ZEITGEIST

A Short History of Modern Germany

The history of Gestalt psychology is intimately connected to the history of modern Germany. Unlike France and Britain, Germany only emerged as a modern, unified nation state in the late 19th century following the Franco-Prussian war (1870-1871). The new German Empire was a constitutional monarchy with the Kaiser (emperor) at its head. The first Kaiser, Wilhelm I, had Otto von Bismarck as his chancellor; he worked to make Germany a nation capable of competing militarily and economically with Britain and France. Through rapid industrialization and urbanization Germany quickly achieved those goals.

Following the death of Wilhelm I in 1888, the new Kaiser, Wilhelm II, relieved Bismarck of his duties and set a new course seeking to expand German influence beyond Europe. That meant becoming a colonial power. Wilhelm II expanded the German military and stirred up a diplomatic crisis with France over Morocco prior to World War I. Complicated defensive alliances with Austria-Hungary contributed to Germany's entry into the World War I. All sides expected a short war; after four years of trench warfare on the Western Front, the entry of the United States into the war, and a successful naval blockade by Britain, Germany was forced into an armistice by November 1918. After, the Kaiser abdicated and a German republic was proclaimed. Almost immediately, revolution broke out in Germany with one side trying to duplicate the success of the Russian Bolsheviks and the other attempting to restore the old order. Nearly a year later and mostly because of army intervention, the revolution ended having changed little political or socially. The 1919 Treaty of Versailles ending the war imposed stiff penalties on Germany: the loss of all of its overseas colonies and portions of its European

territory. Plus, it demanded enormous monetary reparations for having started the war.

The next 14 years, the Weimar Republic, were tumultuous. Hyperinflation hit hard in 1923, raising the prices of ordinary products such as bread and butter from a few marks to billions of marks. The value of money dropped so quickly that people rushed to buy goods as soon as they were paid their salaries and before prices went up again later in the day. Many lost everything they owned. The establishment of a new currency ended the inflationary cycle but the wounds were long lasting. Paradoxically, the next few years led to a German renaissance in the arts and sciences. Berlin became a cosmopolitan world capital hosting a new kind of *avant garde* experiment in social mores. During this period new plays and cinema thrived, German scientists won Nobel Prizes, the Bauhaus school of architecture evolved, and the cabaret emerged as a popular form of entertainment. It was the German version of the Roaring Twenties. The worldwide stock market crash of 1929 hit Germany hard. The last years of the Weimar Republic saw increased factionalism, fighting in the streets between armed groups, and political intransigence. In this atmosphere, Adolph Hitler and his Nazi party grew quickly by appealing to a mythical German past and promising an end to chaos.

The Weimar Republic ceased to exist in January 1933 when Hitler was named chancellor. His Nazi party quickly moved to squash all opposition. German Jews were targeted early, including world-class scientists such as Albert Einstein. German psychology and science, which up to this point was arguably the best in the world, came to an abrupt near halt. Scientists, artists, performers, and authors left Germany; many ended up in the United States (see chapter 1).

Gestalt psychology was deeply affected by its forced expulsion from Germany. The history of psychology, itself, was brutally altered by the events following Hitler's accession to power. Toomela (2007) argued that those events led to the abandonment of the methods and goals of

pre-World War II German-Austrian psychology and that since then (p. 10, original italics), "*modern mainstream psychology can be understood as a direct continuation of pre-WWII North American psychology.*" Meaning that psychology today would be much different had Gestalt psychology continued to flourish in a Europe without Nazism. Many of its findings remain in modern mainstream psychology, but no one can say what the history of psychology would have been otherwise.

PREVIEW

The antecedents to Gestalt psychology mostly centered around the phenomenon of *melody* and attempts to explain it. Ehrenfel's concept of *gestalt quality* presaged the later definition of a *gestalt*. Other early work included Mach's explanation of the *Doppler Effect* and his discovery of *Mach Bands*. Wertheimer's description of the *phi phenomenon* put Gestalt psychology on the map as did his elucidation of the *Gestalt principles of perception*. From the beginning, Gestalt psychologists considered themselves as scientists attempting to discover causal relationships between gestalts and underlying physiological mechanisms. They also borrowed freely from physics appropriating concepts such as *force fields, isomorphism,* and *field theory*. Wertheimer's early research on *mathematical thinking* was an example of *cross-cultural psychology*. Gestalt psychology was broad in its approach going beyond perception to include learning (human and animal), thinking, and social psychology. Köhler's research on *insight learning* and *transposition,* Zeigarnik's work on *memory,* Wertheimer's book on *thinking*, and Lewin's and Asch's *social psychological studies* all testified to the breadth of Gestalt psychology. Gestalt psychology lives on in 21st century psychology; one just has to know where to look.

INTRODUCTION

This chapter details the rise of Gestalt psychology, which developed and grew primarily in

Germany at about the same time as Behaviorism and Neobehaviorism were coming into ascendance in the United States. The earliest glimmers of Gestalt psychology came in the late 19th century as Ernst Mach and Christian von Ehrenfels struggled to understand sensation and perception. Both realized that musical melodies persisted despite radical alterations in tempo, key, or instrument. Ehrenfels coined the phrase *"Gestaltqualitäten"* or Gestalt Quality in an attempt to capture the phenomenon of melody which was not just a collection of elemental notes strung together in time. Instead, melody was a gestalt, a thing in and of itself. Ehrenfels's idea was influential but incomplete.

His student, Max Wertheimer, was the first to expand upon the still evolving idea that a melody could be psychologically real and irreducible to more fundamental units (see below). The breakthrough for Gestalt psychology came when he later discovered the phi phenomenon, or the apparent movement of a spot between two rapidly flashing light sources. Fortuitously, Wertheimer found himself in the company of two younger researchers: Wolfgang Köhler and Kurt Koffka. Together, the three of them became the founders of Gestalt psychology. In Germany from 1912 to 1933, Gestalt psychology grew quickly and threatened to become a viable alternative to American behavioral psychology. But, history intervened in the form of Adolph Hitler and the rise of Nazi Germany. All three of the founders and many of their students fled Germany, most of them at peril of their lives. The move to the United States stalled the further growth of Gestalt psychology. Few American behaviorists were congenial to their ideas and theories. Furthermore, the displaced Gestalt psychologists were mostly unable to regain the traction and momentum they had enjoyed in Germany. They trained few new students, and two of them, Wertheimer and Koffka, died young.

