Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 365-418.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

ISSN 2307-7999
e-ISSN 2310-4635

REVIEW ARTICLE

An Early Psychology of Science in Paraguay

Una temprana psicología de la ciencia en el Paraguay

José E. García

Universidad Catolica Nuestra Señora de la Asunción, Asunción, Paraguay

Psychologist. University Professor. Director of *Psicología Básica y Aplicada* (Basic and Applied Psychology) magazine. His main research areas are History of Psychology, Psychologist Education and Evolutionary Psychology

Received on 22-03-16
Approved on 20-06-16

***Corresponding author**

Email: joseemiliogarcia@hotmail.com

How to cite:

Garcia, J. (2016). An Early Psychology of Science in Paraguay. *Propósitos y Representaciones, 4*(2), 381-418. Doi: http://dx.doi.org/10.20511/pyr2016.v4n2.125

Summary

The psychology of science is a field of research emerged in the late 80's and its basic interest is the study of the conditions determining the rise and development of scientists and researchers. However, in spite of its apparent novelty, it is feasible to find background widely disseminated in the work of previous authors. One of them is R. Ross, who wrote an article in the Paraguayan journal *Letras* in 1915. Ross argued that geniuses' production is one of the most valuable potentials to which a nation can aspire and has a relevance degree higher than any kind of wealth. His argument agrees with considerations related to the subjective processes leading creative inspiration, the generation of new ideas and the relations between genius and insanity, a view that fits the ideas of the Italian physician Cesare Lombroso. The article concludes that R*oss'* ideas may be identified as a distant background for the psychology of science, although it has not reached a later continuity in the work of other Paraguayan authors. The methodology adopted is both descriptive and critical, with a contextual analysis of the primary sources that are relevant to the problem.

Keywords: R. Ross, psychology of science, genius, history of psychology, psychology in Paraguay.

Resumen

La psicología de la ciencia es un campo de investigación surgido a finales de la década de 1980 y cuyo interés fundamental es el estudio de las condiciones que determinan el surgimiento y desarrollo de los científicos e investigadores. Sin embargo, pese a su aparente novedad, es factible encontrar antecedentes diseminados ampliamente en la obra de autores previos. Uno de ellos es R. Ross, quien escribió un artículo en la revista paraguaya *Letras* en 1915. Ross sostenía que la producción de genios es una de las potencialidades más valiosas a las que puede aspirar una nación y que ella se encuentra en un grado de importancia superior a otra clase de riquezas. En su exposición

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

abunda en consideraciones relacionadas con los procesos subjetivos que conducen la inspiración creadora, la generación de ideas novedosas y las relaciones entre la genialidad y la locura, punto en el que se ajusta a las ideas del médico italiano Cesare Lombroso. La conclusión del artículo es que las ideas de Ross pueden vislumbrarse como un antecedente lejano para la psicología de la ciencia, aunque no haya alcanzado una continuidad posterior en la obra de otros autores paraguayos. La metodología adoptada es a un tiempo descriptiva y crítica, con un análisis contextual de las fuentes primarias que resultan pertinentes al problema.

Palabras clave: R. Ross, psicología de la ciencia, genios, historia de la psicología, psicología en Paraguay.

Introduction

There are several ways in which psychologists may express their interest toward science. The belonging to an area mainly identified with the production of scientific knowledge was essential for the formation of its disciplinary identity and to the consolidation of the discipline status as an independent expertise area. It should be reminded that psychology, according to the reconstruction of the most traditional historians (Baldwin, 1913a, 1913b; Brett, 1912; Klemm, 1914; Mercier, 1918; Rand, 1912), comes from the major core of philosophy, an essentially reflexive field from which most of psychologists cautiously stepped back, as a basic requirement for the entire acknowledgement of their autonomy.

Chronologically, relations between both areas come from Greek antiquity. Philosophy supplied psychology with some of its most consistent and long-lasting frameworks (García, 2015a), incorporating theoretical outlines of such extension and depth as the dualism embodied by Pythagoras and Plato and the monism represented by Democritus and Aristotle (Uttal, 2004), as well as the idea that knowledge is inherent or is learned from the daily contact with the surrounding reality (Fine, 2014), in addition to other similar conceptual milestones.

For authors like Cacciopo and Freberg (2013), the family tree of psychology includes both philosophy and physical sciences. Of course, it is impossible to marginalize medicine as some of the great personalities that stood out in health care in the old world had some thoughts about the nature of personality, character and temperament (Dumont, 2010) or pretended to innovate practical aspects with the application of archaic therapies for problems affecting the mind and behavior (Millon, 2004). This inclination variable toward science has direct connotations on the public image that practitioners obtain and are part of the collective effort to define an own identification for the discipline.

A second way in which psychology approaches to science is by turning it into one of its spheres of research interests, becoming a new element for

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

the analysis and enabling the access to an explanation of its dynamics and particular processes. Since the subject-matter of psychology is the behavior and cognitive phenomena, it is the evident main dimension toward which its investigation should be oriented. Those who choose this aspect of the relation between psychology and science may possibly recall, in first place, the modern sub-discipline of *psychology of science,* whose first works were published some time ago, in the mid 80's (Simonton, 1988).

