# Making Sense of the Modernist Muse

## Creative Cognition and Play at the Bauhaus

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In a review of the methodology of the Bauhaus (Germany's famous art school of the Weimar Republic era) in light of more recent scientific research on creativity and especially in light of the work of László Moholy-Nagy, the author examines the emphasis the school placed on play and positive emotions and concludes that it evinced a highly sophisticated understanding of creative cognition half a century ahead of science. He thus questions the modernist and rationalistic paradigms into which the Bauhaus has been enshrined and discusses its true relationship to the idea of play. **Key words**: Bauhaus; cognition; creativity and play; László Moholy-Nagy; philosophy; photography

The Bauhaus, Weimar Germany's iconic modernist school, which operated from 1919 to 1933, pioneered the integration of industry, science, and design. In this article, I focus on László Moholy-Nagy, one of the more prominent Bauhaus artists and pedagogues, who played a key role in formulating the Bauhaus philosophy. Moholy-Nagy had a particular enthusiasm for formalist photography and led and developed the *Vorkurs* (preliminary course), the cornerstone of Bauhaus pedagogy. While often characterized as a utopian rationalist in traditional art-historical accounts, Moholy-Nagy's photographic formalism and visual pedagogy, which he developed in *Painting, Photography, Film,*[1] *The New Vision,*[2] and *Vision in Motion,*[3] are not pleas for rationalism; they reveal, instead, visionary insights into the mechanisms of creative cognition such as disinterestedness, conceptual recombination, categorical reduction, and, perhaps most importantly, the importance of play to creativity.

Many scholars, such as Pelle Ehn in his "Manifesto for a Digital Bauhaus,"[4] still broadly admire the Bauhaus's integration of industry, science, and design, yet view it aesthetically as firmly entrenched within the narrow confines of rationalist modernism, "a democratic failure diminished to an elitist program of 'hard' regular geometric white shapes in steel, glass, and reinforced concrete."[5] Indeed,



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the general, conventional portrayal of the Bauhaus describes its aesthetics not just as this embodiment of rationalistic, hierarchical, rule-driven modernism, but further as a functionalist dogma devoid of symbolic communication and historical consciousness, one characterized by "an unquestioning faith in modern science as the logical and seemingly omnipotent discipline par excellence. . . with which artists were prepared to renounce nature as a logical consequence of the already predominating influence of the machine."[6]

This view owes much to the Western tradition that correlates creativity with mystery and madness, exceptionalism, uninhibited subjectivity, and "the spontaneous overflow of powerful feelings."[7] However, this perspective neglects or misunderstands key features of the Bauhaus philosophy and methodology, especially those that emphasize a playfulness no less profound and fertile for its use of technology as instrument and experimentation as method. Moreover, in recent decades, cognitive psychology has researched and formulated principles governing creativity much more closely aligned with the Bauhaus approach than with the views of its critics or with the traditional classical, romantic, and psychoanalytic notions of creativity still prevalent in art history. I suggest that both the school and its representatives were active proponents of the processes and methods we consider today hallmarks of play, and that this reveals the Bauhaus's visionary understanding of creativity, a view confirmed by more recent research into human cognition.[8]

Although many continue to consider the Bauhaus errant and dehumanizing, some critics questioned that paradigm as early as the 1920s. In fact, Walter Gropius, founder and first director of the Bauhaus, objected to hiring Theo van Doesburg, founder of the Dutch art movement De Stijl (Dutch for "The Style," an art movement also called neoplasticism), because Gropius found van Doesburg's bare idealization of geometry too dogmatic and reductive, despite great affinities between their aesthetic visions.[9] A similar debate on rationalism erupted in 1953, when the former Bauhaus student Max Bill invited Danish painter Asger Jorn to join the faculty at the *Hochschule für Gestaltung* (School of Design) in Ulm, Germany, where the Bauhaus tradition continued in postwar Germany. Jorn, one of the founders of Situationism, vehemently opposed the functionalist and rationalist curriculum proposed by Bill and accused him of perpetuating the rationalist myth of the Bauhaus and of misrepresenting its original spirit, which mixed expressionist influences—such as experimentation and exploration—with functionalist ideals. After Bill resigned in 1957, Tomas Maldonado introduced a methodology called scientific operationalism, which "was rooted

in semiotic and information theory, and purged of the aestheticized idealism implicit in Gropius's Bauhaus."[10]

The rationalistic portrayal of the Bauhaus has proven remarkably persistent, even though, more recently, several scholars have questioned this traditional interpretation. Alain Findeli discusses Moholy-Nagy's design pedagogy in the context of Johann Wolfgang von Goethe's *Naturphilosophie* and John Dewey's pragmatics and concludes that it combines both technical skill with aesthetics and ethics and allows students to become artist-designers sensitively attuned to the complexity of a rapidly evolving society.[11] Typically, scholars regarded the choreography of Oskar Schlemmer, master of form at the theater workshop, "as a now familiar statement of dehumanization, with bankrupt choreography."[12] Juliet Koss, by contrast, suggests that the costumes "re-created the human body—literally and symbolically, onstage and off—in the shape of the doll, a creature embodying both empathy and estrangement."[13] Kevin Moore, too, questions the rationalist paradigm of the Bauhaus by pointing to the playfulness inherent in Moholy-Nagy's photographic experiments, noting that "photographs at the Bauhaus convey a disorienting sense of subjective vitalism, fragmentation, and irreverent humor."[14]

Moore's research presents Moholy-Nagy's photography in a refreshingly positive manner and quite accurately identifies the playful element that art historians have characterized as joylessly formalist. However, Moholy-Nagy's photography was not merely playful; he writes insightfully about the character of creative cognition and the way in which the playful use of the camera can liberate the creative imagination. He is not only aware that cognition and perception can have a negative impact on creativity and imagination, he also redefines creativity along lines that are closer to current trends in cognitive psychology than to the more romantic and mystical views shared by many of his predecessors and contemporaries.

