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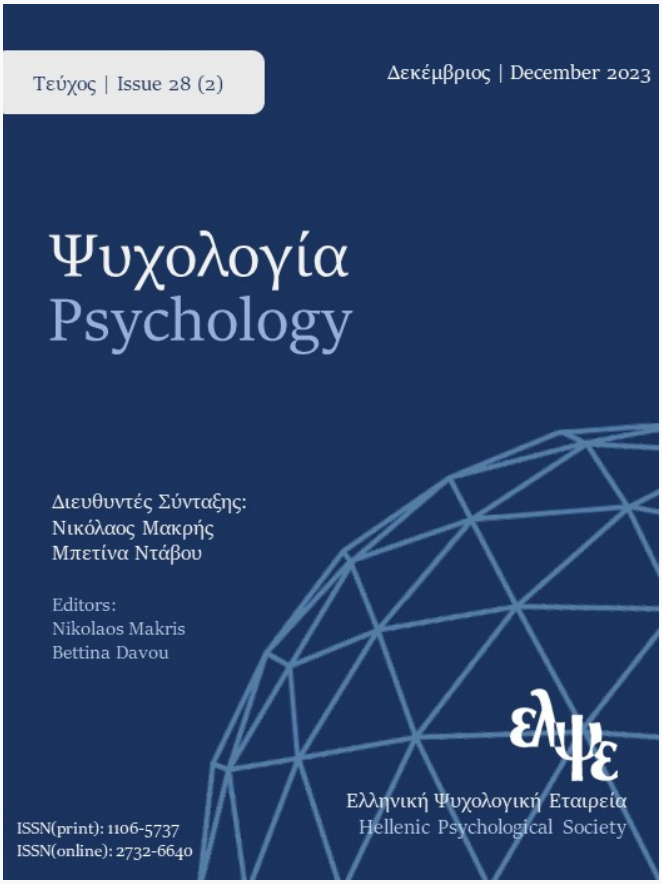

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Ελληνική Ψυχολογική Εταιρεία
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ΣΥΖΗΤΗΣΗ | DISCUSSION

From the human mind's powerful unconscious capacities to its digitally extended possibilities

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KEYWORDS

Unconscious processes, Human-internet interaction, Cognitive development, Metacognitive development, Theory of mind

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ABSTRACT

This commentary elaborates on the themes presented in this special issue, composed of four theoretical reviews and two empirical studies, that all show how much our understanding of cognition and metacognition has advanced during the last fourty years. From the inherent, both conscious and unconscious, capacities of the human mind to its digitally extended possibilities, as well as to the subtle mechanisms of cognitive and metacognitive development, the papers show how much cognitive research has moved on, from approaching the mind as a cognitive system analogous to a computer, which was the dominant perspective in the beginnings of Cognitive Psychology in the 1960s, to approaching the mind as a human function within a dynamic, multifaceted, demanding, and continuously changing sociocultural environment, above and beyond its component processes and the way they interrelate.

The papers presented in this special issue sample the significant theoretical and research advances in the psychological study of the mind, thought processes, and learning that have been taking place over the last four decades, both internationally and in Greece. From the almost banned use of the word "mind" in the context of the behaviourist approach of the early and mid-20th century, to the conception of the mind as a "pure" cognitive system in analogy to a computer system proposed by the cognitive revolution in the 1960s and 1970s (Bruner, 1990), present day Psychology, with the contribution of other disciplines, such as neuroscience, sociology, and cultural studies, is now attributing to the human mind the richness it deserves. This issue contains four theoretical reviews and two empirical studies that all demonstrate how a comprehensive study of the mind has the power to reveal subtle mechanisms and their interactions and to unveil the enormous potential of human cognition.

