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The Legacy of Max Wertheimer and Gestalt Psychology

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IN 1946, Solomon Asch wrote that the “thinking of Max Wertheimer has penetrated into nearly every region of psychological inquiry and has left a permanent impress on the minds of psychologists and on their daily work. The consequences have been far-reaching in the work of the last three decades, and are likely to expand in the future” (Asch, 1946, p. 81). Asch’s article on “Max Wertheimer’s Contributions to Modern Psychology” appeared in *Social Research* as a tribute, and in response to a challenge by the first president of the New School for Social Research, Alvin Johnson, to study “the work of Max Wertheimer and its meaning for social science” (Johnson, 1943, p. 398). Indeed, the legacy of Wertheimer, founder of Gestalt psychology and one of the first members of the Graduate Faculty of Political and Social Science at the New School, has been substantial.

Wertheimer was born April 15, 1880 in Prague, Czechoslovakia, where he matriculated at Charles University in 1899; although he was initially a student of law, courses with the illustrious philosopher Christian von Ehrenfels managed to divert Max’s interests to philosophy. On October 27, 1902, he enrolled at the Friedrich-Wilhelm University of Berlin as a student of philosophy and psychology. At the University of Berlin, as in Prague, Wertheimer gave his intellectual interests

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wide rein in the study of psychophysics, experimental psychology, logic, and philosophy. In 1904 he attended the University of Würzburg where, in less than half a year, he completed his doctoral degree with Oswald Külpe and Karl Marbe, on the use of the word association method in the detection of criminal guilt, a theme on which he had already been working two years earlier in Prague.

From 1905 to 1916 Wertheimer held intermittent appointments at Prague, Vienna, Berlin, and Frankfurt, working at psychiatric clinics and at physiological and neurological institutes. His work during this period was devoted to a broad range of interests, including the psychopathology of language, *Völkerpsychologie* (sociocultural psychology), pedagogy, epistemology, the aforementioned diagnosis of guilt by word association, detailed individual experiments on patients suffering from alexia (an inability to use the spoken language), analyses of the music and thinking of indigenous non-Western tribes, studies of the perception of apparent motion, and, perhaps most importantly, investigations of the psychology of thinking and of logic.

In 1929, Wertheimer accepted a call to become professor of psychology and director of the Psychological Institute at the University of Frankfurt. He was to be in Frankfurt only four short years, interrupted by a heart attack and then the advent of Hitler, before his immigration to the United States in 1933 at the age of 53. Although he was among the more visible German psychologists of his time, Wertheimer was fortunate to have an offer from the New School before coming to America.

During the founding year of the New School's Graduate Faculty of Political and Social Science, Alvin Johnson helped initiate the General Seminar, an interdisciplinary meeting devoted each semester to a different shared topic of social and political interest. Graduate students and faculty from other institutions joined the Graduate Faculty in seminars devoted to "America and Europe," "Political and Economic Democracy,"

and "Power in the United States." Inspired by the liberal, interdisciplinary spirit of the New School, Wertheimer was instrumental in the creation of a seminar on the methodology of the social sciences that met from 1933 to 1943. He participated over the years with diverse social scientists including Karen Horney, Albert Salomon, Arnold Brecht, and Adolph Lowe in the exploration of themes relating to the "Problem of Value," "Current Problems of the Social Sciences," and "Methodology of the Social Sciences." As leader of the seminar, Wertheimer "consciously sought to relate the political concerns of the General Seminar to more fundamental philosophical issues of epistemology and value" (Rutkoff and Scott, 1986, p. 105).

To further strengthen the impact of the Graduate Faculty's scholarship, beyond the modernist walls of the New School, Johnson spearheaded the founding of *Social Research*, a journal that published contributions from the General Seminar. Emil Lederer, dean of the University in Exile and later of the Graduate Faculty, joined sociologist Hans Speier in editing the new journal. In 1934, Wertheimer joined Johnson, Max Ascoli, Horace Kallen, Emil Lederer, Hans Speier, Frieda Wunderlich, and other members of the Graduate Faculty as members of *Social Research's* first editorial board. Wertheimer's deep compassion for the human condition and his dedication to the ideals of ethics, truth, freedom, and democracy were clearly evident in several essays that he wrote in the United States, including two published in *Social Research* (Wertheimer, 1934, 1935). In an unpublished introduction to a collection of these papers, Albert Einstein wrote that Wertheimer's essays

concern democracy, ethics, freedom, truth, with the intent of substituting for superficial observations an analysis which does justice to the total situation. Behind these essays lies above all a methodological need which derives from the gestalt-psychological point of view: beware of trying to understand a whole by arbitrary isolation of the separate components or by hazy or forced abstractions! . . . Rarely will one find honesty, striving for

simplicity, and independence united in such purity (Wertheimer, 1965, p. 87).

