

SPHERES OF MEANING:
AN ANALYSIS OF STAGES FROM PERCEPTION TO
ABSTRACT THINKING¹

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The relationship between perception and thought has always been as much a philosophical as a psychological problem. The psychologist Floyd Allport (1) argues that no theory of perception is adequate unless it encompasses the phenomenon of meaning. How, one may ask, do encountered objective entities, whether physical stimuli, event structures, or logical meanings attain subjective reality, that is, reality within the percipient organism? The philosopher H. H. Price (21) raises a parallel question: from whence come the universals and how are the abstract concepts actually represented in the knowing subject? One approach to these problems is simply to define both perception and conceptual thinking as the codifying of events. The question is, however, whether the mental operations involved in both are identical. If one considers only the achievements, i.e. the end-products of perceiving and conceptualization, one may over-emphasize the apparent similarities and neglect the functional differences. Therefore a qualitative analysis of the psychological processes underlying these achievements is necessary.

In this paper I attempt (1) to examine certain qualitative factors which distinguish between perception and abstract thought; (2) to demonstrate intermediate stages between these two; (3) to describe such stages in experiential terms and link them to developmental psychology.

COGNITIVE MODES FROM PERCEPTION TO ABSTRACT THINKING

My basic premise is that both perception and thinking are processes which are cognitive; both have representational functions, insofar as they represent external and internal events in experience. The adaptive role of this cognitive structuring has been traced by Piaget as a genetically increasing balance between "assimilation" of and "accommodation" to the object (20). One may characterize the developmental span from perception to abstract thought as the sequential emergence of unit formations, i.e., organized structures, as shown below. These come to represent invariant relationships and functional interdependencies. In the course of ontogenesis these unit

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formations first refer to properties of the perceptual object in relation to its surround. Later there is the establishment of invariant relations among groups of objects thought of; and finally there appear units which constitute invariances among *ideas* embodied in symbols. What is common to the cognitive processes of perception and of thinking seems therefore to be that they both come to refer to invariant functional relationships (20, 7). What, however, distinguishes both is that these relationships are differently codified and realized in experience.

On first inspection the chief difference between the perceptual and conceptual modes of representation seems to be this: in immediate perception there evolve *constancies*, such as form, size, brightness, and object identity, which result from non-reflective commerce with objects without intentional learning; in concept formation, there are constructed *invariant relationships* which result from reflective thought and intentional learning, e.g., inductive or deductive reasoning imposes systems of order upon perceptual data or carries out such operations with symbols. On closer examination, however, this general distinction may be too crude and characterize cognitive function too one-sidedly, namely, chiefly in terms of "accomodation to the object." When we focus on the subjective aspects of cognition, particularly "assimilation," a number of intermediary stages of representation from perceiving to abstract thought are discoverable, with psychologically different forms of unit formation at each stage.

To illustrate this, let us suppose a sine-like curve is seen. At the primitive stage, where ego and world are relatively undifferentiated from each other, we have a predominance of sensory-motor participation in the expressive features of the curve, its rhythmic rise and fall, its smooth and round motion. The perceptual unit thus formed is a "physiognomic" impression where the object is assimilated in terms of a *sensory-affective schema*. This is a subjective representation of the reaction to the dynamic aspect of the stimulus material, such as rising, falling, smooth, etc. The relationship to sensory-tonic theory is apparent (30, 36).

With greater separation of ego and world this dominant physiognomic impression gives way to a more "thing-like" figure-ground percept of a curve. Here the object is still assimilated schematically as a spatial configuration of something-curved, without discriminating specific parts. The unit formation via this *perceptual schema* represents invariant spatial relations but not detailed, absolute stimulus elements. (This fact is demonstrated by transposition of spatial forms or melodies).

Next, the curve may be apprehended as a snake, an ornament, a mountain range, or a magic symbol. The curve is then assimilated in terms of a *sphere of meaning*. The curve, for example, is experienced as belonging to the sphere of dangerous animals, or pretty designs, or landscapes, or magical powers. The unit formation via the sphere represents a realm of meanings which are connected

through having belonged together in experienced *situations*. The functions of objects also belong to a sphere of meaning.

