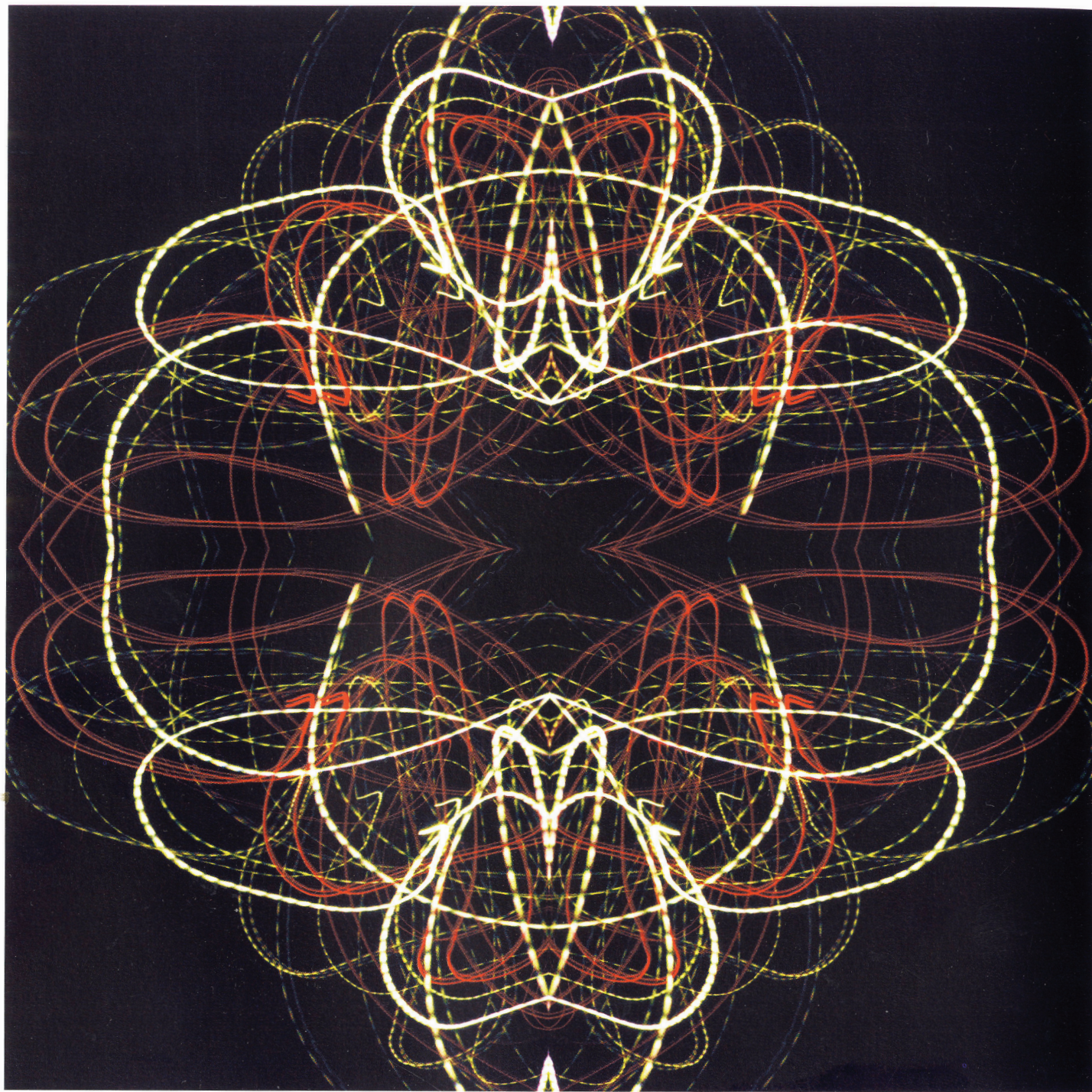


Time + Motion

Excerpted from
*Graphic Design The
New Basics*



Time and Motion

Every drawing can be understood as a motion study
since it is a path of motion recorded by graphic means.

László Moholy-Nagy

Time and motion are closely related principles. Any word or image that moves functions both spatially and temporally. Motion is a kind of change, and change takes place in time. Motion can be implied as well as literal, however. Artists have long sought ways to represent the movement of bodies and the passage of time within the realm of static, two-dimensional space. Time and motion are considerations for all design work, from a multipage printed book, whose pages follow each other in time, to animations for film and television, which have literal duration.

Any still image has implied motion (or implied stasis), while motion graphics share compositional principles with print. Designers today routinely work in time-based media as well as print, and a design campaign often must function across multiple media simultaneously.

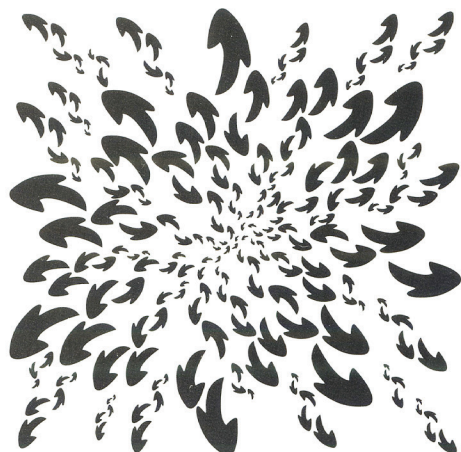
Animation encompasses diverse modes of visible change, including the literal movement of elements that fly on or off the screen as well as changes in scale, transparency, color, layer, and more. These alternative modes of change are especially useful for designing animated text on the web, where gratuitous movement can be more distracting than pleasing or informative.

It can be useful to think about the screen as an active, changing surface as well as a neutral stage or support onto which characters rush on and off. Thus a fixed field of dots, for example, can light up sequentially to spell out a message, or objects can become visible or invisible as the background behind them changes color or transparency. A word or design element can stay still while the environment around it changes.

Film is a visual art. Designers of motion graphics must think both like painters and typographers and like animators and filmmakers. A motion sequence is developed through a series of storyboards, which convey the main phases and movements of an animation. A style frame serves to establish the visual elements of a project, such as its colors, typefaces, illustrative components, and more. Such frames must be designed with the same attentiveness to composition, scale, color, and other principles as any work of design. In addition, the motion designer thinks about how all these components will change and interact with each other over time.

This chapter introduces some basic principles for conveying temporal change and motion, both in still and time-based media.

Long Exposure Photography A camera can capture a path of lights moving over time. The oscillations of AC currents are not visible to the eye, but, when recorded through a camera lens, the oscillations create a dashed line. DC currents generate smooth lines. Here, a single long-exposure photograph has been repeated and rotated to create a larger visual shape. Sarah Joy Jordahl Verville, MFA Studio.