## The Self: A Barrier to Creativity

From a cognitive point of view, creativity is typically described as a process of combination, one that blends seemingly incompatible concepts together to produce surprising new meanings[15] and one through which "properties often emerge in a combination that were not evident in any of its constituents."[16] Classical, romantic, and psychoanalytic notions portray our creative imagina-

tion as freewheeling, unpredictable, and mysterious, attributing the source of creative insight to a supernatural force, a muse, or the unconscious. Cognitive psychologists, by contrast, would argue that creative insights are always limited by our conceptual space; the range of computational possibilities our minds can hold is constrained and structured by experience, memory, education, culture, language, and habit.[17]

Our imagination is also limited by a range of cognitive principles that allows us to master everyday tasks with expediency and efficiency. We create conceptual categories according to cognitive economy—to the detriment of creativity. We could categorize a collie as a mammal, animal, or organism, but we tend to think of it as a "dog." This is the level of categorization—known as the basic level—most suitable for everyday life.[18] We also correlate certain attributes according to what Eleanor Rosch calls our perceived world structure: "The perceived world is not an unstructured total set of equiprobably co-occurring attributes," as Rosch points out, "rather, the material objects of the world are perceived to possess . . . high correlational structure."[19] Wings are, for example, perceived to occur more frequently with feathers than with fur, hence cognitive categories are structured accordingly.[20]

Associative thinking is often equated with flights of the creative imagination, as in James Joyce's stream-of-consciousness or Marcel Proust's interconnecting of memory and sensation. But, although creative thinking certainly associates unusual concepts into surprising combinations, creativity is often impaired by "steep associative hierarchies"[21]—the typical and conventional associations we conjure up subconsciously and automatically. Principles such as "the basic level" or "perceived world structure" are mental shortcuts, most helpful when dealing with commonplace situations that require immediate decision and action, but they also result in naïve theories about how the world works.

In addition to such cognitive mechanisms, a whole range of principles of visual organization deliver a biased and structured interpretation of the visual world. These basic principles of Gestalt theory[22] include the law of proximity (the tendency to see objects in close proximity to each other as belonging to a group), the law of closure (our inclination to perceive partial objects as complete), the law of continuity (a cross, for example, we see as two intersecting lines rather than four individual lines) or the law of *prägnanz*, which stipulates that our perception of a visual field necessarily distinguishes between figures and grounds, making it impossible to view the ground without inverting the relationship and transforming the ground into the figure.[23]

Moholy-Nagy was very aware of the mental shortcuts our minds use and how they restrict flexible rearrangement of concepts into unusual and novel constellations. He points out that "the eye, together with our intellectual experience, supplements perceived optical phenomena by means of association and formally and spatially creates a conceptual image,"[24] which stultifies our imagination. This prevents us from what he refers to as "productive creativity"—"establishing new relationships between the known and the as yet unknown optical, acoustical, and other functional phenomena."[25] This passage is not only insightful in its acknowledgement of the counter-creative effects of cognition and perception, but Moholy-Nagy's demystified and prosaic definition of creativity as a process of combination anticipates the definitions advanced by cognitive psychologists several generations later.

## The Real Muse: Formalism and Objectivity

Moholy-Nagy approached the problem of the conceptual image with brilliant ingenuity: the medium of photography offered a unique way of unleashing the creative imagination. By viewing the world through the camera lens, "we may say that we see the world with entirely different eyes,"[26] Moholy-Nagy proclaims. By placing a frame around the phenomenal world and exploiting the differences between human and camera perception, the camera lays bare the stereotypical and anthropocentric point of view with which we conventionally perceive our environment: "In the photographic camera we have the most reliable aid to a beginning of objective vision. Everyone will be compelled to see that which is optically true, is explicable in its own terms, is objective, before he can arrive at any possible subjective position."[27]

Whether the camera truly delivers an objective image of the world is, of course, philosophically questionable, but it is certainly less tainted by associations, memories, or ideologies than using the camera as a representational and documentary medium; it thereby enables the viewer to look at the world from a novel perspective, thus helping him or her restructure the relationships within an image by deactivating prior intellectual experience.

In Moholy-Nagy's formalist photography, our established mental categories are defamiliarized, and we experience our surroundings not in terms of the basic level, but at levels of categorization that we normally would not consciously entertain. In figure 1, for example, we do not see a domestic cat but a luscious

Figure 1. Negative photograph of a cat, by László Moholy-Nagy, ca. 1926. In *The New Vision* by Moholy-Nagy, 2005, 41. © Laszlo Moholy-Nagy/Billedkunst.dk 2014.