Under Wertheimer's direction, the New School became a highly visible center of Gestalt psychology, one of the most influential schools of psychology during the first half of the twentieth century in the United States (Krohn, 1993, p. 93). The decade that he taught at the New School was eventful, productive, and all too brief. At his home in the New York suburb of New Rochelle, Wertheimer died suddenly of a coronary embolism on the afternoon of October 12, 1943. Several weeks later a memorial service was held at the New School in which Albert Einstein joined many others who filled the New School auditorium to celebrate Wertheimer's life and work. Clearly, Wertheimer's greatest legacy is Gestalt theory, to which he tirelessly devoted his life and work.

The Nature and Research of Gestalt Psychology

In reaction to the "blind" atomism so common in the psychology of his day, Wertheimer formulated Gestalt theory while he was in Frankfurt and continued his work at Berlin. He was convinced that the scientific method offered the best hope for demonstrating and developing his holistic ideas. For Wertheimer, Gestalt theory was not merely a theory of perception or of thinking, or a theory of psychology; it was, rather, a *Weltanschauung*, almost an all-encompassing religion. The core of it was a faith that the world is a sensible coherent whole, that reality is organized into meaningful parts, and that natural units have their own structure. Although no human mind might be able fully to fathom all of creation, it is nevertheless possible for us to discover these structures, and a faithful description of any phenomenon can be true to the internal rules and principles of the phenomenon itself.

Wertheimer was against the narrow application of an

arbitrarily analytical, “and-summative,” mechanical mode of thought in scientific work—indeed in any area. Viewing wholes as the mere sum of their component parts, he argued vehemently, does violence to the true nature of these wholes; parts must be seen in terms of their place, role, and function in the whole of which they are parts. While a few wholes in nature in some sense are just the sums of their parts (perhaps a pile of pebbles or a handful of coins), such instances are rare cases of an extreme of inertness. In the great majority of cases, the whole does not equal the sum of the parts, nor is it merely more than the sum of the parts—the typical whole is so different from a sum of its parts that thinking in any such summative terms yields only a distorted, impoverished caricature of genuine reality. One of his favorite examples of a Gestalt was a soap bubble. Its “component parts” are not indifferent to each other. A tiny alteration such as a pinprick in one minute part produces a dramatic change in the whole.

Together with his colleagues Kurt Koffka and Wolfgang Köhler, Wertheimer established Gestalt psychology as a viable and dynamic movement in psychology by the 1920s. Although he published little, several of his publications are commonly regarded as classics in the history of psychology. In a clear forerunner to later Gestalt thought, he published a 1910 paper on the structure and Gestalt characteristics of the music of the Vedda, a native tribe in Ceylon (now Sri Lanka). Shortly thereafter, his analysis of the phi phenomenon (or perception of apparent movement) appeared in the *Zeitschrift für Psychologie* in 1912; although he had introduced Gestalt ideas in earlier papers, this article is still commonly described as the founding document of Gestalt psychology. But perhaps his most widely recognized work was a 1923 article in *Psychologische Forschung* titled “*Untersuchungen zur Lehre von der Gestalt: II* (Investigations in Gestalt Theory: II)” (Wertheimer, 1910, 1912, 1923). In this work, Wertheimer boldly asserted that human perception is inherently organized into meaningful Gestalten, often drawing from experience and context.

Likewise, form perception is not driven by associative factors but by a dynamic process of organization. Assemblages of lines and dots are not perceived as unrelated, piecemeal units or as a chaotic mass, but are instead grouped into meaningful configurations based on their similarity, proximity, closure, continuity, and the like, and governed by dynamic processes such as *Prägnanz*, a tendency toward simple Gestalten. Although several of his early publications focused on perception, Wertheimer remained primarily interested in the psychology of thinking.

Wertheimer's principal obsession in his last years, as it had been throughout much of his career, centered on the psychology of thinking. Köhler believed that Wertheimer "saw with disappointment that in this country his name was connected with details of perception while his main contribution to human thought was looked upon with distrust" (Köhler, 1944, p. 143). In an unpublished draft of a preface for a slim 1925 book, *Three Contributions to Gestalt Theory*, Wertheimer made clear that "the widespread misunderstanding that Gestalttheorie is an extension of perception is objectively and historically false." The first major Gestalt theoretical work was a 1912 one, "*Über das Denken der Naturvölker* (On the Thinking of Indigenous People)," a paper that appeared in the *Zeitschrift für Psychologie* several months earlier than the more frequently cited one on apparent motion. He had lectured on thinking since the earliest years of his professional career and offered a course entitled "On Better Thinking" at the New School. The Gestalt analysis of thinking was his primary interest from the beginning and remained his main focus throughout his professional career.