Despite those obstacles, a second generation of Gestalt psychologists emerged. Two social psychologists, Kurt Lewin and Solomon Asch, influenced American psychology greatly. Lewin

extended gestalt ideas into social psychology and personality. Asch conducted groundbreaking research in perception and conformity. Rock and Palmer (1990) argued that Gestalt psychology has succeeded in becoming a major part of 21st century psychology in the areas of perception, learning, and cognition. Indeed, Gestalt psychology and its ideas are still inspiring research in psychology today.

Wherever a naturally occurring and energy-efficient phenomenon or process exists that seems irreducible to simpler constituent parts, researchers should suspect that a **gestalt** exists. What are gestalts? The simplest answer is that they are coherent wholes, but that is too simple a definition. For the most part, gestalts are already present in the environment, either as percepts, solutions to problems, or ways of social interaction. The Gestalt psychologists saw themselves as explorers, discoverers, and chroniclers of gestalts. The best way to understand their approach and what they meant by a gestalt is to examine the history leading to Gestalt psychology.

ANTECEDENTS TO GESTALT PSYCHOLOGY

The earliest origins of Gestalt psychology occur in the 1860s in German-speaking Europe. By then, physics was no longer the only dominant science. Biology, bolstered by Darwin's theory of evolution, and psychology, because of Fechner's psychophysics, had become the new scientific triumvirate. Ernst Mach, himself a young scientist at the time, later wrote:

> Physics, physiology, and psychology are indestructibly connected, such that each one of these sciences can only be successful in combination with the others, and yet each one of them is an auxiliary science to the other two (Quoted in Heidelberger, 2004, p. 160).

Mach lived a life immersed in all three of those academic disciplines, contributing original work in physics, psychology, and biology. While he is most remembered today for his contributions to

physics, it is a mistake to neglect his work in biology and psychology. In physics, he explained the reasons behind the **Doppler Effect** using simple apparatus. Mach demonstrated that the Doppler Effect was not an illusion. Instead, it was a physical phenomenon. As a noisy object approached an observer, the sound waves from it arrived faster, raising their pitch because their own speed was added to the speed of the moving object. After, as the object passed by the observer and receded, the sound waves arrived more slowly, lowering their pitch because the object creating them was moving away. Mach, thus, demonstrated a physical cause for a psychophysical phenomenon.

Mach is most famous for the physical concept that bears his name: Mach numbers. The development of bullets that could travel faster than sound was the impetus for that research. Using high-speed photographic techniques he developed himself, Mach explained how objects that exceeded the speed of sound caused the now familiar sonic boom.

Mach used evolutionary theory to explain the development of science itself. He was one of the first scientists to write about science as a way of thinking. For him, science was the culmination of a long natural history of cognition that began with simple animal behaviors such as reflexes and perception. The evolution of memory was a major milestone in the process. After, came everyday thinking, followed by scientific thought. Mach considered evolution as necessary for any adequate scientific description of the world. He believed that "the purpose of science is to give the most economical description of nature as possible" (Pojman, 2009, np).

Mach also heavily influenced psychology and may be considered to be one of the earliest Gestalt psychologists. His analysis of **Mach Bands** led to a new conception of the relationship between sensations and perceptions. Much like Kant before him, he argued that the sense organs themselves preprocessed sensations before sending them to the brain. In other words,

the eyes, ears, and other sense organs did not simply send unaltered sensory information to the brain for analysis. Instead, the sense organs first interpreted stimuli, altered them, and then sent that information to the brain for further processing. In the case of the Mach Bands, the preprocessing he discovered was later explained by the physiological process of lateral inhibition, where the sensors inside the eye pay more attention to areas of contrast than they do to areas of constancy. The Mach Bands are illusory because they are artifacts of the perceptual process, not true representations of stimuli. Thus, early on in the history of what was to become Gestalt psychology, an explicit connection was sought between sensation and physiology.

Mach argued that observers did not have direct access to the external world. Instead, the observers themselves, along with their perceptual processes, created an experiential version of the real world. He argued further that it was the relations between stimuli that were most important to perception, not the stimuli themselves. Any other interpretation, he argued, would lead to chaos. Much like Wertheimer later, Mach seized upon music and melody as powerful examples. He was one of the first to realize that melody depended upon the tonal relationship of notes, not upon the notes themselves. Mach's notions were seminal to later Gestalt theorists. Christian von Ehrenfels took Mach's ideas and coined a new term—form qualities or *Gestaltqualitäten*. With that, the Gestalt psychology genie was truly out of the bottle.

Christian von Ehrenfels's (1890) article *"Über 'Gestaltqualitäten"* (On 'Gestalt Qualities') was the most influential early article on Gestalt psychology. In it he refined Mach's early ideas. Where Mach saw a gestalt such as a melody as the unitary perception of two things, the notes over a time span, Ehrenfels saw the melody as *the* gestalt itself. Thus, Ehrenfels created a completely new psychological entity, the gestalt, which could be analyzed on its own without

having to worry about analyzing its component parts. Wertheimer studied with Ehrenfels and later cited his article as one of the main inspirations to the founding of Gestalt psychology. However, there were other sources of inspiration floating in the *zeitgeist* as well. One of those was William James's approach to psychology; another was the discovery of physical force fields and their effects.

William James had long opposed Wundtian elementism. In its place he had substituted his stream of consciousness approach (see chapter 9). James strongly resisted any attempt to study consciousness by any means that involved its analysis into constituent parts. Such attempts, he believed, would destroy the phenomena themselves. Carl Stumpf (see chapter 7), who maintained a lifelong personal relationship with James, passed on Jamesian ideas to his students Kurt Koffka and Wolfgang Köhler. They, together with Max Wertheimer, provided the final impetus for the founding of Gestalt psychology.

Ever since Newton, psychologists and other scientists had looked toward physics for inspiration. The first Gestalt psychologists were no exception. Köhler, especially, was drawn to the latest findings in physics through his studies under the famous physicist Max Planck. Much of Köhler's research late in his life was devoted to finding an isomorphic (point-to-point) relationship between the outside world and the brain (he never found it). Einstein and Wertheimer were personal friends for most of their adult lives and often discussed the relationships between physics and psychology. The discovery of **force fields** (e.g., magnetism and electricity) late in the 19th century was of prime importance to the gestaltists (**see Figure 12.2**). The fact that magnetism and electricity exhibited a higher-order and predictable patterns gave Gestalt psychologists the hope that they might discover similar patterns in the brain. Thus, the convergence of several factors: the discovery of the gestalt itself, a widespread reaction

against Wundtian elementism, and new data from physics helped set the stage for Gestalt psychology to emerge during the early part of the 20th century. The universally acknowledged founder of Gestalt psychology was Max Wertheimer whose analysis of the thinking of the Vedda tribe from Sri Lanka marked the first instance of full-blown Gestalt psychology.