Figure 2. The *Empress of Australia* by László Moholy-Nagy. In *The New Vision*, by Moholy-Nagy, 2005, 44. Copyright Weltspiegal. Source: Klassik Stiftung Weimar.

texture molded into a feline shape of sculptural quality. In figure 2, we do not see a photograph of the proud *Empress of Australia* gliding majestically across the ocean but observe the rippled surface of a liquid that engulfs a delicately pointed and roughly hewn wedge and its gentle piercing of the surrounding matrix.

Thomas Ward emphasized the importance of overcoming the conceptual image, basic levels of categorization, or perceived world structures in a study he conducted that invited college students to let their imagination run free and draw fantasy animals on an alien planet.[28] When given the opportunity to indulge in the most fanciful flights of the creative imagination, students produced fantasy aliens that were remarkably unimaginative and surprisingly similar to real animals. Neither did the fantasy animals vary much across the fifty participating students, even when conditions on the alien planet were specifically described as very different from those on earth; most included bilateral symmetry, appendages, and eyes and ears. If asked to imagine a feathered animal on a very different planet, participants tended to give it wings and beaks but no ears. They usually gave intelligent animals a humanoid form and clothing to wear and allowed them to communicate. The students also envisioned the young members of an alien species as having larger heads in relation to their bodies than adults, as is the case with many familiar, earthbound species.

Finke, Ward, and Smith suggest that the students were not just falling victim to well-established and entrenched categories of what an animal ought to look like and how it ought to behave but were also being influenced by a variety of anthropocentric beliefs (such as that vision is more important than hearing) and observed correlations between attributes (such as feathers, beaks, and flight).[29] Because we perceive the world to correlate attributes (such as feathers and flight), we easily and subconsciously develop naïve theories about the world, such as that feathers must have evolved to allow animals to fly. In reality, there are a variety of conflicting theories, such as that feathers evolved to insulate against heat loss or to enhance aerodynamics.[30]

Moholy-Nagy's enthusiasm for objective vision may sound reductive, formal, and rationalistic, but in the context of his arguments, it is the portal to creative cognition rather than an embrace of rational thought. Since the camera lens does not operate according to human principles of perception, photography has the unique and uncanny ability to reproduce our immediate surroundings from a less egocentric and anthropocentric perspective. The frame of reference of our visual surroundings is reframed through the act of framing.

His photographs do not, however, simply frame our everyday surroundings in unusual ways; they defamiliarize the mundane or familiar by bypassing the visual principles of organization that force us into perceiving the world as a gestalt: "The view from above, from below, the oblique view . . . often disconcert people who take them to be accidental shots. The secret of their effect is that the photographic camera reproduces the purely optical image and therefore shows the optically true distortions, deformations, foreshortenings, etc."[31]

The most fundamental difference between the mechanical and the human eye lies in the absence of three-dimensional perspectives. The camera strips humans of one of their most fundamental means of perceiving the world: stereoscopic vision, or our ability to perceive three dimensionally due to the distance between our eyes.

The photograph of Marseille (figure 3) is shot through the wrought iron banister of a balcony. Stereoscopic vision would normally detract attention from the delicate pattern it confers upon the street. A casual glance would either dissolve the banister or obliterate the street. It is only in this photograph that one obtains a sense of here-ness on the balcony and simultaneous there-ness on the street. Bypassing principles of visual organization directly influences cognition and category formation. Following Rosch's theory of cognitive economy we might normally categorize the banister as a structural support and a security feature, but, in the photograph, it emerges as a carefully crafted ornament that highlights the role of the balcony as a transitional space and intimate vantage point between apartment and city, while also enchanting the urban streetscape by overlaying an arabesque pattern.

Human vision is not only stereoscopic, but anisotropic; it is bottom-heavy in character. Two identical objects will, for example, look unbalanced if we place one above the other—the higher object will have to be lighter (in size or color) because our vision prefers that which strives downward. Similarly, we perceive a cube as more stable and balanced than a diamond, even though the latter is merely a rotated cube.[32]

Manipulating the anisotropic character of our vision is a hallmark of Moholy-Nagy. He often frames his photographs diagonally and creates a disorienting effect that forces viewers to establish or re-create a frame of reference. The passersby in *White Diagonal* (figure 4), limited by their anthropocentric perspective and vision, would remain unaware of the geography they are traversing, but the bird's perspective, together with the anisotropic manipulation, create the impression of an almost surgical collision of asphalt and nature, with the latter

Figure 3. *Marseille* by László Moholy-Nagy, 1928. © Laszlo Moholy-Nagy/ Billedkunst.dk 2014.

Figure 4. *White Diagonal* by László Moholy-Nagy, 1940. © Laszlo Moholy-Nagy/ Billedkunst.dk 2014.

bleeding onto the walkway in irregular patches of dampness, an evocative and indeterminate composition of organic and geometric shapes and textures. The cognitive category of "park" is softened; it is both a network of walkways superimposed upon a green space as much as asphalt barriers constraining nature.

