

## Article in press

SCIENCE AS A MEANS TO THE  
DEVELOPMENT OF PSYCHOLOGY

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La Psicología ha evolucionado desde la definición de tratado del alma hasta la actualidad, donde se la considera ciencia que estudia la mente y la conducta humana. El camino de alejarse de la filosofía para acercarse a la ciencia ha sido complejo porque la ciencia se ajustaba más a otras disciplinas donde puede evaluarse la causalidad más fácilmente que en la Psicología. A pesar de la complejidad del objeto de análisis, la Psicología ha aportado conocimientos que han mejorado la vida de las personas en ámbitos muy diversos. Asimismo, el acercamiento a la ciencia ha dotado a la Psicología de métodos sistemáticos para organizar el conocimiento. Este artículo trata de profundizar en las fortalezas que tiene la Psicología para ser legítimamente ciencia y también señala que el deseo de aprender y la actitud científica como actitud crítica podría ser el camino para la mejora de la Psicología.

**Palabras clave:** Psicología, Ciencia, Psicología basada en la evidencia, Evaluación, Método científico.

Psychology has evolved from its definition as a treatise on the soul to the present day, where it is considered a science that studies the mind and human behavior. The path of moving away from philosophy and towards science has been complex because science was better suited to other disciplines where causality can be evaluated more easily than in psychology. In spite of the complexity of the object of analysis, psychology has contributed knowledge that has improved people's lives in very diverse areas. Similarly, the approach toward science has provided psychology with systematic methods with which to organize its knowledge. This article aims to delve into the strengths that psychology has as a legitimate science. It also points out that the desire to learn and the scientific attitude as a critical attitude could be the way to improve psychology.

**Key words:** Psychology, Science, Evidence-based psychology, Evaluation scientific method.

Psychology has undergone different debates throughout its lifetime and one of the most important is whether it is a science and, if so, what kind of science it is (Ribes-Ñesta, 2009, 2019). From this approach alone, several things are shown. The first thing is that it seems to have been unclear whether it was a science and that has been to the detriment of psychology. The possibility of it not being a science seems to have brought with it that it was not «good enough» and this has conveyed an internal feeling of undervaluation in relation to other disciplines (López & González, 2018). In this approach, scientific knowledge is the objective and superlative method.

Psychology has evolved greatly throughout history (Gondra, 1997). In the Renaissance it was considered a «treatise of the soul» (Vives, 2003). In fact, proof of this is the origin of the term «psyche», which means soul. In its journey, it has passed through the science of the mind and the study of consciousness to the science of behavior (Bornas & Noguera, 2002). Another of the revolutions has been the cognitive revolution, which, while continuing to refer to behaviors, attempted to explain them through a series of mental processes (Puente,

2011). The definition of psychology and of the psychological is important in this debate because depending on this definition the question of whether psychology is a science or not can also be answered to a greater or lesser extent. As it will be explained later on, there are aspects whose study has advanced significantly. Others, however, are difficult to solve and are not only the competence of psychology. Two of the most important could be the determinism of behavior and the «separation» of body and mind (Arce-Bustabad, 2008). In relation to behavioral determinism, the various psychological approaches place different weight on free will and the more deterministic models (Ferrer, 2017). Sanz and Gonzalo (2007) pointed out that genes, the brain, and the environment influence people's behavior, but that, nevertheless, these elements do not eliminate our will, so we have «free will». It will be necessary to continue studying and understanding this circumstance better as far as possible. The second aspect, despite its difficulty of analysis, has been accompanied by the advance of neuropsychology, which has attempted to approach these issues. Since 1970, there has been rapid progress in our ability to investigate the brain, which has led to a significant increase in information regarding the functioning of the brain (Kent, 2018). For example, in the case of neuroimaging, it has revolutionized all clinical neurosciences because of the way in which we can now visualize the living brain (Bigler, 2013).