The theme variety covering the current psychological study of science is very extensive and includes a wide variety of subjects, such as biological psychology of science, psychology of science development, cognitive psychology of science, psychology of science personality and social psychology of science, among other areas involved (Feist, 2006, 2011). However, as all influential ideas in psychology, this new sub-discipline has a background. Feist & Gorman (2013) pointed out the work of French-Swiss botanist Alphonse de Candolle (1806-1893) as one of the most important predecessors. He wrote a book titled *Histoire des sciences et des savants depuis deux siècles* (Candolle, 1873), in which he offered an environmental interpretation in order to account for the influences determining the rise of scientific eminences. Besides all its merits, this work was a reaction to the hereditary orientation book that British Sir Francis Galton (1822-1911) published years ago and that today is a classic of science, the well-known *Hereditary genius* (Galton, 1869).

However, Candolle also, according to the criterion of Feist & Gorman (2013), inspired Galton to write *English men of science: Their nature and nurture* (Galton, 1874), treatise usually considered as the first one related to the study of scientist psychology. In addition, this is an important point to consider, since very important authors like them provided theoretical contributions almost one century before the formal establishment of the new field.

Nevertheless, the psychology of science is not the first discipline to seriously focus on these matters but, on the contrary, the one that showed

a late rise. Indeed, there is a philosophy of science that had its most significant production in the work of Austrian Karl Popper (1902-1994) and the American Thomas S. Kuhn (1922-1996). The first built a coherent and rigorous theoretical outline that allowed an intermediate point of view between dogmatism and relativism (Gattei, 2009), while the second installed one of the most influential systems emerging in the analysis of science development (Hoyningen-Huene, 1993).

However, it should be stated that some scientists such as René Descartes (1596-1650), Isaac Newton (1642-1727) and Albert Einstein (1879-1955) had a very significant role for the future progress of science (Okasha, 2002), even many centuries before. Several events associated for the formal establishment of this sub-discipline (Feist, 2012), among them the publication of the famous work of the French mathematician Henri Poincaré (1854-1912), *Science and hypothesis*, in 1908 (Poincare, 1918), and the creation, in 1910, of the Vienna Circle, a select and strict club of philosophers and scientists that Lang (2007) called "a single vortex of ideas".

On the other hand, the history of science, which already has a remote background in the works of Greek and Syrian authors, has its forefathers in the modern European academies of science that started to gather in the 18th century. Their modern founder is the Belgian chemist George Sarton (1884-1956), considered as the pioneer of the historical study of science due to his large number of publications (Sarton, 1948) and due to the introduction of these subjects in the academic field. Additionally, he was the founder of the *Isis* magazine in 1913. Likewise, there is a sociology of science that, although had an essential pillar in the work of William Ogburn (1886-1959) *Social change*, 1922, had its main promoter in Robert K. Merton (1910-2003), whose large number of works helped to define the gathering between science and sociology.

Understood in modern terms, the psychology of science is an extremely productive research space with links and implications with many other fields. Among them, for instance, educational psychology is a singularly

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

interesting apex. It is defined as the science of human behavior applied to the teaching and learning processes (Tuckman & Monetti, 2011). Its purpose is to generate practical knowledge aimed at solving behaviors that occur in educational contexts. Therefore, it is an environment essentially aimed at research.

As educational psychology is an area identified with the applied profession, there is no doubt that the study of social and individual events leading to the rise of highly qualified individuals, and that in optimal circumstances may even guide their capacities to the creation of new scientific or technological theories including remarkable innovation degrees, is –or should be- an essential part for the objectives included in school teaching. In fact, several of the historical founders of educational psychology researched the way in which different environments generate proper conditions for the achievement of exceptionally gifted individuals (García, 2015b).

The discovery of family and personal difficulties that are estimated as direct or mediate background for the appearance of the scientific genius not only interested classic authors such as Galton, but also defines one of the current layers of psychology and education of gifted or exceptionally gifted children (Simonton, 2014). Furthermore, the way in which education and training provided by school affects the creative development in science, and the way in which the role of teachers may maximize the efficacy of these processes, are found in the core of the educational psychology agenda (Simonton, 2009). These same phenomena may lead us to understand why other less fortunate human beings (from a naturally gifted point of view), are so far away from the real possibilities to access to relevance achievements in such tasks. The bridges that join psychology of science and scientists with the current challenges faced by educational psychology are wider than what they seem like at first sight and are barely starting to be discerned.

The fact that a new and emerging study area, as psychology of science is, has to explain background located in any previous temporary period does not obey to a historical iron law, so exceptions to its pretended validity may

be admitted. However, it is very likely that previous expressions are found in the work of previous authors that foresaw some of the positions defended nowadays. This is because knowledge does not emerge from nowhere or emerge from its own generation, as may be the case with the generous creations of an inane deity. On the contrary, scientific ideas follow their own course owed to the evolution of societies housing their circumstantial creative individuals, as well as to own internal processes of each discipline and the very dynamic dimensions that affect the complex relation between subject and object.

In this regard, the study of psychology history is very useful and beneficial as it allows locating and analyzing remote bibliography that may be feasible to consider in a temporary precedence relationship with contemporary thinking. Its accurate identification is not carried out in order to build a celebratory interpretation of people and events involved, but to understand, in a thorough and finished way, the basic logic ruling the transformation of specialized knowledge. In fact, modern explicative theories on the processes leading to the evolution of theories or the possible continuities or disruptions expressed thereof, take into account the factors operating from the inside as from outside of psychology, and only vary in the relative weight given to each of these elements (Pérez Ríos, 1990).