In the opening scene of his graphic film sketch, or "typophoto," *Dynamic of the Metropolis* (1921–1922), Moholy-Nagy manipulates the laws of *prägnanz* and grouping. The film begins with an "animated cartoon of moving dots, lines, which, seen as a whole, change into the building of a zeppelin."[33] The law of *prägnanz* stipulates that our perception of a visual field necessarily distinguishes between figures and grounds, while proximity describes the tendency to see objects in close proximity as belonging together. As the animated cartoon progresses, these principles of visual organization create a figure-ground illusion in which the two-dimensional image of simple abstract shapes suddenly emerge as

an intricate three-dimensional figure of considerable depth of field—a sophisticated demonstration of how visual heuristics determine category formation and how what we see determines what we think.

Moholy-Nagy's photography may appear cool and harsh, but it is precisely such coolness that liberates the creative imagination by avoiding the pitfalls of "the conceptual image" to which the participants in Ward's alien-planet study fell victim. Aspiring towards objectivity may contradict traditional notions of creativity as unrestrained, uninhibited, cathartic, and emotional, but it certainly tallies with neuroscientific research that has linked creative insight to low cortical arousal.

Creative insights usually occur when we are not actively concentrating on a problem, when our mental and visual attention is not focused. Using electroencephalography (EEG), Kounios and his collegues[34] have demonstrated that occipital beta- and alpha-band activity, which is responsible for focusing attention and inhibiting processing of peripheral visual information, becomes particularly low among insight-based, creative problem solvers. Such a disinterested and unfocused state of mind results in absorbing much more varied, peripheral, and indiscriminate visual information and allows the subconscious mind to experiment with unusual combinations of concepts without being filtered through individuals' intellectual experience and conceptual image of themselves. In fact, the cortical arousal of insight-based thinkers registers lower during creative problem-solving tasks (such as the Alternate Uses Test) than their baseline recording (in stark contrast to analytic, accretive problem solvers, whose attention and cortical arousal are high when problem solving).[35]

Moholy-Nagy's photographic pedagogy, his New Vision, is, in this sense, an externalization of a principle of creative cognition. The camera eye simulates the way in which high-creative individuals perceive the world, its objectivity is analogous to the low cortical arousal and defocused visual attention of creative individuals; just as highly creative individuals perceive the world disinterestedly, the view through the mechanical eye guides one away from basic levels of categorization and stereotypical associations. "Everyone is talented," Moholy-Nagy proclaims and calls the camera "the most reliable aid to a beginning of objective vision. . . . We may say that we see the world with entirely different eyes."[36] While such enthusiasm may sound utopian, I would call Moholy-Nagy's New Vision merely unromantic; his demystification and democratization of creative cognition is certainly not a eulogy to rationalism.

## The Preliminary Course: Creativity, Categorical Reduction, and Play

While Moholy-Nagys's New Vision stimulates and trains the disinterested state-of-mind conducive to creative insight, the Bauhaus preliminary course, which he taught with Josef Albers from 1923 to 1928, distills the very essence of creative problem solving. Its methodology and exercises externalize the combinatorial nature of creativity and integrate categorical reduction and play, which are among the most important companions of creativity.

Finke, Ward, and Smith define categorical reduction as "a shift from categorizing an object at the basic level to categorizing it more abstractly in terms of its underlying or constituent properties."[37] If one were to attempt to imagine an animal on an alien planet, a creative point of departure might be to think of the animal not as something requiring a head, legs, and eyes, but as an organic mechanism that converts energy, an entity that projects itself through space, or living matter requiring a means of orientation and protection. Such an abstract approach helps overcome the constraints of mental categories, perceived world structures, or naïve theories.

The Bauhaus is typically described as quintessentially modernist because of its enthusiasm for basic shapes, primary colors, and rules and theories. From the perspective of creative cognition, however, such an approach is not a matter of taste or zeitgeist, but simply sensible and intrinsically creative; its methodology instantiates the principle of categorical reduction at its very core. At the Bauhaus, students could devote their studies to a specialized medium (such as textile, wood, stage, light) only after successful completion of a year-long preliminary course, which represented a categorical reduction of visual media itself. In these first two semesters, students were introduced to the most basic ingredients of art and design: line, tone, color, structure, texture, surface treatment, and volume.[38]

Johannes Itten, who first developed the preliminary course between 1919 and 1922 and was known as the Master of the Art of Color, investigated the relationship between color and form in the most categorically reduced sense. His points of departure were basic geometric shapes—the circle, square, and triangle—and the colors of the spectrum. Russian painter and art theorist Wassily Kandinsky, who also taught color and form in the preliminary course, would first consider form and color separately, then progress to an investigation of the relationship between the two and ultimately consider their relationship to the

background. "This was undertaken," as art historian Frank Whitford observes, "in a carefully structured, almost scientific way."[39] And Master of Form Paul Klee, who taught at the Bauhaus from 1921 to 1931, would similarly begin from the most basic and abstract: the point, a point in motion (a line), and three basic subtypes of lines—active (nondirected), passive (colored form), and medial (describing a form).[40]

One of Moholy-Nagy's contributions to the preliminary course was the espousal of biotechnics, a term coined by the philosophical biologist Raoul Francé.[41] Francé argued that all living systems could be understood as complex arrangements of seven basic, biotechnic shapes: crystal, sphere, cone, plate, strip, rod, and spiral. Nature, Francé believed, could inspire innovation, because the principles of evolution had developed highly creative, surprising, and efficient solutions to many problems of engineering. Peridinida, a type of plankton with flagella as propulsion, could, for example, serve as models for new types of turbines.[42] Modeling even such sophisticated structures merely required a complex elaboration of the elementary biotechnical shapes. The art historian Olivar Botar argues that Moholy-Nagy's interest in Francé's work documents a bioromantic inclination;[43] I suggest that Moholy-Nagy recognized in Francé's work a description of the basic mechanisms of creativity—its combinatorial nature and its reliance on categorical reduction—and instantiated these so-called biotechnical elements in the preliminary course.