In 1935, Wertheimer began preparing a book-length manuscript on *Productive Thinking*, a process that he described as thinking that "really forges ahead," that "really grasps an issue" (Wertheimer, 1945). He believed that meaningful comprehension arrives only when details are seen in their interrelatedness. He documented different reactions by adults

and children when confronted with geometrical and mathematical problems as well as with social conflicts. One of the later chapters, based on interviews with Albert Einstein, was a detailed account of how the internationally famous physicist constructed his theory of relativity. Wertheimer managed to finish the manuscript in the last months of his life but did not live to see the publication of *Productive Thinking* in 1945, nor did he witness the profound impact that the book has quietly managed to exert on psychology, even to this day. Although Max Wertheimer died more than fifty years ago, his ideas remain a vital part of psychology in the latter part of the twentieth century.

The Fate of Gestalt Psychology After Wertheimer's Death

Although Köhler was active in research and writing until his death in 1967, Gestalt psychology was soon characterized by some as an antiquated and largely moribund school of psychology. In 1950, Edwin G. Boring reported that "Gestalt psychology has been successful. . . . The movement has produced much new important research, but . . . Gestalt psychology has already passed its peak and is now dying of its success by being absorbed into what is Psychology" (Boring, 1950, p. 600). Although Boring was a severe critic of Gestalt theory, his words, written during the reign of the reductionist school of behaviorism, may have been historically fairly accurate at the time. Other scholars have echoed Boring's pronouncement, prompting Mary Henle to observe that "Ever since that time we have been invited to funerals of Gestalt psychology. . . . Even Mark Twain would have been dismayed by so many exaggerated reports. One cannot escape the thought that a movement that has required so many funerals must have extraordinary vitality. I believe that we still have important things to learn from Gestalt psychology" (Henle, 1985, p. 100). In recent years, a growing number of

psychologists appear to agree with Henle, and there is a renewed recognition of the value of Gestalt theory.

Following Wertheimer's death, Gestalt theory was actively studied by scholars in many countries: China, Egypt, Great Britain, France, India, Italy, Japan, Poland, Romania, Spain, and the former Soviet Union, by such internationally illustrious scholars as Agostino Gemelli, Gaetano Kanizsa, Alexander R. Luria, Albert Michotte, Eugenio Rignano, Jean Piaget, and Lev Vygotskii. In Wertheimer's adopted countries of Germany and the United States, the spirit of Gestalt theory was preserved in the work of many prominent psychologists, including Rudolf Arnheim, Solomon Asch, Leon Festinger, J. J. Gibson, Fritz Heider, Mary Henle, Kurt Lewin, Abraham Maslow, Wolfgang Metzger, Ulric Neisser, Theodore Newcomb, Edgar Rubin, Viktor Sarris, Muzafer Sherif, Herbert Simon, Lothar Spillman, Edward Chace Tolman, Hans Wallach, Hans-Jürgen Walter, and Herman Witkin. Outside of psychology, Gestalt theory has been explicitly applied in anthropology, art, economics, education, industry, mathematics, music, physics, and sociology.

Psychology of Art and Music

Wertheimer's fascination with the Gestalt structure of music and art was shared by several illustrious artists. In Berlin, he personally knew the esteemed German painter Käthe Kollwitz and other artists and musicians. During the 1920s and 1930s, Paul Klee, Vassily Kandinsky, and Josef Albers drew upon Gestalt theory for inspiration in their writings, paintings, and lectures at the German Bauhaus School (Teuber, 1973, 1976). The Dutch graphic artist M. C. Escher was also deeply influenced by some of the work on figure-ground relationships in the Gestalt literature on perception (Teuber, 1974). Wertheimer's interest in this area continued after he immigrated to America, and he taught a course on "The Psychology

of Music and Art” at the New School. Koffka was also interested in the area and made some contributions to it (Koffka, 1940, 1942).