Psychology's subject of analysis is ourselves. In psychology,

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we are a sounding board that faces another sounding board and it is difficult for us to be objective because we have been raised, educated, and we have developed a vision of the world in a social, emotional, and life context, with a certain genetic load. This «inward» study is substantially different from study in which physical aspects can be tangibly studied. This is especially important because it is not as quantifiable as a meter that always measures the same thing. In this sense, it should be noted that the word «meter» comes from the Greek term (metron), which means «measurement». In the measurement of the meter there have also been variations in its pattern and definition, so even the most quantifiable measurements evolve, improve, change, and have relative and absolute uncertainties, as in the case of the meter (Prieto, 2019). Almost three decades ago, Caparrós (1991) deepened the debate by pointing out that it was not an empirical science but that it was subject to verification. Given the complexity of the object of study—one of the most complex that we have at our disposal—not meeting all the requirements of other types of disciplines should not be a problem but rather it should highlight the difficulty of studying human beings (Pérez-Álvarez, 2018).

Being different does not mean being “less than” or worse. In his main methodological treatise, the *Logik*, Wundt discussed what he called «the erroneous transfer of the approach [Betrachtungsweise] from the natural sciences to psychology». For Wundt (1894) mental forces have no place in this system since explanations in terms of physical causation lead to predictions, while explanations in terms of psychic causation are generally post hoc. It is true that this is not easily resolved in the realm of the psyche (Fierro, 1982). In spite of everything, the study of psychology has provided us with a great amount of data on vulnerability, predisposing factors, and protection factors that, whilst not definitive, could help and favor the most probable development of certain problems (de Oca Valdez & Medina, 2019).

In that sense, the previous definition, which tended to define psychology as the science that studies the mind and human behavior (BPS, 2020), following Morris and Maisto (2005), does not reflect the width, depth, or the passion of the field. Psychology seeks to explain the way we perceive, learn, remember, solve problems, or communicate with other people throughout our lives. It also attempts to understand, evaluate, and analyze aspects such as intelligence, sadness, personality, the ability to understand the world around you, among many others, and thus establish interpersonal and inter-group differences. In psychology, we know that our discipline requires knowledge of areas that are as separate as they are united, such as the functioning of systems (for example, the family); biological aspects which are so involved in certain problems (for example, addictions); contextual and social factors (for example, the influence of social values); and so many others. Ash (2002) reviewed the science and profession of psychology since 1850. In the past couple of decades, the recent history of psychology has undeniably

taken giant steps and is attempting to provide an answer to the problems of our society in areas and subjects not previously thought of (Tortella-Feliu et al., 2016).

As can be seen, despite the fact that the factors of the equation are more complex and difficult to measure and evaluate in order to be proven experimentally, psychology already has certainties. Ebbinghaus (1908) said that psychology has a long past, but only a short history. At the end of the 20th century, psychology expanded widely. As previously mentioned, new technologies and research methodologies, new fields of inquiry, and new approaches to the study of behavior and mental processes have emerged, which have served to redefine psychology on an ongoing basis (Pan et al., 2017). As a result, psychology has gradually made its way through its research and is gaining social recognition as it provides answers to society's problems. As Cepeda (2014) points out, it is in a moment of growth, in which it feeds from several scientific disciplines—such as neuroscience, philosophy, sociology, and anthropology—which enriches and improves the discipline and favors the achievement of integrated, unified, and autonomous knowledge. At the present time, in which we are suffering confinement due to Covid-19, we are finding that the profession and the tools it provides are essential. We are hearing the echo of society about the psychological effects of the pandemic on many levels and the trust in psychology, in part, to be able to address these effects (Urzúa et al., 2020).

It is important to point out that psychology has not been the only discipline that has had difficulties in defining its object of study. This is a process through which all of the sciences have passed and one that helps to update and improve it constantly (Cabrera-González, Abreu-Márquez, & Martínez-Abreu, 2019). During the first half of the 20th century, physics represented the «mother of all sciences» with a predominance of a positivist conception in which general models were proposed that sought to predict and, ultimately, the primary objective was to be able to control the models by manipulating the causes. This was the model that other disciplines had to follow (Bernal, 2006). However, each century of our history has taken different values as its epicenter. In previous times, it was philosophy or religion (Lindberg, 2002). At this moment science or the scientific is what is considered most true, but we do not know whether this will be validated or refuted in future times (Arias-Monge & Navarro-Camacho, 2017). Following Popper (1975), science is only the best-corroborated hypothesis so far. In the future, perhaps this paradigm that we take for granted will be different. The ability to be able to advance, improve, and change will help us in these changes, if they should come.

