

psychological processes in cognition and personality

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PSYCHOLOGICAL PROCESSES IN COGNITION AND PERSONALITY

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HEMISPHERE PUBLISHING CORPORATION
Washington New York London

DISTRIBUTION OUTSIDE THE UNITED STATES
McGRAW-HILL INTERNATIONAL BOOK COMPANY
Auckland Bogotá Guatemala Hamburg
Johannesburg Lisbon London Madrid Mexico
Montreal New Delhi Panama Paris San Juan
São Paulo Singapore Sydney Tokyo Toronto

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1 2 3 4 5 6 7 8 9 0 EBEB 8 9 8 7 6 5 4 3

This book was set in Press Roman by Hemisphere Publishing Corporation. The editors were Valerie M. Ziobro, Brenda Munz Brienza, and Janet Mais; the production supervisor was Miriam Gonzalez; and the typesetter was Peggy M. Rote.
Edwards Brothers, Inc., was printer and binder.

Library of Congress Cataloging in Publication Data
Main entry under title:

Psychological processes in cognition and personality.

(The Series in clinical and community psychology)
Bibliography: p.
Includes index.
1. Personality and cognition—Addresses, essays, lectures. I. Fröhlich, Werner D., date
II. Series. [DNLM: 1. Cognition—Congresses. 2. Concept formation—Congresses. 3. Perception—Congresses. 4. Personality—Congresses. BF 311 P974]
BF698.9.C63P75 1983 150 82-21230
ISBN 0-89116-243-7
ISSN 0146-0846

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Foreword

This volume is a welcome and valuable contribution to the literature for a number of reasons. With the exception of Juris Draguns and his coworkers, activity within the framework of microgenesis has been almost exclusively European in origin, and the dialogue with the international community has been limited. The present volume makes available a comprehensive view of the many facets of this approach and identifies the extensive primary literature.

The opportunities for integration among diverse approaches increase as psychology matures. Historically, the subject matter of microgenesis has been of concern to investigators of sensory and perceptual phenomena, albeit at a different level of conceptualization. Identification of the contribution of the initial events in the visual system was the objective of the early career research of Nobel laureate H. K. Hartline. His classical studies of the primitive eye of the horseshoe crab have provided a valuable framework for understanding the sensory and perceptual events associated with activity during the first fraction of a second after light strikes the retina. Because the subject matter of microgenesis overlaps in time with these processes, our ultimate understanding of the role of sensory, perceptual, and cognitive variables must be based on consideration of all of these factors and mechanisms. The geographic and conceptual isolation of researchers in these fields has hindered the necessary interchange of ideas.

The potential for a fruitful multidisciplinary approach to the temporal development of perception is by no means limited to the initial events in the visual process. By using the powerful analytical tool of Fourier analysis, our understanding of the sensory basis for recognition of complex objects has been significantly advanced. With this technique, it is possible to specify the spatial frequency components of the visual stimulus subserving complex perceptual events and to relate these to psychophysical and neurological mechanisms. Identification and experimental manipulation of the optical components of complex stimuli provides a new and exciting procedure to analyze the mechanisms subserving object recognition as well as their temporal characteristics. The feasibility of meaningful investigations of individual differences in the ability to process such stimuli among normal observers as well as individuals with neurological deficits has been established.

Whether we prefer to identify our primary interest as sensory physiology, perception, information processing, cognition, or microgenesis, we are all interested in understanding the same phenomena. There is much that we can learn from one another. The present volume should serve to overcome one of the barriers to mutual effort and cooperation.

Herschel W. Leibowitz

Preface

Process-oriented approaches to psychology have proliferated over the last few decades. This book takes stock of the variety of conceptualizations and methods applied to the study of perceptual and cognitive processes as these unfold over time, the duration of which may sometimes not exceed even a fraction of one second.