Inspired by Wertheimer’s work and passion for the arts, Rudolf Arnheim (who took over the New School course on the psychology of art after Wertheimer died) used Gestalt theory to explore architecture, music, painting, poetry, sculpture, radio, and theater (Arnheim, 1966, 1974a, 1986). An artist organizes sensory facts according to fundamental Gestalt principles of organization like unity, balance, and segregation. Like Wertheimer, Arnheim saw the principles of Gestalt theory in the natural world, not only in the rigorous constraints of the laboratory (Arnheim, 1943). According to Mandler and Mandler, Arnheim’s work “has been central and seminal and is certainly one of the milestones in the contribution of Gestalt psychology to American culture” (Mandler and Mandler, 1969, p. 394).

Although perhaps not as systematic or visible as Arnheim, other psychologists examined the psychology of art and music from a Gestalt perspective. Gestalt theory has been used to interpret and analyze modern art, especially the work of Jackson Pollock (Kobbert, 1989). One scholar analyzed the “surface perception” of Gestalt patterns in classical art as well as wall paper in contrast with the more unconscious appeal of modern art (Ehrenzweig, 1948). Another employed the Gestalt principles of *Prägnanz*, integration, adjustment, and purposive differentiation in the study of the creative process of various artists in architecture, dance, literature, music, painting, and sculpture (Rees, 1942). Others such as Adelbert Ames at Dartmouth College and Hoyt Sherman at Ohio State University considered Gestalt principles of perceptual phenomena as a model of art instruction (McWhinnie, 1992). Gestalt theory was also advocated as an effective tool in music education (Steinitz, 1953/1954). Raymond Holder Wheeler at the University of Kansas even analyzed the epochs in the history of music by contrasting cold, atomistic periods (for example,

program music, lyrics) with warm, Gestalt periods in music (for example, serious operas, tragedies, institutionalized music) (Wheeler and Gaston, 1941). Finally, Gestalt principles have also been used in the analysis of poetry (Tsur, Glicksohn, and Goodblatt, 1991).

Personality and Psychotherapy

Although Wertheimer published no works explicitly on problems of personality or psychotherapy, his ideas have frequently been applied in these areas. Kurt Lewin's field theory was highly influential in the study of personality dynamics, and the neuroscientist Kurt Goldstein considered himself an early associate of Wertheimer's. Goldstein constructed an organismic theory based on a holistic, biological model of personality (Goldstein, 1939). Goldstein borrowed loosely from the Gestalt school in describing the interaction between the *whole* organism and the environment. Andras Angyal also provided an organismic orientation in describing "biospheres," holistic systems that include individuals and their environments (Angyal, 1939, 1941). As was true of Goldstein, Angyal's work used language familiar to Gestalt theory even if some of his concepts were not.

Another early attempt at a Gestalt theory of personality was made by one of Wertheimer's students, Werner Wolff, who used ideas of his mentor to examine the expression of personality as manifest in gestures, stride, and posture (Wolff, 1943). One of Wolff's colleagues, Abraham Maslow, admired Wertheimer's work but also was struck by his bold and unusual character. Secretly, Maslow began taking notes about Wertheimer's personality. Although they were crude and informal at first, Maslow's observations evolved into a disciplined undertaking as he tried to identify basic themes and patterns in the lives, thoughts, and personalities of Wertheimer and the anthropologist Ruth Benedict; he took more systematic,

although still spontaneous, notes in a "GHB" ("Good Human Being") notebook from 1945 through 1949 (Lowry, 1973, p. 33). Captivated by the personalities and motivations of Wertheimer and of Benedict, Maslow read biographies of historically eminent women and men, searching for common characteristics of "healthy-minded" people. Maslow used Goldstein's concept of "self-actualization" to describe his observations of optimal personality development. Based upon his study of Wertheimer and Benedict and his readings about Thomas Jefferson, Abraham Lincoln, Albert Einstein, and Eleanor Roosevelt, Maslow identified specific traits of "good specimens" (Maslow, 1971). In later years, Maslow developed a model of humanistic psychology that preserved the holistic flavor of Gestalt theory although it differed radically from Wertheimer's approach with regard to content and method.

Gestalt psychology was utilized in studies of selfhood and even of humor (Josey, 1935; Maier, 1932). Although Wertheimer dismissed Freud's work as excessively associationistic and unscientific, several theorists have tried to link psychoanalysis and Gestalt theory in the study of archetypes (inborn forms of cognitive and emotional reaction to universal basic symbols), subliminal perception, and the unconscious (Bash, 1946; Fisher and Paul, 1959; Prasad, 1932). It has even been suggested that Freud was an important precursor to the ideas of Wertheimer and especially of Lewin (Bernfeld, 1934).

