15 Gestalt Psychology and Kurt Lewin

Once in a conversation, the late Karl Lashley, one of the most important psychologists of the time, told me quietly, "Mr. Köhler, the work done by the Gestalt psychologists is surely most interesting. But sometimes I cannot help feeling that you have religion up your sleeves." (Köhler 1969, p. 48)

Gestalt psychology began in late nineteenth-century Germany in opposition to what was perceived as pervasive molecularism in psychology. The original Gestaltists were impressed with physics, not biology, and were perhaps inspired by the writings of the Scottish physicist James Clerk Maxwell. Many writers suggest that Gestalt views were actually absorbed into psychology and that the Gestaltist influence lies in whatever changes this caused in mainstream psychology (e.g., Bower and Hilgard 1981).

Kurt Lewin is often treated as a Gestaltist, though it is clear that he was no such thing. Gestalt psychologists were basic researchers earnestly attempting to understand the "physics of the mind." Lewin was an energetic applier and a student of topics that are often expressed in newspaper headlines—racial discrimination, industrial productivity, worker morale, and the like. He was responsible for many of the concepts that were used by social psychologists during the second half of the twentieth century.

Gestalt Psychology

For now the Gestalt psychologists discovered that this procedure made them neighbors of the most advanced natural scientists, the physicists. (Köhler 1969, pp. 48–49)

Wolfgang Köhler, last of the original Gestaltists, died in 1967, but the theory is still presented in a variety of textbooks and research papers.

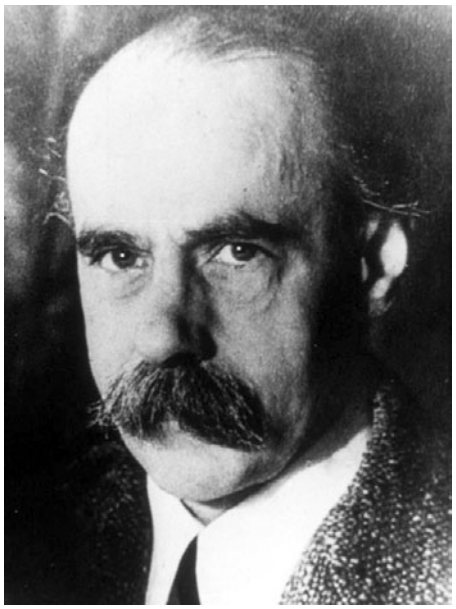

Figure 15.1
Wertheimer. Courtesy of the Archives of the History of American Psychology, University of Akron.

Theirs was not only a psychological theory but a worldview and a philosophy of science (Ash 1985, pp. 295–344). Was their message relevant only in the early decades of the twentieth century, and has it been absorbed into mainstream psychology?

Beginnings of Gestalt Psychology

All three founders of Gestalt psychology were introduced to scientific research by Carl Stumpf. Interestingly, when Stumpf was first offered a professorship of philosophy at Berlin, the Prussian government included a laboratory as large as Wundt's, and a higher budget with more modern equipment. This was in 1893, and Stumpf turned it down! He did not favor psychology as a separate discipline involved in "big science." What he agreed to was a "Psychological Seminar," with lectures, exercises, and demonstrations.

His advanced workers included Max Wertheimer (see figure 15.1), Kurt Koffka (see figure 15.2), Wolfgang Köhler (see figure 15.3), Kurt Lewin, and others. Instruction in experimentation was given in Berlin by Hans Rupp and Friedrich Schumann, both of whom had been

Figure 15.2
Koffka. Courtesy of the Archives of the History of American Psychology, University of Akron.

Figure 15.3
Köhler. Courtesy of the Archives of the History of American Psychology, University of Akron.

trained by G. E. Müller. Stumpf taught his students to be guided by the loftiest ideals, reflected in a tribute from Wertheimer on Stumpf's seventieth birthday in 1918:

> As much as you love and support work in specialized science, you have nonetheless taught us to keep our gaze directed to larger questions of principle, to work toward the fruitful cooperation of psychology and the theory of knowledge, with the highest problems of philosophy in view. None of us wishes to be locked up in the workroom of specialized science. (Ash 1985, p. 298)

The Beginnings: Wertheimer Attacks—the Wrong Enemy?

> I remember Wertheimer at some of our New School seminars—a man of passionate convictions, who was extremely intolerant of all differences and who would shout at anyone who took issue with him. (Marrow 1969, p. 106)

The original outline of Gestalt Psychology was published by Max Wertheimer in 1922 as "Investigation of the Gestalt Doctrine." In it he criticized the prevailing psychology of his time, as he saw it. The Gestalt position rose in objection to the orthodox view, characterized by Wertheimer as resting on two hypotheses:

> I. The mosaic or "bundle" hypothesis.—Every "complex" consists of a sum of elementary contents or pieces (e.g. sensations)
> . . .
> II. The association hypothesis.—If a certain content A has frequently occurred with B ("in spatio-temporal contiguity"), then there is a tendency for A to call up B. . . . This is the ground plan of associationism.

Wertheimer went on to characterize both hypotheses as instances of "and-summation, i.e. a construction from pieces . . . which, as primarily given fundaments, underlie all else."[1] From these there is no limit on the higher structures that may be erected, but, whatever they are, they depend on no intrinsic factors—organismic factors play no part in the construction of experience. In all, Wertheimer gave an adequate account of even the sophisticated associationism of Helmholtz and John Stuart Mill.

A Straw Man? Were there such associationist ("and-summists") as Wertheimer described in 1922? Or was he flailing the corpse of Herbart, who had been gone for half a century? Wundt was not an and-summist, nor was G. E. Müller, who appeared to appreciate configurations at least as much as did some proto-Gestaltists, such as von Ehrenfels. In America, Titchener was still strong and he was an ana-

lyst, all right, but in a half decade he would be dead and his influence dispersed and diluted. Who was the object of criticism in 1922, and, similarly, who could be identified as the villains in the second half of the twentieth century?

The target was and is no straw man, that's certain, but it is also no individual or small group to whom we may easily point. Wertheimer was absolutely correct when he acknowledged this and pointed to the culprit:

> But we are not examining "general doctrines"; the aim is to inquire what actually is done, what the positive content underlying the terminology of experimental reports really is . . . (Wertheimer 1922, p. 51, reproduced in Ellis 1939, p. 113)

No one in 1922 openly urged the strict associationist position that Wertheimer critiqued, and few did so during the following decades of the twentieth century. But it nonetheless existed as a tacit basis for much of the theory and research of the century.

What Are Gestalten? That is a very good question, and Wertheimer answered it in a more or less satisfying way:[2]

> The given is itself in varying degrees "structured" ("gestaltet"), it consists of more or less definitely structured wholes and whole-processes with their whole-properties and laws, characteristic whole-tendencies and whole-determinations of parts.