THE FIRST GENERATION OF GESTALT PSYCHOLOGISTS

Max Wertheimer (1880–1943)

Biography

Max Wertheimer was born in Prague where his father ran a successful business college. The Wertheimer family lived comfortably while simultaneously straddling two cultures, Jewish and German. Later, Max Wertheimer's Jewish ancestry would put him and his family at risk of their lives and force them to emigrate first to Czechoslovakia and then to the United States to escape Nazism. Wertheimer's father groomed his other son, Walter, to succeed him as director of the business college. Max, on the other hand, resisted his father's wishes and obtained a more traditional education. After attending a Catholic grammar school and a local gymnasium, he enrolled at the University of Prague to study law. In addition, he took a wide variety of other courses, and after two years switched to the study of philosophy and psychology.

Contributions

One of his teachers at Prague was Christian von Ehrenfels. From Prague, Wertheimer moved to the University of Berlin where he studied with Carl Stumpf. There, Wertheimer worked in the Phonogram Archives that Stumpf had established. Those archives collected samples of music, preserved on wax cylinders, from around the world. Understanding the psychology of music played a pivotal role in the early development of Gestalt psychology. Wertheimer was an accomplished musician. Singing songs and playing music was always a part of his life from

childhood on. He even brought musical instruments to class in order to illustrate points in Gestalt psychology. The phenomenon of the persistence of melody first noted by Mach and later by Ehrenfels, was one of the first indications that the introspective analysis of elements of thought might be the wrong approach to psychology. Melody persisted despite the changes in notes, musical key, or type of instrument. Musical melodies persisted because of the relations between notes, not because of the notes themselves. The Gestalt maxim, "the whole is something else than the sum of its parts," (Koffka, 1935, p. 176) first began with the analysis of melody and was later observed in perception, learning, and thinking. A melody is a gestalt; a whole. Breaking it down into its component notes reveals nothing about the melody itself.

From Berlin, Wertheimer moved to Würzburg to study with Oswald Külpe where he developed an interest in the psychology of lie detection. Wertheimer received his PhD in 1904; the topic was "Experimental investigations of diagnosis on the facts of a case." He published several other articles on forensic topics soon after. A dispute with Carl Jung (see chapter 13) over who had first published research about methodologies of lie detection soured Wertheimer's interest in the topic. Despite possessing a PhD, he could not yet teach in a German university or supervise graduate students. Like all other European PhD graduates of his day he had to complete yet another thesis (the habilitation thesis) in order to secure a university position. He spent time visiting and studying at various universities before settling down in Vienna. There, he worked with experts who were studying the effects of brain lesions on speech, the **aphasias.** Following that work, he did ethnographic research on the music of the Vedda nation of Sri Lanka. Their songs had been recorded on wax cylinders and preserved at the Phonogram Archives in Berlin. Another early research project concerned the mathematical thinking of non-European peoples. Unlike many of his contemporaries, he did not assume that Aboriginal peoples possessed inferior

or primitive modes of thinking. This research was his first to use the gestalt point of view explicitly. King and Wertheimer (2005, p. 96) remarked:

> The entire article is imbued with the Gestalt mode. It appears to be the first extensive instance of this kind of approach, and is unmistakably a product of Gestalt-theoretical thinking, a way of thinking that was clearly hinted at in the 1910 paper on the music of the Veddas . . . the paper makes it clear that the early Gestalt mode of approaching issues occurred in cognition, the psychology of thinking, and *"Völkerspsychologie."*

Wertheimer's next research area, apparent motion, made him famous and qualified him to teach and supervise graduate research. The research on apparent motion, later called the phi phenomenon, was not the first example of Gestalt psychology. It was, however, the datum that caused others to take notice of Gestalt psychology for the first time.

The Phi Phenomenon

No one knows exactly what Wertheimer observed in 1910 through the train window as he was traveling from Vienna to begin a vacation. One version (Hunt, 2007) stated that he noticed that the more distant telegraph poles, houses, and hilltops along the route seemed to be speeding along with the train. He realized the "movement" he was observing had to be somehow coming from his brain. To an observer outside the train, all of those stimuli would appear stationary. Regardless of what the inspiration was, it caused him to stop at the next station, Frankfurt, and buy a common toy available at the time—a zoetrope or stroboscope (**see Figure 12.3**). The rapidly spinning slits made the slightly different images on the inside of the toy appear to move. He quickly dropped his vacation plans and went to the University of Frankfurt where one of his former teachers, Friedrich Schumann, was working. He made laboratory space available to

Wertheimer along with a **tachistoscope** of his own design. That instrument allowed its users to present stimuli under accurate timing conditions far beyond those of the toy zoetrope. Schumann also volunteered two of his graduate students, Wolfgang Köhler and Kurt Koffka, as research subjects. This lucky confluence of people and events marked the beginning of Gestalt psychology as a new movement in psychology.

But, what exactly had Wertheimer found and why was it so important? Steinman, Pizlo, and Pizlo (2000), while teaching about Gestalt psychology, found that their students were "skeptical about Wertheimer's publication launching a revolution in perception" (p. 2257). Those students already knew that motion pictures and nickelodeons had preceded the discovery of the phi phenomenon, so they wondered what was so new and unusual about it in 1912. The authors concluded that psychology textbook authors failed to describe the phi phenomenon correctly. Furthermore, they inferred that Boring (1942) had reversed the definitions of the phi phenomenon and its complementary partner, optimal movement (the beta phenomenon):

> He [Boring] got only one thing wrong. Namely, the ϕ-phenomenon is observed near simultaneity and not near successivity . . . The ϕ-phenomenon is not observed when the switching speed is increased from successivity towards optimal movement (β). This rather mysterious error in Boring's influential book probably led to the confusion about Wertheimer's revolutionary phenomenon that is evident in most contemporary textbooks (Steinman, Pizlo, & Pizlo, 2000, p. 2259).

Simply put, the phi phenomenon is *not* the apparent movement of an object to and fro caused by displaying two similar visual stimuli (e.g., dots or lines) alternately in a darkened room. Instead, the phi phenomenon that Wertheimer and his subjects observed was the movement of a spot between the two stimuli that occurred when the stimuli were presented nearly simultaneously.