Based on these considerations, the purposes that guide this article are: a) Examine an essay of R. Ross of 1913, published in the Paraguayan magazine *Letras* as a possible demonstration of an early concern for subjects included nowadays as part of the psychology of science, b) Compare the points of view supported therein with some conceptions prevailing in the modern study of scientist psychology, c) Analyze R. Ross' article in the context of scientific and epistemological knowledge valid in the early 20th century, and d) Assess the article relevance regarding the particular evolution of Paraguayan psychology. The methodology that supports the study is a qualitative analysis and lies in the examination and interpretation of primary sources, looking for a proper contextualization of the problem and for the explanations the author offers for a finished understanding thereof.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

An article of R. Ross

The historical study of Paraguayan psychology suggests several possible aspects, one of them is the analysis of its theoretical content depending on the production that cultural magazines had and whose dissemination began in the late 19th century and early 20th century. Recently, a couple of researches focused on two of them: a) the *Revista del Instituto Paraguayo*, published between 1896 and 1907 (García, 2014c) and b) *Letras*, edited in 1915 and 1916 (García, 2015c). These works do not intend to examine the wider and general cultural context in which its content and theme distribution should be inserted, but the most specific connections with the early modeling of psychology and the individualization of articles contained on its pages, which may comprise a specific interest for the discipline.

In the case of *Letras*, the included writings cover four works whose approaches have affinity relations with psychology. These works belong to Báez (1915), Domínguez (1915), Ingenieros (1915a, 1915b) and Mercante (1915). From these four, Báez and Domínguez were Paraguayan, while Ingenieros and Mercante were Argentinian. Among these publications with eventual psychological reverberations, however, there was a fifth one that was not included in García's (2015c) prior debate. It is an essay registered in a more *interdisciplinary* order, studied thoroughly in the area of science epistemology besides the psychology *per se*.

Nevertheless, since the attempts to classify ideas and their affiliations or intellectual roots are not always direct or entirely clear to distinguish, it is worth noting for the benefit of the article that, in every way, some concepts used entirely border the perimeter of psychology. Furthermore, certain general focus points may be considered analogue to those modernly kept by science psychologists. In this type of knowledge archeology that the history of psychology is, more detailed attention should be paid to this article and its matches, declared or implicit, with the psychology of science under its current conceptualization.

The article of R. Ross, titled *El genio de la ciencia (The genius of science)*, was published in 1915 in the first edition of *Letras* (Ross, 1915) magazine. The most characteristic individual in charge of this publication, although the only one was Professor Manuel Riquelme (1885-1961), one of the most recognized pioneers of Paraguayan psychology during the first half of the 20th century (García, 2014a). Riquelme has its own seat of honor in the history of Paraguayan psychology, among other reasons due to the publication of an important introductory book in 1936 (Riquelme, 1948), the first with this approach written by a Paraguayan author.

Ross' text starts with a direct and conclusive affirmation: the production of geniuses is the first power of a nation, and it is above and has more relevance than having a fertile soil, abundant material wealth or the opportunities brought by trade. Higher, even, than flaunting an honest country dedicated to work. This occurs because the history of any country is the same of its geniuses, both big and small. And the fact that many of them have not found an outstanding place in modern history, precisely results from the lack of outstanding individuals. It lacks importance the fact that many times, overlapping the other mortals; they receive only distrust or the general mockery of other people who do not have their same values and abilities. Therefore, great geniuses become a sort of valued and elusive treasure that, because of their fragility and rareness, turn out to be even more valuable.

Next, states Ross (1915) that it is that spark of intelligence what determines the precise moment in the projection of scientific inspiration. It is part of the conventional creativity vision that its movements only obey to what some people name the *eureka moments,* which are usually described as a single spark of blinding lighting (Lee, 2002). In fact, in contemporary literature, creativity is frequently associated with the *insight* experience, understood as the irradiation moment in creative process (Simonton, 1999a). Certainly, the production of deep sparks is admissible when these instantaneous flashes occur. Not only new ideas emerge with them but, also, it becomes a vision of the problem considered at the moment.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

However, other authors suggest that the phenomenon of creation or conceptual innovation is part of a slow and organic process occurring on a more gradual basis. Psychologist Mihaly Csikszentmihalyi states that the *insight* is better studied through certain mental processes resulting in creative products (Csikszentmihalyi, 2014). However, Ross (1915), on the contrary, stated that said condition was not entirely sufficient. In addition, he believed it was indispensable that the individual was fully convinced of the usefulness of his creative project. Therefore, it was necessary a mind with the conditions to achieve a more proper valuation of things.

Supported by the typical terminology of Gustave Le Bon (1841-1931) in the early 20th century, he affirmed that multitudes are not interested in great achievements, as may be those arising from thinking, if at the same time they are not provided with obvious and immediate benefits, such as food, fortune or good time. Those individuals far from excellence, instead of lavishing benefits for the progress of mankind, just impose their interests to the others and, because of that, it is not strange that this leads to prejudices instead of favors.