Von Ehrenfels was promoting the doctrine of "form-qualities," or *Gestaltqualitäten*, during this period, and that view, like Mach's, makes a lot of sense. They emphasized form/structure/organization as an indispensable feature of percepts, perhaps more important than the elements themselves. The musician von Ehrenfels was constantly pointing to the melody that survives drastic transposition—changes in scale and key—so of course form qualities were important. However, Wertheimer would have none of that:

> Nor are "Gestalten" the sums of aggregated contents erected subjectively upon primarily given pieces . . . not simply blind, additional, "Qualitäten," essentially as piecelike and intractable as "elements" . . . nor are they . . . merely "formal." (Wertheimer 1922, pp. 53–54; Ellis 1939, p. 15)

Wertheimer went on to predict that the study of perception "will not be grounded in a 'purely summative' point of view" (ibid). Physiology and stimulus constellations are what are important, so where does that

leave psychology? In fact, Wertheimer wrote that this hypothesis permits "Psychological penetration of this problem" for the first time.

Gestalten are meaningful wholes, and "meaningful" is, as ever, difficult to define. It appears as "inner coherence," "an inner necessity," and, in general, "a whole is meaningful when concrete mutual dependency obtains among its parts." Others would try to clarify Wertheimer's characterization of Gestalt theory,[3] and are there Gestalten? Wertheimer concluded, "Whether there is such a thing as meaningfulness or not is simply a matter of fact" (Wertheimer 1922, p. 57; Ellis 1939, p. 16).

Fundamentals: Psychology as Physics

The words "Gestalt" and "Gestalt Psychology" have taken on an aura very unlike that meant by the founders of this viewpoint. Many psychologists and nonpsychologists take Gestalt theory to be a humanistic sentimentalism that deals with "the whole person," and takes "holistic viewpoints." Such stuff, whatever merits it might have, has no connection whatever with Gestalt Psychology.

Max Wertheimer grew up as a student of the violin and always appreciated music and auditory perception. He knew Albert Einstein later in life and understood physics well enough to understand Einstein's reconstruction of his thinking while devising relativity theory. Wolfgang Köhler had similar interests in audition and viewed mental life (and all life) as only an aspect of physics. The laws that govern the physical world govern the world of conscious experience as well. There was no "getting in touch with one's feelings" for these individuals. And we will see that Gestalt work in what could be called emotional well-being was far from therapeutic.

The Phi Phenomenon and Related Effects Wertheimer first presented Gestalt theory in 1912, but not in his classic paper on apparent motion—the phi phenomenon—as is commonly thought. That paper was preceded by one on number concepts among primitive peoples (Wertheimer 1912a, pp. 321–378). Unlike what is supposed to be true of Western arithmetic, primitive peoples count units differently. One horse plus one horse is two horses, and one person plus one person is two persons. However, one horse plus one person is a rider.

That same year the phi paper was published, officially launching Gestalt psychology (Wertheimer 1912b). The phenomenon of apparent movement was known and had been studied for almost a century,

since Plateau in the 1820s, so it was not a "discovery" that launched the movement. Ash pointed out that there existed a number of theories proposing to explain apparent motion as "motion sensations," "fused afterimages," and "illusions of judgment," by Mach, Marbe, and Schumann, respectively.

The psychophysicist Sigmund Exner had found that apparent motion can produce negative afterimages just as does real motion, and he proposed that some physiological process was involved rather than a judgment process (Ash 1985, p. 309). Wertheimer's experiments, using Koffka and Köhler as subjects and a tachistoscope[4] built by Schumann, refuted those theories while supporting Exner's physiological theory. When a vertical line is briefly presented, immediately followed by the presentation of a horizontal line, the perceived movement is not movement of anything; it is "pure phi," and it corresponds to the "cortical streak" brain process that underlies it. It is an example of a pure, dynamic phenomenon—motion in and of itself, not the motion of some thing and not the sum of a series of isolated events.

Koffka was "enthralled" and wrote in 1931,

> Wertheimer did very much more: he joined the movement experience, the movement *phi*, to the psychology of pure simultaneity and of pure succession, the first corresponding to form or shape, the second to rhythm, melody, etc. This was the decisive step. (Ash 1985, p. 310)

The varieties of apparent motion were described in 1913 by Kenkel, a student of Koffka's who named alpha, beta, and gamma movement in 1913 and by Korte, also a Koffka student, who added delta movement in 1915. The main categories of apparent movement are as follows:[5]

phi mov't pure movement from pairs of flashing lights
beta mov't object moves from one to another position
alpha mov't size change w/successive presentation—Kenkel was working with the central line of the Müller/Lyer illusion as its two forms alternated successively
gamma mov't expansion/contraction w/illumination change
delta mov't reversed mov't when second stimulus is much brighter—then the movement is in the direction opposite the order of presentation.

In 1915 Korte also worked out the laws of optimal movement, showing how it depends on the distance between the stimuli, the time between them, and their intensity. If the time interval is constant, the optimal distance for apparent movement varies directly with

intensity. If the distance separating them is increased, intensity must be increased. The perception of phi depends also on expectations and attitude, so that an analytical attitude discourages it and a passive attitude promotes it. It is also easier to perceive movement of a meaningful unit, like an arm attached to a shoulder, than a line attached to another line.

In addition, it is clear that eye movements are unnecessary. Recall that this was the explanation endorsed by Wundt, though he did not originate it. When we see the apparent movement of the successively lit dots of light or of the vertical line that is succeeded quickly by a horizontal line, the apparent movement is no more than the movement of our eyes.

This is decidedly not the case, as is clear in the case of gamma movement, since the change is expansion and contraction, produced by changes in illumination, and it is unclear how the eyes could move to produce such an effect. Also, illusions of movement include the familiar spiral illusion of Plateau, introduced in 1850. Depending on direction of rotation, a spiral drawn on a disk appears to expand or to contract, an experience certainly not produced by eye movements.

Köhler and Koffka were impressed indeed with Wertheimer's findings. Fifty-four years later, in his final series of lectures, given at Princeton, Köhler began with a recounting of the 1912 phi experiment, complete with illustrations (Köhler 1966). Koffka, on the other hand, performed his own experiments and described them in 1930.

Three-Dimensional Motion Gestalten Koffka described simple conditions that produce gestalt phenomena in three dimensions (Koffka 1930, in Murchison 1930, pp. 161–187). In the simplest case, the phi phenomenon is produced by successively exposing two parallel lines, so that movement is seen from left to right, for example. If a third parallel line is introduced between the two original lines and if the new line remains constantly visible, the movement appears behind the new permanent line. The observer describes the movement to appear to be passing through a tunnel. Koffka proposed that "the permanent line excludes the phi process from its own area without being capable of breaking it up. Thus the process is forced into the third dimension" (in Murchison 1930, p. 169).

The change from two- to three-dimensional movement also happens in other cases of phi. Benussi showed that if two dots, ten centimeters apart, are exposed in succession, we see at first the dot moving

back and forth. However, after a while the "moving dot" appears to be moving in a circle in a horizontal plane, thus giving the appearance of depth. Koffka suggested that movement in a circular track cannot be in the vertical plane, since there are "no vectors upwards or downwards."