Next, the curve may be seen in a general way as a figure with geometric properties. The line is then assimilated in terms of a *conception* such as: spatial forms like these have to do with geometry. This conception represents an idea about a relationship between experienced content (spatial forms) and a word meaning (geometry). Because at this level geometric properties are not yet adequately conceptualized and distinguished, they may not be differentiated from properties pertaining to physics or mechanics or mathematics.

On the level of abstraction, the line is viewed as representing a sine-curve, i.e. a mathematical symbol for a law of periodic waves, or a trigonometric function for which an equation can be substituted. Here we are dealing with concept formation, based on the deliberate construction of invariant relationships between objects thought of, or ideas. In *abstract conceptual thinking* the underlying similarities are isolated as the invariant, while simultaneously the changing aspects of the object are recognized. The work of Bruner *et al.* (4) on different strategies in concept achievement is a clear demonstration of such psychological activities. Objects may be now perceived as representatives of a class and not merely assimilated through schemata, spheres of meaning, or conceptions. On this level language can create conceptual symbols (word meanings) and produce other new ones (number meanings, etc.) which become increasingly dissimilar from the objects, ideas, and relationships they signify.

This paradigm of experiential stages from perception to abstract thought paraphrases a theme of Cassirer (6): One cannot justly speak of a raw material of pure sensations in perception. In this as in any of the described stages, a definite unit formation occurs which transcends the specific sense data and establishes more general relationships and "meanings." It is my thesis that in the child the development from perception to thought goes through kindred stages of assimilative representation until the formal conceptual level is reached; also, in the adult such stages are not obliterated but continue to play an important role in the "actual genesis" of ongoing processes in perceiving and thinking. Of these stages, only those of schema and sphere of meaning will be discussed.

PERCEPTUAL SCHEMATISM

There are many uses of the term "schema" in psychology (29). All agree that it is a form of internal representation, except perhaps for the earliest sensory-motor schemata posited by Piaget (20). My analysis emphasizes the representational character of perceptual, as well as of the most early functional schemata. In these a cognitive unit formation is also possible, in experience as well as in memory. For instance, in spatial orientation a primitive functional schema may be-

come a representational "mapping" of the environment. Take Scupin's case of the child who refused to re-enter a house on the same staircase by which he had left it because to him this could only be the way *out*. Apparently the boy had retained a "strip map" of the path in one irreversible direction. Moreover, a case may be made out for a schematism in perception of objects such as figure-ground on each of its genetic levels. The psychological activity which organizes the relations of four lines into a quadrangular form may lead to a schematic assimilation of four-sidedness or four-corneredness which later allows for the recognition of other four-sided forms as in the case of transposition (e.g. differently shaped, differently colored). In this sense an invariant of visual perception such as form may result from the formation of a schema.

The schema codifies the varying impressions of the object into a more general relationship of a typical unit, a "preferred Gestalt." Owing to this schematism it is the typical configuration of the object-form that attains a preferred representation in perception and memory (19). It seems to be a common function of these schemata that they establish phenomenal constancy and allow for the experience of *sameness* over a certain range. Such phenomenal sameness (or similarity) goes with the general typing character of schematism, but this is accomplished at the expense of registering in awareness *all* the possible, specific variations of the object appearance. Moreover, when a certain point of deviation from this schematic type is reached, the phenomenal sameness or similarity stops and no recognition occurs. It is a well known experimentally established fact that the range of transposition is limited (25).