As with personality theory, a Gestalt approach was represented in psychotherapy and psychopathology but not always in a direct way. Without question, the Gestalt therapy of Fritz Perls has generated the most attention within the clinical community. Despite its popularity, Henle demonstrated, without questioning the efficacy of the therapy, that Perls' work bears literally no intellectual resemblance to the Gestalt theory of Wertheimer, Köhler, and Koffka (Henle, 1978). Arnheim voiced a similar sentiment by noting, "I can see Max Wertheimer fly into one of his magnificent rages, had he lived to see one of the more influential tracts of the therapeutic

group in question dedicated to him as though he were the father of it all" (Arnheim, 1974b, p. 570).

Indeed, many clinicians outside of the Perls camp recognized the value of a holistic perspective long before Fritz Perls. Wertheimer had several students who pursued the clinical implications of the Gestalt model. In 1924, Heinrich Schulte published an article based on his work with Wertheimer on a Gestalt theory of paranoia (a form of psychopathology characterized by extensive delusions) that differed radically from the traditional Freudian model (Schulte, 1923). According to this perspective, a human is seen not only as an individual but also as a "We-being"; people are considered to be "essentially both a whole in [their] own right and part of encompassing groups" (Levy, 1986, p. 248).¹ Although Schulte is listed as the sole author of the publication, Erwin Levy claimed that Schulte approached Wertheimer at a psychology conference in Leipzig and asked his mentor for help, whereupon Wertheimer dictated the paper to Schulte (Levy, 1986, p. 230). According to Levy, such episodes were not unusual: "much of the work out of the Berlin and Frankfurt psychological institutes was inspired and closely supervised by [Wertheimer] but published under his students' names. As long as the work was done, recorded authorship was of secondary importance" (Levy, 1986, p. 230). Wertheimer also encouraged Levy to study psychopathology from a Gestalt perspective (Levy, 1943). Molly Harrower, one of Koffka's most promising students, also published in the area (Harrower, 1939).

During the 1930s through the early 1960s, several articles appeared in the German and American literature that attempted a synthesis of Gestalt theory with psychiatry, neurology, and clinical psychology.² Gestalt theory also found application in child pathology, speech disability, shock therapy, and criminal behavior during this same period (Kisker and Knox, 1943; Semerari, Balloni, and Castellani, 1966; Voelker, 1942). In the early 1930s, psychiatrist Lauretta Bender began work on a test that required subjects to reproduce simple

figures and used Gestalt principles to analyze the poor reproductions made by brain-injured patients (Bender, 1938). The Bender-Gestalt Test gained great popularity and several other psychometric tests were developed based on Gestalt principles (Mooney and Ferguson, 1951; Street, 1934). The Gestalt concept of *Prägnanz* was even reported as offering one of the best interpretations of the classical Rorschach psychodiagnostic inkblot test (Brosin and Fromm, 1942).

Education

The Gestalt model, as repeatedly emphasized in Wertheimer's *Productive Thinking*, has important implications for education and teaching. In the fall of 1934, Wertheimer offered a seminar on the "Consequences of the Gestalt Theory of Psychology for Education and Teaching." The Gestalt perspective paralleled closely the functional ideology of progressive education as opposed to the more structural orientation of traditional education (Commings, 1937). Carr demonstrated that the holistic goals of progressive education are closely linked to Gestalt theory: "When the subject memorizes by studying the whole selection, the details are organized into a total configuration, each element in its proper relationship; the subject who uses the part method learns a jumble of details which have no organization" (Carr, 1934, pp. 199–200). Several scholars have proposed educational and reading programs based on Gestalt psychology.³ But Wertheimer's vision of a Gestalt theory of education perhaps came through most in the work of two of his students, George Katona and Catherine Stern.

Katona's most significant contribution to Gestalt psychology was a 1940 book on memory and education titled *Organizing and Memorizing*. Like Karl Duncker's research on problem solving (discussed below), Katona's book acted as a strong complement to Wertheimer's work on productive

thinking but with direct applications to educational psychology. In a series of studies, Katona demonstrated that “meaningful learning,” understanding of information based on insightful grouping, yields superior results to “senseless learning,” artificial learning without real structural understanding. Whereas meaningful learning is the product of meaningful organization and true understanding of a principle, senseless learning is the outcome of rote memorization and drill exercises. Based on his research, Katona concluded that memorization is more likely to yield faster rates of forgetting than understanding and is also less likely to transfer to the learning of new tasks.