These changes have been driven not only by reasons of content but also of method. Science is not defined only by what it studies, but by how it studies, in other words, how the process is. In this sense, psychologists are also scientists, who can adopt certain procedures to obtain and organize knowledge, and use systematic methods, both quantitative

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and qualitative, to collect data about the phenomena of interest and to provide answers to problems of different kinds. There is no doubt that our task as psychology professionals is to search. Science, in that sense, shows us that the fundamental thing is the ceaseless process of search and on that endless path, what vertebrates psychology as a science is related to the structuring of knowledge in a systematic way (Dyason et al., 2019).

In order for us all to seek and be able to organize what we are looking for, we must also try to speak in the same language. In the specific case of psychology, each of the psychological schools uses different terms to talk about very similar concepts. Would it be possible for us to speak the same language? Do we want to? Do we know how? Psychology (and history) has also taught us the difficulty that this entails. Wouldn't the difficulty be not being able to understand or recognize the equivalent other regardless of whether it is their skin color, political or religious ideas, gender, or «their psychological view»? (Campos, Cortes, & Silva, 2019; Gutiérrez, 2018; Menéndez, 2016). Despite the fact that, in the attempt to justify their own concepts and theories, these confrontations have caused a distancing between the «families», psychology has been reinforced. Each of the approaches has aimed to bring more knowledge and progress and this may result in improving the quality of life of the people, relationships, and systems it studies. The question is whether psychology draws on both at the same time, that is, on knowledge from the social, cultural, and natural sciences. As a consequence, assuming this, could mean assuming the quantitative method of logical positivism, with which the natural sciences construct their knowledge, in the same way as the qualitative method proposed by phenomenology, among others. Would different typologies fit in the definition of science? Could it be, given the complexity of the object of analysis, «another science»? Is it necessary to be a science? Does science solve everything? Will science be the solution of the future? Does psychology not have enough evidence to refute the doubt that it is legitimate as a science?

Psychology has struggled to define both the content and methods of psychology throughout its history. To this end, first of all, it is no longer part of philosophy, from which it has achieved total independence. This is shown by the change that has occurred in relation to the exercise of the health profession called General Health Psychologist (seventh additional provision on the Regulation of Psychology in the Health Field, of General Law 33/2011, of October 4, on Public Health, BOE 240 of October 5, 2011). This change places us closer to medicine, physiotherapy, and nursing, for example, and further away from the sciences of education or philosophy, which have previously been more closely linked in our recent history. However, it is curious to note that when we look up 'soul' in the RAE [the dictionary of the Royal Academy of Spanish] (2017), it indicates that the term comes from philosophy and what we find in its first meaning, refers to «*the principle that shapes and organizes the vegetative, sensitive,*

*and intellectual dynamism of life*». With this meaning, it could also represent current psychology. After all, it speaks of biology, emotions, and thoughts. Also, the 'logos' in its name, comes from philosophy and speaks to us of reason. Philosophy with this definition brings us closer to science and shows us that it is still situated in the place where it was originally defined. However, leaving «behind» the social sciences could also make psychology lose a very useful and important corpus of knowledge from which it could continue to benefit if it were situated between the two. Underlying this attempt to be more biologist is the idea that psychology could be a more «soft» science than others, such as biology (Cacioppo & Freberg, 2018; Henriques, 2004; Smedslund, 2016). Psychology deals with aspects that cannot be analyzed through the microscope or other advanced technologies. As previously stated, human phenomena are more complex than physical phenomena, and the principles cannot be disassembled for analysis in the same way as physical or chemical phenomena. Perhaps for this reason the explanations should be more complex?

In its proximity to the rest of the empirical sciences, psychology seeks general laws based on concrete events. As well as deducing consequences that can be proven empirically, psychology attempts to see if this is possible through experiments and, when it is not, through some valid form of verification that allows the verification or refutation of the theory. In that sense, some of the arguments that psychology as a science may take into consideration would be the following; the function of science is knowledge, prediction, and technical application. The constant search, which we will address later, is good proof of this (Ribes-lñesta, 2018). At this time, as has been pointed out, psychology is shown in numerous publications, which are consequences of previous studies that aim to advance in knowledge. Although the data are already outdated, previously Ramonet (1999) reflected that, during the last thirty years, more information had been produced in the world than during the previous 5 thousand years, while «a single copy» of an edition of the New York Times contains more information than a cultured person in the nineteenth century consumed during his or her entire life. If this was already evident in the 1980s, with the proliferation of new knowledge-expanding technologies and methodologies the situation has increased exponentially.