As was the case with the term "mind", nonconscious processes were also a taboo within the positivistic scientific paradigm that dominated Psychology for many decades. In fact, although internal mental processes that could not be overtly observed were manifested in behaviour and, therefore, had to be further investigated, they were never labelled unconscious, or even nonconscious. Most cognitive and experimental psychological research of the 1970s and 1980s that dealt with processes outside of the awareness or intention of the individual were labeled *subliminal* (e.g., Erderlyi, 1974), *automatic* (e.g., Frederiksen, 1984), *autobiographic very long-term memories* (Wegman, 1985), *implicit* (e.g., Underwood & Bright, 1996) and other such terms.

Even though the purpose of psychological research has always been to provide a meaningful explanation of learning in everyday-life, where we face a learner who has a personal history, interacts with other people and the environment, and must survive within this environment, as was extensively argued by some scholars back in those days (e.g., Entwistle, 1985, 1988, 1991; Boekaerts, 1987, 1993, 1996), the heavily psychoanalytically loaded concept of the unconscious had a difficult existence within experimental psychology. Thus, although researchers

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often came across processes which indicated nonconscious processes, new terms were introduced, which demonstrated a "continued nervousness on the part of experimental psychology about making its peace with the unconscious" (Erdelyi, 1985, p. 60). Nevertheless, four decades ago, in a groundbreaking paper for that time, Shevrin and Dickman (1980) had argued that the study of the unconscious was a prerequisite not only for cognitive processes but for all psychological theory. Today, no researcher would doubt it anymore. Kihlstrom's (1987) influential article 35 years ago restored the notoriety of the concept, and today, the cognitive unconscious has become a vigorously researched multidisciplinary area (see e.g., Reber and Allen, 2022).

In her paper in this issue, entitled "The power of the cognitive unconscious: the case of implicit learning", Eleni Ziori presents a thorough review that clarifies the connections of the concept of cognitive unconscious with different research areas, such as subliminal perception, blindsight, implicit memory, and implicit learning. She focuses on the latter and presents recent research findings on implicit learning, beyond laboratory research, in the context of a meaningful everyday world. She critically examines up-to-date research findings on implicit learning in different contexts, such as social skills, language acquisition, and motor and perceptual skills, and discusses recent evidence that top-down processes, as are the individual's emotional state, prior knowledge, motives and goals influence implicit learning, with selective attention being a major mediating mechanism.

Petros Roussos and Eleni Sidiropoulou & Panayiota Metallidou take the discussion further, from the human mind's powerful nonconscious capacities to its digitally extended possibilities.

In his paper "The mind online: can digital technologies affect how we think?", Roussos discusses the effects of the large amounts of information, instantly accessible to the individual, on cognitive processes and performance. What is central in the quantity and speed of information in contemporary times is *acceleration*. How does acceleration affect cognition?

More than two decades ago, before the wide expansion of the internet, Abbot (1999) attempted an estimate of the amount of information imposed on people, due to the development of digital technologies. He calculated that every day, 20 million words of technical information were recorded, which required six weeks of eight-hour daily reading, assuming a reading speed of 1,000 words per minute; by that time the reader would have fallen five and a half years behind, because of new information uploaded in the meantime. Abbot, also, argued that a weekday edition of the New York Times in the 1990s contained more information than an average person living in 17th century Britain would have been exposed to in a lifetime, and that more information had been produced between the 1960s and the 1990s than in the last five millennia. Around the same period, Eriksen (2001) elaborated on the paradox of how the exponential growth of apparently time-saving technology has made slow time an increasingly scarce resource, with significant effects on every human process for which time is a prerequisite -from concentration and reflection to identity and relationships.

Keeping a balanced, calm, and collected approach, Roussos discusses the influences of the digital expansion on various cognitive processes. He critically examines literature that provides evidence of the deleterious effects of media multitasking on attention. He points out that although the internet provides access to large amounts of information at low mental effort, thus allowing mental resources for processing rather than searching, the tendency of users to rely on the organization of information imposed by internet applications may have detrimental effects on comprehension, and this results to an illusion of knowledge. Indeed, low effort and low investment in critically comprehending the information, in the past has been defined as surface (vs. depth) approach to learning (Marton & Saljo, 1976a; 1976b). Back in those days before the expansion of digital technologies and the internet, surface learning was defined as a hasty, fast form of processing, leading to failure of comprehension of meanings, of the relationships between concepts, and of the conclusion to which information leads, low validity control, failure to connect new information with pre-existing knowledge, a neutral, indifferent attitude towards the information, and a failure to detect possible personal significance of the information. This type of superficial handling of information contributes to a tendency to be up-to-date and informed rather than knowledgeable and does not permit the critical assessment that is necessary for evaluating the credibility of online information. Roussos' discussion of recent evidence highlights the need for organised digital education programmes that go beyond the teaching of information management techniques, to the development of critical thinking with respect to the general digitalisation of everyday life.