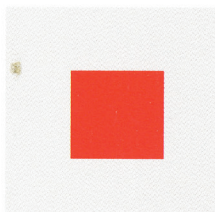


Eruption of Form

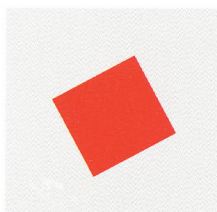
These shapes as well as their explosive arrangement suggest movement and change. Sasha Funk, Graphic Design I. Zvezdana Rogic, faculty.

Implied Motion

Graphic designers use numerous techniques to suggest change and movement on the printed page. Diagonal compositions evoke motion, while rectilinear arrangements appear static. Cropping a shape can suggest motion, as does a sinuous line or a pointed, triangular shape.



Static A centered object sitting parallel to the edges of the frame appears stable and unmoving.



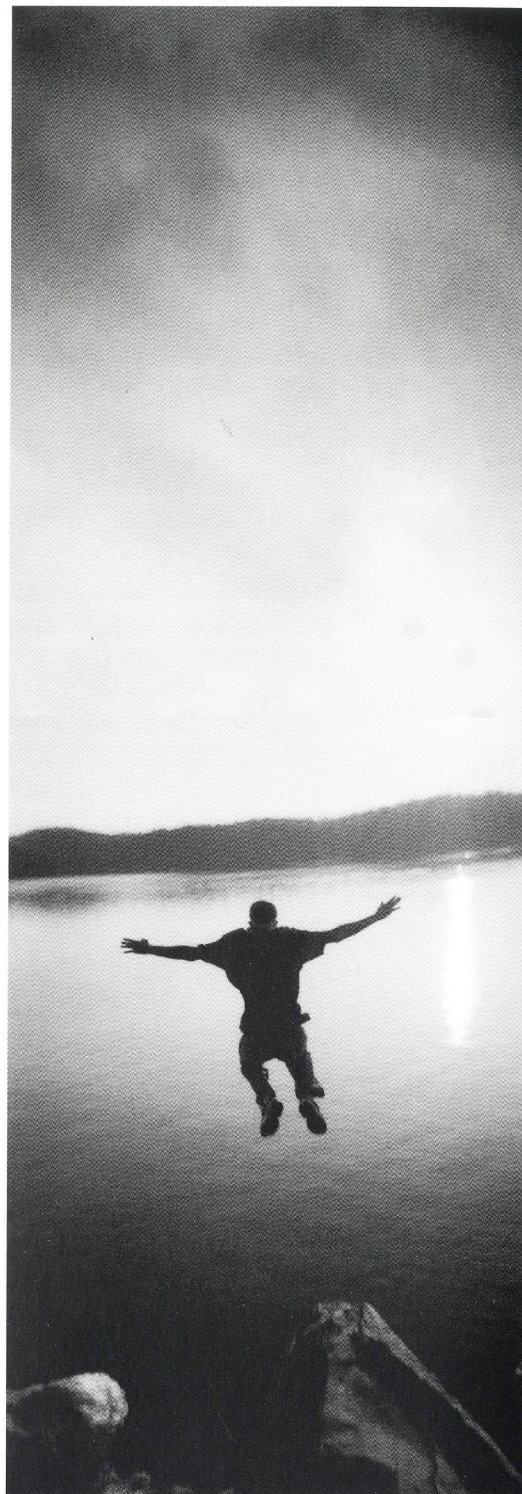
Diagonal An object placed on a diagonal appears dynamic.



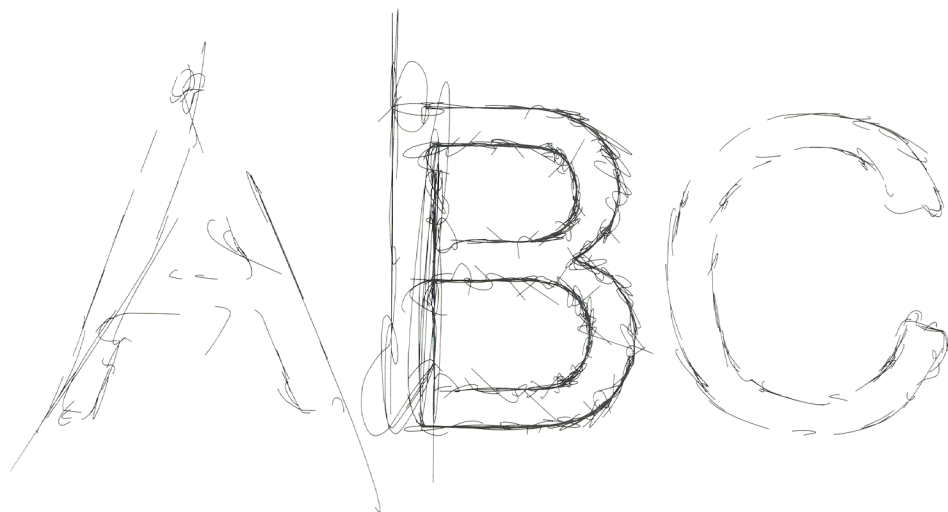
Cropped An object that is partly cut off appears to be moving into or out of the frame.