Psychology should—and does—have a desire to learn. Popper (1975) pointed out that the scientific attitude was the critical attitude, which did not seek verifications but crucial contrasts. Its increased depth in the concept of rationality is very important since it situates it in the disposition to learn from our errors and the attitude of consciously looking for our errors. For this author, it is a way of thinking and even of living and what is most important is the disposition to listen to critical arguments. How important is the capacity of scientific activity as a capacity for listening to the arguments of the other! The other who sees the world and approaches it in a different way. Science, understood in this way, becomes entangled in

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the capacity for empathy. In the case of Popper (2002), in that necessary introduction made by José Antonio Marina, he talks to us about the humility of science. He questions that we will not be able to reach an absolute truth, which also shows us the limits of science and reduces in this way the megalomaniac ideal of an absolutely secure knowledge. However, since we have to choose, it will be more «rational» to choose the best tested theory, that is, the best tested one for the moment. In that line, he makes a comparison between Einstein and an amoeba. According to Popper, Einstein consciously seeks to critique theories and formulate them with precision. The amoeba cannot be critical of expectations or hypotheses. Likewise, it constructs knowledge in problems and not in concrete subjects, subjects that can be located in different disciplines. The atrocious specialization for Popper could mean the loss of the meaning of what is done. Will psychology have to approach the greatest number of disciplines in order not to get lost? Is there one psychology or many? Are the limits of what belongs to psychology and what does not clear? Should psychology have limits?

Psychology, at present, is a science that studies human behavior—affects, thoughts, meta-thinking, relationships with others, groups, brain, and so many other things. All of this nourished and wide spectrum of what psychology contains, is far from what it originally had. It is important to point out that, at the beginning of the 20th century, the main method of data collection was introspection or self-observation in a laboratory. Now, perhaps because of the original «challenge» of John B. Watson (Watson & Rayner, 1920; Watson, 1913; 1924), psychology has entered a debate about the evidence-based therapies. Evidence-based psychology aims to disseminate the application of psychological treatments that have been scientifically tested (Becoña et al., 2004). In this debate, as Marino Pérez-Alvarez (2019) points out, different psychotherapies—in addition to cognitive-behavioral therapy, which was the most common in efficacy studies—have also shown their efficacy, such as psychodynamic therapy (Steinert et al., 2017), humanistic therapy (Mullings, 2017), existential therapy (Hale & Stephenson, 2017), and systemic therapy (Pol et al., 2017). Furthermore, he adds, it seems that the different approaches could not be canceled due to their lack of efficacy. In the case of depression, Cuijpers (2017), for example, has pointed out that such disparate therapies as cognitive-behavioral therapy and short-term psychodynamic psychotherapy, among many others, could be effective. Could it be because there are common factors? Along these lines, Pérez-Álvarez, Fernández-Hermida, Fernández-Rodríguez, and Amigo (2003) pointed out the need for guidelines for effective psychological treatments. In the guidelines, cognitive-behavioral therapy was the most represented one. In fact, cognitive-behavioral therapy and evidence-based psychology have come to be seen as equivalent. Pérez-Álvarez (2017) also pointed out that the fact that some therapies are more effective or efficient than others are for certain problems does not mean that the different

approaches can be ruled out due to the lack of efficacy regarding certain problems. Other studies go deeper and analyze in detail everything related to the comparison of the different psychotherapies and conclude, among many other things, that there is still nothing conclusive in the field of research in psychotherapies, without underestimating everything that has been done previously. César González-Blanch and Laura Carral-Fernández (2017) also pointed out a fundamental aspect in that, out of the hundreds of therapeutic models that exist, only a few have been examined. Furthermore, they add, studies that maintain the efficacy of psychotherapies could be subject to limitations as they contain important biases and methodological weaknesses. Research processes with disparate methodologies, which do not follow the same processes for comparison and which only talk about positive results could affect the fact that everything works. Does everything work? Does everything work in the same way? Does nothing work? Does only one «remedy» work? With different languages, different study processes, are we approaching science? Should we approach it in the same way? Is there only one way?