In yet another case, successive presentations of a V and an inverted V positioned above it result in movement as motion around the axis of symmetry. This resembles a spinning top—why does that appear, rather than a perception of movement from inverted V, to V, to inverted V, and so on? Koffka explained that this would require strong distortions in form—a V cannot flip back and forth vertically without change in appearance. The simpler organization, if movement is to be seen, is a spinning top.

Illusions and Laws of Grouping Since we live in an organized world, it is necessary to show how that organization occurs, and this is the function of the laws of Prägnanz. These laws describe the manner in which we tend to structure the world toward "good Gestalten," and many a Gestalt-sympathizing psychologist has difficulty in defining a "good Gestalt." One can say only that it is that toward which organization tends, and, since the Gestalt is the basic unit of experience, it is impossible to be more precise. We see a row of dots: . . . . . and call it a line, showing the effects of proximity. We see the same number of dots arranged differently . . . . . and call it three groups of dots, again because of proximity.

We tend to see objects as symmetrical, even when they are not; this follows the principle of symmetry. We see a circle with a small gap in it as closed, which follows the law of closure. We see the world as objects on backgrounds, which Edgar Rubin proposed as the principle of figure–ground. There are many more laws of organization, totaling well over one hundred (Helson 1925, pp. 342–370). The Gestaltists saw associationists overstressing the importance of contiguity in space and time, as well as similarity. These represent only two of the many laws of organization—proximity and similarity. And the law of effect reflects further misplaced emphasis, this time on the law of closure. When rewards act as such, it is because they provide closure by ending a preceding sequence of behavior, thus making a "unit" of that behavior. However, closure is no more important than contiguity/proximity, similarity, or other laws of organization. These laws are simply aspects of the behavior of physical forces.

Psychology *Is* Physics

> For now the Gestalt psychologists discovered that this procedure made them neighbors of the most advanced natural scientists, the physicists.

The quotation above comes from Köhler's (1969) *The Task of Gestalt Psychology*[6] where, after a discussion of Wertheimer's principles of grouping according to proximity, similarity, and simplicity, Köhler drew the parallel with the physics of the turn of the century. This is not the mechanical physics of Newton, where particles in space and time individually act on one another—it is the physics of Pierre Curie, James Clerk Maxwell, Max Planck, and Ernst Mach. Here is the rationale behind Gestalt theory:[7]

> Mach, for instance, asked this question: When a physical system approaches a state of equilibrium or a steady state, why is this change so often characterized by growing regularity, symmetry, and simplicity in the distribution of the material and the forces within the system?

Köhler also studied the writings of Clerk Maxwell, "the greatest figure in the development of field physics," and Max Planck, who introduced quantum physics. Maxwell described Faraday's earlier work, which made possible the electrical generator, as beginning with "wholes" and arriving at the parts by analysis, rather than the reverse, beginning with parts. He quoted Maxwell along these lines in a treatise published in 1873, noting that this was forty years before the Gestalt psychologists began:

> We are accustomed to consider the universe as made up of parts.... To conceive of a particle, however, requires a process of abstraction, since all our perceptions are related to extended bodies, so that the idea of the *all* that is in our consciousness at a given instant is perhaps as primitive an idea as that of any individual thing. (Ibid., pp. 60–61)

Köhler's intention was to show by reference to the greats of physics that the Gestaltists were not preposterous—they were not "proceeding in a fantastic fashion." Far from it, in fact, since they were in agreement with the most natural of the natural sciences.

The physical analogy to which the Gestaltists turned was field theory, not Newton's mechanics or Descartes's geometry. To qualify as instances of Gestalt phenomena, physical processes had to meet what Köhler called "Ehrenfels's criteria." They had to be "suprasummative," so that qualities and effects were not derivable solely from properties of their parts, and they had to be transposable—so that their organization survived changes in the absolute values of their parts.

He pointed to electrostatics as an example. In an ellipsoidal conductor the density of charge is greatest at the points of greatest curvature and least where the curvature is least. It is the shape of the conductor, not its material or the quantity of charge. If charged particles are fed into one part of the conductor, the charge immediately redistributes itself to maintain the curvature/charge relationship.

Since the brain is a chemical/electrical entity, electrical fields there must correspond to perceptual Gestalten. To be isomorphic, brain processes need not mirror perceptions, they need only functionally correspond. It is easy to imagine how phenomena such as figure–ground and reversible figures, or even the Müller–Lyer illusion, could be produced by electrical fields and differences in charges on or in the cerebral cortex.

Köhler referred to Mach's findings in fluid dynamics as evidence that physical systems tend toward end states that are as simple and regular as possible. The tendency toward simplicity and regularity was called *Prägnanz* by Köhler. These principles apply to problem-solving behavior, as well as to perception, as Köhler tried to show in 1917.

Köhler and Insight?

> I know that several psychologists will not easily believe that my description of intelligent behavior in apes is correct.... Therefore I have made moving pictures of some experiments of this type. They are much more convincing than all words and arguments which I might add in order to corroborate my statements; but we have no technique to give this strongest argument to the readers of a scientific journal. (Köhler 1926, pp. 145–161)

Wolfgang Köhler, the longest-lived and most influential of the Gestaltists, spent the years from 1913 to 1920 as director of the anthropoid research station of the Prussian Academy of Sciences on the island of Tenerife, in the Canary Islands off the west coast of Africa. He was twenty-six, seemingly young for a position of such responsibility, and he had no experience with apes or with any other animals. His doctoral dissertation at the Friedrich-Wilhelm University in Berlin in 1909 concerned hearing, and he continued his auditory research as assistant and instructor at the University of Frankfurt. Later he served as Wertheimer's subject in the famous phi experiments of 1912, when he became devoted to the Gestalt movement.

Why a young auditory researcher with no animal experience would be sent to a German research station on a Spanish island in the middle

of the British shipping lanes just prior to World War II has become a subject for speculation (Ley 1990). The British quickly took control of the region when war broke out, and they saw no threat from German researchers studying apes on Tenerife. However, they might have wondered why the Germans had brought apes to the island—there were none there before 1913, and they were removed in 1920.

Inexperienced and perhaps distracted, Köhler nevertheless carried out a series of experiments on chimpanzees, chickens, and even children, published in translation as *The Mentality of Apes* in 1925. One line of research demonstrated *transposition learning* in chickens. He found that the birds could learn the concept of "degree of," so that after training to peck the lighter of two gray papers, they would choose the lighter of other presented pairs. They were responding to a relationship, not to the absolute values of the stimuli.

Even clearer results were obtained with apes and colors. Karl Lashley (1912) had found earlier that rats could learn to choose the larger of two circles. Over the next several decades, Lashley would side with the Gestaltists, stressing the importance of responding to relationships. This position was attacked more or less successfully by Clark Hull and his associates, who viewed Gestalt relationships as a "doctrine of despair" (1943, p. 26). Köhler was impressed with what seemed to be insightful problem solving by animals, and he saw this as damaging to psychological theories of the day, including Thorndike's connectionism.