Moholy-Nagy gave students simple geometric shapes from a variety of materials and textures—cardboard, wood, metal, rubber, glass, textile, paper, plastics—and asked students to improvise with them. In other words, he asked them to engage in undirected constructional and object play. They thereby cultivated an awareness of a work's structure, texture, volume, surface, and color, often resulting in surprising formal and functional experiments. Improvising with such elementary structures allows truly imaginative constellations because they operate below the radar of mental categories, associations, or naïve theories. The more basic and reductive the elements, the broader the range of possibilities for which they can be put to use, resulting in unusual experiments (many of which are published in *The New Vision*, such as Niedringhaus' spatial exercise[44] or Mizutani's spring-like construction).[45]

Seven decades later, psychological research provides empirical support for both Francé and Moholy-Nagy. In a series of influential studies, Finke employs an analogous and equally playful methodology in scientific research on creativity.[46] He examined creative mental synthesis with a set of fifteen different three-

dimensional shapes: simple parts (sphere, half-sphere, cube, cone, and cylinder), more specialized parts (rectangular block, wire, tube, bracket, and flat square) and very specialized elements (hook, cross, wheels, ring, and handle).[47] Participants were asked to improvise and recombine these elements mentally—three at a time—and experiment with their three-dimensional preinventive structures (essentially mental doodles) to synthesize new inventions for particular object categories, such as furniture, personal items, transportations, and appliances.

Finke's experimentation with playful improvisation included three different conditions: random category with chosen parts, chosen category and random parts, random category and random parts. A computer would generate objects in the random part conditions according to an algorithm that gave simple objects a 50 percent chance of being selected, and specialized and highly specialized objects a 33.3 percent and 16.7 percent chance, respectively. In the most successful condition—random category and random parts—48.6 percent of subjects create a practical invention, and 13.6 percent developed a creative (i.e. practical and original) invention. Finke, Ward, and Smith point out that these results are "quite remarkable, taking into account that the subjects were never told to be creative, that they were not preselected with regard to creative ability, and that they had only two minutes to perform the task."[48]

The success of the random-category and random-parts condition rests on the fact that the choice of parts remained immune to the subjects' personal preferences—that is to whether they found them pleasing, meaningful, or reminiscent of something. The random category augmented creative output, because subjects were forced to think outside the box to make their preinventive structure relate to the randomly chosen category: "Creative imagination is a highly structured activity and is thus not an arbitrary process or one that results simply from random associations among ideas. Random selection of components or interpretive categories can, however, enhance creativity by forcing one to abandon conventional ways of exploring and interpreting preinventive structures."[49]

The preliminary course was premised on a similar methodology and combined improvisation with preinventive structures (in other words, mental constructional play) in conditions similar to those of Finke's random parts and random category:"No copying of any kind is employed in this workshop, nor is the student asked to deliver premature *practical* results."[50] Just as Finke found that allowing subjects free choice of parts did not necessarily promote creativity, Moholy-Nagy embedded improvisation with constraints to guarantee an element of randomness. "Exercises in surface treatment"[51] for example, include:

1. surface treatment of paper with free choice of tools (such as needle, tweezers, sieve) used in any desired way (pricking, pressing, rubbing, filing, boring, etc.);
2. surface treatment of paper with a single tool (needle, knife, tweezers, etc., or by folding and the like);
3. surface treatment by coloring different kinds of fabric;
4. surface treatment on paper with different tools (paint brush, air brush, etc.); the same on canvas;
5. surface treatment with color and brush on different materials;
6. different surface treatment (such as with graphite, sand, wood particles, sawdust, shavings, etc., scattered on glue).

While the generation of practical results was not the primary focus of the preliminary course, improvisations with preinventive structures were often highly suggestive of practical inventions or resulted in actual innovations. "Many people will perhaps not be convinced of the justification of such exercises until some practical application is pointed out. For example: book binders and manufacturers of wrappers (for chocolate, cookies, etc.) could get attractive 'patterns' in this way"[52] (figure 5). Other practical results that were developed by students during the preliminary course include Peter Keler's famous cradle of 1922 (figure 6), which continues to be manufactured even today.[53]

While this approach may sound prescriptive and reductive, it merely betrays an understanding of the fact that our creative imagination is not entirely freewheeling but operates in a highly structured manner, one in which constraints and elements of enforced randomness can promote creativity. Like other kinds of inventive play, this approach is rule governed, while the objective for this pedagogy is "spontaneity and inventiveness." As Moholy-Nagy explains, it intends "to show the student the way to a universal outlook, to make him conscious of his creative power."[54] The participants in Finke's study certainly seem to suggest that this methodology was highly effective. They genuinely "thought that they had learned how they could be more creative as a result of their participation."[55]