Such spots were not real; they were created by the brain. Furthermore, observers saw both stimuli and the moving spot at all times.

Wertheimer's article on the phi phenomenon, while groundbreaking, provided only the sparsest description of the phenomenon itself. His lectures and other verbal communication were much more influential in spreading the finding. Wertheimer was always at his best while speaking and often confessed that he had trouble writing about his ideas. Also, he allowed his ideas to sit, unpublished, for years before finally putting them on paper. Students who heard his lectures, both in Germany and later in the United States, fell into two distinct camps. They either became avid disciples or were completely lost. Wertheimer published the least of the three original gestalt psychologists but was always considered to be the fountainhead of the movement. For example, Koffka (1935, pp. 53–54) wrote:

> Wertheimer had just completed his experiments on the perception of motion in which Köhler and I had served as the chief observers . . . on that afternoon he said something which impressed me more than anything else, and that was his idea about the function of a physiological theory in psychology, the relation between consciousness and the underlying physiological processes, or in our new terminology, between the behavioural and the physiological field. To state it in these new terms, however, is not quite fair, because this very statement was only made possible by Wertheimer's idea; before, nobody thought of a physiological or, for that matter, of a behavioural *field*. [original italics]

Wertheimer's discovery of the phi phenomenon was more than the simple elucidation of a new finding. He sought to explain the physiological basis for it and ruled out, experimentally, older explanations that argued that eye movements were the cause. The physiological mechanism he

proposed—short circuits in the cortex—has not stood the test of time. Indeed, modern psychology has yet to provide a universally accepted physiological explanation for the phi phenomenon. From the beginning, Gestalt psychologists saw themselves as experimenters and posited a causal relationship between the molar phenomena they studied and yet-to-be discovered neural mechanisms. Further, their vision for Gestalt psychology went far beyond the area of perception alone. The Gestalt psychologists were proposing a complete reworking of the entire psychological enterprise. Wertheimer, late in his career, was more interested in the gestalt analysis of thinking and problem solving. Still, the impact of Gestalt psychology on the study of perception was immense. Wertheimer's (1923) early research was especially so.

Gestalt Principles of Perception

Gestalt psychology developed quickly following the discovery of the phi phenomenon. During World War I, Wertheimer and other psychologists were drafted into the German army. There, Wertheimer performed various research projects including one with Erich von Hornbostel (Volmar, 2014) in which they developed an instrument capable of precisely determining the direction from the user to a noise source (e.g., the discharge of a cannon). In 1916, Wertheimer moved back to the University of Berlin as an instructor. Quickly, Berlin became the nerve center of Gestalt psychology. In addition to Wertheimer, its Institute of Psychology, led by Köhler, included Hornbostel and Kurt Lewin as faculty. One of its legacies to psychology was Wertheimer's (1923) principles of gestalt perception which still grace the pages of every general psychology textbook today (**see Figure 12.4**).

Wertheimer (1923) summarized gestalt principles of perception naming proximity, similarity, common fate, set, direction, closure, good curve, figure-ground, and past experience as the main ones. He also argued that for past experience:

> Some of our apprehensions are determined in this way. Often arbitrary material can be arranged in arbitrary form and, after sufficient drill, made habitual . . . And yet, despite its plausibility, the doctrine of past experience brushes aside the real problems of apprehension much too easily (p. 86).

Thus, he acknowledged the role of experience in perception but believed it accounted for only a small piece of the puzzle. Today, modern psychology texts (e.g., Weiten, 2010) typically focus on a shorter list of Gestalt principles. Weiten's text lists figure-ground, proximity, closure, similarity, simplicity, and continuity. It is tempting to limit Gestalt psychology's effect on psychology to perception only, but that is a mistake.

As Rock and Palmer (1990, p. 61) pointed out when they wrote about the long-term influence of Gestalt psychology:

> The list of major perceptual phenomena they elucidated—grouping, figure-ground organization, frames of reference, figural goodness, and apparent motion . . . is impressive. Although it is logically possible that these discoveries could have been made independently of their methods and theoretical beliefs, it seems unlikely. The Gestalt attack against Structuralism was devastatingly effective. In addition, the Gestaltists were victorious over the Behaviorists in their clash regarding the nature of learning, thinking and social psychology.

From these perceptual beginnings, Gestalt psychology branched out to affect psychology as a whole. The history of Gestalt psychology, however, is intimately tied to political events in Germany following World War I. The rise of Adolph Hitler in 1933 altered the life courses of Wertheimer and many other Gestalt psychologists. Because many of them were Jewish, Wertheimer and nearly all of his colleagues were forced to leave Germany. Had they stayed they

would have, doubtlessly, fallen into the hands of the Gestapo and been killed in the concentration camps.

Wertheimer's Later Career

At the University of Berlin, Wertheimer began to turn his interests away from perception and towards the psychology of thinking. As always, he was slow in turning his ideas into print. His magnum opus on the subject, *Productive Thinking* (Wertheimer, 1945), was not published until after his death. As Gestalt psychology achieved worldwide prominence in the 1920s, all three of its founders were invited to appointments in the United States. Only Wertheimer declined. His negotiations with Harvard University were protracted and ultimately failed. One reason for his not accepting the American offer was that he was also in negotiations with his old school, the University of Frankfurt. When offered a chairmanship there along with the rank of full professor, he accepted. After he arrived, Frankfurt rapidly became a center for research in the social sciences. Theologian Paul Tillich taught there, as did psychologists Theodor Adorno, Erich Fromm, and philosopher Herbert Marcuse.