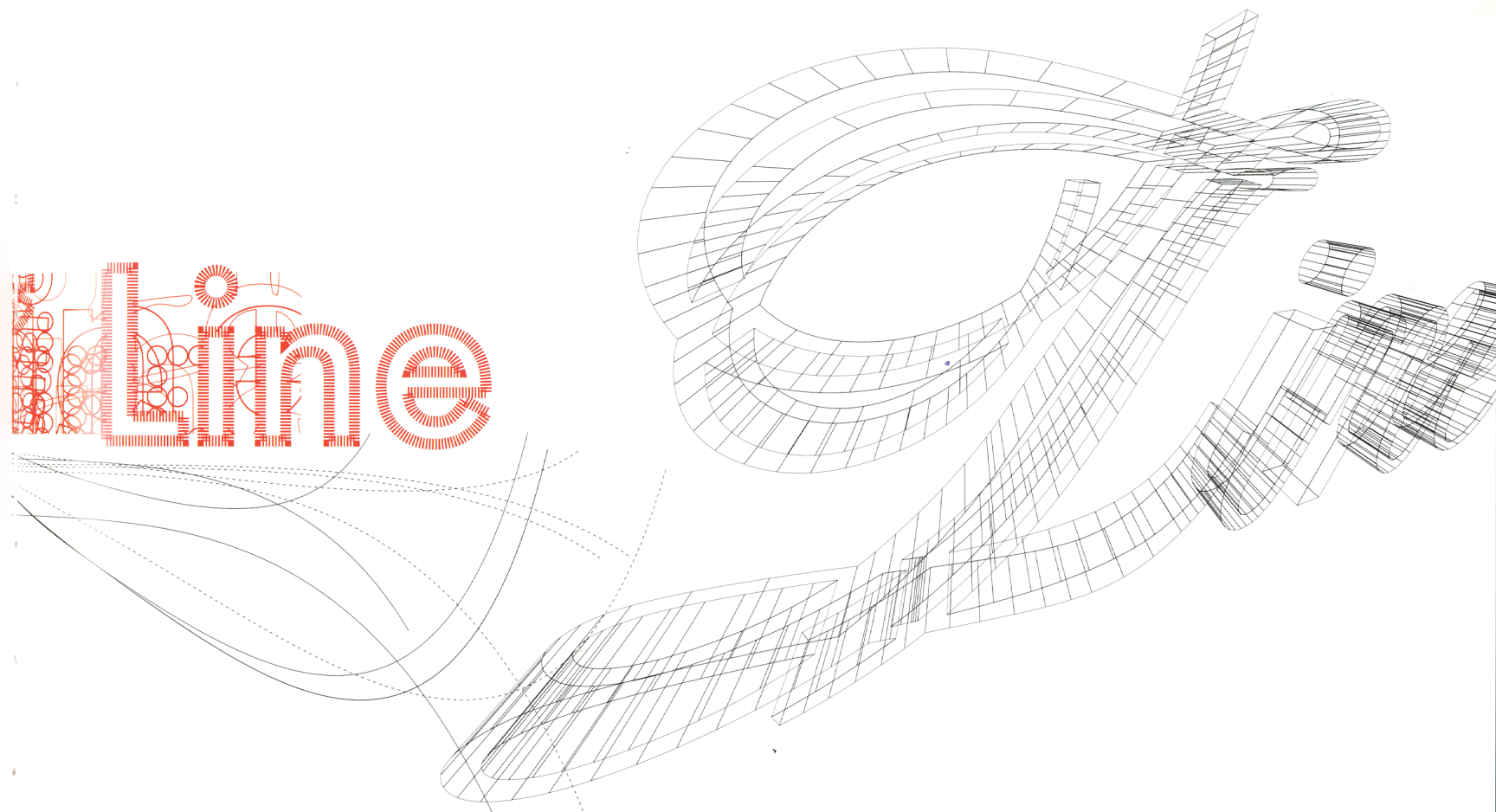
Point the Way The shape of an arrow indicates movement. Robert Ferrell and Geoff Hanssler, Digital Imaging. Nancy Froehlich, faculty.



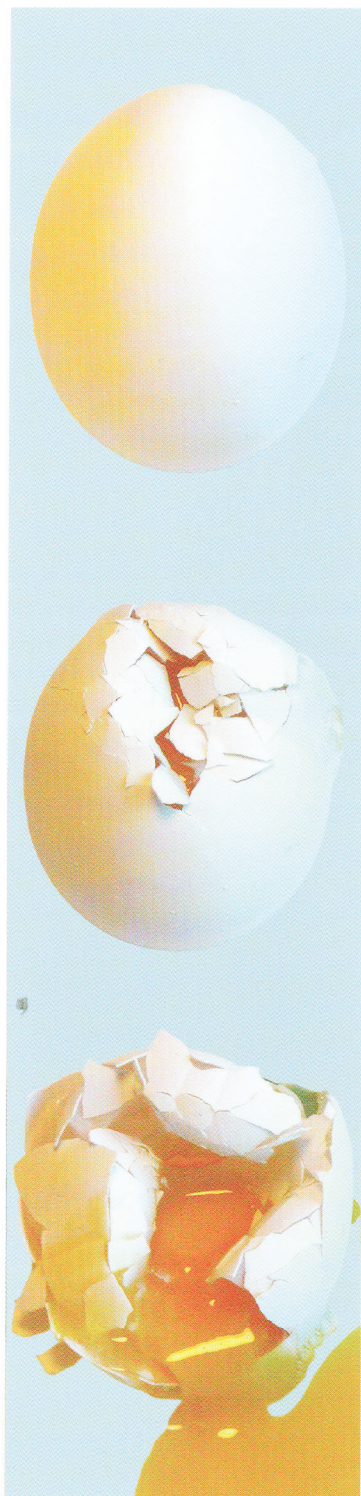
Moment in Time A skilled photographer can capture a moving object at a dramatic instant. Steve Sheets, Digital Imaging. Nancy Froehlich, faculty.



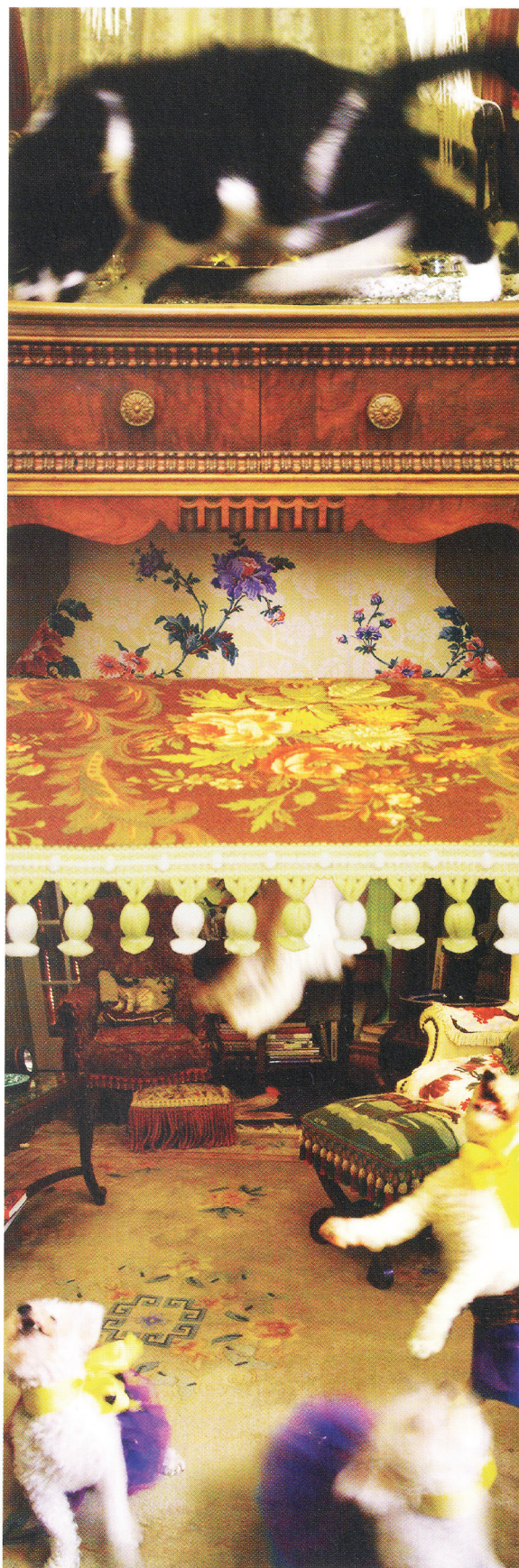
Restless Line These scratchy, sketchy lines contrast with the static letterforms they describe. The letters were drawn with Processing code. Ahn Yeohyun, MFA Studio.