Catherine Stern too borrowed Wertheimer’s ideas about structural understanding; she rigorously applied them to school children learning the fundamentals of mathematics. During the course of her study, she developed “Structural Arithmetic,” an education program based on her research and on Wertheimer’s ideas about productive thinking. In opposition to drill and associative learning, Stern constructed situations in which the structural characteristics of the number system are understood, not memorized, by children. In 1949, she published *Children Discover Arithmetic: An Introduction to Structural Arithmetic*, a book based on her research and dedicated to Wertheimer. In later years, Stern continued to work on other facets of educational experience, with emphasis on the learning methods of discovery and insight (Stern and Gould, 1955). In particular, she concluded that the teaching of alphabetic characters is, like the teaching of arithmetic, all too often based on memorization and drill (or the “sight method”). Based on this assumption, Stern developed a program of “Structural Reading” which “teaches children to grasp structural characteristics common to whole groups of words, and to grasp sentence structure in such a way that henceforth they can read a great many words and sentences with comprehension” (Stern and Gould, 1968). Stern’s work was an ambitious

effort to extend Wertheimer's ideas about thinking into the realm of education.

Social Psychology

In his 1982 book, *History and Systems of Social Psychology*, William Sahakian devoted three chapters to Gestalt psychology's role in the development of social psychology. According to Sahakian, "Gestalt psychology, predicated on wholes and grouping, is itself basically a social psychology, not only of human groups but of nonhuman grouping as well. Grouping principles are quite pertinent in the investigation of social perception" (Sahakian, 1982, p. 296).⁴ By the time Wertheimer arrived in America, several scholars had discovered the value of Gestalt theory in sociological and anthropological investigations.⁵ At the New School, Wertheimer lectured on social psychology and discussed broad social themes in his essays on political freedom and democracy. In this spirit, several of his students and colleagues further extended Gestalt theory into the realm of social psychology.

Drawing upon basic Gestalt themes, Kurt Lewin's field theory profoundly impacted social psychology in general and the study of group dynamics and leadership in particular. It is difficult to assess fully the great impact that, Lewin's work had on social psychology; Lewis Coser observed that, in less than a decade at the University of Iowa, Lewin "raised a whole generation of social psychologists who were to dominate the field for several decades" (Coser, 1984, p. 25). Wertheimer's successor at the New School, Solomon Asch, further strengthened the union between the Gestalt perspective and social psychology in his seminal research on group pressure (Asch, 1951). Although often cited as a study of conformity, Asch's work focused more on the coordination of the individual's perspective with the group's perspective, and about the disturbing feeling that results when those perspectives are

incongruent. For Asch, the social psychologist must consider the individual with regard to the larger social context:

To understand [persons] we must see [them] in [their] setting, in the context of [their] situation and the problems [they are] facing. If we wish to understand a given quality in a person we must not isolate it; we must see it in relation to [that person's] other qualities. For this reason, also, the 'same' quality in two persons is often not the same psychologically. . . . When the phenomena being observed have order and structure, it is dangerous to concentrate on the parts and to lose sight of their relations (Asch, 1952, p. 600).

Asch also relied on Gestalt assumptions in his investigations of perception, learning, memory, and personality theory (Rock, 1990).

In addition to Lewin and Asch, the work of other notable social psychologists was also informed by Gestalt psychology. Fritz Heider's appreciation of Wertheimer's achievements is evident in his work on attribution and in his cognitive theory of interpersonal relations (Heider, 1958, 1983). Muzafer Sherif's research on the autokinetic effect (the apparent motion of a single pinpoint of light in an otherwise totally dark environment) and intergroup conflict and cooperation contains Gestalt themes (Sherif and Sherif, 1969). Another important figure at the New School, Leon Festinger, was especially influenced by Lewin in the development of his model of cognitive dissonance (when people's actions and attitudes are mutually inconsistent) (Festinger, 1957). Sahakian claimed that Gestalt theory provided a base for several other technical social psychology theories including Newcomb's theory of communicative acts (which included balance between the roles of communicators and of communications), Cartwright and Harary's theory of structural balance (in social relationships in general), Abelson and Rosenberg's (somewhat different) balance model, and the congruity principle in social interactions of Osgood and Tannenbaum (Sahakian, 1982, p. 296). In considering more

recent developments, Graumann concluded that although not explicitly part of mainstream social psychology,

Gestalt theory, in various modifications and fusions, is a very dynamic undercurrent of social psychology's mainstream. . . . Even some of the more specific Gestalt principles and theorems that are no longer cited or quoted have retained their dynamic part, functioning, however, as hidden or implicit assumptions. . . . If I am correct in proposing that Gestalt theory has been incorporated in social psychology as a fundamental implicit theory and has finally become a frame of reference for further theorizing, then the Gestalt heritage in social psychology has a much better and a more enduring place than many of the fleeting theories and theorems of the present (Graumann, 1989, p. 79).