From a different perspective, Sidiropoulou and Metallidou, see human cognition and the internet as partners rather than competitors. In their paper "Metacognitive phenomena during human–internet interactions", they discuss how human cognitive and metacognitive processes become interwoven with the new digital tools provided by the contemporary sociocultural environment. They approach the internet as a transactive partner of

the mind that contributes to cognitive offloading, through a complementary division of labour, although the individual may not always be aware of the strategies employed by the internet. From the sociocultural tradition founded by Vygotsky (1978, 1986), and in line with the pioneering work of Entwistle (1985, 1988), and Monique Boekaerts (1987, 1996) who made the "person in situation" approach central to educational research, by considering the many personal attitudes (social, cognitive, and emotional) of the individual learner, Sidiropoulou and Metallidou highlight the novel metacognitive opportunities that develop within the new digital cultural environment. To the concern that declarative memory has weakened as people tend to rely more and more on the internet to retrieve the information they need, rather than assimilating this information in their knowledge base and accessing it when needed, as some studies (e.g., Pfeifer, 2013) have indicated, Sidiropoulou & Metallidou counterpropose that if approached from Wegner's (1987) transactive memory perspective, human cognition and internet tools should not be seen as competitors, but rather as intellectual partners working together towards a common goal. They, then, proceed to discuss the pros and cons of a relationship with such a transactive memory partner, based on empirical evidence that reveals, on the one hand, a human tendency to turn impulsively to the internet for purposes of cognitive offloading, and on the other hand that people tend to perceive the internet as an omniscient and hypermnesic cognitive companion. This tendency, however, reduces the person's feeling of knowing, but interestingly, an inflated feeling of confidence is observed in several studies presented by the authors, which is attributed to blurred boundaries between the two partners, as people tend to attribute properties of the internet to themselves.

The power of media to blur psychological and social boundaries is not a new idea. Approximately four decades ago, in his provoking book *No Sense of Place*, Meyrowitz (1985) argued that new media (back then, primarily television), by removing previous barriers of information, had abolished the boundaries between different kinds of human activities and relationships, so that human experiences and behaviour were no longer shaped by where one is, or with whom; but this new condition had led to the blurring of boundaries of age, gender, identity, relationships, as well as the ways that people perceive and handle information. The research findings thoroughly reviewed by Sidiropoulou and Metallidou suggest that the power of digital technologies to blur boundaries permeates even the most advanced human processes, such as cognition and metacognition; nevertheless, the authors identify subtle variations in the research findings, which could potentially suggest ways of improving metacognitive skills, so that people can assess their own and their digital partner's capabilities with greater accuracy.

Metacognitive knowledge (i.e., the individual's accumulated knowledge about his/her knowledge and learning, and metacognitive regulation (i.e., monitoring and controlling his/her cognitive processes) are central to information processing, learning, and performance within every context, digital or offline. The next two papers present research that examines subtle mechanisms involved in cognitive and metacognitive development and performance of children at different ages.