Thus, the methodology of Finke and the Bauhaus highlight the importance of play behavior to creative endeavor. The psychiatrist Kay Redfield Jamison observes that play "sets and becomes the physical arena for exploring new objects and for combining physical activities with sensory activities in ways that might otherwise remain untried."[56] In *Enhancing Creativity*, Nickerson emphasizes "the

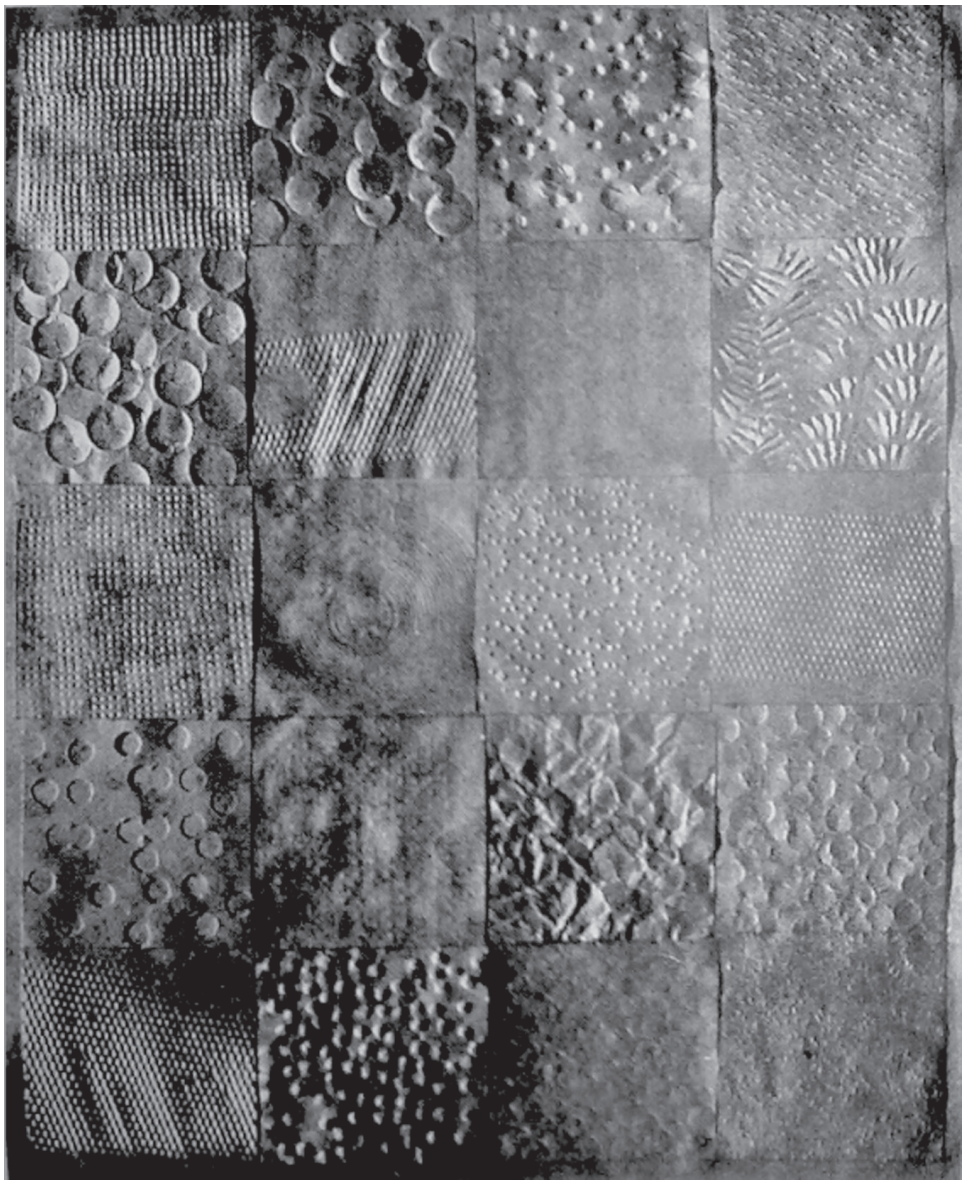

Figure 5. Surface treatments of paper by Gerda Marx in 1927, second semester, in *The New Vision* by László Moholy-Nagy, 2005, 48. © Stephan Consemüller.

importance of playing with combinations of pictorial parts in the generation of creative visual patterns" and argues that even much scientific hypothesizing