But, the Nazi storm clouds were growing. After Hitler was named chancellor of Germany in 1933, change came quickly. Sooner than most, Wertheimer realized that his days in Germany were numbered. He had never listened to Hitler speak on the radio, but after doing so, Wertheimer and his family left Germany the next day (King & Wertheimer, 2005). Soon after, he accepted an offer to teach at the newly formed New School for Social Research in New York City where he taught until his death. Because Koffka and Köhler had published far more than he had and because they had been in the United States longer, they had become the public faces for Gestalt psychology. However, they both always acknowledged Wertheimer as the founder of Gestalt psychology. Once in the United States, Wertheimer was quickly and cordially accepted

into the American Psychological Association and the Society of Experimental Psychologists. He taught his first courses at the New School for Social Research in German, but soon began to lecture in thickly accented English. He was on friendly personal terms with Boring and Hull although they did not agree with his version of psychology. He supervised many graduate student theses, most of which dealt with thinking and not perception. His new emphasis on thinking led him to finally produce a book on the topic, *Productive Thinking* (1945). He began to write the book in 1935. He finished it just before his death eight years later and it was published posthumously. The book is short; it is only 224 pages long. Its first five chapters covered problem solving using mostly geometric and mathematical examples. The last two chapters described how Galileo and Einstein arrived at their historic discoveries. Throughout, the focus was on elegant as opposed to "ugly" solutions. Commenting on his examples, he concluded:

> We found factors and operations at work—essential to thinking—which had not been realized by the traditional approaches, or had even been neglected by them. The very nature of these operations, e.g., of grouping, of centering, of reorganization . . . is alien to the gist of the traditional approaches . . . the features and operations described are of a characteristic nature: they are not piecemeal, they are related to the whole-characteristics, they function with reference to such characteristics (p. 189–190).

To Wertheimer, Gestalt psychology could encompass nearly any aspect of human or animal behavior. The key was not to break down natural processes artificially; instead it was to look for an organic whole, a gestalt, and examine it concretely, functionally, and experimentally. His colleague, Wolfgang Köhler, was the first Gestalt psychologist to study animal learning. His research on insight learning in apes challenged existing views of learning as a trial and error

process.

Wolfgang Köhler (1887–1967)

Biography

Wolfgang Köhler was born in Reval, Estonia (modern Tallinn), where his father ran a German school. Köhler returned to Germany when he was six. Academics were stressed in his family; all five of his brothers and sisters were well educated. Köhler himself attended three universities: Tübingen, Bonn, and Berlin. Although he loved physics and studied at Berlin under Max Planck, the famous physicist, Köhler's research and PhD degree were in psychology. He was teaching at Frankfurt when Wertheimer conducted his phi phenomenon research and served as one of the original participants.

Contributions

Köhler was immediately attracted to Gestalt psychology. After Koffka's arrival at Frankfurt, all three engaged in long conversations about their new approach to psychology. Soon after, however, Köhler was appointed by Stumpf as the second director of the newly established Primate Station on the island of Tenerife off the west coast of Africa. The station had been established so that "the behavior of the chimpanzee, gorilla, orangutan, and gibbon would be studied and compared, permitting a better evaluation of these animals on an evolutionary scale" (Teuber, 1994, p. 552). Tenerife was picked because of its relatively constant temperate weather and its nearness to Cameroon, then a German colony and a place where apes could be captured in the wild and then transported to Tenerife for study under more controlled conditions. The apes had preceded the arrival of the first director, Eugen Teuber. Upon his arrival he quickly found and developed a site, hired an animal keeper, and began filmed observational studies. Teuber's research focused on the animal's emotional behavior and their communication abilities.

However, once Köhler arrived, he and Teuber began studying the apes' cognitive abilities. Working together, they set up a fruit basket that was suspended in the air by means of a rope and pulley. At the end of the rope, a large ring hooked onto a tree limb held the fruit in place. Köhler hoped that the apes would examine the rigging of the basket and simply unhook the ring and get the fruit. That never happened. Instead, a chimpanzee named Sultan learned to dislodge the fruit from the basket by vigorously shaking the rope and causing the fruit to fall to the ground. Köhler realized that his initial experiment was too complicated. After Teuber left for home and because Köhler believed he, too, only had a year to conduct his research, he quickly went to work. He could not foresee or imagine that he would end up staying on Tenerife for nearly six years. The outbreak of World War I in August 1914 was the event that led to his long sojourn on the island.

Following the failure of the fruit basket experiment, Köhler devised simpler tests for his animals. He provided them with wooden crates that they could move and stack. Later, he hung a banana out of reach from the netting that formed the roof of the animal enclosure. Sultan, eventually judged the smartest of the station's apes, solved the problem in about five minutes. But, his solution was unlike any previously described example of animal learning. Unlike Thorndike's cats, for instance, Sultan showed no evidence of trial-and-error learning. Instead, he first attempted to retrieve the banana by jumping up for it. When that failed, he quit trying for a short period. Then, he stood up, grabbed a box, and placed it *directly* under the banana. Now, he was close enough to jump up and grab it. From that point on, getting the banana was accomplished in the same way. Köhler named this type of learning as **insight learning.** It was characterized by the sudden appearance of a solution after a period of quiescence. Köhler interpreted Sultan's solution in gestalt terms. He believed that Sultan had reorganized the problem cognitively. The ape had somehow realized that putting the box right under the banana

was the solution. Köhler devised other similar tests including hanging the banana higher so that boxes had to be stacked upon each other in order to retrieve the banana (**see Photo 12.2**), tests involving the use of sticks to retrieve food items, and detour tasks. He also compared the behavior of his apes to that of dogs, chickens, and a young child. (See more information on insight learning in chapter 14.)

Another test he used demonstrated the phenomenon of **transposition.** He used chickens first and chimpanzees later. The chickens first learned to discriminate between two gray boxes, learning to choose the lighter shade. Next, Köhler tested them with the original light gray box and a newer one colored an even lighter gray. The chickens now chose the new lighter shade. Chimpanzees showed the same pattern; for the apes the stimuli varied in size not in color. Köhler concluded that both species had learned a *relationship* because neither picked the original training stimulus. Thus, he used Gestalt psychology to interpret his animal learning experiments. He believed he had demonstrated that his apes had exhibited intelligent behavior, a radical concept at the time. Remarkably while war raged in Europe, he wrote up his results and had them published while still at Tenerife. His book, *The Mentality of the Apes,* was published in German in 1917, and in English a few years later (Köhler, 1925). Although the book made him world famous, he mostly left animal research behind after his return to Germany.

Was there another reason for Köhler to stay at Tenerife so long? Ley (1990 researched Köhler's life on Tenerife. He discovered that Tenerife had been a strategic location for German naval and that German spies operated on Tenerife and other nearly islands. While he uncovered no direct evidence linking Köhler to those espionage operations, he found that Köhler knew the German spies, and that he may have housed a hidden radio set on the property of the Primate Station. Most likely, Köhler was *not* sent to Tenerife as a spy. Teuber (1994) disputed the

account in Ley's book and he responded to her criticisms. Ley's book, if nothing else, provided intimate glimpses at Köhler's life and times, including details of his personal life largely unavailable elsewhere. For example, according to his second wife Lili (Ley, 1990, p. 202), who, in response to why Köhler had agreed to go to Tenerife, told him:

> She smiled fondly as she told me that Wolfgang was an "adventurous romantic"; it was the adventure that led him to accept the post . . . Mrs. Köhler explained that Americans don't understand people like Wolfgang, people who have two sides to their personalities—a public self and a private self. Americans are usually one way or the other. That is, an American who is a serious-minded scholar would be a serious-minded scholar all of the time; there would not be another side to his personality. Thus, many Americans may never have thought that Wolfgang was ever anything but a serious scholar. They certainly would not have guessed that he was an "adventurous romantic."

