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## Editorial for Special Issue "Psychophysiology and Experimental Psychology"

Editorial para número especial "psicofisiología y psicología experimental"

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### Abstract.

The first experimental laboratory in psychology was founded in Leipzig (Germany), where Wilhelm Wundt mainly investigated feelings and sensations by employing experimental methods. Almost a century and half after its debut, experimental laboratories have extremely evolved in terms of apparatus, instruments, and recording techniques. Under a multi- and interdisciplinary perspective, we can now better understand human cognitive and affective processes. As current *zeitgeist* has placed increasing emphasis upon the ecologically valid research, an "out-of-the-lab" approach, integrated with both human and nonhuman research, is expected to leverage scientific advances in the field of human behavior.

### Resumen.

El primer laboratorio experimental de psicología se fundó en Leipzig (Alemania), donde Wilhelm Wundt investigó principalmente los sentimientos y las sensaciones empleando métodos experimentales. Casi siglo y medio después de su debut, los laboratorios experimentales han evolucionado enormemente en cuanto a aparatos, instrumentos y técnicas de registro. Bajo una perspectiva multi e interdisciplinar, ahora podemos comprender mejor los procesos cognitivos y afectivos humanos. Dado que el *zeitgeist* actual ha puesto cada vez más énfasis en la investigación válida ecológicamente, se espera que un enfoque "fuera del laboratorio", integrado con la investigación humana y no humana, impulse los avances científicos en el campo del comportamiento humano.

### Keywords.

Experimental Psychology; Psychophysiology; Eye Tracking; Research Methods; Neurosciences; Human Behavior.

### Palabras Clave.

Psicología experimental; psicofisiología; seguimiento ocular, métodos de investigación; neurociencias; comportamiento humano.

It is a delightful honor to present the special issue devoted to “Psychophysiology and Experimental Psychology”. International Journal of Psychological Research (IJPR) has become a reference journal for researchers investigating basic and applied aspects of human behavior. Since 2008, when this journal was first established, it has had several special issues edited by some of the most prominent figures in the field. It is my hope to continue in their footsteps by keeping the journal’s standards as the “go-to” journal for psychologists and researchers in the psychological science domain.

One goal of the special issue “Psychophysiology and Experimental Psychology” is to show the use of physiological and behavioral measurements for conducting basic and applied psychological research in humans and nonhumans. At the same time, this special issue is thought to be a guideline for researchers/psychologists who are interested in learning from the experiences of those who have already conducted physiological and behavioral experiments in and out of the lab. Fortunately, the contributors to this issue have greatly simplified my curation task by putting together a set of nine manuscripts intended to promote the use of classic and novel physiological and behavioral recording techniques.

A lot has changed since Wilhelm Wundt established his first psychology laboratory at the University of Leipzig in 1879. Wundt had the main goal of promoting psychology as a distinct scientific discipline apart from philosophy, demonstrating the importance of experimental methods and systematic observation in studying mental processes (Rieber, 1980). Under a structuralist approach, he aimed to identify the basic elements of consciousness [*Bewusstsein*] through introspection [*Selbstbeobachtung*], defending that psychological phenomena were linked to physiological experiences, and therefore could be studied more objectively using laboratory experiments as the most important empirical method to be used in the construction of scientific knowledge. In one of his *magna opera* —*Grundzüge der physiologischen Psychologie* (The Principles of Physiological Psychology; Wundt, 1874)—, it can be seen his metamorphosis from physiologist to psychologist, stating that thoughts and sensations should be analyzed into their constituent elements, in much the same way as a chemist analyses chemical compounds. According to Wundt’s perspective and contrary to Kant’s view, to achieve this it was mandatory to add experiment to the internal observation and measurement needed to be employed (Sturm, 2006).

Therefore, Wundt arranged for the manufacture of appropriate apparatus and instruments, such as tachistoscopes, chronoscopes, kymographs, pendulums, etc., and set the task of developing applications for the instruments (Nicolas & Ferrand, 1999). For example, participants would be exposed to a specific stimulus (e.g., a light or the sound of a metronome) and asked to report their sensations, measuring reaction times and the

duration of mental processes (Ayala et al., 2008; De Leo, 2006). However, despite the use of precise and elegant techniques of measurement (based on Fechner’s methods), research methods and equipment available during that time were significantly different from modern experimental laboratories and current research methods. Technological advanced tools (hardware and software) that were not available during Wundt’s time allow us today to study ocular movements, cardiac, electrodermal or brain activity and their relation to cognitive and affective processes through a non-invasive and real-time techniques. Additionally, computer-based data analysis, artificial intelligence (AI), and simulation tools have also revolutionized the way experimental research is conducted and how data are now analyzed (Taylor & Taylor, 2021).

Moreover, the scope of experimental research topics has also expanded beyond just the study of the mind’s structure and its components. Currently, under a neuroscientific approach, the intersection of different scientific areas such as computer science, statistics, biology, and psychology, allowed us a more comprehensive understanding of human behavior.

In addition, experimental psychology has traditionally been conducted within laboratory settings, providing researchers with controlled experiments for studying cognitive and affective phenomena. However, in recent years, there has been an increasing trend towards conducting experimental psychology research outside of the lab. This shift has been promoted by the development of portable recording devices, which allow researchers to collect brain and behavior data in naturalistic settings, thus ensuring ecological validity (Shamay-Tsoory & Mendelsohn, 2019). Conducting experiments in real-world settings enhances ecological validity, providing a more accurate representation of cognitions, emotions, and behaviors in everyday life. Portable recording devices, such as smartphones, smart bands, or eye tracking glasses, allow researchers for ambulatory assessment through which participants’ behavior, physiological responses, and subjective experiences can be now tracked over long periods in their daily lives, providing insights into long-term patterns and context-dependent factors that may not be captured in brief laboratory experiments (Elmer & Lodder, 2023).

In the past years, the internet itself has increasingly been used as a setting for online-based research experiments (Musch & Reips, 2000). Experimental tasks can be now simply conducted via web browser, allowing to present specific stimuli and collecting a wide range of responses. Online platforms such as Pavlovia, Gorilla, Open Lab or even Qualtrics, enable researchers to put together experimental tasks, either from a library of common experiments or specifically programmed. These web-based experiments are highly versatile: the same experiments and materials may be used online, but also (often in parallel) in more traditional laboratory settings

or in distributed collaborative experiments with numerous researchers and samples at different locations. Yet, web-based experiments remain challenging, since they require an extra skill set to be possessed by researchers and a special attention to online data security (Reips, 2000).

Remarkably, current researchers are focused on the same basic mental processes, such as sensation, perception, attention, and memory, just as Wundt and his disciples were more than 100 years ago. Yet, modern experimental psychology became a diverse and dynamic field that continues to evolve and adapt to new technologies, multi- and interdisciplinary, and emerging research questions.

The current special issue of “Psychophysiology and Experimental Psychology” is a great mean to present new methodological trends in current experimental research. It is my hope that the present studies will serve to advance and improve the quality of experimental research, namely when it comes to physiological and behavioral measurement, and it will be interesting to see how they can shape the direction in psychological research.

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