For example, extreme variations of four-sidedness, i.e. a diamond, may no longer be recognized as four-sided forms. Even college students tend to assign a diamond or trapezoid to a model triangle instead of to a model square in their initial sorting; the schema of "pointedness" overrides the schema of "four-sidedness" (22). Our interpretation may be supported by the experiments of Tinbergen (28) on birds. Using cardboard dummies which schematically mimicked either birds of prey or a parent bird, he determined the limits of form change within which flight or approach reactions would be elicited. The findings by Spitz (26) in human infants parallel the kind of schematic perception suggested in the above studies. He investigated the smiling response to the human face, during the first 6 months of life, using varying masks to determine the range of the crucial response-releasing factors. The essential "Gestalt quality" was found to be: the shape of the mask or human face has to be seen *en face* within a certain size range, and the Gestalt has to consist of *two* eyes, forehead, nose, and motion. Even if the stimulus had nothing human in it and was the nodding puppet of a scarecrow, the smiling occurred, as long as the mentioned *schematic* cues were present.

Schematic cognition therefore differs from concept formation. In conceptual thinking the entire range of variations can be covered by imposing upon the changing aspects of the object an abstraction. This isolates the common characteristic, which is the invariant, and at the same time registers in awareness both the variations as different and the invariant as similar. The concept can therefore cover a wider range of variations in essential similarity than can the schema. The concept actually takes over the identification of the invariant when the schema stops. It remains an intriguing question whether the schema does play a role in conceptual thinking, i.e., whether Kant was psychologically right when he claimed that the images we form of objects can be connected with concepts only by means of the schema to which they belong (7).

SPHERES OF MEANING

We now turn to the sphere of meaning, a term borrowed from Messer and Schilder (18, 24) but defined somewhat differently. The sphere corresponds to a sphere of existence. It is a region of the life space, based upon an unreflectively developed unit formation in experience and action; behavior-objects and ideas that belong together in habitual situations are assimilated into a realm of meanings that is experientially represented in the person. Recurrent functions of objects, or means-end relationships and the consistent roles of persons can form spheres of meaning. The so-called "functional definitions" are derived from action situations of this kind: A ball is "something to bounce with," a mother-in-law is "something to contend with," etc. Many unit formations of everyday life have this character of a meaning sphere, and generally occur together with an emotional investment.

The findings in word association experiments from Jung to Schafer and Rapaport support this. Typical spheres of meaning in this sense are the home, the home town, the family, friendships, the school, and the job. When Barker and Wright (3) record the recurrent activities of children in stable behavior and community settings, they map out significant regions in the child's life space. These settings can be called spheres of existence, and become spheres of meaning when they have attained internal representation. Instances of somewhat more general spheres of meaning retaining a personal character are the sex sphere and the private versus the public sphere of our existence. Finally the emergence of the distinction between "not-me" and "me," or "thou" and "I" leads to the establishment of a "mine" sphere, a very important unit formation indeed. The body schema of Henry Head is only the first layer in the building of the total unit of

self-identity as a sphere of meaning. Gordon Allport has recently called this belonging-to-me-ness, the "proprium," which represents "all the regions of our life that we regard as peculiarly ours . . . all aspects of personality that make for inward unity" (2, p. 40).

Assimilation of life space events through spheres of meaning leads to a representation that has a broader character than the unit formation in the schema or perception proper. Thus we may speak here of pre-concepts, because in such a meaning sphere *different* contents share a common relationship of felt participation (15). There is object reference which, however, is not independent of a situational context.

To clarify this level of experience in terms of the abstract versus concrete terminology, a possible error of interpretation should be corrected. Goldstein and Scheerer (14) stated explicitly that in the concrete attitude an arousal of ideas and thoughts can occur. Manipulation of and operation with ideas and thoughts can take place. But both are experienced in a different way than when engendered by a reflective abstract attitude. It would therefore be erroneous to conclude that ideational representation must be an abstraction, either because it represents things or situations which are not momentarily and concretely present, or because it deals with thought contents. Instead, one may speak of levels of increasing symbolization and generality in *non-reflective* experience versus the level of *intentional abstraction*, or better, *abstract intentionality*. That many kinds of symbolization do not involve abstraction is generally recognized, e.g., in art and in dreams (Susanne Langer, C. Hall, and E. Fromm).