Perception and Neuroscience

An area in which Wertheimer's work and Gestalt psychology in general have maintained a vital impact is human and animal perception; among researchers in this field are "descendants of the Gestalt tradition, which constitute modern perceptual psychology. Although the Gestalt descendants are diverse, their lineage influences both their similarities and their disagreements" (Banks and Kraljick, 1991, p. 306). Gestalt properties and laws of grouping have continued to be a productive research heuristic in contemporary perception research.⁶ In addition, modern perceptual psychologists have conducted fruitful investigation of such Gestalt topics as perceptual organization, figure-ground segregation, and perceptual combination of attributes (Banks and Kraljick, 1991, p. 314). Literature on perceptual organization and on the role of self-motion in perception of the environment also bears a distinct Gestalt influence (Kubovy and Pomerantz, 1981; Remez, Rubin, Berns, Pardo, and Lang, 1994; Wallach, 1987). However, Henle has argued that not all modern perceptual

psychologists are in complete agreement with or have a full understanding of Gestalt psychology (Henle, 1989).

Gestalt psychology advocated a kind of phenomenal realism, arguing for a functional comparability of phenomenal experiences and physiology. Perceptual experience is directly and dynamically related with neural functioning in the brain. This view has much in common with current trends in cognitive neuroscience (Epstein and Hatfield, 1994). At present, the field of cognitive neuroscience is examining relations between cognitive functions and neural processes in a manner that resembles the classic Gestalt conception of isomorphism (the idea that the form of subjective experience is fundamentally the same as the form of the brain events underlying the experience) (Sheerer, 1994). The current neuroscience of perception has also shed new light on traditional Gestalt ideas (Spillman and Werner, 1990).

Contemporary research on the neurological foundation of visual perception has tapped into Gestalt findings for two specific reasons. First, the single neuron theory, based on research more than a century ago by Santiago Ramón y Cajal and Charles Scott Sherrington, could not account for complex visual phenomena. Although most twentieth-century investigations of visual perception were directed by this theory, the single-neuron doctrine proved too simplistic to explain complex visual perceptual phenomena studied by Gestalt theorists, including figure-ground relations, grouping, and context-dependent percepts. Second, research on vision in the past few decades has uncovered neural mechanisms that correspond to perceptual events that had been described much earlier by Gestalt psychologists. As a result, the past two decades have witnessed a shift from research on individual cell functions to the integration of these functions into an organized whole. In this tradition, findings about receptive fields, neuronal networks, and the interaction between the recently-identified magno- and parvocellular streams (which are integrating systems in the brain) have provided possible

explanations of how simple stimuli are synthesized into a meaningful whole by the brain.

Thus, neuroscientists are now examining neural events described much earlier in the Gestalt literature. For example, coherent motion of a subpart of the visual field is believed to play a key role in figure-ground separation in a process described by neurophysiologists as “binding” but earlier discussed by Gestalt psychologists as “common fate.” Gestalt researchers also proposed that perceived concavity or convexity is determined by the illumination gradient while today’s researchers use the terms “shape-” and “depth-from-shading” to describe the same phenomenon. In addition, the Gestalt principle of common fate is well illustrated in recent experiments on stereokinetic effects (in which motion of a subpart of the visual field generates the perception of that part of the field as an integrated unit) (Spillman and Ehrenstein, unpublished).

A rich understanding is developing of the workings of individual neurons interacting in complex visual systems. Gestalt theory made clear the inadequacy of the single-neuron model in explaining how visual stimuli are constructed into meaningful wholes by the brain and the nature of complicated visual percepts. According to a very recent manuscript by Spillman and Ehrenstein, “The search for distributed processing and global information exchange in neural networks testifies to the resurgent interest in holistic approaches such as Gestalt psychology” (Spillman and Ehrenstein, unpublished, p. 4). With extensive and technologically sophisticated research on visual systems, neurophysiologists are reexamining questions that Gestalt research had been unable to answer.

Cognitive Psychology

Cognitive psychology is the area in which perhaps there has continued to be the most explicit awareness of Gestalt theory.

Like Wertheimer and his colleagues, cognitive psychologists rebelled against behaviorism and investigated a broad range of mental processes. Given Wertheimer's holistic perspective on productive thinking and other cognitive processes, recognition of his work seems natural. Gestalt themes have emerged in studies of learning and memory, especially in studies on the role of organization in learning.⁷ It has also been suggested that Gestalt theory can be very useful for the current connectionist movement called parallel distributed processing (Epstein, 1988; van Leeuwen, 1989). But the Gestalt legacy is perhaps most dominant in the cognitive work on problem solving and thinking (Kessek and Bevan, 1985; Montgomery, 1988).

