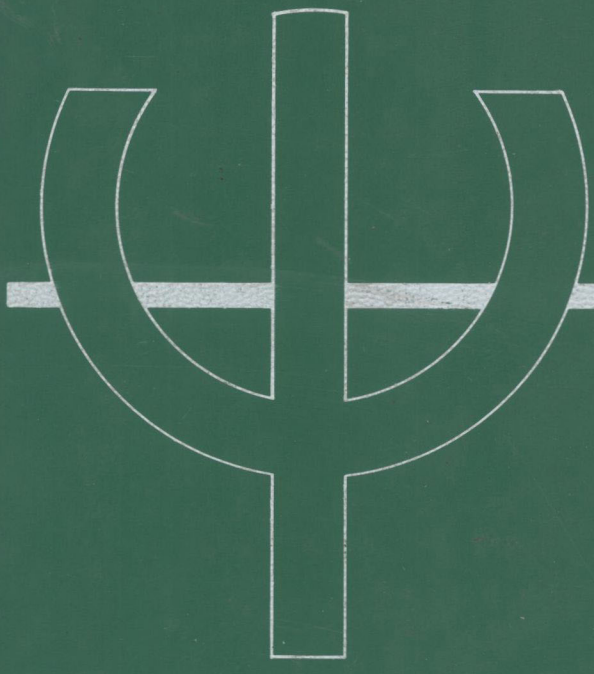

ADVANCES IN PSYCHOLOGY

6

from Associations to Structure

Kellogg V. Wilson

NORTH-HOLLAND

FROM ASSOCIATIONS TO STRUCTURE
The Course of Cognition

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Editors

G. E. STELMACH

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PREFACE

This book is the product of a series of shifts in my theoretical orientation which have gone back over a period of years. I was well acquainted with Hullian learning theory and with D.O. Hebb's *The Organization of Behavior*. (Hebb, 1949) from my undergraduate and Masters work at the University of Nebraska with W.J. Arnold. I also acquired an interest in language while there. All of these interests were continued during my Ph.D. work at the University of Illinois with C.E. Osgood. After receiving my Ph.D., I was convinced that my views on language and cognition were as advanced and sophisticated as possible, but that opinion was shattered by my experiences with George A. Miller and, particularly, Noam Chomsky at a summer seminar held at Stanford University under the sponsorship of the Social Science Research Council. After that, I held a confused mixture of behavioristic and structuralist views which I appreciated were contradictory, despite the efforts of Dan Berlyne (1965) to reconcile the two positions. I appreciated the brilliance of Chomsky to the point of a near-blind faith and still regard his work on the relations of classes of formal grammars to automata (Chomsky, 1963) to be of considerable importance. However, I began to doubt his infallibility as a "philosopher of mind" with the publication of *Cartesian Linguistics* (Chomsky, 1966) and *Language and Mind* (Chomsky, 1968). I began to seriously question the adequacy of the Chomskian rejection of associationistic models after noticing the apparently associationistic character of the early proposals for semantic networks in computational linguistics (Wilson, 1972). As a result of that, about ten years ago I began a paper, which is now Chapter V of this book, and also began writing a series of additional papers which eventually became the core of this book. The net result of all this inquiry was to return me to a position not vastly different from the views I held at the time I received my Ph.D., although I now think they have been developed in a considerably more sophisticated form.

The title of this book very probably originated in an unconscious plagarism of the title of a paper by Mandler (1962). It is such an appropriate title that I hated to give it up and I am grateful to Dr. Mandler for his permission to use it. This book is intended primarily as a statement of a theoretical position. However, it could be used as a text in a course on cognition provided that the instructor was willing to accept, or at least tolerate, the rather obvious theoretical "bias". The subtitle has a quite intentional double meaning.

I would like to thank the following for their helpful correspondence regarding drafts of earlier portions of this book.

Robert Abelson, the late Daniel Berlyne, Charles Brainerd, John Holland, Charles Osgood, Allan Paivio, Zenon Pylyshyn, Roger Schank

I would also like to thank the following colleagues at the University of Alberta for their comments and suggestions.

Charles Beck, Ed Cornell, Bruce Derwing, Don Kuiken, Arnold Powell, William Rozeboom, Jeff Sampson, Len Schubert

This book was almost entirely composed at computer terminals which induces a rather different approach to writing. Rather than finishing a section before proceeding, it is tempting to write some sections in incomplete form and insert new material later. For this reason, Chapters IX and XI (among others) expanded considerably beyond their original lengths. The advantages of ease of revision and addition are somewhat counterbalanced by some difficulties in integrating new material with material which had been written previously. I hope that I have been careful enough in reviewing the manuscript to have created the illusion of continuity of production.

This book was produced by an APS-5 photo typesetter which was controlled by a magnetic tape produced by the Textform program run by the University of Alberta Computing Center. Since this is a relatively novel way of producing a book, there have been a large number of minor technical difficulties encountered along the way. I particularly want to thank Dave Holberton and Debbie Reinhart for their assistance in doing what I was not competent to do.

I also want to thank Sandra Wilkins and, especially, my wife, Katherine Wilson, for their many hours of proof reading the earlier drafts.

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Introduction

Over the past two decades, the behavioristic and stimulus-response forms of theorizing have largely lost the dominant position they once had among experimental psychologists. There has been a good deal of concern with various cognitive phenomena, such as language, but there is no general theory of cognition. Insofar as there is a theoretical orientation, it is more or less structural and it is concerned with the kinds of internal processes which behaviorists neglected as a matter of policy. The more extreme forms of behaviorism, such of that of Skinner, deserve much of the criticism which they have received, but the more extreme forms of structural theories have their own severe limitations. The positive thesis of this book is that a form of associationism, less extreme than behaviorism, is in agreement with the available empirical evidence and can be supported as adequate in principle by theoretical arguments. The negative thesis is that the more extreme structural theories have virtually no empirical support and have severe theoretical problems in accounting for how the very abstract "structures" (which are thought to control mental processes) are created. The title summarizes that central thesis - namely, that the structure of human cognition is developed from associations. This book is a general treatment of cognitive phenomena from an associationistic perspective and attempts to integrate cognition into broader psychological theory.

In the zeal accompanying the new cognitive paradigm, behaviorism and associationism have come to be equated by their mutual critics. Initially, Chomsky (1959) claimed that the principles of Skinner and other behaviorists were, in principle, inadequate to account for the structure of language. Later, Bever, Fodor and Garrett (1968) extended this critique to all forms of associationism. These critiques were highly oversimplified and neglected that there are varieties of associationistic thinking which do not suffer from the severe limitations of extreme behaviorism. Chapter I reviews a variety of associationistic and behavioristic positions held by past theorists and shows that only a small minority of associationistic positions are as limited as extreme behaviorism. Much of the rest of the book is devoted to updating the associationistic position, particularly in regard to the central role played by rules and propositions in cognition.

The concept of association used in this book is essentially that of Hebb (1949). The approach of this book is not behavioristic, in any strict sense, and, in particular, is quite distinct from the Skinnerian form of behaviorism. In addition to being based on Hebb, this book is, in a sense, a continuation of the cognitive learning theory of Tolman. Thus, rather than proposing yet another paradigm shift, an attempt is made to extend to current cognitive topics the somewhat neglected and unfairly discredited paradigm