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WORKING MEMORY AND EXECUTIVE CONTROL: A FESTSCHRIFT FOR ANDRÉ VANDIERENDONCK

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Throughout his career, André Vandierendonck (PhD 1973, Ghent University) has been one of the most prominent scientific and institutional representatives of cognitive psychology in Belgium. André Vandierendonck became head of the Department of Experimental Psychology at Ghent University in 1995. At that time, the department consisted of two faculty members and a handful of scientific collaborators. Under the chairmanship of André Vandierendonck, it expanded exponentially after the introduction of a strong scientific research and publication tradition. Today, 15 years later, the same department counts nine faculty members and a scientific staff of nearly 60 people. Together, they produce a voluminous and high-quality body of scientific output addressing a wide range of topics in cognitive (neuro)psychology. Also at the European level, he has been active in the development and expansion of the field, as the president of European Society for Cognitive Psychology, as the editor of international journals and as one of the founders of the European Working Memory Symposia. This special issue is in celebration of André Vandierendonck's contributions to cognitive psychology.

During his own research career, André Vandierendonck was a pioneer in a variety of research areas in cognitive psychology. We have attempted to bring these research domains together in this Festschrift under the umbrella of *Working Memory and Executive Control*. We are honoured that such a highly distinguished, international set of prominent cognitive psychologists were willing to contribute to this Festschrift.

The Festschrift is organised according to André Vandierendonck's personal research history. His initial contributions from the late 1970s to the early 1990s were mainly focused on *categorisation*. This topic is represented in the first article by Yves Rosseel from Ghent University, who was also the first of more than 20 students to obtain a PhD under the supervision of André Vandierendonck, and who conducts research on categorization (Rosseel, 2002). In their contribution, Rosseel and De Schryver (this issue) present an

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experiment designed to compare a number of computational models of category learning, amongst which André's PRAS model (Vandierendonck, 1995). André Vandierendonck's second line of research on memory processes was mainly focused on the notion of schemata (Vandierendonck & Van Damme, 1988). In this special issue, the domain of memory is represented by Joachim Hoffmann (University of Würzburg) who presents an essay on the origin of memory, in which he argues that the contents of short-term memory are essentially traces left by actions performed on stimuli (Hoffmann, this issue).

By the mid 1990s, André Vandierendonck became increasingly interested in *human reasoning* (Vandierendonck & De Vooght, 1997; see also later, e.g., Duyck, Vandierendonck, & De Vooght, 2003). In this Festschrift, one of the pioneers of the field, Philip Johnson-Laird (Princeton University), provides support against the idea that human reasoning would depend on the processing of logical rules, and argues why reasoning is better understood as based on mental models (Johnson-Laird, this issue).

In the mid 1990s, André Vandierendonck also developed an interest for the cognitive function that turned out to be one of his principal areas of expertise, namely *working memory*. This work was mainly framed within the Baddeley and Hitch model (Baddeley, 1986; Baddeley & Hitch, 1974), one of the first and most influential models of working memory. In this Festschrift, Alan Baddeley (University of York) presents his newest insights in the Episodic Buffer (Baddeley, 2000), the fourth and most recently added subsystem of the multi-component working memory model (Baddeley, Allen, & Hitch, this issue). The Festschrift contains two more contributions from influential working memory theorists. One is from Randall Engle (Georgia Institute of Technology), who has greatly advanced working memory theory, mainly through the study of working memory capacity, using the individual differences approach (Engle, 2001). In this volume, he presents a critical review of those studies that propose that working memory capacity may be altered through training and practice (Shipstead, Redick, & Engle, this issue). The other influential theorist is Klaus Oberauer (University of Zurich), who does not adhere to the multi-component view of working memory, but instead defines the distinction between short-term, long-term and working memory in terms of different levels of activation and the involvement of attention (Oberauer, 2009). The topic he addresses in this Festschrift is the distinction between procedural and declarative working memory (Oberauer, this issue).

