test subjects – 6 experts (students at the FHNW Academy of Art and Design) and 6 novices (students at the Department of Psychology, University of Basel) were shown a selection of the image pairs shown above. The description of the study was adapted to the context of this article and does not follow the guidelines that are standard in psychological publications. It is meant as an outlook on how empirical study could be done based on the practical results. With a sample size of 12 subjects, no statistically significant results are expected, and the collected data was therefore descriptively examined.

### 7.1 Procedure of the Pilot Survey

The test subjects were asked to sit in front of the test monitor in the laboratory.<sup>1</sup> After a process of validation and calibration, a greeting text on the screen informed the participants about the task and procedure of the study. Each of the stimuli consisted of a pair of images shown above with which

<sup>1</sup> These analyses were done in the eye tracking laboratory in the Department of Cognitive Psychology, University of Basel.

Figure 26

saccade recording in response to a stimulus on hypothesis H1, novice group.

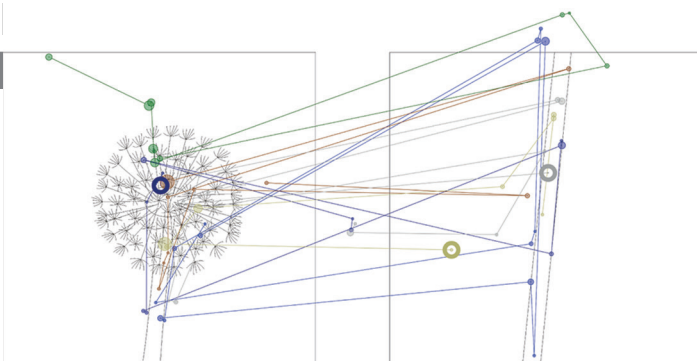
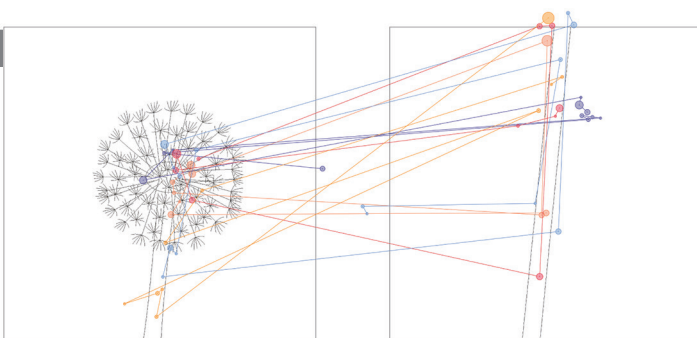


Figure 27

saccade recording in response to a stimulus on hypothesis H1, expert group.



the test subjects were individually presented, at random, for 5 seconds. After each viewing, the subjects were asked to state on a binary scale (yes/no) whether they perceived the two drawings as part of a single image or not. After the question was answered, the next stimulus appeared.

## 7.2 Results of the Eye-Tracking

### Pre-Study

The eye movements when looking at the stimuli for testing the analogy of directional vectors (H1) depicts that the test subjects particularly scrutinized the orientation of the form in the image on the right to make the decision as to whether the two images could be considered to belong together or not. (see Figures 26 and 27).

The fixations on the stimulus for the testing of correspondence of the upper end (H2) show that the test subjects particularly scrutinized the area at the upper edge of the picture where the form is cut off by the frame. Here, the data from both groups (novices and experts) are represented together (Figure 28).

Visual similarities are processed at an early stage of perception before the test subjects become aware of them. These perceived similarities are lost in the course of further processing or are submerged under conceptual associations. However, the early stages of processing influence

Figure 28

fixation on a stimulus for the testing of the hypothesis on the upper end (H2).



eye movements, which the acquisition of eye-tracking data for the study of these processes confirms (Handerson & Hollingworth, 1999; Indurkha & Ojha, 2013). The recording of eye movements enables the acquisition of visually simply accessible data and its transference into quantitative data. An examination of the descriptive data shown here assists the supposition of the rightness of both hypotheses. A statistical evaluation of the values was not carried out on the pre-test.