Dimensional Line The dimensionality of these curving lines gives them movement in depth. The letters were manipulated in Adobe Illustrator. Ryan Gladhill, MFA Studio.

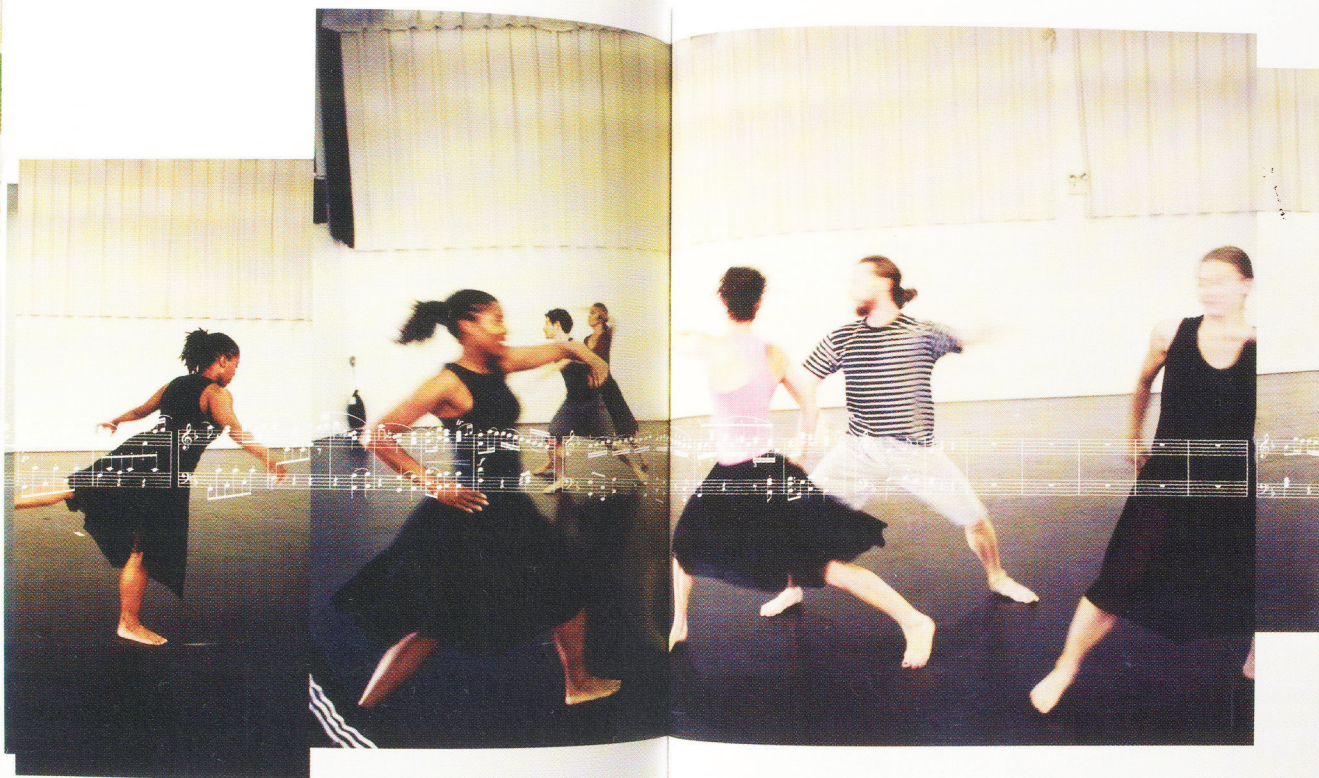


Egg Drop Bryan McDonough



Sequential Time Showing images in a row is an accepted way to represent time or movement on a two-dimensional surface. Drawings or photographs become like words in a sentence, linked together to tell a story. The designs shown here use cropping, sequence, and placement to suggest time and movement. *Digital Imaging. Nancy Froehlich, faculty.*

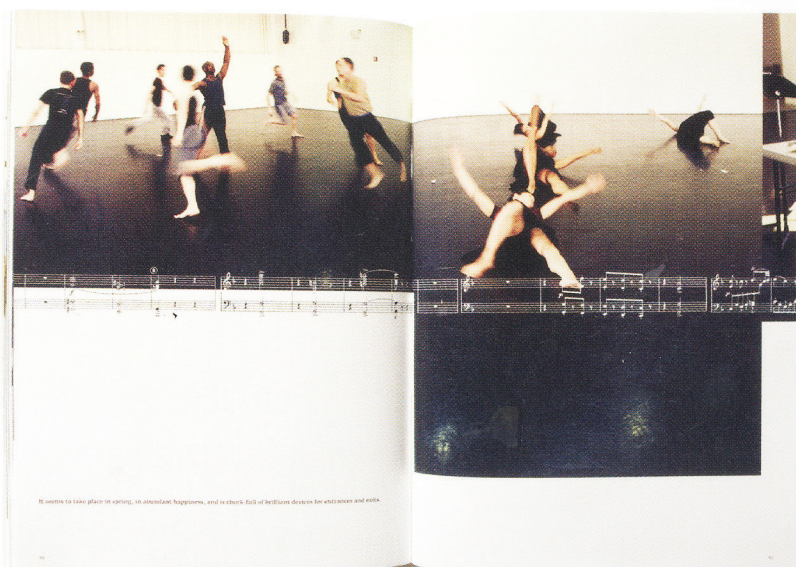
Cat Walk Sam Trapkin



Here is the Mark Morris Dance Group, captured rehearsing *Mozart Dances* at the light-filled Mark Morris Dance Center in

Brooklyn, just before the work's premiere at the Mozart Festival last August.

Completed just before the choreographer's 50th birthday.



It seems to take place in spring, in abundant happiness, and is rich full of brilliant devices for wholeness and unity.