Ross (1915) agrees with reflections concerning human beings and to that where greatness lies in. In this regard, it differentiates the man who is only skilled and capable from the one who "may do great things". The first one has the possibility of being *great among the smaller*, but the second one has the power to be *great among the greater*. Connected to all this is the power of intelligence, related to vital aspirations. When the man is young, he chooses things he will have to do according to the mental ability owned, and this condition is non-transferable. If his intelligence is very low, then he will just aspire to pleasure and simple things; if he is a little well gifted, he will go after wealth and fame, always seeking them for himself, and if nature has granted him even more ability, he will possibly want to provide a benefit to his country. Finally, if he reaches the highest level, his aim will be fixed in providing goodness for mankind, regardless of his self, but the development of the others.

At first sight, the decision on who were the greatest men in history may complicate the choice among personalities like Isaac Newton (1642-1727), William Shakespeare (1564-1616) or Napoleon Bonaparte (1769-1821). Of the latter, it may be mentioned he was a temporary bright ray and that today, after a long time that saw him establish his influence on men, remains a little more than a memory, not beyond the other two mentioned. However, here Ross, once again, reminds us that Napoleon only worked for himself, not for someone else's benefit. On the contrary, Shakespeare projected his contribution to the entire mankind clearing up the deepest and most dense thresholds of human conscience through his literary creation: a depth and imperishable lesson, *a future incomparably higher,* to use Ross' (1915) words. Literature full of psychology, the abnormal conditions of the mind attracted the diligent attention of Shakespeare, who turned it into his favorite study subject (Bucknill, 1859).

The author says that original ideas come out spontaneously in the mind of the great men and establish in them a clear feeling regarding the relevance and value of efforts made. This makes them different from the other individuals, who only work thinking of themselves, being this the cause and at the same time, the destination of their benefits. However, these conditions, although necessary and essential, are not enough to reach the highest objectives. According to Ross (1915), the man of science must have the necessary determination and decision, and the courage to overcome the obstacles hindering his path. That is, not only some cognitive conditions are conjugated; other variables aiming at emotional and volatile factors are also part of this. Scientific progress is a path full of uncertainties and doubts that, additionally, is flanked by many difficulties. Hence, the rising of great discoverers and artists is full of fatigue, perplexities emerging when thinking about the value of their own efforts and the possibilities to progress.

The triumph of the scientist is a balance of the original qualities he has, like the genius to conceive ideas, the acuteness to perceive where the real problems are, the decision to achieve what someone is looking for

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

and the energy applied to work, although it also depends of finding the right opportunity. Here, fate plays its part, and the outside conditions add the missing ingredients. In the history of previous centuries abounded, undoubtedly, other great individuals with the same or maybe even higher potential of Newton or Shakespeare, but the efficient occasions to fully develop their potentials did not conjugate. When that element, so elusive and unpredictable, is lacking, then no ideal conditions boosting the genius appear. It is a matter of fate and real talent.

This is not a sub estimation of a scientist's personal qualities. In fact, current psychology establishes very accurately the interconnections that may occur among the variables of personality and creativity. Feist (1998), for instance, conducted a meta-analysis of a large number of researches and found that, in general, creative people are different because they are more open to new experiences, less conventional and conscientious, show more self-confidence and self-acceptance and are easy to lead. Likewise, they are ambitious, dominant, hostile and impulsive. Genetically-based personality and intelligence factors may account for the 13 and 29 percent of the variation in scientific talent (Feist, 2010). Creative people are less conformist, and having the approval of others is not an essential need (Owens, 2009).

According to Ross' point of view (1915), men gifted with the necessary qualities for great achievements are those who can exploit the occasional junctures emerging on their path. In this regard, he affirmed that, "actually, favorable circumstances are common, but genius is rare and, up to certain point, it is the one who creates opportunities" (Ross, 1915, page 34). The fact that all necessary conditions to end in the production of scientific talents are uncommon is the main reason, stated Ross (1915), why human progress is so slow, difficult and elusive.

In fact, the constant production of geniuses and talented individuals strongly depends on the randomness of the environment and of an endless number of concurrent variables, hence it is not a factor arising indiscriminately and repeatedly at any time deemed. The fact that geniuses require adequate

cultural and political conditions to settle in a place and at a certain time is something that is well established in modern psychological literature (Simonton, 1999b). Also, the interrelationships between the availability of talented individuals and the global development of a country. Lynn and Vanhanen (2002) state that nations whose populations have higher levels of intelligence are likely to have higher levels of achievement regarding their educational activities and, probably, more individuals making relevant contributions to national welfare.

Ross (1915) agreed that nations produce geniuses of all kinds, but only at certain times. In contrast, there are very long periods of time when their corresponding societies lack talented people and progress seem absent. This means staying mostly static and without any kind of progress, which may not occur in any society if it is not provided with inquisitive individuals. When suddenly talents begin to emerge in a community, it is reasonable to expect that some transformation is occurring in the immediate environment, since the birth of exceptionally skilled people suggests, according to Ross (1915), the validity of a biological law that stimulates them.