The question of whether the test subjects feel that the image pairs belong together could also be tested by means of a questionnaire. But analysis through eye tracking additionally enables the acquisition of data about specific areas of scrutiny within the images and the placing of these in connection with the connectability of the two images that the participants perceived.<sup>2</sup>

## 8. Conclusion

In the preceding practice-led study, it was asked whether formal preconditions for a connection between images can be differentiated. This question can be answered clearly in the affirmative, and first premises can be presented by category. Similarity is an important factor with respect to a perceivable connection between images: similar vectors of movement within the images are an essential conducive factor; as well, identical grey-scale values of the lines and the ability to perceive the same spatiality in the two images are of significance for a connection. The elements of linkage are simple, basic image characteristics, and they generate a powerful connection between two separate images through similarity. Formal mechanisms of connection by means of similarity were already observed by Rudolf Arnheim: "Any aspect of percepts – shape, brightness, color, spatial location, movement, etc. – can cause grouping by similarity. A general principle to be kept in mind is that although all things are different in some respects and similar in others, comparisons make sense only when they proceed from a common base. . . Comparisons, connections, and separations will not be made between

2

An exhaustive description of the setting and the results is not provided within the scope of this publication as the pre-test is meant to illustrate a possible continuation of the practical study but has not yet been constructed as an empirical study jet.



unrelated things, but only when the setup as a whole suggests a sufficient basis (Arnheim 1974, 79). Expanding upon Arnheim's fundamental observations, the present study demonstrates that formal similarities operate not only within single images, but also beyond their boundaries, inducing a connection between elements of neighboring images. If, in his experiments, Arnheim was able to prove that a similar orientation or analogous form groups objects within an image, in this present study a further effect of analogy becomes evident: not only is it able to bring different objects in different pictures into mutual connection; the grouping because of a similarity also has an effect on the meaning of the picture. Formal correspondence can have the result that one image connects with another, neighboring or remembered image, and by means of this linkage a different meaning is ascribed to the images. Two different processes may be distinguished: on a purely visual level, a connection between the images is made on account of similarities. Once such a connection exists, the second process begins, building on the first: the change of the image's meaning. This mechanism is particularly conspicuous if the first image has an undefinable or ambiguous statement. The forms on the right side of the first three test series (4.1-4.4) – two parallel lines – are open and only receive a clear attribution through the connection to the image on the left. The ambivalence of the right-hand image is resolved through the connection to the left-hand image. In the last test series on botanical correctness (4.5), another aspect becomes evident: here, if there is a correspondence of formal aspects – the orientation of the form within the format or the line strength of the two drawings is identical – a connection between the images becomes perceptible. Although the viewer knows from experience that a dandelion does not have thorns, it is possible for him or her to recognize the two drawings as different sections of the same plant. Here, it becomes demonstrable that, on account of formal analogies, natural laws can be "overlooked" and "erased." An ambivalence between knowledge and perception is provoked. Pictorial characteristics such as line strength or vectors of movement within the images are indeed very simple, but they have the power to upstage botanical laws and assign a new meaning to an image that fits the formal circumstances. A connection between pictures can thus easily be generated through the similarity of specific iconic elements. Once a linkage exists, a change in an image's meaning becomes possible. If the idea is taken further that a connection between two images is possible by simple means and that, through linkage, a change in a picture's meaning can be achieved, it becomes evident how easily an ambivalent image can be manipulated in its meaning, and what influence is thereby granted to line strength and the vectors of movement within the image.

\_\_\_\_\_ In Figures 19 and 20, another mechanism of perception can be observed. While it is easily possible to perceive the two images in Figure 19 as a whole, this is not the case in the connection between the images in

Figure 20. Why not? The theory of embodiment, which was developed by Mark Johnson and George Lakoff, offers an explanation here: "An embodied view of meaning looks for the origins and structures of meaning in the organic activities of embodied creatures in interaction with their changing environments. It sees meaning and all our higher functioning as growing out of and shaped by our abilities to perceive things, manipulate objects, move our bodies in space, and evaluate our situation." (Johnson 2007, 11ff). Accordingly, the human capacity to recognize meaning in the environment is located deep in a person's own bodily experience with the surrounding world. The orientation of the human body in space leads to a fundamental understanding that growth is experienced as a process with a vertical elongation upward and that the head of an organism subject to this mechanism is located at the upper end. Building on this, it becomes understandable that the image on the left marks the upper termination of the two images and the one on the right marks the lower. Another item of knowledge anchored in a person's interaction with his or her own sphere of experience is that the upper termination of growing organisms, as a rule, become narrower at the top. So, to be able to interpret the form on the right as a stem, it cannot become wider toward the top, since it then would neither fit together with the lower termination of the image on the left, nor would it correspond with the natural organic laws of growth. However, it is strange that botanical correctness in series 4.5 is circumvented to enable an adequate connection, whereas in Figure 20, deeply rooted knowledge about fundamental natural forms and mechanisms makes it impossible to connect the two images into a whole. It is possible that here the difference between knowledge rooted in the body and knowledge that is cognitively learned is making itself shown: corporeal knowledge that is built through interaction with the environment and that suggests that growth must follow naturally conditioned laws is absolutely fundamental and unavoidable. However, the learned and more specific knowledge that a dandelion has no thorns can be ignored for the sake of a corresponding composition.