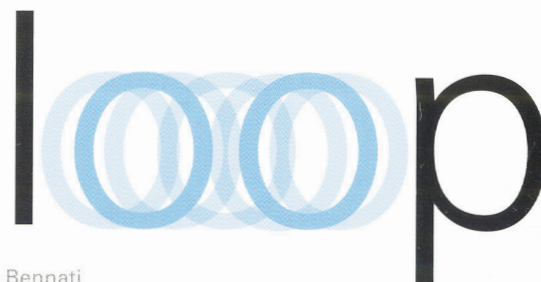
Connecting Time and Space In these layouts for a photo essay documenting a piece by choreographer Mark Morris, the floor line becomes a point of connection, bringing together numerous shots taken over time. Abbott Miller and Kristen Spilman, Pentagram. *2* magazine. Photography: Katherine Wolkoff.

Implied Time and Motion An effective logotype can be applied to anything from a tiny business card to a large-scale architectural sign to a computer screen or digital projection. The logotypes shown here use a variety of graphic strategies to imply motion.

In this project, designers created a graphic identity for a conference about contemporary media art and theory called "Loop." Each solution explores the concept of the loop as a continuous, repeating sequence. The designers applied each logo to a banner in an architectural setting and to a screen-based looping animation. (Photoshop was used to simulate the installation of the banners in a real physical space.)



Lindsay Orlowski



Jaime Bennati

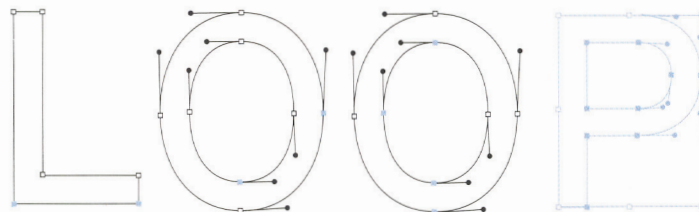
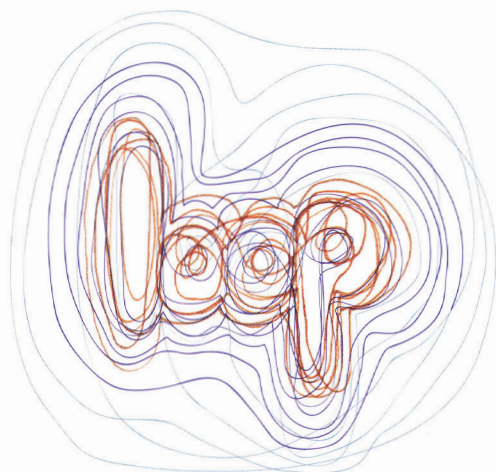


Loop Logo Numerous techniques are used in these studies of the word "loop" to imply movement and repetition. Some designs suggest the duration of the design process itself by exposing the interface or by drawing the logo with an endless, looping line. Above, transparency is used to create an onion-skin effect; cropping the logo on the banner further implies movement. Graphic Design II. Ellen Lupton, faculty.

loop



loop



May Yang
Sueyun Choi
Lauretta Dolch

Alexandra Matzner
Lindsay Orlovski
Yuta Sakane



Key Frames Depicted here are important moments within a dancer's continuous leap.
Sarah Joy Jordahl Verville, MFA Studio.

Animation Basics

Like film and other "motion pictures," animation uses sequences of still images to create the optical illusion of movement. The brain retains images for a split-second longer than the images are actually before us, resulting in the illusion of movement when numerous images appear in rapid succession. This phenomenon is called "persistence of vision." As images appear to move and come alive, the illusion is powerful and fascinating. Images for animation can be created via software, photography, and drawing.

The smallest unit of animation is the frame, a single still image. In the technique of frame-by-frame animation, a series of still images are drawn or digitally created. These still images differ from frame to frame by successive deviations in scale, orientation, color, shape, layer, and/or transparency.

In producing animation, the most important frames, called "key frames," are the fixed states that a lead designer draws or creates. In both

hand-drawn and digital animation, these key frames are normally the first and last frames of each short sequence of action, indicating the start and conclusion of one or more important changes in movement. For example, the key animator may create the frame of a person about to do a cartwheel and another key frame of that same person landing at the completion of the cartwheel. Assistant artists, known as "inbetweeners," then fill in the gap by drawing the missing in-between frames, which are called "tweens." The tweens can also be generated automatically by digital animation software, which automates the time-consuming production process while making a smooth transition over time between the key frames. The process of developing these in-between frames is called "tweening."

Some professional designers and animators prefer drawing all their images using the frame-by-frame animation process, rather than by automated tweening, because it provides cleaner edges, better quality

of motion, more accurate details, and greater control of subtle elements such as facial expressions. However, frame-by-frame animation is more time-consuming to produce than computer-generated motion and can result in inconsistent images. Computer-generated tweening can cause jerky lines and unwanted shadows, but it has several advantages as well. The computer's memory can provide access to databases that store previously rendered people, landscapes, buildings, and other objects, and these renderings can be used repeatedly, saving time and production costs. In addition, with computer-generated frames designers can easily adjust such variables as timing, orientation, color, layering, and scale.

In general, typography and abstract graphic elements are easily animated via automatic tweening, as compared to facial expressions or complex bodily movements.

Research and writing assistance:
Sarah Joy Jordahl Verville

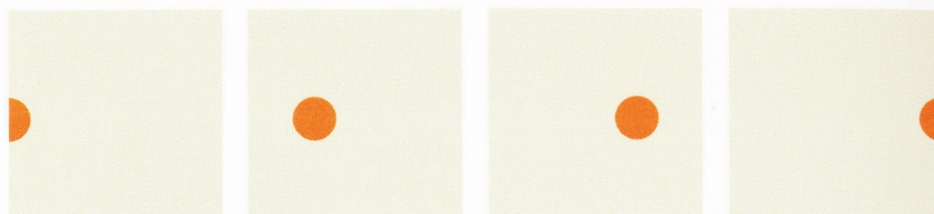


Composite Time and Motion Nine frames are compressed into one image. Color moves from warm to cool, and layers accumulate from back to front, depicting change over time. The assets of animation are thus used here to compose a still image. Sarah Joy Jordahl Verville, MFA Studio.