The tradition of such investigation can be traced to the late 1920s, when Gemelli in Italy, Sander in Germany, and Werner in Germany and the United States published investigations of the perceptual process under the names of *microgenesis* and *Aktualgenese*. These studies were devoted to processes of percept formation in various contexts. More recently, in Sweden and Norway, these approaches were continued under the name of *percept-genetic approaches to personality*. For a long time, however, these approaches remained on the fringes of conceptual and empirical effort in the mainstream of modern psychology. The recent upsurge of interest in information processing holds promise of changing this situation.

With this hope in mind, the contributions of 19 authors have been brought together. They provide in our view a realistic and manifold cross section in content and format of currently pursued process-oriented research, not only in perception and cognition, but in a number of domains of psychology. Some of the investigators are steeped in the traditions of microgenetic investigation at its conceptual and methodological sources; others have found their way to this topic from a variety of practical concerns or proceeding from a comprehensive theoretical formulation. The aim of some writers is, therefore, the integration of perceptual responses unfolding over time with the indicators and formulations of psychophysiology. Others have applied themselves to the task of relating such responses to personality, of finding clues in them of incipient or actual personality disturbance, and of detecting commonalities between such response sequences and more global domains of individual functioning. Points of contact with, and limitations of, information theory in relation to these temporal phenomena have been established, and new tailor-made approaches have been sought to provide statistical methods for process analyses applied to the phenomena in question.

The contributors to this volume come from nine countries and represent a variety of specializations in psychology: general experimental, physiological, personality, developmental, and clinical. They were brought together under the auspices of Stiftung Volkswagenwerk at a conference at the University of Mainz (Federal Republic of Germany) in June 1977. This meeting was the first international conference concerned with the development of percepts and concepts over time. The contributions assembled in this volume represent the expanded and revised versions of their papers. The conference was made possible by a grant from the Volkswagenstiftung (Volkswagen Foundation). We, the editors, express our

sincere appreciation for this generous support and for the support of the Friends of the University of Mainz (Freunde der Universität Mainz), which was used for retyping of the revised chapter manuscripts. The participation of the third editor (J.G.D.) in the planning of this Conference was facilitated by a fellowship from the German Academic Exchange Service (Deutscher Akademischer Austauschdienst); this support is gratefully acknowledged.

It is hoped that this book will be useful as an introduction to current work in this area and that it may contribute toward integration of all of these approaches into the mainstream of the international psychology of the late 20th century.

Werner D. Froehlich
Gudmund Smith
Juris G. Draguns
Uwe Hentschel

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I

AIMS AND METHODS OF PROCESS-RELATED APPROACHES

1

Microgenesis by Any Other Name . . .

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Contemporary observers of microgenetic research are confronted with a paradox. On the one hand, there are a limited number of research centers, notably at the universities of Lund, Mainz, and Oslo, at which microgenesis is being systematically and continuously investigated, in addition to a great many more episodic and scattered efforts taking place elsewhere.[1] On the other hand, there has been a general flowering of process-oriented research related to perception, cognition, motivation, and personality. The growth of such research has been variously sparked by the increased interest in mediational activity, the rising prominence of information processing as a field of investigation, the ever greater acceptance of cognitive conceptualizations in psychology, and the general shift in emphasis from the products to the processes of behavior. While differing in their conceptual antecedents and in their theoretical and empirical objectives, these approaches (e.g., Erdelyi, 1974; Haber, 1969; Kreitler & Kreitler, 1972, 1976) are broadly concerned with events that transpire between the presentation of a stimulus and the formation of a stabilized response to it and are, as such, germane to microgenesis in the classical sense of the term (Sander, 1928).

My objective in this chapter is to relate to microgenesis the methods and results of a host of process-oriented investigators, some of whom may not have heard of the word and may not care to be identified with the concept. The result of this venture may be integration of microgenesis into the mainstream of the psychological literature, a development whose time has come.