Nevertheless, in this collective enterprise that is science there is room for other people, with allegedly modest intellectual gifts, but required by it to complete many essential tasks. This anticipates the existence of another class of men, with fewer merits, but more common than the privileged candidates to genius. They are those who work in the tasks of observation and collection of basic data, without aiming at great syntheses or theories or to large system buildings. Men in this level of scientific work, argued Ross (1915), may not be provided with such brilliant inclinations, although they possess equally useful and relevant abilities for science tasks: the deep desire to reach an important work, the full decision to conduct it and the essential virtue of patience. Also, bearing in mind the probability that a proper and deserved reward will never come, in equal proportion to the dedication and effort. Through this way, perhaps by way of chance or whimsical fate, timely findings can also be obtained.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

Science is not only the successful achievement of the discoveries made by powerful minds in the analysis of reality and armed with a prodigious inspiration, something that in the history of psychology is associated with the challenged vision of *great men* as the sole architects of scientific progress (Hilgard, Leary & McGuire, 1991). Ordinary individuals who do not reach the fiery emerging of the genius, but with a tenacious work, and especially with the right ally of chance or *serendipity*, obtain significant progress, they also play a unique role.

Determined to recognize the kinds of individuals in relation to the type of activity developed in science, Ross (1915) distinguishes two types of "minds": a) one, he mentions, that acts mainly as a *troubleshooter* and b) a second one that is basically an *attentive observer of external facts*. Both tasks are important in the dynamics of research, but have different scopes. To specify the correspondence, our author affirmed that science has nine parts of thought and one of observation. Clearly, a markedly uneven proportion. In this perspective, the theoretical and analytical function appears above the practical dimension, which most basic materialization is the compilation of data.

The various contingencies converging for the rising of the genius enable the analysis of many different but related problems, one of which is the link with insanity. This way of facing exceptionally gifted individuals, and to closely observe their relation with the unusual, eccentric and morbid behavior, is one of the main aspects, which several studies of this subject have taken. Ross (1915) does not ignore them in his article, focusing them from the point of view of Cesare Lombroso (1835-1909), the famous Italian criminologist who had also studied the particular contexts that this elusive and controversial condition suggests.

In fact, Lombroso (1891) suggested that the resemblance between insanity and genius, although it cannot be argued that both necessarily are confused, serves to show that one does not exclude the other, especially when the same subject is considered. Not to mention the exceptionally gifted individuals

who, at some point in their lives, suffered from hallucinations or mental illnesses, or those who ended glorious careers due to opaque fits of madness. As with Giambattista Vico (1668-1774), for example, many men of great intellectual conditions were subject to monomania or hallucination episodes. His detailed analyses of numerous and famous personalities of science and art of his time led him to conclude that, despite the objections anticipated regarding the scope of his conclusions and the skepticism aroused by the use of statistics as a rule and criterion for the interpretation of his studies, such manifestations of insanity could be affected and even conditioned by a number of accidental circumstances, entirely independent from the physical or mental condition of each person.

In addition, other requirements for successful scientific work, including the validity of optimal situations that lead to discovery and invention, may be subordinated to accurate external influences. Thus, climate contexts acquire a fundamental importance, not always in notorious ways. Naturalists, for instance, have more facilities for research and experimentation when working in warm weather days, while for anatomists cold winter nights are particularly favorable, although certainly human bodies can be used in all seasons. Astronomers, on the other hand, get much benefit for their stellar measurements in the winter night hours, when refraction influence is less.

In addition, Lombroso (1891) stated that these accidental circumstances affect other even more crucial aspects, including death, birth or murder of other individuals. The importance of the relationship clearly emerges when statistics are systematically incorporated into the explanatory context. Eventually, all lead to the same result and the deduction of a common determinant, which can only be found in weather conditions. Both artistic creations and scientific discoveries are associated with each other since they sustain moments of excitement and extreme sensitivity in the individual and merge the most diverse acts in productive syntheses. These forms of exaltation enforce the moments of great creative fecundity.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

Lombroso believed that additional factors such as race and biological inheritance were closely related to madness. His approach to these problems was gradually structured based on theories that were common at his time. However, his concept of insanity was clearly extensive as it was referred to any observable deviation regarding the average behavior, something that is not shared by contemporary psychiatrists. Whatever the case may be, for Ross (1915) the condition of genius was that of a tyranny constantly acting on the individual. He compares it to a burning fire that pushes and at the same time, devours. For all its achievements, the genius feeds on all the internal energies of man. The exceptional provision prevails and overcomes all adverse circumstances that seek to block their way, whether they are skeptical attitudes emanating from the environment, criticism, misunderstanding and even hatred or jealousy born from the adversaries. In essence, it is persistent and does not stop until succeeding. This impulse is deeply anchored to the human motivations, and incites its fire as an endless fuel.

Ross (1915) takes several examples from history to illustrate his point: Socrates, who had to drink the hemlock; Bruno, who faced the uncontrollable horror of the fire; the persecution and humiliation against Galileo. There are many examples where the great personalities of mankind, their best minds and distinguished benefactors had to hardly pay, many times, too many, for their condition of more advantaged and changing beings. Misunderstanding spreads the version that geniuses are crazy, or that their work is unnecessary and even harmful. And it is in most of them that the author focuses its final thought:

> Recently, analogue cases have occurred and they will continue occurring. The stain, the insane, is not in the genius' mind; it is in the audience's mind (Ross, 1915, page 35).

It is an unfortunate fact that mankind, in general terms, has not made the necessary effort, commitment or decision to favor the birth of geniuses and allow their development and multiplication. In any situation that their rising has restricted or suppressed or inhibited its early blooming, peoples and their

culture knew the true path of decline. Ross (1915) stated, in a somewhat cautionary tone, that the fundamental task of mankind should be, in the coming decades; retain geniuses or individuals of superior intelligence as one of the treasures to preserve for future generations.