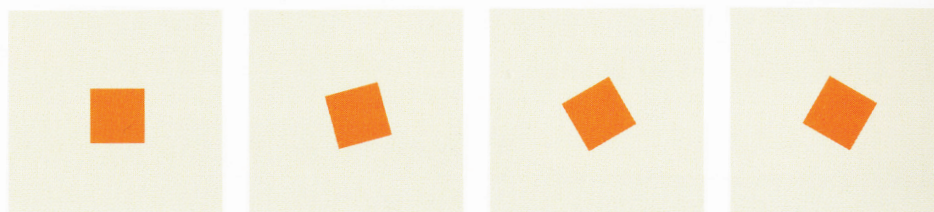
Change Over Time

All animation consists of change over time. The most obvious form of change consists of an element moving around on the screen—the Road Runner approach. The Road Runner can “walk” onto the screen like a character in a play, or it can appear there suddenly as in a cut in a film.

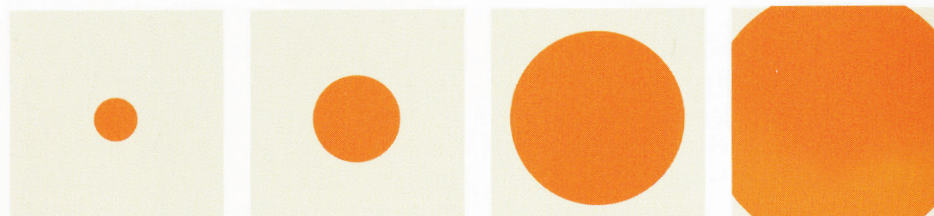
Changing the position of an object is just one way to make it change. Other modes of change include shifting its scale, color, shape, and transparency. By altering the degree of change and the speed with which the change takes place, the animator produces different qualities of movement. Complex and subtle behaviors are created by using different modes of change simultaneously. For example, an object can fade slowly onto the screen (changing transparency) while also getting bigger (changing in scale).



Change in Position Every object on a two-dimensional surface has a pair of x/y coordinates. Changing the coordinates moves the object. (3-D animation includes the z axis.) In this sequence, the object’s x position is changing, while the y position is fixed, yielding a horizontal movement.



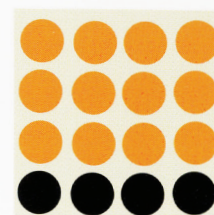
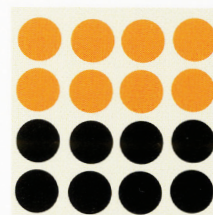
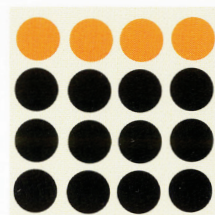
Change in Rotation Continuously altering the angle of an object creates the appearance of spinning, shaking, and other behaviors.



Change in Scale Making an object larger or smaller creates the impression of it moving backward or forward in space. Here, the object is not moving (changing its position); only its size is changing.

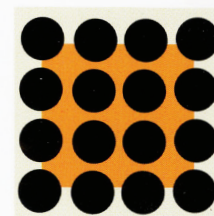
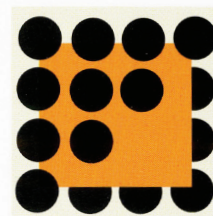
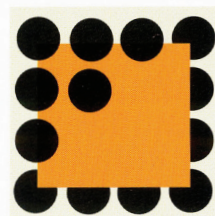
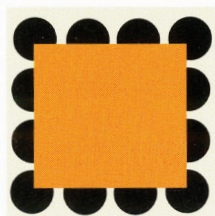


Change in Shape Letting a line wander can produce all types of shapes: abstract, amorphous, representational.



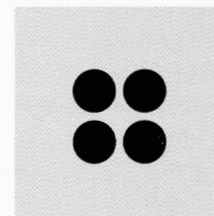
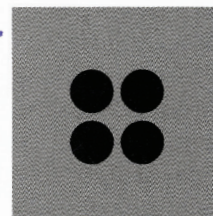
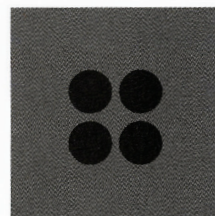
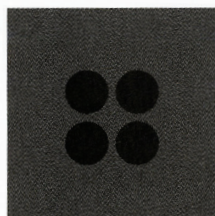
Change in Color Like a theater marquee that creates the appearance of movement by sequentially turning light bulbs on and off, color animation creates motion by sequentially illuminating or changing the color of predefined areas or objects.

Here, a wave of color appears to pass over a field of static objects. Countless variations are possible.

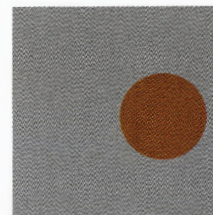
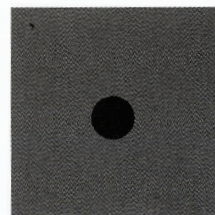
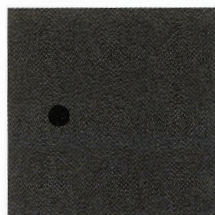


Change in Depth Many image-editing programs allow the designer to divide an image into layers, which are comparable to the sheets of transparent acetate used in traditional cell animation.

Layers can be duplicated, deleted, altered to support new image elements, merged into a single image, and hidden. Here, objects on back layers gradually move forward.



Change in Transparency Animators alter the transparency of an image to give it the appearance of fading in or out of view. Here, the top layer gradually becomes more transparent, revealing an image behind it.



Multiple Modes of Change Most animations combine several modes of change at once.

This sequence incorporates changes in position, scale, color, and transparency.

Animating Type

In film and television and on the web, text is often in motion. Animating type is like animating other graphic elements, but the designer must pay special attention to legibility and reading order.

The most elementary technique is to shift the position of a word so that it appears to move around like a character or other object. Animated words do not have to literally move, however: they can fade in or fade out; they can flicker on or off the screen letter by letter; or they can change scale, color, layer, and so on.

When animating text, the designer adjusts the timing to make sure the words change slowly enough to be legible, but not so slowly that they become a drag to read. Context also is important. A constantly changing logo in a web banner, for example, will quickly become irritating, whereas sudden and constant motion in the title sequence of a film can help set the tone for the action to come.



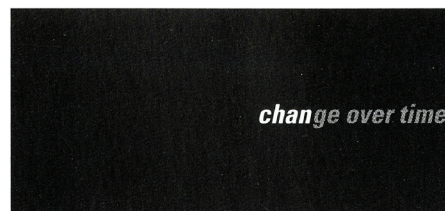
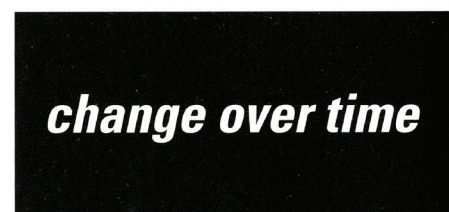
Change in Position Moving text around the screen is the most basic means of animating type. Commonly, type enters from the right side of the screen and moves left to support the normal direction of reading. Ticker or leader text also tends to move in this direction.