Lest important distinctions be blurred, microgenesis has, first of all, to be distinguished from a variety of other related process-oriented approaches. What

[1] A considerable amount of microgenetic research has been conducted over several decades in the Soviet Union. It goes back to the pioneering efforts of Lange (1892), who formulated a "law of perception" according to which all percepts traverse a series of qualitatively different and ever more definite stages of consciousness. The more recent work extends over a variety of basic and applied areas. This is not the place to provide a systematic review of this literature. A number of Soviet studies are included in the text of the chapter as they relate to specific points raised. The author is greatly indebted to Dr. Talis Bachmann of the Tartu State University Psychology Department for calling his attention to this research and for making many of these studies available to him.

are the essential features of microgenesis? Contrary to what the term implies,[2] the scope of microgenesis need not be restricted to fleeting and subtle events that unfold over brief periods of time. The essential hallmark of microgenesis is a sequence of directly observable events between the presentation of a stimulus and the formation of a stable response (Flavell & Draguns, 1957; Froehlich, 1964; Graumann, 1959b; Sander, 1928). To elaborate, microgenesis is a series of experiences that, as the accumulated empirical research shows, proceed discontinuously and in a succession of readily discernible stages. As such, it stands in contrast to other developmental progressions, notably ontogenesis and phylogenesis, that permit the influence of developmental processes over days, months, years, decades, centuries, or millennia but do not allow one to capture development in process. Similarly, microgenesis differs from a variety of information-processing (Haber, 1969) and cognitive (Neisser, 1967) approaches that are concerned with the process of perception or cognition but conceptualize it in terms of a variety of mediational activities. These activities can lend themselves to a variety of explanatory, predictive, and model-building uses; yet they are distinct from the observable phenomena that occur in microgenesis.

What is fundamental to microgenesis is a process of search that is triggered by the discrepancy between the information inherent in the stimulus and the activity, task, or solution demanded of the observer. Microgenesis, then, is necessarily a heuristic activity (Linschoten, 1959) that is triggered by the demand or challenge of going beyond the information given (Bruner, 1957) or of completing the incomplete (Arnheim, 1969). These operations typically require time and provide the opportunity for observing the alternation of stages in the formation of a percept, the attainment of a solution, or the development of a stabilized, automatized response. Thus microgenesis cuts across the domains of functioning into which psychology is so neatly divided—perception, cognition, motivation, and the rest—and may last from seconds to days, or longer, provided that it unfolds in observable time.

Much of the empirical and conceptual effort in the past was directed toward identifying parallels between microgenetic and other developmental sequences, especially ontogenesis. This chapter is written with the objective of sparking and stimulating a comparable research undertaking toward relating microgenetic and other process-related approaches that pertain roughly to the same time spans but differ in their observational versus inferential quality. At the end of the trail, one could envisage the integration of these different, yet complementary, ways of investigating psychological processes.

That this is not an idle dream is attested by Erdelyi's (1947) novel integration of microgenetic, perceptual-defense, and information-processing findings in a reformulation of response processes to anxiety-arousing and threatening, yet not optimally distinct, stimuli. On a more general scale, the Estonian psychologist Bachmann (1977) explicitly drew on microgenetic data and formulations in arriving at a model of the interacting attentional, mnemonic, informational, and other determinants of a perceptual act. Of particular interest, from the micro-

[2] It is evident by this time that *microgenesis* as a term has misleading connotations, as pointed out by Graumann (1959b); because it has sunk roots in English-language usage, however, it is now difficult to replace. In this chapter, it is used as a semantic equivalent of *Aktualgenese* in German and does not imply the adoption of a specific theoretical model or of an explicit stand on the issue of macro–micro correspondence.

genetic point of view, is the overlapping nature of sensory analysis, sensory-objective synthesis, concrete-image formation, and abstract image in Bachmann's model of perception over time.