\_\_\_\_\_ The methodology of 'practice-led iconic research' allows us to answer questions arising from an applied field but is also qualified for research on image perception in general. The study that was presented here is situated in the field of iconic research and was designed to approach the question of how images interact. The findings may be directly applicable to image production, but they primarily encourage designers to question how they place images in books, magazines, or in an exhibition context and to look at the effect those decisions have on the meaning of an image.

## References

- Rudolf Arnheim, *Art and Visual Perception. A Psychology of the Creative Eye*, Berkeley 1974.
- Lena Bader, Martin Gaier, Falk Wolf, (Ed.): *Vergleichendes Sehen*, München 2010.
- Anique Bosschaert, Valentie en tekst-beeldcongruentie in kranten. Hoe de keuze voor, het begrip, de herinnering, de geloofwaardigheid en de waardering van krantenartikelen word beïnvloed, Amsterdam 2014.
- Uta Brandes, Michael Erlhoff, Nadine Schemmann, *Designtheorie und Designforschung*, München 2009.
- David Ganz, Felix Thürlemann (Ed.): *Das Bild im Plural. Mehrteilige Bildformen zwischen Mittelalter und Gegenwart*, Berlin 2010.
- Stephanie Geise, Katharina Lobinger (Ed.) *Visual Framing. Perspektiven und Herausforderungen der Visuellen Kommunikationsforschung*, Köln 2013.
- Johannes Grave, Arno Schubbach, Zug um Zug – Vergangenheit im Bild, in: Peter Geimer, Michael Hagner (ed.), *Nachleben und Rekonstruktion. Vergangenheit im Bild*, München 2012, S. 71 - 92.
- John M. Handerson, Andrew Hollingworth, High-level scene perception, in: *Annual Review of Psychology*, 50, 1999, 243-271.
- Hloucal, Teresa-Maria, Kontextabhängigkeit visueller Wahrnehmung: Der Einfluss der aktuellen Befindlichkeit auf die Wahrnehmung neutraler Stimuli in free-viewing-tasks; eine Eyetrackingstudie, Dissertation, Osnabrück 2010.
- Bipin Indurkya, Amitash Ojha, An Empirical Study on the Role of Perceptual Similarity in Visual Metaphors and Creativity, in: *Metaphor and Symbol*, 28:4, 2013, 233-253.
- Mark Johnson, *The Meaning of the Body. Aesthetics of Human Understanding*, Chicago 2007.
- Wolfgang Metzger, *Psychologie. Die Entwicklung ihrer Grundannahmen seit der Einführung des Experiments*, Darmstadt 1954.
- Margarete Pratschke, Bildanordnungen, in: Horst Bredekamp, Birgit Schneider, Vera Dünkel (ed.), *Das Technische Bild. Kompendium zu einer Stilgeschichte technischer Bilder*, Berlin 2008, S. 116 -119.

Michael Renner, Practice-led Iconic Research, in: *diid, disegno industriale industrial design* Rdesignpress, 41, 2010, S. 76 - 82.

Claire Reymond, Bild und Bild. Eine Untersuchung zwischenbildlicher Prozesse, in: *Medienpädagogik. Zeitschrift für Theorie und Praxis der Medienbildung*, Themenheft 23, 2013.

Lulu Rodriguez, Daniela V. Dimitrova, The levels of visual framing, in *Journal of Visual Literacy*, Volume 30, Number 1, 2011, 48 - 65.

Joost Schilperoord, Alfons Maes, Heleen Ferdinandusse, Perceptual and Conceptual Visual Rhetoric: The Case of Symmetric Object Alignment, in: *Metaphor and Symbol* 24, 2009.

Felix Thürlemann, Zur Einführung. Singular und Plural der Bilder. Mehrteilige Bildformen zwischen Mittelalter und Gegenwart, in: David Ganz, Felix Thürlemann (Ed.), *Das Bild im Plural*, Berlin 2010, S. 7- 38.

Felix Thürlemann, *Mehr als ein Bild. Für eine Kunstgeschichte des hyperimage*, München 2013.

Karl Voll, *Vergleichende Gemäldestudien*, München 1907.

Gerd Wenninger (Red.), *Lexikon der Psychologie in fünf Bänden*, Heidelberg/Berlin 2001, Bd. 3, S. 49.

Heinrich Wölfflin, *Kunstgeschichtliche Grundbegriffe. Das Problem der Stilentwicklung in der neuen Kunst*, Basel/Stuttgart 1985.

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