Change in Color In the sequence shown here, the type itself is static, but a color change moves across the text letter by letter. Endless variations of this basic kind of change are possible.



Change in Transparency White type appears gradually on screen by gradually becoming opaque.



Multiple Modes of Change Many animations combine several techniques at once.



This sequence features change in position, scale, and transparency.



Animated Typography In this animation by Peter Cho, each letter is built from pixel-like units. The individual units as well as complete letters, words, and phrases are subject to change. Elements move in three-dimensional space and they change scale, color, and transparency.

All these complex and simultaneous changes serve to emphasize the text and make the message readable over time. Peter Cho, *Imaginary Forces*, 2000, for the Centers for IBM e-Business Innovation.



Storyboard

Since motion design can be labor-intensive, designers must plan carefully every aspect of a piece before production begins. Once a concept is developed, the script is fleshed out with storyboard sketches and a style frame. These visual tools are essential for designing commercials, online banners, television broadcast animations, and film title sequences.

Storyboards summarize the content or key moments of an animation's events. Storyboarding also determines the flow of the storyline and suggests the major changes of action. In addition to movements, the personality, emotions, and gestures of the characters and objects are also expressed. The layout of a storyboard, similar to that of a comic strip, consists of sketches or illustrations displayed sequentially to visualize an animated or live-action piece. Notes describing camera angles, soundtrack, movement, special effects, timing, and transitions between scenes are often included.



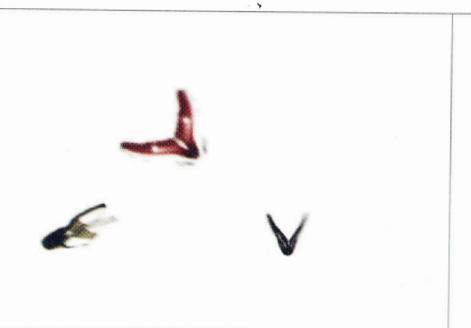
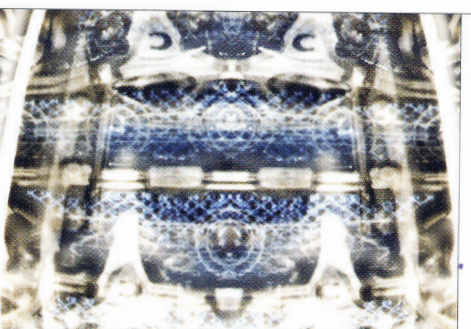
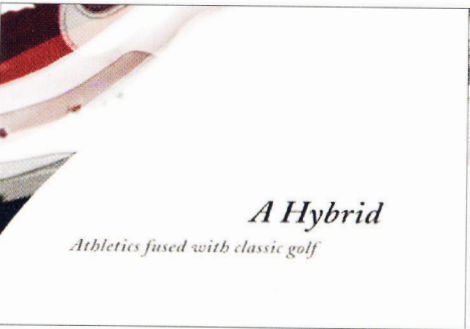
Style Frame

The ultimate look of an animation is expressed in one or more style frames, which set the aesthetic tone and formal elements. A style frame captures many of the graphic elements used throughout the piece. The typography, colors, patterns, illustrations, and photographs chosen for the project are often included.

Storyboarding and developing style frames are creative processes that allow the designer to plan and brainstorm before the animation is realized. These tools serve as guides to production and vehicles for presentation to clients. Successful style frames and storyboards are always clearly defined and easy to interpret.

Metamorphosis This animated advertisement for Nike shoes, designed by Trollbäck and Company, presents golf shoes that are mounted like butterflies in a museum frame. The shoes come to life and fly away. The meaning of the scene changes as the camera moves in and out to reveal the context.

Director: Joe Wright. Designers: Jens Mebes, Todd Neale, Justin Meredith. Creative Directors: Jakob Trollbäck and Joe Wright. Editor: Cass Vanini. Producer: Elizabeth Kiehner. Client: Nike, Ron Dumas.

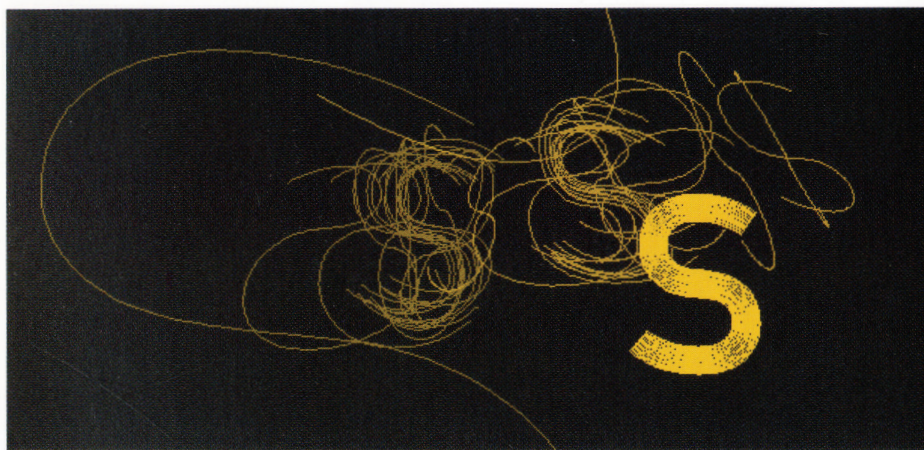
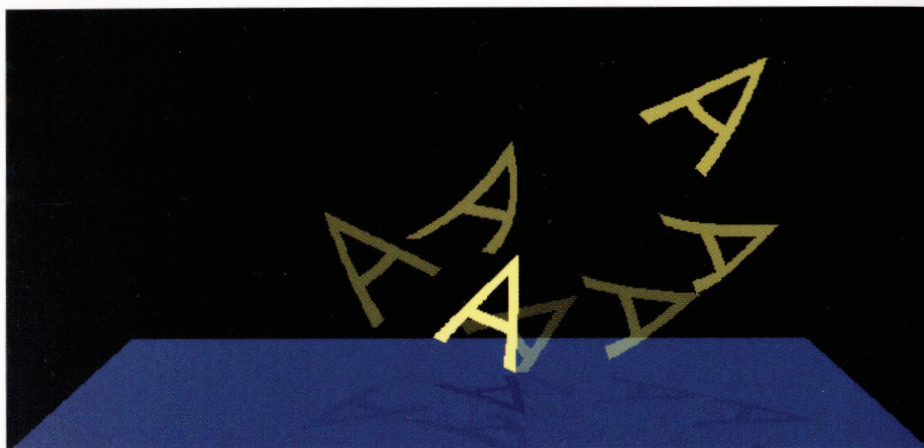
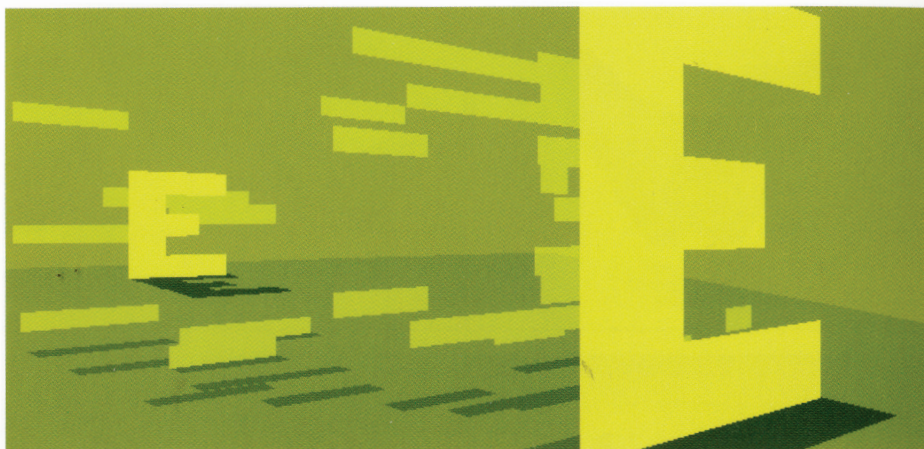