APPROACHES TO THE STUDY OF MICROGENESIS

To facilitate such integration, it may be useful to introduce and categorize the major approaches to the study of microgenesis. Although a multitude of methods for the study of microgenesis have been developed (see Böhm, 1959; Flavell & Draguns, 1957; Graumann, 1959b for reviews), they fall roughly into three broad categories. The first of these, on which the bulk of explicitly microgenetic research, both classical and modern, is based, involves progressions of stimuli from maximal or pronounced information deprivation to the presentation of adequate or optimal amounts of information for the response or decision at hand. To this end, the normally continuous process of microgenesis is fractionated into a limited number of discrete presentations of gradually increasing information input. Presentation of a stimulus tachistoscopically, at gradually increasing exposures, is probably the most prominent technique of this type, although a host of others have been developed. Their common denominator is the progressive introduction of information that, in the optimal case of everyday confrontation with objects of our experience, is instantaneously available.

Related to this format, yet different from it, is the approach of facilitating an observable microgenetic progression by means of the repeated presentation of the.same stimulus; the subject attains recognition here not by dint of increasing information inputs but by extracting ever more information from the suboptimally clear or intense stimuli. This mode of stimulus presentation is more closely associated in the literature with the topic of perceptual learning (e.g., Dodwell, 1971; Hershenson & Haber, 1965; Sperling, 1960) than with microgenesis. It confronts the experimenter with the problem of establishing a subtle imbalance between the information given and the task at hand. If the gap between them is too wide, no progress toward recognition occurs. If it is too narrow, recognition is instantaneous, and the opportunity for observing microgenesis is lost.

The last approach depends on the naturalistic observation of perceptual or cognitive acts in process. It is closest to the phenomenon of microgenesis as it occurs in a variety of real-life situations, yet it is the approach that poses the greatest difficulties of operationalization. The problem is one of capturing our perceptual and cognitive processes as we are confronted with a variety of sensorily impoverished, cognitively complex, or intellectually taxing stimuli. This problem is but a special case of making our covert operations overt, of externalizing our internal processes. Even if the historically important taboos against introspection are dropped, and there are signs that this is indeed happening (see Mahoney, 1974; Radford, 1974), two problems remain: (a) verbal report and subjective experience do not correspond, and (b) putting one's thoughts into words affects the progress of the task at hand in a variety of ways. These difficulties are exacerbated as these tasks become cognitively more challenging, personally more meaningful, and affectively more involving.

The scope of situations to which the concept of microgenesis can be legitimately applied is wide but not unlimited. Its outside edge is reached as we come

to developmental progressions that unfold beyond one specific span of experienced time. Microgenesis, to hark back to the term by which it is known in German, is *actual genesis*—a progression that is observable from start to finish. Perhaps we need an additional term, not yet invented, for other temporally extended and segmented progressions that are not ontogenetic yet transcend the confines of a discrete and observable time span. Various slow processes of self-realization and self-knowledge, spontaneous or facilitated by psychotherapy or psychoanalysis, come to mind in this connection.

It is obvious that there is a vast range of varied microgenetic phenomena. There are also characteristic courses microgenesis can take and certain techniques for triggering it. In broadest terms, microgenesis can begin with a whole or a part. In the former case, an entire stimulus is presented, however impoverished, distorted, or obstructed it may be. In the latter instance, fragments are shown in an ever-increasing number. Werner's (1948, 1956, 1957) application of the orthogenetic principle to microgenesis is primarily derived from observations of the first variety; as in other developmental sequences, the stages of diffusion and fragmentation are traversed, only to give way to integration. By contrast, Sander (1928) proposed another succession of stages from simple reproduction of discrete detail, through confusion upon accumulation of discrepant and incongruous detail, to the formation of a preliminary gestalt and, finally, of a stabilized and complete image. These two formulations are different but not necessarily incompatible; they rest in two distinct ways of gradually introducing the stimulus.