In considering Köhler's findings, it is important to realize that he had little knowledge of the theories of the time, including Thorndike's (Ley 1990). He interpreted Thorndike's trial-and-error learning as no more than random and blind fumbling, with S-R connections mechanically stamped in by consequences. We have seen that this is not a fair representation of Thorndike's views, but Köhler was not alone in believing that it was.

Like other Gestaltists, Köhler believed that problem solving, perception, learning, and thinking involve the organism's regarding the relevant parts of its environment in a particular way. They stressed *Einsicht*, or "insight," which they saw as opposed to trial and error, as basis for learning. Köhler defined insight in 1925 as "the appearance of a complete solution with reference to the whole layout of the field." Let us examine Köhler's findings and assess just exactly what he found.

A typical problem for an ape required that two sticks be joined together to achieve the length necessary to retrieve a banana placed out-

side the bars of its cage. In another situation, an obstructing box had to be moved before the ape could reach the banana. A typical chimpanzee exhibited plenty of behaviors that Köhler described as "crude stupidities," but the moment of "Einsicht," or "insight," eventually came. Overall, the chimpanzees showed astonishing *stupidity*, not insight. In one case, Köhler wrote that "it did not dawn on Tschego for hours to push the obstructing box out of the way." Köhler judged errors as "good," when they were caused by "lack of comprehension of the conditions of the task." "Bad errors" were manifestations of "the crude stupidities arising from habit." These errors were extremely annoying to the experimenter; "It almost makes one angry," he wrote.

However, just as Watson's work with children was compressed into the story of Albert B., so Köhler's investigation of "ape mentality" was pretty much the story of *one* ape, Sultan. Only he could solve the most difficult problems without demonstration or assistance. When a banana was hung from the ceiling of a room and a wooden box was nearby on the floor, only he could move the box to use as a platform to reach the fruit. None of the others could do so without the assistance of demonstration. Chimpanzees are not adept at stacking boxes, and when they did manage to successfully stack them, it was often without regard for the location of the banana. Even Sultan failed here, so the "insight" shown was not striking.

Perception of Depth: Was Berkeley Mistaken?

> Not only is tridimensional vision, as a result of organization, possible without binocular parallax and experience, but inasmuch as less articulate organization seems prior to more articulate organization, tridimensional vision must be the earlier form.... (Koffka 1930, p. 177)

Three-dimensional vision may be more basic and primitive than is two-dimensional vision, according to Koffka (1930, p. 216). But how can that be, since depth perception has been *explained*, and, as Koffka noted, the explanation is so widely accepted that no one bothers to do research on depth perception any longer? Not surprisingly, the Gestaltists did not accept the traditional account for depth perception, the theory proposed by Berkeley in 1709 and accepted as fact in the twentieth century. For example, Woodworth (1938) listed the many cues that transform the two-dimensional retinal image into a three-dimentional world.

That view begins with the fact that we have two eyes and specific retinal points that are disparately stimulated. Disparate images act as

a cue for an inference of "outness"—therefore, we see depth, actually a compromise between seeing two objects and seeing one. It was Helmholtz who demonstrated conclusively that distance is the product of such "unconscious inferences."

Does that mean that our perception is really the sum of those stimulated points—the complex of sensations that result? That illustrates the complaint made first by Wertheimer and echoed by Köhler and then Koffka that psychology cannot be a matter of construction of wholes from pieces. After all, *physical science* no longer follows such a model, so why should psychology?

Koffka's argument was simple, though the evidence is difficult to summarize. First, he said that, according to Helmholtz's theory, we do not normally see double images because we interpret them as depth. It is only with effort that we can detect double images at all, as when we focus on a near object while attending to distant ones. However, Helmholtz knew well, Koffka contended, that double images may themselves be localized in space, an impossibility if they were the cue for space.

More convincingly, Koffka argued that depth perception occurs frequently in the absence of disparate retinal images. The depth perceived in the apparent movement demonstrations described above occur with monocular viewing. The Necker cube appears three-dimensional viewed with one eye, as do many other patterns that possess the structural properties required:

> when simple symmetry is achievable in two dimensions, we shall see a plane figure; if it requires three dimensions, then we shall see a solid. But always the organization of the field resulting from retinal stimulation will show the greatest possible symmetry.

The most elementary case of space perception is the figure–ground relationship described by Edgar Rubin, since what is perceived as "figure" is perceived as in front of a "ground." However, this is true whether or not it really is closer than the background.

Even color brightness influences depth perception, since brighter colors seem more "surfacy" (Koffka 1930, p. 174) and are "thinner" than are dark, less bright colors which look "thicker," and show depth. "Brightness here does not mean simply the intensity of reflected light, but a quality that Koffka could only call "insistence." Titchener (1910) called it "self assertiveness," or "aggressiveness." Koffka suggested that when we look at a scale of shades of gray from white to black,

there is more than an intensity difference. Compared with white, a dark gray is less aggressive, assertive, and "insistent." And it is thick and deep, compared with the white, which is "surfacy and thin."

Beyond Classic Gestalt Theory

Gunnar Johansson is familiar to students of developmental psychology because of his findings on the perception of "biological motion." In brief, Johansson showed that when a dozen or so lights are attached to a person's feet, knees, waist, elbows, wrists, and shoulders, observers instantly recognize "biological motion" when the configuration of lights is seen moving in the dark (Johansson 1975). Further, observers can distinguish male versus female models with fair accuracy, and even fairly young infants can distinguish biological from artificial motion. However, this later and more popular work derived from a broader basis in 1950 when Johansson extended Gestalt psychology beyond Wertheimer's laws of organization to include event perception (Johansson 1950).

Patterns of motions resolvable to horizontal and vertical components were described by Pierre Lissajous (1822–1880), a French physicist who reflected light from mirrors mounted on tuning forks held at right angles and created a variety of visual patterns, as may be more easily done with an oscilloscope. Ernst Mach, the German physicist already familiar to us, first considered such effects in psychology. Consider a simple example to see how resolution to vectors seems to explain phenomena.

Two spots below move fairly slowly, at a rate of 0.7 centimeters per second, though frequency may be varied widely. One moves up and down vertically and the other back and forth horizontally. They briefly meet at the low point of the first spot and the extreme left of the second's path. Subjects may comprise a large audience, which looks at the two spots moving toward one another, fusing briefly, and moving apart. However, viewers clearly see the spots moving on an oblique path—the "vector resultant" of the vertical and horizontal motions. The two spots move toward one another, meet in the middle of the oblique "path," and retreat, sometimes appearing to collide and bounce away from one another.

Many more complex cases are possible, and some are described by Johansson. Effects occur even when motion is absent, as when the brightnesses of several lights are varied in such a way as to produce

apparent motion. Imagine one light rhythmically changing intensity, as if "pumping," and you will see how it might seem to be approaching and retreating. These effects are "W-phenomena," or "wandering" phenomena, and Johansson was careful to show that they are not a subclass of gamma effects or stroboscopically produced apparent movement effects. Wertheimer's apparent movement effects disappeared if stimuli were separated by 200 milliseconds—simple succession was seen, rather than movement. W-effects occur within ranges of stimulus separation of 175 to 4,500 milliseconds and hence are a different order of event. These "motion Gestalts" (dropping the less-familiar German plural) are demonstrable with color changes, as "sound phantoms," and as "phantom air currents," (Johansson 1950, chapters 7, 8, and 9, respectively), but discussion of them is beyond the scope of this chapter.