Interestingly, Köhler hardly ever spoke about his years at Tenerife afterward. Ley also discovered that his closest colleagues were still in awe of him and his accomplishments long after his death. Of course, whether or not he was a spy on Tenerife had no impact on his career as a psychologist.

Köhler's appointment to the chairmanship of the Psychological Institute of the University of Berlin, succeeding Stumpf, soon after his return from Tenerife surprised many because he was so young. Soon, he had put together what was perhaps the best collection of psychologists in the world at that time. Henle (1978) listed many of the faculty who worked at Berlin before Hitler came to power. Among the faculty she named: Kurt Lewin, Karl Duncker, Hedwig von Restorff, and Otto von Lauenstein. She wrote (p. 944):

> The institute attracted students from many countries; and the ideas of Gestalt

> psychology were respected and were spreading in Germany and in other countries. It is possible that our science would be different today if that institute had been able to continue its work.

Before he finally resigned from Berlin, Köhler traveled twice to the United States. In the mid-1920s he taught at Clark University and in the mid-1930s at Harvard. After his time at Harvard he returned to Germany. Unlike Wertheimer and Koffka, who were Jews, Köhler was a Protestant. So, he did not need to flee Germany for religious reasons as they had. Nevertheless, when James Franck, a Jewish physicist at the University of Berlin was fired, Köhler wrote an article protesting it. It was "the last anti-Nazi article to be published openly in Germany under the Nazi regime" (Henle, 1978, p. 940). Köhler fully expected the Nazis to arrest him and waited up all night (when the Nazis usually made such arrests) playing chamber music with friends. The Nazis never came for him. He resigned while still in the United States after discovering that personnel changes were being made at the Institute without his being consulted. He returned to Germany to settle his affairs and then accepted a faculty position at Swarthmore College in Pennsylvania where he remained for the rest of his career. In the United States, his research centered on the connection between cognition and physiology. He was particularly attracted to **field theory** and attempted to discover a connection between the electrical activity of the nervous system and behavior. Those experiments, however, did not find any such connection. After the end of World War II, he traveled back to Germany from time to time and taught courses at the Free University of Berlin, completing, partially at least, a kind of life circle. The third original Gestalt psychologist, Kurt Koffka, was the first to move to the United States and the first to describe Gestalt psychology to an English-speaking audience.

Kurt Koffka (1886–1941)

Biography

Koffka was born in Berlin. His father and many of his relatives were lawyers. However, one of his uncles was a biologist and influenced him not to follow in the family's legal tradition. After graduating from a Berlin gymnasium, Koffka spent a year studying at the University of Edinburgh in Scotland. Unlike Wertheimer and Köhler, Koffka learned English early in life. He received his PhD from the University of Berlin; his dissertation topic concerned the teaching of rhythms. From Berlin, he first went to Würzburg and then to Frankfurt to work with Friedrich Schumann. Koffka and Köhler were his assistants. Koffka would later say that his early career in psychophysics had prepared him to accept Wertheimer's Gestalt psychology (Harrower-Erickson, 1942). Koffka soon moved to the nearby University of Giessen. He and his students published many experimental studies during that period. Tolman visited Koffka twice and was one of the first Americans to get a first-hand look at the emerging Gestalt school.

Contributions

Koffka's (1922) article in the *Psychological Bulletin* was the first concrete exposition of Gestalt psychology in English. Early on he wrote (p. 532):

> I shall try first of all to make my American readers understand what the theory purports to be. So far there exists no general presentation of the theory which marshals all of the facts upon which it rests; indeed, the general field of psychology has not, as yet, been treated from this point of view.

However, Koffka failed to live up to those words. Most of his article discussed perceptual research done by gestalt psychologists and left the long-term impression that Gestalt psychology was primarily concerned with perception. He was correct, however, in stating that the ideas

behind Gestalt psychology had yet to be presented in print. Both he and Köhler would later publish books that better explained their new movement.

Koffka was the first of the three Gestaltists to move to the United States. After brief stints at Cornell and Wisconsin, he accepted a research professorship at Smith College. His contract allowed him five years without teaching duties or expectation of publication. An expedition to Uzbekistan to study people who had recently experienced widespread levels of social change led to his contracting a fever and being bedridden. During his long illness he drafted the first chapter of his book *The Principles of Gestalt Psychology* (Koffka, 1935). His book, however, proved to be difficult to read and did little to further the cause of Gestalt psychology in the United States. It did, however, extend the scope of Gestalt psychology beyond the study of perception. He argued that from the fundamental question of perception, "Why do things look as they do?" (p. 680) logically followed necessary structures: the perceptual field, the realization that behavior requires an environment, an ego, memory, learning, and social intercourse:

> We have followed the principles of organization as they become manifest under diverse conditions, starting from the simplest and proceeding to those of higher and higher complexity . . . A gestalt is therefore a product of organization, organization the process that leads to a gestalt . . . organization as a category is diametrically opposed to mere juxtaposition or random distribution (pp. 682–683).

Following its publication he turned to other areas of interest: the humanities and ethics. He realized that those areas, too, were candidates for research by psychologists.

Near the end of his life and just prior to the outbreak of World War II, Koffka spent a year at Oxford University working with brain-injured patients. A book he had planned to write, *Human*

Behavior and its Modification by Brain Injuries, never appeared in print due to his early death from heart disease (Harrower-Erickson, 1942). Thus, by 1943 two of the three original Gestalt psychologists had died. Despite being displaced and forced to emigrate they, nevertheless, managed to train students who were, to an extent, successful in further spreading Gestalt ideas to social psychology. Kurt Lewin and Solomon Asch would contribute mightily to the founding and early development of experimental social psychology.