Yet, the problem is more complicated than that. Recent microgenetic research (e.g., Lastowski, 1976; Lesswing, 1973) highlights the difficulty of eliciting diffuse whole responses at the beginning of microgenesis, even by the classical techniques of tachistoscopically presenting the complete stimulus. Individual differences come into play, perhaps akin to the cognitive style of field dependence-field independence, although empirical attempts to link established measures of this variable with characteristic modes of microgenetic progression have, so far, failed to yield conclusive results (e.g., Schiller, 1970). Apart from such enduring stylistic and other personality variables, situationally determined sets, explicitly communicated through experimental instructions or implicitly assumed by the subject, undoubtedly come into play (see Marks, 1967, 1968, for demonstrations of such effects on other aspects of microgenesis). Extricating these three strands of stimulus, person, and task characteristics as they steer the course of microgenesis toward the apprehension of the whole or the accumulation of detail remains an important task for future microgenetic research. Pending the resolution of this problem, we are faced with three types of microgenesis, each of them potentially divisible into two successions of different stages.

CONVERGENCES WITH OTHER DOMAINS OF PSYCHOLOGY

Scanning contemporary and recent approaches to psychology reveals many that are related to these three process-oriented approaches; of particular interest are studies undertaken outside of the specific domain of microgenesis. Global acts of readaptation provide maximal contrast with the traditional microgenetic approaches. Such macroscopic acts can be observed in the traditional visual inversion experiments that produce temporary disorientation and gradual adaptation to the

new version of the visual world. The process of this transformation is well worth studying. Cegalis (1971) in his doctoral dissertation has brought the lens-inversion method into direct contact with microgenesis as experienced in more miniature situations and has continued research along these lines (Cegalis, 1973; Cegalis & Leen, 1977; Cegalis & Murdza, 1976; Cegalis & Young, 1974). The parallels between microgenesis and this adapting to what is first experienced as distortion and incongruity and ends up being accepted as the "natural order of things" may potentially be uncovered.

An even more dramatic adaptive challenge is associated with the postoperative recovery of sight and the gradual process of learning to make sense of and realistically apprehend a variety of stimuli. What in a normal adult results in an experience of instantaneous identification of stimuli engenders a laborious, protracted search in the newly sighted. In the famous monograph by von Senden (1960), the features of these microgenetic sequences are faintly discernible. It is not easy to derive general conclusions from a collection of case reports spanning many centuries and originating in a variety of countries. Even though von Senden's outspokenly empiricist conclusions from this compilation of evidence have been challenged (see Banissoni & Ponzo, 1968), it is evident that a newly sighted person emerges from blindness to a phenomenal world of confusion, conflict, misperception, and illusion, a world in which identification and recognition are achieved, but only by dint of effort and time.

A special and fascinating instance of real-life microgenesis is provided in a situation characterized not by deficit but by talent. Artistic and scientific creation requires time, is marked by false starts and abrupt changes in direction, is accompanied by emotional states from euphoria to dejection, and is potentially divisible into stages and phases. It is remarkable that, for all the upsurge of research in creativity, the process aspect of artistic and scientific production remains to this day neglected. Csikszentmihalyi and Getzels (1971) have had the rare opportunity of conducting a systematic study while "looking over the shoulders" of artists in the actual process of artistic creation; they distinguished several types of this observable sequence and related them to characteristics of the artists and of their products. Vicariously, Arnheim (1962) addressed himself to the same task within the confines of a single major artistic creation; he had access to Picasso's sketches and notebooks for the definitive version of Guernica. On the basis of these materials, he reconstructed the genesis of this masterpiece. It is interesting that Arnheim made explicit use of microgenetic literature in this task. The old collection of reconstructions of instances of scientific and mathematical creativity by Hadamard (1945) contains references to different stages of creative process, and some of their categorizations are not unlike the *P* phases observed in a variety of microgenetic experiments by the University of Lund investigators (Kragh & Smith, 1970). Cooperation between scientific and artistic creators and the investigators of this creation in process would seem a fruitful avenue of study worthy of systematic and vigorous pursuit.

But whereas only few people contribute innovatively or productively to science or the arts, all of us are involved in making unique and novel decisions in the course of our lives. These are decisions for which we have no precedent and that often involve emotional participation, vacillation, provisional commitment akin to *Vorgestalten* (Flavell & Draguns, 1957; Sander, 1928/1962), and marked reduction in a subjective sense of imbalance and tension once the judgment has been arrived