Ouvrage collectif | 1994

Extract | Open Access

This file is a(n) Extract of:

The development of working memory

De Ribaupierre, Anik (ed.); Hitch, G.J. (ed.)

The Development of Working Memory

Edited by

Anik de Ribaupierre

University of Geneva, Switzerland

Graham J. Hitch

Lancaster University, UK

Contents

Preface

Working memory refers to the temporary storage of information that is being processed in a wide range of cognitive tasks. In this Special Issue we bring together research on the development of working memory that arises within two quite different approaches. The first is the neo-Piagetian perspective, which attempts to capitalise on the insights of Piaget's work by proposing information-processing accounts of cognitive development. A dominant theme in this approach is the claim that working memory limitations play an important role in the development of cognitive abilities (Case, 1985; Halford & Wilson, 1980; Pascual-Leone, 1970, 1987). The second approach stems from the study of working memory and information-processing in mainstream cognitive psychology. It uses such knowledge to guide and inform investigation of the development of working memory in children (Baddeley, 1986; Hitch & Halliday, 1983; Hulme, Thompson, Muir, & Lawrence, 1984).

Despite their obvious similarities, the two approaches have tended to remain rather separate. This first became apparent to us when we met at a symposium on the Development of Working Memory at the International Conference on Memory at Lancaster in 1991. The idea for a special issue of *International Journal of Behavioral Development* arose in the aftermath of a subsequent poster workshop on Developmental Aspects of Working Memory at the Fifth European Conference on Developmental Psychology at Seville in 1992. The aim of the workshop was to bring together researchers using the two approaches in order to promote the exchange of ideas, methods, and data, and to explore conflicts and agreements. This Special Issue is intended to serve a similar purpose in the context of a much wider audience.

Neo-Piagetian researchers have tended to conceptualise working memory as a set of central limited capacity resources which exert a general constraint on cognitive processes. Accordingly, a major goal of neo-Piagetian research has been to develop techniques for measuring the capacity of working memory and to chart its development. The papers by Alp; de Ribaupierre and Bailleux; Morra; Pascual-Leone and Baillargeon, illustrate different facets of this approach. In contrast, research on adult

working memory has emphasised the fractionation of its resources, with evidence suggesting in particular the need to distinguish relatively peripheral phonological and visuo-spatial subsystems from central resources (Baddeley, 1986). Because these subsystems are currently better understood than the central component of adult working memory, they have tended to be the focus of related developmental studies. This tendency is illustrated here in the papers on visuo-spatial working memory (Longoni & Scalisi; Walker, Hitch, Doyle, & Porter) and phonological working memory (Henry). Seen this way, the complementarity of the two approaches is fairly obvious: One has tended to emphasise central aspects of working memory, the other more peripheral aspects. Clearly, however, both are likely to be relevant. This is illustrated here in the paper by de Ribaupierre and Bailleux, which suggests the importance of taking peripheral resources into account in the assessment of central working memory capacity. A further significant strand of research in both approaches, is to investigate links between the development of working memory and various aspects of cognitive development. If knowledge about the development of working memory has any utility, it should inform our understanding of developmental changes in a broad range of cognitive activities. This type of work is illustrated here in the case of the specific cognitive abilities of language acquisition (Blake, Austin, Cannon, Lisus, & Vaughan) and reading (Siegel).

We must emphasise, especially to readers unfamiliar with the field, that we have not attempted to collect a set of papers which gives a representative overview of all the many current approaches to the development of working memory. A call for papers was sent out in the fall of 1992. Among the criteria for inclusion in the issue were that individual papers should address developmental aspects of working memory and that the collection should represent a balanced coverage of topics, ages, and methods. The result is an impressive set of nine papers. We regret, however, not to have more papers on life-span issues, considering the editorial objectives of the *International Journal of Behavioral Development*, and, more importantly, the striking similarities in concepts between work conducted on childhood and on older adults. This is simply a consequence of not having actively solicited papers, but having used a "bottom-up" approach. Nor have we deliberately sought papers that integrate or contrast competing approaches. There are, for example, major questions being raised about the assumption that working memory is important in cognitive development (Brainerd & Reyna, 1993; Halford, 1993). However, we hope that by placing side-by-side a selection of papers approaching the topic from the neo-Piagetian and experimentalist perspectives, we can illustrate the vigour of current research on the development of working memory, the kind of progress that is being made, and the broad range of problems presently being tackled.

We wish to express our thanks to Linda Siegel, Editor of the *International Journal of Behavioral Development*, for giving us the opportunity to edit this issue. We also thank the reviewers, whose names will appear in a later issue. They provided prompt and very helpful expert reviews not only on first versions, but often on revisions.

Perhaps it is fitting to conclude on a more personal note. Coming from different trends of studies on working memory, acting as co-editors considerably fostered our understanding of the other's perspective. We hope that after having read the different papers, the reader will share our view that these two trends are indeed complementary rather than, as some would argue, incompatible.

September 1993
Graham J. Hitch
Lancaster University, UK
Anik de Ribaupierre
University of Geneva, Switzerland

REFERENCES

Baddeley, A.D. (1986). *Working memory*. Oxford: Clarendon Press.

Brainerd, C.J., & Reyna, V.F. (1993). Memory independence and memory interference in cognitive development. *Psychological Review, 100*, 42–67.

Case, R. (1985). *Intellectual development: Birth to adulthood*. New York: Academic Press.

Halford, G.S., & Wilson, W.H. (1980). A category theory approach to cognitive development. *Cognitive Psychology, 12*, 356–411.

Halford, G. (1993). *Children's understanding: The development of mental models*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Hitch, G.J., & Halliday, M.S. (1983). Working memory in children. *Philosophical Transactions of the Royal Society*, B302, 324–340.

Hulme, C., Thompson, N., Muir, C., & Lawrence, A. (1984). Speech rate and the development of short-term memory span. *Journal of Experimental Child Psychology, 39*, 241–253.

Pascual-Leone, J. (1970). A mathematical model for the transition rule in Piaget's developmental stages. *Acta Psychologica, 32*, 301–345.

Pascual-Leone, J. (1987). Organismic processes for neo-Piagetian theories: A dialectical causal account of cognitive development. *International Journal of Psychology, 22*, 531–570.