In their paper entitled "Executive functions, listening comprehension, and metacognitive processes in childhood: developmental profiles", Zoe Bablekou, Elisavet Chrysochoou and Smaragda Kazi examine cognitive and metacognitive development in relation to the three areas of executive function (working memory, cognitive flexibility, and inhibitory control), and to linguistic processing as manifested in listening comprehension tasks. Through a thorough review of research on the development of executive function, metacognition, and their interplay, the authors conclude that although this interplay is theoretically established, it is not yet empirically robust, also due to a deficit of research on the cognitive and the metacognitive foundations of listening comprehension, although as a capacity, it precedes reading comprehension, a research theme most frequently investigated. They then, embark on a cross sectional study with preschoolers and 2nd grade elementary school pupils to investigate the relationship of executive function components with listening comprehension capacity, and their contribution to metacognitive abilities as a function of age. Through a series of assessments, their study disentangles the subtle cognitive mechanisms involved in metacognitive and metacomprehension development and highlights the necessity for domain-specific training, that would enable children to monitor their own learning and comprehension strategies in different learning tasks.

Listening comprehension tasks and visual inspection tasks, both constitute parts of intelligence measures. In the 1970s and 1980s, two complementary approaches that developed within the information processing theory had shifted the focus of research on intelligence, from the individual's performance on an intelligence test to the cognitive processes through which it is achieved, that is from cognitive outcome to cognitive processing (Pellegrino & Glaser, 1979). One approach was the *cognitive-components approach* represented in the research

of Egan (1979) and Sternberg (1977, 1980, 1982) and his colleagues (e.g., Sternberg & Salter, 1982). According to this approach, the difference in performance is sought in the way the individual synthesizes simple cognitive processes to achieve the desired cognitive outcome. The second was *the cognitive-correlates approach*, expressed mainly in the work of Chiang & Atkinson (1976), and Hunt (1971, 1975, 1978, 1980) and his colleagues. In their research they studied the correlation between, on the one hand, the individual's performance on simple tests requiring information processing and, on the other hand, his/her results on psychometric measures of intelligence, with the aim of identifying the underlying factors that produce individual differences in performance (i.e., the effectiveness with which the individual executes the various internal cognitive processes). From within this second perspective, in their paper "Exploring the relationship between visual inspection time task and intelligence in young children" George Spanoudis and Anna Tourva attempt to identify the contribution of perceptual speed, as assessed with inspection time tasks, to attentional control as an important cognitive component that contributes to general intelligence. They critically review research evidence on the contribution of several cognitive components to general intelligence and investigate their hypotheses by adopting a diffusion model of analysis, applied to data derived from inventively combined scales and tasks, with participants from seven to 18 years of age. Among other findings, their study shows that inspection time and attentional control improve with age and confirms that discrimination speed and attentional control processes have a remarkable contribution to verbal and nonverbal intelligence and to individual differences in general intelligence.

The last paper in this issue explores theory of mind development from an interdisciplinary perspective. In her paper "Biological and cognitive mechanisms and the role of culture in theory of mind development: In need of an integrative, biocultural perspective?" Elisavet Chrysochoou presents a comprehensive critical review of interdisciplinary research on theory of mind, adopting a comprehensive approach which considers the biological, cognitive, and cultural foundations of theory of mind development, from early childhood to adulthood. She persuasively argues towards a bio-cultural perspective that could possibly provide a unifying theory of theory of mind, through the consideration of maturational processes in the brain, cognitive and metacognitive development, as well as environmental and life-span changes that involve phase-specific adaptive demands over the course of the individual's life. She suggests that more studies are needed on the neurocognitive and sociocultural basis of theory of mind development, to better understand how people understand other people by ascribing mental states to them, including the knowledge that others' beliefs, desires, intentions, emotions, and thoughts may be different from one's own.

Although interdisciplinary research in psychology has evolved considerably in recent decades, it seems that our discipline still falls short of a more comprehensive study of the human being in context. In her paper, Chrysochoou revisits a question raised by one of the pioneers of cognitive psychology 40 years ago. In Norman's (1980, pp. 3-4) own words, "The human is a physical system, yes, with a component of pure cognition describable by mechanisms [...] But the human is more: The human is an animate organism, with a biological basis and an evolutionary and cultural history. Moreover, the human is a social animal, interacting with others, with the environment, and with itself. The core disciplines of cognitive science have tended to ignore these aspects of behavior".