THE SECOND GENERATION OF GESTALT PSYCHOLOGISTS

King and Wertheimer (2005) documented the growth of Gestalt psychology in Germany after World War I by looking at a "second generation" (p. 163) of Gestalt psychologists, primarily students of Wertheimer, Köhler, and Koffka. While space does not permit mention of all of those students, two deserve further treatment here. Kurt Lewin, easily the most prominent researcher of the second generation, was not a student of any of the three founders of Gestalt psychology. Instead, he completed his PhD under Stumpf at Berlin just prior to Köhler's arrival there. Another student was Solomon Asch, who studied under Wertheimer in the United States after completing his doctoral studies at Columbia University. After Wertheimer died, Asch took over his position at the New School of Social Research for a few years. Lewin and Asch eventually became prominent American social psychologists. They expanded Gestalt theory into new areas of psychology beyond perception and learning. Lewin applied it to personality and social dynamics, while Asch examined topics such as field dependence and independence, impression formation, and conformity.

Kurt Lewin (1890–1947)

Biography

When Lewin was born in Mogilno, it was a small village in Prussia (now Poland). He and his

family were Jews during an era when anti-Semitism was rampant. Jews could not own land or serve as army officers (Lewin, 1998). When he was 15 his family moved to Berlin. He proved to be an excellent student, and after completing his preparatory studies eventually enrolled at the University of Berlin, hoping to become a medical doctor. Soon, however, he decided to study philosophy and psychology under Carl Stumpf. When World War I broke out he enlisted in the German Army. Wounded, he recovered and returned to Berlin as a faculty member where he became interested in Gestalt psychology.

Contributions

Before arriving at Berlin and while convalescing from his wounds, he wrote an article (Lewin, 1917, 2009) presaging some of his later theoretical thinking. In it he argued that the same objects change markedly in the mind of observers depending whether they are home during peacetime or on the battlefield at war. A soldier might tear down a house for firewood whereas a peacetime neighbor would not:

> That which lies within the combat zone belongs to the soldier as his rightful property . . . Even something as barbaric as the burning of floors, doors, and furniture is utterly incomparable to similar treatment of house furniture under peacetime conditions (p. 205).

These early observations of his would be later fleshed out in gestalt fashion. He would eventually combine the environment, motivations, and tensions as all contributing to an ever-changing complex gestalt, the life space. Once established at Berlin, he quickly began to publish articles and train graduate students. One of his students, Bluma Zeigarnik, discovered the phenomenon that bears her name, the **Zeigarnik Effect.** After noticing that waiters in a restaurant seemed to forget patron's orders after they had served them, she conducted experimental research along

those lines. She had people work on several types of tasks such as stringing beads or naming objects beginning with a particular letter. Then, she interrupted them on half of the tasks. Later, she asked them what they had been doing and discovered that they were extremely more likely to remember tasks that had not completed compared to those that had. Soon, because of the research produced by Lewin and his students, he was internationally known, and had become nearly as prominent a gestalt theorist as Wertheimer, Köhler, or Koffka.

In 1933, Lewin served as a visiting professor at Stanford University. He was about to return home when Hitler came to power. Köhler, concerned about Lewin's safety in Germany as a Jew (despite his war record), won him an extension of his leave. During that time, Lewin was able to secure a faculty appointment at Cornell in the Department of Home Economics. He and his family moved to the United States as yet another set of refugees from Hitler's Germany. From Cornell, he moved to the University of Iowa, where he made many original contributions to the psychology of personality, the study of leadership, and group dynamics.

From Gestalt theory, Lewin adapted field theory and applied it to personality. In his conception of personality, behavior was a function of a person and environment. He provided a simple equation:

$$B = f(P, E)$$

which simply restated those words mathematically. Each person, though, was different from any other person (including identical twins), because no one lived in the same environment. His "life space" was a dynamic representation of his personality theory. As people moved through life they added interests and abilities. As they developed, their life spaces became more and more complex. He applied field theory toward a variety of personality variables: needs, abilities, and barriers. He also saw personality as a kind of locomotion through the environment. Later, he

would use this framework to change people's ideas and move them from prejudice to tolerance, for instance. He called his approach **Topological Psychology.** From early on in his career, Lewin was interested in applying psychology to the world outside the lab. Kihlstrom (2019, p. 4) later redefined Lewin's life space thusly, returning it to Koffka's definition of gestalt psychology:

> In the spirit of Lewin's pseudomathematics, the proper formulation of Lewin's Grand Truism is not B=f(P, E) or B=f(P + E) but rather B=f(PxE): the whole is greater than the sum of its parts.

Ash (1995, p. 274) noted:

> From his early essay on Taylorism to this talk to teachers during the Depression, Lewin's aim remained consistent—to humanize social practice in the factory and the school as well as in the laboratory . . . He clearly made the ideological and social power dimensions of this issue more explicit than anyone else in the Berlin school.

After World War II started, Lewin applied his research on leadership toward the training of American servicemen. Just before the United States entered the war, he had completed research on leadership styles (Lewin, Lippitt, & White, 1939). Working with 10-year-old boys, they simulated three different kinds of leadership styles: autocratic, democratic, and laissez-faire. They found that the boys responded very differently depending on how they were being led. When led in an autocratic style, the boys were lethargic and docile. When led in a democratic style, they were friendly and playful with each other. The boys led in a laissez-faire style were more aggressive with each other and less likely to cooperate or engage in constructive activities. The results of that study were used to select candidates for espionage for the Office of Strategic Services (which became the CIA after the war).

Lewin left Iowa for MIT in order to found the Research Center for Group Dynamics. Inspired by his personal experience with Nazism, he investigated whether people could change ingrained beliefs and attitudes. During an early session with government employees, he discovered that immediate feedback helped reduce prejudice. He also found that established attitudes could be "unfrozen," changed, and then frozen again as new, changed ones. Soon after founding the Group Dynamics Center, Lewin unexpectedly died from a heart attack. Yet, during his short but eventful life, he was able to bring gestalt ideas to the fields of personality and social dynamics. Ash (1992, p. 204) summarized Lewin's career in the United States:

> Nearly alone among the leading émigré psychologists, Kurt Lewin succeeded in creating both a successful career for himself and a "school" of followers in America through his skillful use of the growing network of private, semiprivate, and public funding agencies that formed the transition from an academic discipline to a science-based profession. His field-theoretical ideas on the problems of minority groups played an important part . . . in American social psychology.

Solomon Asch, himself another émigré, conducted fundamental and groundbreaking research in social psychology using Gestalt psychology as his guiding light.