Conclusion

The psychology of science is a relatively new field of research whose first congresses, societies and specialized articles became known in the last three decades, but whose background can be found in the work of various authors who wrote and theorized throughout previous decades. Today, this area has been developing with increasing strength within psychology as an aspect aimed at understanding, in a systematic and consistent manner, different biological, phylogenetic, ontogenetic, family, educational, social and cultural conditions resulting in the emergence of creative individuals in different areas of human activity, including the wide range of scientific research.

In this regard, the inquiry of the processes pertaining to the generation of great talents has important practical implications, though perhaps not very clear yet, which can be summarized in the understanding, developing and sustaining of optimal environments or, at least, friendly to the emergence of people with the ability, vision and determination needed to contribute to the productive development of their own cultural groups.

The potential development of highly creative individuals is important for a wide range of situations, and it is undeniable that it also has an essential component for any project that aims at national development (García, 2014b). Similarly, it is a field of very promising connections with specialized sectors such as educational psychology, supported in the knowledge of the effects of the home and school environment in the establishment of new inventions, and of the most effective strategies to enhance intelligence and creativity in the most gifted human beings.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

The ideas established herein record past background. They are represented by authors who, although have not intended to settle science psychology in contemporary terms, came early with concepts and viewpoints that sound provocatively similar to current opinions. The article by R. Ross that has undergone a concise analysis in these pages is a significant case. In a clear and decisive way, he stated that geniuses are an unquestionable part of a country's national wealth, a concept very much in harmony with the concepts expressed at that same time by personalities like the British statesman Arthur Balfour (1848-1930), who argued that some varieties of geniuses contributed to social development in very specific points of history, as in the case of Athens in the 5th and 4th centuries B.C., Florence in the 15th and 16th centuries and Holland in the 17th and 18th centuries, to name a few examples (Balfour, 1908).

The presence or absence of genius individuals may even compromise the chances of a country to appear with some real merit in the pages of history. Ross' ideas represented the active involvement of psychological concepts in a vision of the intelligence and its direct counterparty: creativity. Thus, he stressed substantial aspects, such as the motivation that anticipates the achievements of those subjects with greater intellectual capacity, the brilliance that precede or are the cause for the creation of innovative ideas and traits that confer greatness to certain people to cleverly distance them from simple users of circumstances. With his defense of these ideas, he directly bordered the areas of personality and intelligence.

Similarly, Ross (1915) recognized the equivalence between intelligence and the inherent greatness of men, relating them to the quality of their achievements and their greater or lesser projection toward the good of all mankind. Therefore, the achievements toward the common good are always highlighted in the brightest individuals, while the small ones only recognize the presence of their own and tiny personal interests. He understood that intellectual skills are not only comprised in the creative process, but the

emotions and the will to move forward also meet. In the absence of these, any eventual achievement will remain absent.

Environmental contexts in which cultural and personal talents emerged also deserved an outstanding attention. These are combined with the presence of a sufficient determination and intrinsic conviction to continue. However, in all instances of genuine scientific progress the fine balance that comes from the subjective and cognitive qualities of the scientist is imposed. The most gifted people have the ability to recognize more easily and quickly moments and situations to exploit occasional opportunities, the contexts for invention and discovery. They know how to take advantage of them better and more efficiently than others do. Based on these considerations, Ross (1915) could distinguish that there are individuals better equipped for basic tasks, such as collecting and obtaining basic data (the *observer of external facts*), and those who aim at the theory and development of a high-level hypothesis (*troubleshooter*).

Although the difference may suggest a disguised form of intellectual elitism, it is enough to witness the recognition of phenomena as we now call *intellectual styles* (Sternberg, 1997; Zhang & Sternberg, 2009), its essential variants and differentiated action exerted on the researcher's work. All lanterns light up in the dark, but those who are charged with greater fuel supply will extend the brightness of the flame a little further, reducing the shadows of the night environment. Where lamps illuminate the ground, differences in intellect ignite the factors that make up the thought. A similar metaphor is the one that can be drawn from Ross' ideas, who was not either far from the trend of his time, frequent in authors like Lombroso, of connecting a high development of intelligence and genius with a hint of insanity.

Yet, despite its relevance and novelty, Ross' (1915) article is only a quick appearance that did not leave recognizable influences in Paraguayan psychology, neither in short nor long term. His publication can even be seen as circumstantial taking into account his work, on which no further deepening is found. However, this is not a limitation restricted solely

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

to this article, as it stands out as a common and frequent feature in the context of many local scientific productions. In the history of Paraguayan psychology, discontinuity and lack of traditions are evidenced more often than the successful achievement of sustained and consistent efforts (García, 2007, 2009).

It should be noted that Ross' article has the particularity of anticipating ideas and approaches concerning the personality and motivations of scientists several decades before their formal insertion to the subject of psychological science, even taking into account the international scenario. However, at the local level, his ideas were like notes of a melody executed for ears that were not accustomed or trained to listen to it. Not that there was complete absence of intelligence interested in the culture of science, but its development and practice were rare in the national culture of the early 20th century, leaving inquiring minds free to a solitary work and with little social recognition.