Beyond the Timeline

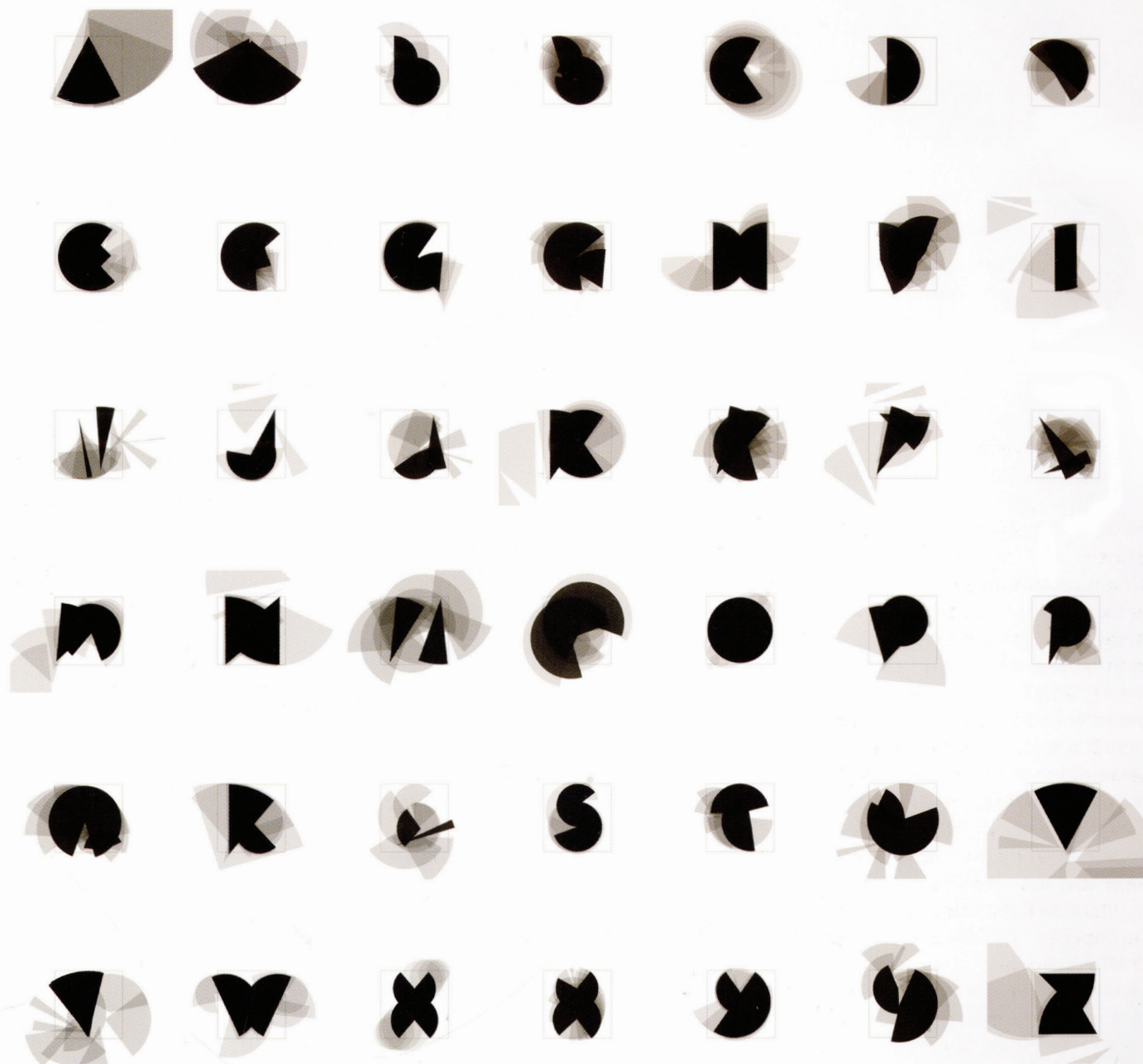
Interactive logos and graphics are another aspect of motion design. Rather than devising a narrative sequence with a fixed beginning and end, the interactive designer creates behaviors. These behaviors involve change over time, just like narrative animations, but they do not occur in a fixed sequence, and they are not designed using storyboards and timelines.

Interactive graphics are created with code, such as Flash ActionScript, Java, or Processing. Instead of working with the interface of a linear timeline, the designer writes functions, variables, if/then statements, and other instructions to define how the graphics will behave.

Interactive graphics need not be complex or hyperactive. Simple behaviors can delight users and enrich the experience of a digital interface. For example, an interactive logo on a webpage can wait quietly until it is touched with the user's mouse; instead of being an annoying distraction, the graphics come to life only when called upon to do so.



Letterscapes In these interactive graphics by Peter Cho, the letters dance, bounce, unravel, and otherwise transform themselves in response to mouse input. Peter Cho, 2002.



Type Me Again Simple pie shapes rotate and repeat to create the letters of the alphabet when users type in letters on their keyboards. Peter Cho, 2000.