Solomon Asch (1907–1996)

Biography

Asch was born in Poland. His family emigrated to the United States when he was in his teens. He attended the City University of New York and did his graduate work at Columbia University. His interest in psychology came relatively late in his academic career; at first he wanted to become an anthropologist. At Columbia, he worked under Woodworth for his master's degree and H. E.

Garrett for his PhD. His psychological training was quite conventional for an American psychologist of his era. His dissertation was on the similarity of shapes of learning curves.

Contributions

He began to teach at Brooklyn College and shortly after met Wertheimer in New York City. Wertheimer profoundly influenced Asch and he, in turn, was the force behind the publication of Wertheimer's book, *Productive Thinking* (King & Wertheimer, 2005). After Wertheimer died, Asch took his place at the New School for a few years. Later, he moved to Swarthmore for many years and there worked with Köhler. He moved to Rutgers and then to the University of Pennsylvania. Over his long career he conducted a number of important experiments, nearly all of which emphasized a gestalt point of view.

Early on, Witkin and Asch (1948) collaborated on a series of experiments designed to test how people responded to changes in their frame of reference. Using a new procedure, the rod-and-frame test, (**see Figure 12.5**) they discovered that people responded in either of two ways. Some people oriented the rod visually, parallel to the vertical side of the frame even when the frame was tilted. Others oriented the rod in an upright position using gravitational cues, disregarding the visual cues provided by the frame. They labeled people who used visual cues to orient the rod as *field dependent* and people who used gravitational cues as *field independent*. Rock (1992, p. 405) wrote:

> Witkin was particularly interested in these differences [field dependence and independence], so at this point he and Asch parted company . . . Witkin sought to correlate these differences with differences in other perceptual tasks . . . This work was among the first investigations of what came to be called *cognitive styles* [original italics]. Asch and Witkin's experiments were clearly attempts to quantify,

experimentally, a gestalt concept, the frame of reference.

Asch was more of a social psychologist than anything else. He conducted studies on impression formation (Asch, 1946) and suggestibility (Asch, 1948). He also published a well-received text in social psychology (Asch, 1952). But, his most famous studies dealt with the relationship between conformity and independence. Asch (1955) summarized those studies. Dissatisfied with previous theoretical accounts of opinion change, Asch created a simple yet powerful experiment. He arranged for male college students to report about an easy-to-discriminate perceptual task. Not surprisingly, the control group made the correct discrimination almost 100% of the time. In the experimental situation, however, there was only one participant. All of the other people in the room were confederates of the experimenter. That lone participant had to make his decision after all the others had already done so. There were 18 trials; in 12 of them all of the confederates gave the wrong answer. The results were remarkable. Fully, 25% of the participants refused to go along with the majority and consistently picked the right answer. But, some 37% consistently went along with the majority giving the wrong answer. In other words, they yielded to the social pressure created by the experimental situation. Nearly all social psychology texts review this experiment. But Friend, Rafferty, and Bramel (1990, p. 39) maintained that "textbooks have frequently given very one-sided readings of the basic quantitative results, without pointing out how different was (and is) Asch's own interpretation." They argued that many social psychology textbooks overemphasized the conformity aspects of the studies and underreported that many of the participants stood fast even under while under great social pressure to doubt the visual stimuli in front of them.

Asch (1952, p. 132) pointed toward his view of such social pressure in the laboratory situation he had created:

> The clash of views generates events of far-reaching importance. I am induced to take up a particular standpoint, to view my own action as another views it or as the action of another person, and, conversely, to view another's action as my own. Now, I have within me two standpoints, my own and that of the other; both are now part of my way of thinking. In this way the limitations of my individual thinking are transcended by including the thoughts of others. I am now open to more alternatives than my own unaided comprehension would make possible. *Disagreements, when their causes are intelligible, can enrich and strengthen, rather than injure, our sense of objectivity* [italics added].

Asch, then, had experimentally created an unusual and complex gestalt in his laboratory. He forced his participants to reconsider their most basic assumptions about their own perceptual abilities by subjecting them to social pressure. He was pleased to find that many of his participants stuck to their guns in the face of nearly overwhelming social pressure. At the same time, he was concerned about those who had yielded. But, both sets of participants had reorganized their thinking. Asch (1955, p. 35) concluded:

> That we have found the tendency to conformity in our society so strong that reasonably intelligent and well-meaning young people are willing to call white black is a matter of concern . . . Yet anyone inclined to draw too pessimistic conclusions from this report would do well to remind himself that the capacities for independence are not to be underestimated . . . those who participated in this challenging experiment agreed nearly without exception that independence was preferable to conformity.

Will Gestalt psychology rise again? No, that is not likely. The holistic philosophy that supported it in Europe found few inroads in America. Thus, Gestalt psychology never took root in the soil of the American atomistic and reductionist philosophical garden. The better question is: How much of 21st century psychology still includes findings from Gestalt psychology? A careful examination will reveal that much of Gestalt psychology remains, but is no longer called by its original name.

WHAT IS GESTALT PSYCHOLOGY?

Arnheim (1986, p. 823) summarized gestalt theory thusly:

> Gestalt theory is concerned primarily with the complex dynamics of organization in field situations, be they physical or psychological. This dynamics is not fully described by the tendency toward simple, regular, symmetrical structure but requires acknowledgement of a countertendency that meets tension reduction with tension enhancement. The countertendency articulates physical and psychological units or objects in interaction with the equilibrating force . . . gestalt psychologists . . . were very much concerned from the beginning with the biological, cognitive, and aesthetic reward of gestalt processes, namely the creation of well-functioning, stable, and clarifying patterns in nature, science, and art—a perfection difficult or impossible to obtain otherwise.

Gestalts, thus, exist everywhere. They can be simple ones such as the perception of a triangle. They can be cognitive such as when a new solution suddenly emerges following a period of thought. Think of insight learning, transposition, or perceptual set. They can be social such as when what others do forces people to reconsider their own cherished ideas or beliefs. In all cases,

however, the gestalts involved are integrated wholes and relationships between stimuli that cannot be understood by examining their constituent parts in isolation. They can only be understood *in toto,* or as gestalts.

A good way to end this chapter is to consider one of Wertheimer's favorite problems (King & Wertheimer, 2005, pp. 390–391):

> A hunter sees a bear one mile due south of where the hunter is standing. He aims a gun at the bear, shoots, and misses. The hunter next walks the one mile due south to where the bear was when the shot was fired, then walks one mile due east, then one mile due north—and ends up standing at exactly the same place from which the gun was shot . . . What color was the bear? (See answer below.)