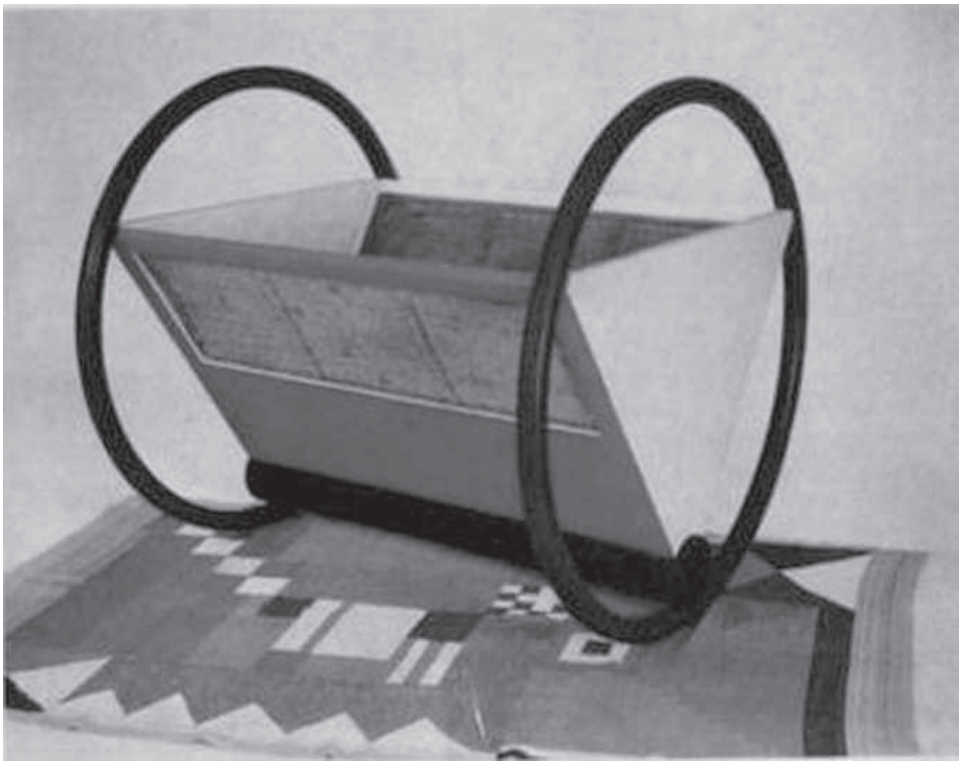

Figure 6. Cradle by Peter Keler in 1922, preliminary course, in *Crafts of the Bauhaus* by Walter Scheidig, 1967.

can be viewed as a form of "intellectual playfulness. . . . There is a great deal of whimsy and play, for example, in much of the thinking that scientists do . . . imagining oneself, for example, riding on a photon at the head of a beam of light."[57]

Finke describes his methodology as "combinational play strategy," a name he derives from the photon-riding Albert Einstein, who himself attributed his success to "combinational play."[58] Moholy-Nagy strives to reawaken this spirit of play that is lost in adulthood: "The method is to keep in the work of the grown-up the sincerity of emotion, the truth of observation, the fantasy and the creativeness of the child."[59] Oskar Schlemmer, Moholy-Nagy's collaborator at the Bauhaus who was in charge of the theatre workshop, articulates the relationship between play and creativity most succinctly when he writes about the importance

of "the play instinct . . . the source of man's real creative values, [which] is the unselfconscious and naïve pleasure in shaping and producing, without asking questions about use or uselessness, sense or nonsense, good or bad."[60]

Traditionally, play has principally been studied in relation to animals and children, and, certainly within art history, the importance of play is still underappreciated. As Brian Sutton-Smith, author of *Ambiguity of Play*, points out, "Few . . . other cultural groups are studied as players, though they are, of course, studied endlessly as actors, musicians, dancers, artists, and novelists, which may perhaps be the same thing, but the idea is not usually consciously entertained."[61] To bring behavioral research and the discourse on play into dialogue with the Bauhaus may seem almost contradictory—it sits uneasily with its image as rationalistic and scientific—but in fact it was the Bauhaus that truly appreciated the importance of play for creativity, as the astute description of Schlemmer exemplifies.

One of the hallmarks of play is its self-rewarding nature. It is an autotelic experience, and the positive emotions it engenders provide the motivation to continue engaging in apparently purposeless activities. The clinical setting of Finke's study or the reductive, formalist approach of the Bauhaus may not appear as playful as gamboling in the countryside, but both students and subjects certainly were engrossed in the peculiar state of mind that psychologist Csikszentmihalyi has called "the optimal experience of flow"—the profoundly enjoyable experience that creative activity induces, "an almost automatic, effortless, yet highly focused state of consciousness."[62]

The subjects in Finke's experiment "seemed genuinely interested in pursuing their ideas, even after the experiment was concluded. . . . Some even asked whether they were permitted to patent their inventions, if they indeed turned out to be sufficiently feasible and original."[63] Similarly, Moholy-Nagy observes: "A delightful result of these exercises with materials was the enthusiasm with which some of the students produced from a piece of valueless fire-wood, for instance, various little objects by intensive manual treatment. Often they rubbed and polished a piece of wood for days at a time, gaining in the end a lasting relationship to the material."[64] Why is the Bauhaus known for functionality when the core of its pedagogy emphasized the importance of play and apparently purposeless activities? Why is the Bauhaus known as the epitome of rationalism when it marks a watershed in the understanding of the very essence of creativity? Schlemmer wrote passionately about play, so why is his *Triadic Ballet* regarded "as a now familiar statement of dehumanization, with bankrupt choreography"?[65]

The reason may lie in the traditional notions of creativity that pervade art history. In the classical tradition, again, creative insights were believed to be the result of supernatural and mystical forces that infiltrate the artist's mind in altered states of consciousness. In the romantic tradition, the source of creativity became more closely located within the psyche of the artist, and while regarded as less supernatural, it remained fundamentally mysterious and the privilege of the typically mad genius. With the rise of psychoanalysis, the artist's madness was regarded as unresolved psychological conflict and childhood trauma, and artistic creativity was conceptualized as an expression of subconscious turmoil. Creativity was a serious business, the privilege of those kissed by a muse or traumatized in childhood, the portal to metaphysical redemption, and inherently ineffable; it certainly had nothing in common with the apparent purposelessness of children's play. To suggest that creativity could be taught and learned or subjected to the scientific method seems almost sacrilegious in the context of its historical trajectory.