This statement can be substantiated by analysis of language. In principle there is agreement among Hughlings Jackson, Goldstein, Vigotsky, Lashley, and Schilder that word meaning can become conceptual, and that it has a stable conceptual core surrounded by a zone of multiple connected meanings. The context of the sentence structure as a whole provides a meaning sphere that determines the specific sense or nuance of the individual word. Therefore only one of the multiple word meanings will be fixed in a given context of speaking or listening or reading. This phenomenon adds another characteristic to meaning spheres: Although they represent relatively stable realms, the spheres can also arise transitorily, as in the current context of language, and can change with the respectively suggested contexts. Furthermore, this analysis indicates that a sphere of meaning can contain a concept, but need not be a concept itself. It can, however, become a concept when subjected to the active process of abstracting the invariant from its various aspects and different contents by reflective reasoning. For example, the sociologist may define hometown, family, friendship, school, job, etc. The psychologist may define the sex sphere, the private versus the public mode of existence, or the proprium.

What has been thus far asserted is: Spheres of meaning differ from actual concept formation. They do not stem from deliberate reflective ordering and abstraction. They are anchored in and derived from situational experiences. They are intermediate cognitive stages between schemata and logical groupings through concepts. We may add that a criterion of Piaget can be applied to meaning spheres: The relationships between the contents of a sphere lack reversibility. E.g., in the meaning sphere, "family," the relations father-son, aunt-nephew, etc. are not reversible. The sphere can be transformed into a concept only when it becomes the object of abstract thinking.

EMPIRICAL EVIDENCE FOR SPHERES OF MEANING

If the present characterization of sphere and the above propositions are correct, it would follow that in everyday behavior and experience meaning spheres are preferred units and have priority over concepts, even for the adult. What empirical support is there for the claim that spheres of meaning are so generally operative?

When X asks a friend, "How is your wife?" X is probably using this word conceptually; the friend may experience the word "wife" first in terms of a meaning sphere. Weigl (32), Goldstein and Scheerer (14), and others have demonstrated in object sorting experiments that highly intelligent subjects may begin their sorting in terms of spheres. For example, they select metal tools by stating "because they are found in a hardware store," and only later do they shift to a concept such as "metal" or "articles of hardware." Schilder (23) concluded that the temporal course of recognition and of a current thought process commonly begins with a general sphere and is first rooted *via* the sphere before the specific target is identified. The numerous studies on "micro-genesis" by the Sander school, by Werner (35) and others also suggest such an unfolding process. The work in this area has recently been reviewed by Flavell and Draguns (10) who consider the evidence promising. Critics have duly pointed out that the techniques are often not direct enough, because the experimenters usually extrapolate from the slow recognition in tachistoscopic exposures the normal course of perceiving and thinking in the instantaneous time span. Weigl's experiments (31) have perhaps tapped the postulated priority of the sphere more directly by showing how the same familiar drawing, when previously viewed as belonging to one sphere of meaning, is hard to recognize when presented later as belonging to a different sphere of meaning. Introspective data furnish further direct evidence: the gradual awareness in the understanding of presented words by Messer's subjects (18), and the search for a missing word momentarily not at one's command, in experiments by Wenzel (33). In both cases a general relationship of a sphere character appears first. This finding is certainly attested to by many others and fits the everyday experience of everyone who has ever groped for a word.

Let us suppose the meaning sphere is a hypothetical construct. What explanatory and empirical status can it have?

Stronger and more univocal support for the operation of meaning spheres in thinking and verbal thought comes from the studies of language structure found in brain-injured patients, particularly aphasics, and from observations on primitive forms of thought.