Kurt Lewin: Gestaltist?

> Motivation (which was Kurt Lewin's main interest) I will not discuss because we do not yet know how Lewin's important work is related to Gestalt psychology, the theme of my lectures. (Köhler 1969, p. 120)

Kurt Lewin (1890–1947) was not clearly a Gestalt psychologist, as Köhler's remark testifies, partly because he was not really a basic researcher, as Gestalt psychologists were and still are. He is particularly interesting and inspirational for those who see psychology as strictly applied, devoted to studying matters that are of popular interest, such as "insight" and the behavior of groups working under different kinds of leadership conditions.

In a real sense, Lewin was the model for the headline-grabbing forms of social psychology that show how subservient to authority people are and how a mock-jail setting can turn normal students into sadistic "guards" and cringing "prisoners." However, many students and colleagues remember him as an inspirational figure who first awakened their interest in psychology.[8]

Lewin[9] was born in Prussia on a date he often said was easy to remember—the ninth nine of ninety, referring to September 9, 1890 (Marrow 1969, p. 3). The family ran a store, over which the family lived. Kurt had an older sister, Hertha, and two younger brothers, Egon and Fritz. Even in childhood Kurt was an observer of social behavior. His brother Fritz was "tall, athletic, and high-spirited and excelled at sports" (Marrow 1969, p. 4), and he often came home late at

night. But, however late he came, his mother, Recha, was waiting with motherly concern. Later Kurt's wife, Gertrud, believed that he gauged the depth of a woman's love or the affection of a friend by their willingness to wait for him, since he was always late for appointments and classes.

The Prussia of the turn of the twentieth century was strongly anti-Semitic; the aristocrats and army officers who were the cream of society would do business with Jews but would not have any social contact with them. Yet, oddly, Prussian law required religious education in elementary school, so Kurt and other Jewish children attended Jewish religious classes and underwent the Hebrew Bar Mitzvah ritual. The Lewin family still celebrated Christmas, however, and exchanged gifts as did other Prussians.

Berlin Education and Philosophical Interests

As an elementary school child, Kurt was sent to board with a family[10] that lived in Posen and later Berlin, since educational opportunities were much better away from Mogilno, their tiny home village. Kurt had not been a standout pupil thus far and was known for temper tantrums that led to the family nickname the "Furious Herring."[11] He was not suspected to be unusually intelligent until his last two years of gymnasium. Marrow noted a significant event that occurred when he was seventeen—one that is of utmost importance:

> In 1907 he was introduced to Greek philosophy and fell in love with it. It was a love that lasted all his life. During this same period his scholastic record improved remarkably. (Marrow 1969, p. 5)

The fact is that a favorite paper contrasted Aristotle's doctrine of essences and natural law with Galileo's Enlightenment notions.[12] He argued for the status of opposites as extremes of continua, rather than as isolated "contrasts," and passionately argued against group-averaged data and for the intensive study of single cases. It may come as a surprise to those who know only Lewin's applied work, but he was always the philosopher. As his wife, Gertrud, said,

> He never abandoned philosophy. In Berlin he lectured one year in psychology and had a seminar in philosophy; the next year he had a lecture in philosophy and a seminar in psychology. (Marrow 1969, p. 17)

An earlier philosophical/theoretical paper appeared in 1922 as an analysis of the concept of "identity" in the sciences (Lewin 1922). He

believed that psychology had reached a turning point (*Wendepunkt*) comparable to that reached in physics in Galileo's time. He contrasted the ways in which physics and biology determine "genidentity," or the ways in which objects maintain identity over time and thus are treated as the "same" object. In physics, objects extend over time, and we can speak of the "same" star shining on the Roman Empire and on the Wrigley Building. And we can say that the material composing the star is essentially the same over the centuries.

However, in biology, we don't do that—the egg and the year-old chicken are structurally very different, yet we treat them as different stages of the same biological matter. The forty- and twenty-year-old are treated as "the same person," though few molecules may have survived the decades. Lewin concluded that physics and biology are therefore essentially different in their descriptive units and the two sciences are thus incommensurable—there is no translating one to the other.

As sciences mature, they purify and segregate themselves increasingly from other sciences. There may be some unity of the sciences, as Descartes hoped to establish, but that may be wishful thinking. Whether "physiological psychology" progresses or not, psychology is best served in segregating itself and developing an autonomous set of concepts, thus purifying itself as do all sciences that advance.

Lewin in Graduate School and as Soldier of Kaiser Wilhelm II

As a graduate student at Berlin he organized courses for the city's workers, whose powerlessness stemmed largely from their ignorance, and this enterprise was evidently successful. In 1914 World War I broke out, and, though he was about to finish his doctorate, he volunteered to serve in the German army, where he spent four years in combat and won the Iron Cross before being wounded in 1918. He volunteered as a private and left a lieutenant who had acquired the useful skill of being able to sleep while standing up and when walking or marching, a skill that he claimed he used later in life (Marrow 1969, p. 10). Lewin was wounded and hospitalized near the end of the war, and his youngest brother, Fritz, was killed in action.

Lewin's first, and perhaps most interesting, psychological work was published in 1917 and titled "War Landscape." He described how the "life space" of a soldier differed from that of a civilian, such that a lovely open field or a quiet spot beneath a cliff appears as inviting to the latter but dangerous to the soldier. More specifically, the landscape

changes for the soldier as he approaches the front lines. When the soldier is still a great distance from the front, the landscape seems to stretch endlessly in all directions. However, as the front is approached, the landscape takes on boundaries, so that it has direction and a front and a back.

This structuring of the space is viewed as objective features of the landscape, though it is a function of "soldier needs" that influence perception. A soldier needs physical protection, food, a favorable position with respect to the enemy, and other things that structure his space. Even objects change character, from "peace things" to "war things," so that things become defined solely by their possible military application.

Lewin used the terms boundary, direction, zone, and topological theory in that paper and referred to the evil of the "dehumanizing of the enemy" as deplorable.[13] In 1918 Lewin returned to Berlin, where he found the research of Wertheimer, Köhler, and Koffka to be interesting but unappealing because of its lack of practical application.

He published two 1919 papers on workers in industry and in agriculture, pointing out the great differences in what is called "hard work." The agricultural worker must do many different things daily and according to season, where the industrial worker does more repetitive things and therefore receives less satisfaction.

He referred to the then-popular time-and-motion studies of industrial engineer F. W. Taylor, who promoted a stopwatch and clipboard approach to factory work. His advocacy of piecework pay[14] and efficiency through the elimination of inefficient motions earned him the nickname "Speedy" among workers. Lewin criticized Taylor, arguing for the "life value" of work over the exclusive emphasis on maximum efficiency (Lewin 1920).