The Bauhaus's enthusiasm for disinterested objectivity, formalism, and abstraction may convey the image of joyless rationalism, but it is imperative to understand the peculiarly Western discourse on creativity from which such interpretations originate. Moreover, the rationalistic portrayal of the Bauhaus conveys a rather dysphoric image of a school that was anything but anhedonic. Bauhaus artists such as Schlemmer and Moholy-Nagy not only recognized play as fundamental to creativity and life itself but represented a new generation of artists who set an end to the traditional notion of the suffering artist. "There are too many 'free artists' in the world," Moholy-Nagy observes. "They are often minor talents with minor problems and without the possibility of ever making a living."[66] Moholy-Nagy was certainly no artist with a tortured soul but intensely charismatic and passionately social. His daughter Hattula notes his "great energy,"[67] his "openness to new points of view,"[68] and his ability to "to draw people into his work . . . to convince them of the excellence of his ideas and plans."[69] Moholy-Nagy himself observes, "My strongest personality trait: that I am an optimist. What I love the most in myself is that I can be happy."[70] Moholy-Nagy may have been an unromantic artist, but he embodies a quintessentially creative personality.

I suggest that the Western tradition of correlating creativity with mystery, madness, an ineffable subconscious, and uninhibited subjectivity has distorted the intentions and achievements of the Bauhaus. Such stereotypes remain prevalent within art history even today, often with no acknowledgment of the scientific

research on creativity that has been conducted in the last half century. Cognitive psychology not only fundamentally questions traditional Western concepts of creativity but provides empirical evidence for the Bauhaus methodology as marking a fundamental and visionary watershed in the understanding of creativity. It also questions the extent to which the Bauhaus ought to be classified as modernist, utopian, or the embodiment of rationality, when its rule-driven aesthetic, its quest for universal laws and objectivity, and its seemingly formalist and reductive approach articulate basic principles of creative cognition and recognize play as fundamental epistemological principle.

## Endnotes

1. László Moholy-Nagy, *Painting, Photography, Film* (1925; repr. 1967).
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3. László Moholy-Nagy, *Vision in Motion* (1947).
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5. Pelle Ehn, "Neither Bauhäusler Nor Nerd: Educating the Interaction Designer," in *Proceedings of the Conference on Designing Interactive Systems, June 25–28, 2002, London, England* (2002), 19.
6. Steven Mansbach, "Science as Artistic Paradigm: A 1920s Utopian Vision," *The Structurist* 21/22 (1981/82): 37.
7. William Wordsworth, *The Complete Poetical Works of William Wordsworth* (1932), 263.
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9. For a discussion on the complex and ambivalent relationship between Walter Gropius and Theo van Doesburg, see Frank Whitford, *Bauhaus* (1984), 116–21.
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11. Alain Findeli, "Moholy-Nagy's Design Pedagogy in Chicago (1937–46)," *Design Issues* 7 (1990): 4–19.
12. Lincoln Kirstein, *Four Centuries of Ballet: Fifty Masterworks* (1970; repr. 1984), 214.
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16. Thomas B. Ward, Steven M. Smith, and Ronald A. Finke, "Creative Cognition," in *Handbook of Creativity*, ed. Robert J. Sternberg (1999), 202.

17. Boden, *The Creative Mind*, 4.

18. Eleanor Rosch, "Principles of Categorization," in *Foundations of Cognitive Psychology: Core Readings*, ed. Daniel J. Levitin (2002), 252.

19. Ibid., 252–53.

20. Ibid., 253.

21. Colin Martindale, "Biological Bases of Creativity," in *Handbook of Creativity*, ed. Robert J. Sternberg (1999), 139.

22. For an introduction to Gestalt theory, see Wolfgang Köhler, "Perception: An Introduction to the Gestalt-Theory," *Psychological Bulletin* 19 (1922): 531–85; Kurt Koffka, *Principles of Gestalt Psychology* (1935).

23. Köhler, "Perception: An Introduction," 554.

24. Moholy-Nagy, *Painting, Photography, Film*, 28.

25. Ibid., 20. Original emphasis.

26. Ibid., 28–29. Original emphasis.

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28. Ronald A. Finke, Thomas B.Ward, and Steven M. Smith, *Creative Cognition: Theory, Research, and Applications* (1992), 119.

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30. Walter Bock, "Explanatory History of the Origin of Feathers," *American Zoologist* 40 (2000): 478–85.

31. Moholy-Nagy, *Painting, Photography, Film*, 28–29.

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33. Moholy-Nagy, *Painting, Photography, Film*, 124.

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35. Martindale, "Biological Bases of Creativity," 141.

36. Moholy-Nagy, *Painting, Photography, Film*, 28–29. Original emphasis.

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38. Moholy-Nagy, *The New Vision*, 21.

39. Whitford, *Bauhaus*, 110.

40. See Whitford, *Bauhaus*, 103–15, for a more detailed discussion of the preliminary course.

41. Raoul H. Francé, *Die Pflanze als Erfinder* (1920).

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49. Ward, Smith, and Finke, "Creative Cognition," 208.
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