From the inherent, both conscious and unconscious, capacities of the human mind to its digitally extended possibilities, as well as to the subtle mechanisms of cognitive and metacognitive development, the papers in this special issue demonstrate the powerful capacities of the human mind. All the articles demonstrate how cognitive research has moved on, from approaching the mind as a cognitive system analogous to a computer which was the dominant perspective in the beginnings of Cognitive Psychology in the 1960s (e.g., Neisser, 1967), to approaching the mind above and beyond its component processes and the way they relate, as a human function within a dynamic, multifaceted, demanding, and continuously changing sociocultural environment. What remains somehow underestimated is the contribution of emotions. Although motivational variables are considered or at least remain within perspective, in all the articles of this special issue, especially in discussions about metacognitive processes, what is missing is the consideration of specific emotions as generators of the impulse to cope with learning circumstances (Keltner & Gross, 1999) or as motivational states that affect both cognition and metacognition (e.g., Izard, 1993). After all, as Norman (1980) so aptly pointed out forty years ago, when he highlighted 12 critical issues that cognitive psychology and cognitive science should tackle, motivation is not a single phenomenon, but a result of a combination of things, from one's fundamental knowledge and goal structures, partially from emotional variables, partially from decisions about the application of mental resources, and partially from other conscious and nonconscious processes. It certainly is a major determinant of behaviour,

Norman (1980) asserts, but if it is a derived issue composed from different aspects of other psychological processes, research must focus on motivation's components and their interactions, and how they affect cognition and learning, rather than to the study of motivation as a unified phenomenon. This is an interesting issue for future research in the powerful capacities of the human mind.

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Ελληνική Ψυχολογική Εταιρεία
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ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Από τις μεγάλες ασυνείδητες ικανότητες του ανθρώπινου νου στις ψηφιακά διευρυμένες δυνατότητές του

Μπετίνα ΝΤΑΒΟΥ

Τμήμα Επικοινωνίας & Μέσων Μαζικής Ενημέρωσης, Εθνικό & Καποδιστριακό Πανεπιστήμιο Αθηνών, Αθήνα, Ελλάδα

ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ

Ασυνείδητες διεργασίες,
Αλληλεπίδραση ανθρώπου-διαδικτύου,
Γνωστική ανάπτυξη,
Μεταγνωστική ανάπτυξη,
Θεωρία του νου

ΣΤΟΙΧΕΙΑ ΕΠΙΚΟΙΝΩΝΙΑΣ

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ΠΕΡΙΛΗΨΗ

Το παρόν σχόλιο αναπτύσσει τα θέματα που παρουσιάζονται σε αυτό το ειδικό τεύχος, το οποίο αποτελείται από τέσσερις θεωρητικές ανασκοπήσεις και δύο εμπειρικές μελέτες, που δείχνουν πόσο έχει προχωρήσει η κατανόηση της νόησης και της μεταγνώσης τα τελευταία σαράντα χρόνια. Από τις εγγενείς, συνειδητές και ασυνείδητες, ικανότητες του ανθρώπινου νου έως τις ψηφιακά διευρυμένες δυνατότητές του, καθώς και τους λεπτούς μηχανισμούς της γνωστικής και μεταγνωστικής ανάπτυξης, οι εργασίες δείχνουν πόσο έχει μετακινηθεί η γνωστική έρευνα, από την προσέγγιση του νου ως ενός γνωστικού συστήματος ανάλογου με έναν υπολογιστή, που ήταν η κυρίαρχη οπτική γωνία στις απαρχές της Γνωστικής Ψυχολογίας στη δεκαετία του 1960, στην προσέγγιση του νου ως ανθρώπινης λειτουργίας μέσα σε ένα δυναμικό, πολύπλευρο, απαιτητικό και διαρκώς μεταβαλλόμενο κοινωνικοπολιτισμικό περιβάλλον, πέρα και πάνω από τις διεργασίες που τον απαρτίζουν και τον τρόπο με τον οποίο αλληλεπιδρούν μεταξύ τους.

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