Other subdomains of working memory that André Vandierendonck continues to investigate to this day, are *verbal* working memory (Duyck, Szmalec, Kemps, & Vandierendonck, 2003; Szmalec, Duyck, Vandierendonck, Barberá Mata, & Page, 2009) and especially *visuospatial* working memory (Vandierendonck & Szmalec, in press). Visuospatial working memory is represented in this Festschrift by the world's authority in visuospatial

cognition, Robert Logie (University of Edinburgh), who has laid the empirical foundation for the distinction between spatial and visual working memory through numerous neuropsychological and behavioural studies (Logie, 1995). Here, he presents a thoughtful review of the literature on everyday multitasking, in which he elaborates on how multitasking in healthy adults relates to various aspects of memory, amongst which also verbal, visual and spatial working memory (Logie, Trawley, Nissan, & Law, this issue). A second representative of the visuospatial working memory domain is Cesare Cornoldi (University of Padova). He presents a study that demonstrates how blind people can develop spatial knowledge when they are guided by auditory cues (Corazzini, Tinti, Schmidt, Mirandola, & Cornoldi, this issue).

From the mid 1990s until today, André Vandierendonck has spent a majority of his investigation efforts to the study of *executive control*, which is also a subdomain of working memory. He took much inspiration from the controversy about the function of the Central Executive, as it was conceptualised within Baddeley's working memory model. Around the turn of 21st century, executive control was so poorly defined that it was sometimes compared to a homunculus or a rag-bag of ill-defined functions. André Vandierendonck focused on the nature of executive control (Szmalec, Vandierendonck, & Kemps, 2005; Vandierendonck, De Vooght, & Van der Goten, 1998a, 1998b) and on the involvement of executive control in daily activities such as *mental arithmetic* (De Rammelaere, Stuyven, & Vandierendonck, 2001; Deschuyteneer & Vandierendonck, 2005; Imbo & Vandierendonck, 2007). In this Festschrift, Patrick Lemaire (University of Provence) provides us with a nice review of the literature on executive control in arithmetic performance, with reference to the work of André Vandierendonck (Lemaire, this issue). The concept of executive control is further elaborated in this Festschrift by Pierre Barrouillet (University of Geneva), in collaboration with Valérie Camos (University of Burgundy). Pierre Barrouillet is the architect of the influential Time-Based Resource-Sharing (TBRS) model (Barrouillet, Bernardin, & Camos, 2004), which proposes that storage and processing in working memory share limited attentional resources and hence show a tradeoff. The model is time-based in the sense that the cognitive load of a particular process depends on how long this process captures the central attentional resources. In this special issue, Pierre Barrouillet relies on his TBRS model to frame the innovative but at the same time provocative hypothesis that executive control sub-serves both the storage and processing functions of working memory, hence abandoning all earlier fractionations of working memory (Barrouillet & Camos, this issue).

Finally, André Vandierendonck has also investigated the concept of executive control across the theoretical boundaries of the multicomponent working memory model (Szmalec, Verbruggen, Vandierendonck, & Kemps, in press;

Verbruggen, Logan, Liefooghe, & Vandierendonck, 2008). In the last years, he has particularly concentrated on *task-switching* and became a recognised international expert in the field in a relatively short period of time (Liefooghe, Demanet, & Vandierendonck, 2009; Vandierendonck, Liefooghe, & Verbruggen, in press). In the Festschrift, this line of research is represented by Iring Koch (RWTH Aachen University). He presents a study on the cognitive representation of task-sets in the task-switching paradigm (Philipp & Koch, this issue). The last article in this special issue is by Gordon Logan (Vanderbilt University), who is one of the leading scientists in the domain of attention and executive control (Logan, 2002). Gordon Logan presents two computational models aimed to compare between reconfiguration and compound-cue retrieval accounts of task-switching (Logan & Schneider, this issue). The model fits indicate that the task-switching data can be relatively well accounted for by compound-cue retrieval without reconfiguration.

With this Festschrift, we hope to have edited a special issue of *Psychologica Belgica* that not only reviews the literature on a wide variety of issues in working memory and executive control, but also one that presents a number of new insights and assumptions that will stimulate further debate and research. As such, we hope that the special issue not only honours André Vandierendonck's scientific past, but also that it will serve as a reference for the scientific future, because this would be the tribute that Andre Vandierendonck truly deserves.

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