Wertheimer's first student to make extensive use of his work on thinking and problem solving was Karl Duncker. After studying productive thinking for his 1926 thesis, Duncker produced his 1935 book on problem solving, *Zur Psychologie des produktiven Denkens* (*Psychology of Productive Thought*), now widely viewed as a classic in the history of cognitive psychology. Drawing from Wertheimer's work, Duncker distinguished between two types of problem solving: organic ("analysis from above") and mechanical ("analysis from below"), with the idea that productive thinking depends on reorganization and structural understanding of the problem situation, that is, an organic process. Duncker divided his book into three main content areas: the structure and dynamics of problem-solving processes; insight, learning, and simple finding; and the restrictive fixedness of thought-material. The third section on "functional fixedness" in particular has received extensive attention from psychologists. Newell noted that "This is the smallest part of the monograph—twenty-six pages vs. forty-five and thirty-four, respectively, for the first two parts. Yet it had by far the largest impact. Functional fixity generated one of the major streams of research in problem solving until the shift in the mid-1950s to information processing" (Newell, 1985, p. 413).

Abraham S. Luchins attended Wertheimer's seminars at the New School and was inspired by his mentor's ideas to study problem solving (Luchins and Luchins, 1994). Beginning in 1936, Luchins conducted research on the "*Einstellung* effect," a mental set used to solve problems. Like Duncker, Luchins examined the potentially blinding and destructive rigidity of set but also explored the occasionally positive aspects of an *Einstellung* in solving a problem (Luchins, 1942).

In the Gestalt tradition of Wertheimer, Duncker, and Luchins, cognitive psychologists have explored the structural processes of thinking, reasoning, and problem solving. Consistent with the Gestalt approach, cognitive psychologists have studied complex, abstract knowledge structures that are variously labeled today as schemas, scripts, and frames (Ericsson, Polson, and Wertheimer, 1982). Wertheimer's emphasis on the nature of insight and understanding in thinking are still important questions in computer simulations of cognition (Simon, 1979). The computer information-processing model of Allen Newell and Herbert Simon outlined problem solving as a goal-directed search among possible solutions within a specific problem space (Newell and Simon, 1972). Their pioneering work on the General Problem Solver, an artificial intelligence program that solved cryptarithmetical problems by reducing a given problem into a variety of subgoals, is especially reflective of Duncker's work (Newell, 1985). More recently, a computer program based on Gestalt assumptions has been created to grapple with insightful problem solving and functional fixedness (Keane, 1989). Despite such achievements, computer simulations of cognitions are still unable fully to account for the role of insight, or understanding, in problem solving (Henle, 1985; Wertheimer, 1985). As Ericsson, Polson, and Wertheimer noted, "Many of the examples so lucidly described by Wertheimer remain only partially understood and continue to represent significant challenges to cognitive scientists who wish to advance our understanding of the psychological mechanisms that underlie

humanity's highest intellectual accomplishments" (Ericsson, Polson, and Wertheimer, 1982, p. xvi).

This sketch has only hinted at the influence of Max Wertheimer's ideas on psychology and the continuing promise of Gestalt psychology. As Asch concluded nearly a half century ago, Wertheimer

has handed on to us a problem of permanent significance and the sharp tools he forged in tireless labor. . . . We cannot speak with assurance about the future of our science. But this much we can say with confidence: wherever the understanding of [humanity] will take a step forward, there people will honor the name of Max Wertheimer and turn back to his thought with a sense of gratitude and affection (Asch, 1946, p. 102).

Notes:

¹ Levy provides a complete translation of the Schulte paper as well as a critical commentary on the themes of the article and how they compare and contrast with classic psychoanalysis.

² For example, Clauser, 1960; Katzenstein, 1956; Kisker and Knox, 1942; Prakash, 1958; Rusk, 1935; Syz, 1936; Werner and Strauss, 1940.

³ For example, Bond and Bond, 1943; Fagan, 1969; Hunter, 1960; Wheeler, 1933.

⁴ For a related treatment of Gestalt psychology's influence on social psychology, see Aron and Aron, 1986.

⁵ For example, Benedict, 1934; Gillin, 1936; Ogden, 1934.

⁶ For example, Quinn, Burke, and Ruch, 1993; Rock, Nijhawan, Palmer, and Tudor, 1992; Saariluoma, 1992.

⁷ For example, Baddeley, 1990; Mayer, 1977; Wertheimer, 1980.

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