Lewin joined the faculty at Berlin in 1921 and formed a group that met at the Swedish Cafe across the street from the Berlin Psychological Institute. There he noticed that waiters remembered their customers' bills only until they were paid, an observation that led to the later research of Bluma Zeigarnik.

Lewin's Theoretical Psychology

His work was so strongly focused on applied features of current culture that it is easy to forget that he did propose a field theory, about which he felt very strongly. He was influenced by the field physics

that had grown in Germany during the early decades of the twentieth century, as were Wertheimer, Köhler, and Koffka, his companions at Berlin. He thought of people as systems of tensions that could be best seen as energy fields, constantly changing as they move in the life space, or psychological field.

The formula $B = f(P,E)$ proposed that Behavior is a function of a Person operating in an Environment, all represented in ellipses called Jordan curves. This spatial representation came from topology, a geometry that represents things arranged in their relative positions, without precise, point-for-point duplication. These representations appeared all over Lewin's papers and became known as "Lewin's eggs" at the University of Berlin.[15]

Always there are spaces and forces and vectors and valences—it was almost psychoanalysis without concern for the history of the individual. Lewin's psychology was a psychology of the present, with no concern for the history that brought a person to the current situation. The book did not do well, and, as it received little notice, Lewin occupied himself with the founding of a psychological institute at Hebrew University in Jerusalem.

Lewin became known in America in 1929 when a student published a description of the experiments with Zeigarnik and portrayed Lewin as a Gestaltist dealing with psychic energies just as physicists had dealt with physical energies only a few decades before (Brown 1929). Lewin himself presented his ideas in the same year at the Ninth International Congress of Psychology at Yale. He presented his talk in German, but it didn't matter, since he showed films and communicated his enthusiasm to an audience which could not understand the language he spoke!

The film showed behavior of children that exemplified his views, such as the appearance of insight shown when an eighteen-month-old infant tries to sit on a spot on a stone. She managed to keep her eyes on the stone by looking down between her legs while backing over the stone—thus ensuring that she would sit on target. Gordon Allport, the Harvard social psychologist, was there and believed that a number of Americans were impressed with the film (again, Hothersall 2004, p. 235).

Real People, Not Statistical Myths

In 1931 Lewin contributed a piece in Murchison's *Handbook of Child Psychology* titled "Environmental Forces in Child Behavior and Devel-

opment," translated by Donald K. Adams.[16] In that chapter, which introduced Lewin to a wide audience, he argued for the study of the behavior of individual children. He proposed that it is imperative to understand well the life space of a single child rather than to collect data averaged over groups. The "average child," who exemplifies such research, has no existence in fact, only as a "statistical myth," to use Lewin's expression.[17]

It is Lewin's views, not those of the traditional Gestaltists, that lead psychologists to believe that the Gestaltists were advocating the study of "the whole person." That was pure Lewin, who did urge that the whole Gestalt of the child's life space be examined. You can rest assured that the result will not match the "statistical-average child."

Over the course of development, the child's life space changes from small and undifferentiated to large and differentiated—note that this is a view wholly in keeping with William James's views and with the tenets of the functionalism that had swept America in the first decades of the twentieth century. As Lewin cast it, the infant's concerns extend barely beyond the limits of its body, and a favorite toy may be removed from a few feet away with no protest. However, a two-year-old will react differently, as we all know.

In the 1931 chapter he also illustrated his method of representing fields and gradients of forces in the life space. He described detour problems, in which the child must move away from a highly valenced[18] goal object in order to eventually reach it. His methods and interpretations were identical to those of Köhler, whose subjects had been the apes brought to Tenerife.

Lewin also described conflict in terms of conflicting forces. A child may experience conflict between two attractive choices—an approach–approach conflict—or between other choices constituting approach–avoidance or avoidance–avoidance conflicts. Perhaps interestingly, he noted that once the choice is made in an approach–approach conflict, the rejected alternative looks mighty attractive.[19]

Perhaps the conception of psychological choice field that Lewin promoted is best illustrated in a strange case published as a very long monograph by one of his students at Berlin, a woman named Tamara Dembo.

A Demonstration of Induced Insanity

Tamara Dembo was a student of Kurt Lewin who reported[20] a fascinating demonstration of induced anger, interpreted as a Gestalt

phenomenon. Her aim was to create a "field of forces" that would "transform a person's life space" in such a way as to produce strong emotion. In fact, the subjects were put into a situation where frustration produces anger, along with general disorganization of behavior. Dozens of subjects participated.

Each subject was seated in a chair within a rectangle marked on the floor and was asked to get a flower from a vase that was just out of reach, while keeping both feet within the rectangle. In that situation, the subject quickly finds a solution by leaning on the chair and thus reaching far enough to grasp the flower. Then the subject is asked to discover a second solution and confronts a "barrier," since there is no second solution and attempts to find one are frustrated.

The subject did not become aggressive at this point but merely informed the experimenters that there is no second solution. Attention to the task is diverted away, and readiness to leave is expressed. However, Dembo then created an "outer barrier" by insisting that there is indeed a second solution and that she is sure that the subject can discover it. To escape the field, the subject must repeatedly attempt to reach the impossible goal. Subjects frequently spent over an hour in this extremely unpleasant situation, before they fled it. However, strange things happened first.

Dembo's subjects reacted to the initial tension of the situation by "Moving up to a level of fantasy where barriers do not exist and wishes can come true" (de Rivera 1976, p. 372). This cannot be maintained and the subject returns to the impossible task, where tension accumulates. The tension acts to dissolve the various boundaries within the field, such as the real goal and an easy but unacceptable substitute—a flower within easy reach. That flower is rejected by the experimenters, and tension mounts. The boundary between reality and fantasy breaks down, along with the boundary separating public and private!

With a little effort, this progression toward insanity is easy to imagine—just picture yourself in a hopeless position, where you must act, but where there is no chance of success. As tension accumulates, your "objectivity" suffers, in a manner of speaking, as occurred with Dembo's subjects. At that point, her subjects engaged in "minor irrationalities—finding themselves holding the nearby flower, thinking that perhaps they really can do an impossible feat (such as hypnotizing the flower), telling the experimenter something that is really too personal to share, and so forth" (de Rivera 1976, p. 372). As the tension continues to mount, the boundaries of the field fade so completely that

even the boundary defining the self versus the environment cannot be preserved. At this point the subject explodes in anger or, in many cases described by Koffka, the subject bolts from the room and is later found huddled in a corner, crying.

Including that experiment, sixty-four experiments were done between 1925 and 1928 with a total of twenty-seven subjects, each spending from one to two hours. The situations were designed to create tensions and generate anger as was the case in "fetch the flower." Other tasks were assigned that were also described as achievable, though they were not. For example, subjects were asked to throw rings over the necks of bottles fifteen feet away—until ten consecutive successes occurred. This was effectively impossible, but it seemed possible.

Dembo saw the effect of these experiments as a transformation of a person's life space, such that the situation becomes filled with tension, transforming the person. Emotion arises from a restructuring of the field, and the intensity of the emotion corresponds to the degree of transformation of the life space. Kurt Koffka endorsed the essentials of this view but preferred to interpret the dynamic organizations as states of tension within the ego (Koffka 1935, pp. 407–410).