When the amnesic aphasic cannot find the word for umbrella, he begins by searching in the sphere, saying for example, "When it rains." In paraphasia a common mistake is to utter an incorrect word which, however, belongs in the correct sphere. For example, a patient may say "Heaven" for "God," "family" for "children," "glass" for "window" (13). The same holds for repeating words on command (16, 17, 35). Such patients show a verbal derailment within the sphere, for example, instead of repeating "cigar," they say "smoke." Schilder and others have pointed out that misrecognition within the right sphere may also occur in visual disturbances and alexia. The patient calls a violin a "trumpet," or a vase "flowers," etc. In reading, he may misread red for "green," peach for "apple," or Italy for "England." Such findings may be multiplied from the work by Goldstein (12), Lotmar (16, 17), and Conrad (8, 9). The various authors on this subject share the conclusion that such changes of language function in aphasia are due to an abnormally early arrest of the unfolding thought and speech process which ordinarily goes through definite stages. The arrest at an early stage of this "microgenetic" development is characterized as being confined to a still undifferentiated thought formation, a "pre-Gestalt." This corresponds to a sphere of meaning beyond which the normal thought process usually continues, eventually to reach a definite structure and specific goal object. Similar disturbances are reported in such patients with regard to the body schema when they confuse left and right or other parts of their bodies, when asked to point to the named part.

A further frequent observation on aphasics, during recovery, is of special interest. It is the tendency to say words of opposite meaning than intended, i.e. erring within the correct sphere by "confusing" the directions. They say "yes" for no, "up" for down, etc. William Stern (27) has reported equivalent observations on young children who verbally confuse hot and cold, dress and undress, up and down, in and out, tomorrow and yesterday. Stern as well as Goldstein hold that these confusions occur particularly with words that have a directional meaning within the same sphere of experience and are used to express deviations towards the extremes of its dimension. When this sphere lacks differentiation, as in pathology or immaturity, a word that fits the sphere is used, but it may be the wrong word because the directions also lack clarity. Freud (11) too recognized this problem when he discussed Karl Abel's theories of the "antithetical sense of primal words," and related this to the archaic language of dreams which "show a special tendency to reduce two opposites to a unity or to represent them as one thing."

The evidence for the operation of meaning spheres thus far considered derives from two sources: the first from experimental observations and the work in the area of microgenesis; the second from brain pathology and certain primitive thought forms. All this has in common a developmental orientation, either with regard to ontogenesis or to the actual genesis of ongoing thought and verbal activity in

the adult. The evidence suggests that in the normal individual certain meaning spheres develop and that they are usually first aroused in remembering, recognition, and the ongoing direction of thought. This hypothesis may also be linked to the theory of trace systems in Gestalt psychology, according to which an individual memory trace becomes available when the trace system of which it is a part is first aroused. It is conceivable that certain trace systems correspond to experiential spheres of meaning. From this position it would follow that if such a system disintegrates in pathology, or has not yet reached an articulated structure, as in immaturity, a "pastpointing" within the sphere occurs and the direction of thought is derailed or aborted.

FUSION AND SYNCRETISM OF SPHERES

Thinking disorder in schizophrenia is often ascribed to a disturbance in conceptual reasoning, whether this be explained by impaired abstraction or other factors. A host of terms has been coined for the resulting behavior, e.g. overinclusion, lack of adequate boundaries, paleologic thought, interpenetration of themes, etc. A common denominator for these terms may be found in the consensus that the schizophrenic cannot separate his main thought direction as "figure" from the background of all the concomitantly arising zones of ideas. While normally such meaning spheres are held in check, they now penetrate the foreground of current thought formulation. Owing to the lack of conceptual control, spheres of meaning gain abnormal preponderance and tend to coalesce in the patient's experience. This fusion and confusion can occur in two ways: (a) either personally determined meaning spheres intrude into the task orientation, or (b) environmental spheres intrude into it.

(a) A patient, preoccupied with fantasies of being an engineer, completes the statement, "My hair is brown because . . . it is a sort of hydraulic evering (*sic*)."
Another patient utters at inappropriate times, "This is plain as air," which turns out to mean "airplane" (he was a former pilot). A female patient, fearful of pregnancy, asks whether she can divide up test blocks "according to the children that are in the world already."
(b) The intrusion of the environmental spheres is obvious in the behavior on the Vigotsky Sorting Test when the patient says, "You've got red blood in your arms. That's got something to do with that" — a red block. Refusing to put identically-shaped white blocks with yellow ones, a patient states, "No Chinese are working in the hospital with white people." Or another patient says, "I've got to pick it out of the whole room, I can't confine it to this game."