This path has left many wounds on its journey. The complexity of psychology requires different perspectives. How difficult it is to affirm that there are no aspects intervening that we cannot control! The dynamism of science, as pointed out by Popper in his prologue (2002), is similar to that which guides evolution. What has been evident in other disciplines in some moments has shown not to be so in others. What has not changed is the change and the need to continue learning. Evidence-based psychology has resulted in a chain reaction. On the one hand, it has served in a very important way for the different approaches to begin to make an evaluation. This in itself is very worrying. Why has there not been a constant evaluation of what we have been doing? How do we know if what we are doing has a real impact? Was another type of «evaluation» being done? Are we afraid to evaluate? If psychological interventions are the tools we use, it is important to know whether they are appropriate and whether we are using them well.

Psychotherapy, according to the RAE (2017) is defined, at this time, as the treatment of mental, psychosomatic, and behavioral problems through psychological techniques. The definition leaves the techniques and their appropriateness to psychology. One of the key elements that could differentiate appropriate treatments would have to be related to the evidence that supports them and the evidence has to do with the type of design that is used (Gálvez-Lara, Corpas, Velasco, & Moriana, 2019).

For its part, the Spanish Federation of Psychotherapists' Associations (FEAP; 1992), defines psychotherapy as: «a scientific treatment, of a psychological nature that, based on mental or physical manifestations of human discomfort, promotes the achievement of changes or modifications in behavior, physical and psychological health, the integration of psychological identity, and the well-being of persons or groups



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such as the couple or the family. In the definition, on paper, it seems simple. It is a scientific treatment. Science «forces» us to consider ourselves as technical people with training for dealing with psychological and behavioral disorders. This image is far from that of the savior, which involves neither the capacity to learn nor the humility that is previously embedded in the history of science. What makes psychology a science is that it is not plagued by personal judgments but by therapeutic decisions that have a solid conceptual and empirical basis (Lobell, Navarro, & i Bort, 2004). In psychology we find «effective treatments» that “do not work” with certain people. What are the crude factors that make the difference? Is a technique the same for two different people? What aspects intervene so that people do not recover? Does the same treatment affect emotional problems in the same way? My experience is full of unknowns and also truths, which can be refuted in the long run. One of my doubts is whether the techniques are always appropriate for all problems and all people. An additional question is how external factors intervene outside the therapeutic context. The experience of progress in patients who did not «meet the requirements» to improve quickly compared to those who have not progressed, when everything seemed to indicate that it was more likely for them. If we agree that the problems are complex, perhaps studies should be oriented towards continuing to determine the profiles of people, the types of interventions most suitable, and the psychotherapeutic processes rather than the results. A text by Einstein, mentioned in the introduction to Karl Popper’s ultra-modern reading (2002) that determined Popper’s entire work was that no theory can be considered scientific if it does not specify the conditions that could invalidate it. Therefore, perhaps the important thing is for treatments to be established in such a way that they communicate their results in a transparent way. Recently, psychology students in a seminar stated that they had attended numerous courses in psychology and were still unable to understand what the task of a psychologist was and they did not know what to do. That all the training courses ended without specifying what the steps to take were. Without having made a detailed study of the situation, it is something that many of us have experienced in different life moments. Is it difficult for psychology to show what does not work? Or is it that we still do not know how it works? What is happening? Psychological science is progressing with evidence and the practice of psychology needs the professional’s know-how. Science and practice have the same desire: to understand behavior and alleviate human suffering. Evaluation, the exposure of what we do, is what earns our profession trust and the people who trust in it (Echeburúa, Gargallo, & Salaberría, 2010; Gálvez-Lara et al., 2019). Voltaire said that «Doctors are men who prescribe medicines they know little about, cure diseases they know less about, in human beings they know nothing about» (1694-1778). Our job, as professionals in psychology, is to try to prevent this from happening. We must strive to know the people we treat, to understand and know more about their suffering, and to be able to offer more

appropriate treatments for which we will necessarily have to have more evidence.

To conclude, I would like to quote José Saramago’s *Blindness* (2015) in which he forces you to stop, close your eyes, and see. In the words of one of the characters «there is in us a thing that has no name, that thing is what we are». That which has no name and which blinds us prevents us from seeing the other and ourselves. That which is about giving a name and studying, in spite of the blindness of those of us who study it, is also psychology. We have before us an exciting challenge that is worth addressing. The path of science and its scientific method are key in this process.

**CONFLICT OF INTEREST**

There is not conflict of interest

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