Other Work at Berlin

Bluma Zeigarnik's dissertation work, a staple item in countless textbooks since it was published, showed the greater recall for uncompleted tasks (Zeigarnik 1927). This was the first corroboration of Lewin's notion of tension systems, with 164 subjects, child and adult, performing from eighteen to twenty-two tasks. These were simple, such as listing cities, solving riddles, counting backward, and stringing beads—half were completed and half interrupted. When subjects were later asked to recall the tasks, those interrupted were recalled twice as often; the ratio of recall of uncompleted to completed was 1.9 to 1. The first task recalled was three times as likely to be an uncompleted one.

Zeigarnik proposed that motivation for a "satisfying performance" arose from three sources: tension arising from a need to achieve completion as a goal in itself, personal ambition, and the "obligation" to follow the directions of the experimenter. The strength of these quasi-needs was manifested when, as often happened, the subject resisted the interruption. Subsequent experiments showed that it was not just the emotion aroused by interruption that was producing the effect. Subjects who were interrupted on one third of the tasks and

subsequently allowed to finish them were no more likely to recall those tasks than the tasks that were uninterrupted. However, the third of the tasks that were interrupted and never finished were once again memorable.

Another Russian woman, Maria Ovsiankina, extended Zeigarnik's findings with 125 subjects who were usually interrupted "accidentally," rather than deliberately, and who were given a "free period" of eight to ten minutes immediately after the interruption. During that period, one hundred percent of the "accidentally" interrupted tasks were spontaneously resumed, and eighty-two percent of the deliberately interrupted tasks were resumed.

Ferdinand Hoppe used darts, ring tossing, puzzles, and arithmetic problems in a 1930 study of aspiration level. Subjects performed tasks of varying difficulty, including insoluble problems, and shifted their stated goals as a result of their experiences of success and failure. In 1928 Anitra Karsten studied psychical satiation, a term coined by Lewin to refer to a "decrease in tension level" due to repetition, but not to muscular fatigue. Her subjects repeatedly drew pencil patterns, read poems, or made pencil strokes until they wished to stop—"had no desire to continue." Tasks judged to be agreeable or disagreeable "sated" faster than did neutral tasks, and Lewin applied the results to the phenomenon of more frequent change in women's fashions than in men's.

It is noteworthy that in all of these experiments, which in many ways were the prototypes for the social psychology of the second half of the twentieth century, the actual behavior of many subjects was examined—no questionnaires were administered and no inferential statistics were used. You can rest assured that Lewin was later criticized for such practices, and he agreed that more subjects never hurt and that exact measurement is desirable in some cases. However, quantitative nicety was clearly of minor importance to him.

Lewin's "Action Research" at Iowa

> The student explained this (his thesis topic) to Lewin and Lewin replied, "Ach, nonsense! Just nonsense!." To a student struggling with a thesis based on a new idea such as this, it's not very encouraging to hear your ideas called nonsense. Well, it turned out to be nonsense. (Roger Barker, in Marrow 1969, p. 94)

Lewin spent nine years at Iowa, from 1935–1944, as Research Professor of Child Psychology—he was able to bring Tamara Dembo, along with Roger Barker, who had just finished a doctorate at Stanford. It was

there that Lewin began his "group dynamics action research," best known for its finding that groups of boys work more efficiently and harmoniously when organized democratically then when control is authoritarian or is largely absent—"laissez-faire." But that famous research was awfully crudely done, and Lewin's antipathy toward the Nazi authoritarian regime in Germany made it impossible for any other findings to emerge.

Other work was more substantial—for example, the "group decision" study done with anthropologist Margaret Mead to encourage the wartime eating of what were called "variety meats." Iowa wives claimed that their husbands specified what meats were to be served, but it was found that it was the wives who did the choosing and the husbands were stuck with that choice. A variety of other research had been published by 1940, and Lewin was becoming famous. And he was aware of the "publish or perish" policy that was conspicuous in America.

Work on level of aspiration that was begun in Berlin by a student named Hoppe was continued and is still recognizable in the studies of the kinds of goals that subjects high and low in need for achievement select. They select goals that are intermediate in difficulty, allowing perhaps a 50/50 chance of success. Those low in achievement need or high in fear of failure choose very easy or very difficult tasks.

The Zeigarnik effect, whereby subjects recall and resume interrupted tasks better than completed ones, and the frustration/dedifferentiation studies were widely known.

In one study, done by Barker, Dembo, and Lewin, children were allowed to play with ordinary toys for half an hour, at which time they were allowed access to a second room that had previously been blocked off with heavy wire mesh. The second room featured more attractive toys, and, after a period of access to them, the children were expelled from the room and access was prevented by the heavy wire screen and a conspicuous padlock. Blocking of goal-oriented behavior was designed to produce frustration, and it apparently did.

Subsequent play appeared regressive, so that a four-and-a-half-year-old became a babyish, thumb-sucking three-year-old. Play seemed less intellectual, unhappiness and restlessness were evident, and some aggression occurred. In a subsequent experiment by Wright, in which pairs of children served, there were actually attacks on the experimenter. The procedure thus appeared to produce regression, dedifferentiation of the life space so as to become more primitive.[21]

Lewin and Industrial Psychology: The Harwood Project

Lewin had become interested in industrial psychology as a young man and published a critique of the Taylor system in 1920. He argued that efficiency experts were not enough and that psychologists were needed to ensure job satisfaction, an essential ingredient if high outputs are to be achieved at low cost. It is not the hours worked but the "inner value" of the work that is important (Marrow 1969, p. 17).

In 1939 the Harwood Manufacturing Corporation established an operation in the mountains of rural Virginia, employing 300 local women. After twelve weeks of training and the use of every known method of incentive and pressure, their output was half that of the company's plants in the Northeast, and Lewin was asked to intervene (Lewin biographer Alfred Marrow was an officer of the company).

Lewin saw that the employees viewed the production quotas as unattainable, so they had no "social reality" and the employees' failure to attain them was not accompanied by feelings of failure. The quotas were not really goals as far as the workers were concerned. The first job, therefore, was to stop pressing individuals to improve and to convince them that the quotas could be met. Workers met in small groups, since Lewin always believed that if group standards are set and group attitudes exist, individuals do everything possible to conform to those standards and attitudes.

The company also brought in sixty skilled workers from the North, who immediately met and maintained production quotas. This had no effect for the first two weeks, but then production of all workers increased. Alex Bakelas was brought in to run things for Lewin, and he began regular meetings with productive supervisors. A group of workers was formed that was allowed to decide how to change to increase production and to vote when and by how much to raise production quotas.

Having a hand in the production process raised quotas and production from seventy-five units a day to eighty-seven and then to ninety, a level that was maintained for five months and that was matched by no other group. In Lewin's words, "Deciding links motivation to action" (Marrow 1969, p. 144), and discussion groups—or other kinds of groups—were not enough.