This blending of spheres of meaning, which evidently are not genuine concepts, is described even by one of the foremost critics of

the assumed abstract impairment in schizophrenics as "a fundamental disorder of concept-formation, in which the function may be considered either as arrested at an intermediate stage before it can be completed or as reduced through disintegration to a simpler level of pre-logical reasoning" (5, p. 18).

In magical beliefs and thought, a "syncretic" unity within a meaning sphere or among spheres is prevalent. This happens when (a) a part of a sphere is experienced as identical with the whole; or (b) two spheres of meaning are apprehended as having identical influence.

Werner (34, pp. 337ff.) described such types of magic in children and preliterate. That this also holds for experiences of modern adults is illustrated by the following: (a) Wendell Johnson (15a, pp. 262 ff.) reports that when subjects are asked to pierce the eyes on photographs of faces, they do so, but balk when the picture of their mother appears. Even though the eye is only part of the photographed face, they feel that this will hurt their mother. Correspondingly, many people refuse to wear the clothes of a close person who has just died. (b) A success or failure experience in one sphere may be felt to be identical to that in another sphere. If X can hit a tree with a rock three times in a row, he feels sure of passing his exam tomorrow. Many children go through the phase of "If you step on a crack, you'll break your mother's back". Again it should be stressed that the symbolization here involved is not conceptual abstraction.

In this connection one may also point to the role of imagery in the subjective representation of spheres of meaning. This aspect has hitherto been chiefly studied in dream analysis and in psychopathology, but needs further investigation.

OVERLAP AND SHIFT BETWEEN SPHERES

In the normal individual the co-arousal of different spheres of meaning may also occur, but, because of reasoning control it takes on a different quality in experience. The person is conscious of the different meaning of the spheres, and can separate and compare them. This constitutes a precondition for the cognitive process in humor—which is often reduced in schizophrenics. Humor may be considered to be the unexpected discovery that two spheres of meaning partially overlap and share the same crucial content.

This is actually the meaning of "double meaning" in one kind of humor, as for example: after addressing a woman's club, a lecturer is asked by one of the ladies, "Do you believe in clubs for women?" to which he replies, "Yes, if all other means of persuasion fail." The meaning sphere of "beating a woman" shares the statement "clubs for women" with the meaning sphere "social activities are good for women." This overlap is experienced as a surprise conflict. And what overlaps and conflicts here in consciousness are not formal concepts but commonly experienced situational spheres of meaning of everyday life. Cartoon humor often fits

the same principle, for example, the Charles Addams cartoon of a mortuary window with the sign, "We Give Green Stamps." The conflict is obvious, and there is of course the overlap between the meaning sphere of "attracting customers for the purchase of groceries or gas by giving green stamps," and the other sphere of "funeral parlor attracting customers by offering in effect a prize for corpses, also giving green stamps." The flavor of normal business promotion in the first case and of bad taste with sinister overtones in the second case adds to the character of the sphere of meaning in both instances.

Lacking the element of conflict, similar experiences of shift from one meaning sphere to another occur in problem-solving activity, e.g. discovering that an item first given in one sphere (scissors for cutting) may also function in another sphere of meaning (scissors as weight for plumb line).

Such reorganizational shifts are also analyzed within social meaning spheres by Wertheimer (37). E.g., two boys are playing badminton. The older wins so consistently that the younger, less-skilled boy refuses to continue the game as a constant loser. How can the game continue and the smaller boy agree to go on? The shift: they can play if they both try to keep the bird up in the air as long as they can. The change from a competitive to a cooperative goal occurs within the meaning sphere of having fun, was not arrived at by discursive reasoning with abstract concepts.

SUMMARY

The presented analysis deals with different experiential and cognitive modes, from perception to abstract thinking, in a genetic approach. This approach introduces certain stages such as "perceptual schematism" and especially "sphere of meaning." The latter construct was postulated as a necessary, intermediate stage in the course of developing perceptual recognition, verbal thought, and abstraction. The usefulness of this construct is illustrated by showing that it may offer a unifying principle of explanation for a variety of experiential and behavioral data in normal and abnormal thinking.

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