The work of Ross (1915) is a typical piece of Paraguayan psychology of the pre-university period: solid, well informed, soberly written, but essentially theoretical. The article contained many elements of analysis on focused topics, some possible sources of comparable hypotheses and evidence for incipient theoretical progress. Still, it did not lead to a sustainable empirical research program.

We are in front of a constant in the history of psychology in this country, translated into the profile of a specialty that sometimes generates ideas for itself and, more frequently, reproduces imported knowledge or some *reception* process, but is frustrated in its transit of thought and the theory to empirical verification or innovation. However, it is a particular feature that, far from being negatively judged, should be understood in its proper context and especially valued as the expression of a discipline with characteristic and different nuances.

An eminently theoretical and reflexive psychology does not need to be seen as negative, even though when predominantly settled on this conditions it leaves a mark in its development as a science. Nevertheless, the emphasis

on theory can be seen as a necessary stage in the creation of more research-oriented approaches that, once present, must be constituted on their basis and which appearance is presumed to be part of a later temporary development. This has not always happened in Paraguayan psychology, but the rescue and revaluation of its forgotten and unknown background, far from having a simple, emotional or strictly evidential value and, therefore, far from the real objectives that inspire scientific work, holds the potential to lead to a critical assessment of its hypotheses and, consequently, toward that delayed second moment that is replication.

From this particular point of view, the work of Ross (1915) published in *Letras* may be a link in the synthesis of current knowledge of the psychology of science with principles sustained exactly a century ago. In this regard, and beyond their historical adventitious interest, it has a new sense in the better understanding of some old questions but with renewed validity.

References

Báez, C. (1915). Filosofía política moderna. *Letras*, *1(2)*, 75-80.

Baldwin, J. M. (1913a). *History of Psychology. A sketch and interpretation. Volume I. From the earliest times to John Locke*. New York: G. P. Putnam's Sons.

Baldwin, J. M. (1913b). *History of Psychology. A sketch and interpretation. Volume II. From John Locke to the present time*. London: Watts & Co.

Balfour, A. J. (1908). *Decadence*. Cambridge: Cambridge University Press.

Brett, G. S. (1912). *A History of Psychology. Ancient and patristic.* London: George Allen & Company. http://dx.doi.org/10.1037/10579-000

Bucknill, J. C. (1859). *The psychology of Shakespeare.* London: Longman, Brown, Green, Longmans & Roberts.

Cacciopo, J. T., & Freberg, L. A. (2013). *Discovering psychology. The science of mind*. Belmont: Wadsworth.

Candolle, A. (1873). *Histoire des sciences et des savants depuis deux siècles*. Genève: H. Georg.

Propósitos y Representaciones
Jul.-Dec. 2016, Vol. 4, N° 2: pp. 359-412.
http://dx.doi.org/10.20511/pyr2016.v4n2.125

Csikszentmihalyi, M. (2014). *The systems model of creativity. The collected works of Mihaly Csikszentmihalyi*. Dordrecht: Springer.

Domínguez, M. (1915). La Nación. *Letras*, *1*(6), 295-304.

Dumont, F. (2010). *A history of Personality Psychology. Theory, science and research from Hellenism to the twenty-first century.* New York: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511676093

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*(4), 290-309. http://dx.doi.org/10.1207/s15327957pspr0204_5

Feist, G. J. (2006). *The Psychology of Science and the origins of the scientific mind.* New Heaven: Yale University Press.

Feist, G. J. (2010). The function of personality in creativity. The nature and nurture of the creative personality. En J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 113-130). New York: Cambridge University Press. http://dx.doi.org/10.1017/cbo9780511763205.009

Feist, G. J. (2011). Psychology of science as a new subdiscipline in psychology. *Current directions in Psychological Science*, *20*(5), 330-334. http://dx.doi.org/10.1177/0963721411418471

Feist, G. J. (2012). The psychology of science is off and running but where do we go from here? En R. W. Proctor & E. J. Capaldi (Eds.), *Psychology of science: Implicit and explicit processes* (pp. 13-39). New York: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199753628.003.0001

Feist, G. J., & Gorman, M. E. (2013). Introduction: Another brick in the wall. En G. J. Feist & M. E. Gorman (Eds.), *Handbook of the psychology of science* (pp. 3-19). New York: Spinger.

Fine, G. (2014). *The possibility of inquiry. Meno's paradox from Socrates to Sextus.* New York: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199577392.001.0001

Galton, F. (1869). *Hereditary genius. An inquiry into its laws and consequences.* London: Macmillan. http://dx.doi.org/10.1037/13474-000

Galton, F. (1874). *English men of science: Their nature and nurture.* London: Macmillan.

García, J. E. (2007). La psicología en Paraguay y el problema de la determinación de los pioneros. *Revista Intercontinental de Psicología y Educación, Tercera Época*, *9*(2), 113-146.

García, J. E. (2009). Breve historia de la psicología en Paraguay. *Psicología para América Latina, Nº 17,* Agosto 2009. Recuperado de http://www.psicolatina.org

García, J. E. (2014a). Eventos y protagonistas centrales para la historia de la psicología en el Paraguay. En G. Salas (Ed.), *Historia de la Psicología en América del Sur. Diálogos y perspectivas* (pp. 142-169). La Serena: Nueva Mirada Ediciones.