Bakelas and J. R. P. French experimented further on methods of increasing and maintaining production quotas without increasing "tension" in the participants' life spaces. Workers were allowed to plan their days—when and how hard to work—as long as quotas were

met. Leadership training groups, later to be called T-groups, involved role playing and sensitivity training and were conducted by French in the early 1940s. French also persuaded the supervisors, all women, to accept the hiring of older workers. There was initial resistance, since the supervisors were sure that older workers—women over thirty—could not physically do the work, could not learn to do it, and would soon quit.

The war had brought on shortages of labor and older workers were themselves in short supply, so Harwood had to hire those that it could find. But how to convince the supervisors to accept them and give them a chance? French asked the supervisors themselves to form a group and look into the question, producing what data could be found to support their contentions. They found, of course, that older workers in fact performed better, learned faster, and stayed on the job longer than did younger workers, and, "these findings being their own, they trusted them."[22]

Group Dynamics at MIT

Lewin was a citizen by 1940, working part-time for the Office of Strategic Services, the precursor of the Central Intelligence Agency, and so was commuting between Iowa City and Washington. What he and his colleagues worked on is not specifically known, because of the veil of secrecy that shields wartime projects. However, it involved problems of boosting morale at home and lowering that of the enemy, choosing leaders, training them, increasing war production, and convincing civilians to change their diet to conform to wartime shortages.

Concerning the last category, Leon Festinger found that a newly introduced beverage was more readily accepted when the container in which it was distributed was also new (Marrow 1969, pp. 155–156). In 1944 Lewin was promised a million dollars' support from the American Jewish Council (AJC) to research racial and religious discrimination and to discover remedies for it. He also was promised support from the Field foundation, and Iowa was pressing him to decide whether he would continue research and teaching there or go off on these new projects, since it was clear that no one could do both.

He contacted friends at Berkeley and at MIT, hoping that one could offer him a home—he preferred that it be Berkeley, because of the climate. As it happened, the MIT offer came first, and he moved to Newtonville, Massachusetts, in August of 1944. A year later an article was published that included the expression, "Nothing is as practical as a

good theory" and described the goal of the new MIT center.[23] The key assumption of the center came from Lewin's experience at Harwood.

It seemed clear that the first thing to do was to set group norms and attitudes—individual members will then go to great lengths and through much suffering to conform to those norms. Hence, it is easier to change the group rather than the individuals comprising it! The center aimed to discover the forces that lead to group cohesiveness, the attractive and repellent forces that define groups. Homogeneity of individual members is not a factor, since members need not be similar, and the "whole is different from the sum of its parts," as Köhler would say.

Even at what was to be this late stage of his career, immersed in applied projects, his teaching was still philosophical and theoretical. Harold Kelley recalled the "exotic, specialized" subjects that Lewin covered—topological and vector analyses, as well as "Aristotelian versus Galilean modes of thought" (Marrow 1969, p. 188). John Thibaut, Lewin's assistant, was formerly a graduate student in philosophy at the University of North Carolina at Chapel Hill. Along with theory and philosophy, Lewin still drew diagrams in the snow, just as he had done decades earlier in Berlin.

Because of its generous funding, The AJC's Commission on Community Relations (CCI) in New York City demanded much of Lewin's time. The goal of the CCI was to better understand, and thus combat, prejudice. This was to be accomplished through long-term research on ways to train community leaders, to change environments, and to make minority groups feel that they belonged.

However, the AJC pressed for "fire fighting" responses to isolated acts of prejudice, the first occurring in 1946. Italian Catholic youths had disturbed Yom Kippur services at Coney Island—what could Lewin do about it? He had only two assistants at the time, and his chief assistant, Charles Hendry, had just quit because Lewin continually started new projects before old ones were complete. In many cases, the new projects interfered with or required abandoning of ongoing work.

Lewin met with local groups of Jews, Catholics, Protestants, and "Negroes" and immediately had the charges against the youths dropped—they were turned over to their priest and to the Catholic Big Brothers. It appeared that the miscreants were not really anti-Jewish but were generally hostile. After all manner of counseling they became substantially less aggressive, though their "attitudes"

remained the same.[24] It was Lewin's view that "you can't legislate good will," and that objectionable behavior is best changed by withdrawing support from the local social group. As was true at Harwood, group norms work wonders.

In related work, Lewin and his assistants found that attitudes toward Negro sales clerks, as assessed by questionnaires, did not correspond with actions. People said that they would not shop at stores with black clerks—but observation showed that they did shop at such stores. Lewin planned to assess methods of integrating housing projects, and it was after his death that results clearly showed that mixing races and religious groups was superior to integration by separate building or area.

The Founding of T-Groups

In the summer of 1946 the state of Connecticut asked for help in training leaders to combat religious and racial prejudice, and Lewin's group held a two-week session at Teachers' College in New Britain. This was an important project both for Lewin, whose CCI was underfunded and understaffed, and for the Connecticut Interracial Commission, whose lack of success to date had called its competence into question. Frank Simpson, head of that commission, called Lewin.

Forty-one volunteers, mostly educators and social workers, half blacks and Jews, met daily in group discussions in which the staff and members of the group were treated as peers. The sessions were taped and reviewed in the evening by staff and then by "students." They spent time role playing and appraising their own behavior—this self-appraisal constituted about a fifth of their time.[25] Most participants, interviewed six months later, reported that they felt more competent working with groups and had more sensitivity to the feelings of others.

The Office of Naval Research awarded a grant to Lewin to establish the National Training Laboratories (NTL) in Bethel, Maine, but he died before the first meeting. The NTL was meant to deal with bigotry and raising the self-esteem of blacks and their children. Simple role-playing instances of bigotry were enacted and different responses tested. The most effective response to a bigot appeared to be a calm one, rather than a violent response or no response—at least this was the judgment of some 500 subjects who participated.

In Britain, the Tavistock Institute was founded by Eric Trist and A. T. M. Wilson, who had previously worked in the rehabilitation of returning British prisoners of war. Lewin published two papers in

the first issue of *Human Relations*, a journal founded by Trist and Wilson and published jointly by Tavistock and Lewin's MIT group. He described his view of group dynamics as quasi-stationary equilibria, with forces promoting and resisting change and promoting and resisting discrimination. Change comes through methods that add to or diminish tension—in his view, decreases in tension are preferable.

On Tuesday, February 11, 1947, Kurt Lewin had a busy day and fell ill late in the evening. His family doctor determined that he had suffered a heart attack and should be hospitalized the next day. The fatal seizure came later that evening. He had seemed exhausted and almost frantic for some time—no longer playful and optimistic. In 1947 Donald Adams asked him when he would get back to "*vergleichenden Wissenschaftslehre*," the comparative study of the sciences, as represented decades earlier in his Aristotle—Galileo paper and in lectures since. Adams remembered his answer:

> I must do that. These things we are finding out will be discovered in five or ten years anyway, but this other might be fifty years away. (Marrow 1969, p. 235)

Or, never? Adams felt that the philosophy of "comparative sciences" was Lewin's real business in life. Maybe Lewin thought so too.