García, J. E. (2014b). La creación de soportes adecuados en la promoción de científicos e investigadores psicológicos. *Cuadernos Pedagógicos, Octubre 2014*, 37-46.

García, J. E. (2014c). Publicaciones psicológicas en la *Revista del Instituto Paraguayo*. *Universitas Psychologica*, *13*(5), 1815-1833. Recuperado de http://revistas.javeriana.edu.co/sitio/psychologica

García, J. E. (2015a). Las brechas del pensamiento en la historia de la psicología. *Arandu-UTIC, Revista Científica Internacional*, *2*(1), 29-73.

García, J. E. (2015b). Fundamentos históricos de la Psicología Educacional. En D. Jáuregui Camasca, R. León Donayre & M. A. Rodríguez Rea (Eds.), *Homenaje a Reynaldo Alarcón* (pp. 393-426). Lima: Universidad Ricardo Palma, Editorial Universitaria.

García, J. E. (2015c). La revista *Letras* y su contribución a la psicología en el Paraguay. *Revista Peruana de Psicología y Trabajo Social*. En prensa.

Gattei, S. (2009). *Karl Popper's philosophy of science*. New York: Routledge.

Hilgard, E. R., Leary, D. E., & McGuire, G. R. (1991). History of psychology: A survey and critical assessment. *Annual Review of Psychology*, *42*, 79-107. http://dx.doi.org/10.1146/annurev.ps.42.020191.000455

Hoyningen-Huene, P. (1993). *Thomas S. Kuhn's philosophy of science*. Chicago: The University of Chicago Press.

Ingenieros, J. (1915a). Las ideas sociológicas de Sarmiento. *Letras*, *1*(2), 64-72.

Ingenieros, J. (1915b). Las ideas sociológicas de Sarmiento (Conclusión). *Letras*, *1*(3), 121-128.

Klemm, O. (1914). *A History of Psychology.* New York: Charles Scibner's Sons. http://dx.doi.org/10.1037/10849-000

Lang, P. (2007). *Schoenberg, Wittgenstein and the Vienna Circle*. Bern: International Academic Publishers.

Lee, R. (2002). *The eureka! moment. 100 key scientific discoveries of the 20th century*. New York: Routledge.

Lombroso, C. (1891). *The man of genius.* London: Walter Scott.

Lynn, R., & Vanhanen, T. (2002). *IQ and the wealth of nations*. Westport: Praeger.

Mercante, V. (1915). Orientación de las cátedras de Filosofía. *Letras*, *1*(2), 73-74.

Mercier, C. (1918). *The origins of contemporary psychology*. New York: P. J. Kenedy & Sons.

Millon, T. (2004). *Masters of the mind: Exploring the story of mental illness from ancient times to the new millennium.* Hoboken: John Wiley & Sons.

Okasha, S. (2002). *Philosophy of science. A very short introduction*. New York: Oxford University Press. http://dx.doi.org/10.1093/actrade/9780198745587.001.0001

Owens, R. L. (2009). Genetics of creativity. En B. Kerr (Ed.), *Encyclopedia of Giftedness, Creativity, and Talent* (pp. 372-373). Thousand Oaks: Sage. http://dx.doi.org/10.4135/9781412971959.n163

Pérez Ríos, J. (1990). El análisis histórico en psicología como un proceso complejo. *Revista de Historia de la Psicología*, *11*(3-4), 491-503.

Poincaré, H. (1918). *Science and Method*. London: Thomas Nelson & Sons.

Rand, B. (1912). *The classical psychologists. Selections illustrating psychology from Anaxagoras to Wundt*. Boston: Houghton Mifflin Company. http://dx.doi.org/10.1037/10885-000

Riquelme, M. (1948). *Lecciones de Psicología* (9ª ed.). Buenos Aires: Ángel Estrada Editores (edición original 1936).

Ross, R. (1915). El genio de la ciencia. *Letras*, *1*(1), 33-35.

Sarton, G. (1948). *The life of science. Essays in the history of civilization*. New York: Henry Schuman.

Simonton, D. K. (1988). *Scientific genius: A psychology of science*. New York: Cambridge University Press.

Simonton, D. K. (1999a). *Origins of genius*. *Darwinian perspectives on creativity*. New York: Oxford University Press.

Simonton, D. K. (1999b). Creativity as blind variation and selective retention: Is the creative process Darwinian? *Psychological Inquiry*, *10*(3), 309-328.

Simonton, D. K. (2009). Applying the Psychology of Science to the science of Psychology. Can psychologists use psychological science to enhance psychology as a science? *Perspectives on Psychological Science*, *4*(1), 2-4. http://dx.doi.org/10.1111/j.1745-6924.2009.01093.x

Simonton, D. K. (2014). *The Wiley Handbook of Genius*. Chichester: Wiley Blackwell. http://dx.doi.org/10.1002/9781118367377

Sternberg, R. J. (1997). *Thinking styles*. New York: Cambridge University Press.

Tuckman, B. W., & Monetti, D. M. (2011). *Educational Psychology*. Belmont: Wadsworth - Cengage Learning.

Uttal, W. R. (2004). *Dualism. The original sin of cognitivism*. Mahwah: Lawrence Erlbaum Associates.

Zhang, L. F., & Sternberg, R. J. (Eds.) (2009). *Perspectives on the nature of intellectual styles*. New York: Springer.