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# Reflections on “Psychotechnics”: Measuring Lives in the Beginnings of Psychology in Brazil

**Luciana Dadico**

Department of Psychology, Universidade Federal de Mato Grosso

Mato Grosso, Brazil

Research Program in Cultural Studies, Universidade de São Paulo

São Paulo, Brazil

## Abstract

*In this article, I discuss the genesis of psychotechnics in Brazil, from 1920 to 1950, starting from narratives about the history of psychology and analyzing, in a comparative way, three psychotechnics courses held in the city of São Paulo. Although these courses respond to local projects aimed at industry and education, our analysis reveals that they also express the materialization of a global project, built on statistical tools, standardized equipment and international circulation of texts and intellectuals. Measuring human activities was in the core of the public recognition of Psychology as a field of knowledge. The critical review of this history is important in order to understand how Psychology took part in building our current way of life. Moreover, understanding this movement within the field can help psychologists today in their work to reduce suffering, but also to change this rationalized state of things, responsible for the suffering production. Such changes imply refusing consolidated models for thinking and research in Psychology, in favor of more interdisciplinary and critical approaches.*

Keywords: History of Psychology, Psychotechnics, Henri Piéron, Roberto Mange, Cultural History

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## Introduction

The issue of this paper is Psychotechnics – a very popular discipline around the world in the beginning of the Twentieth Century. In that time, psychotechnics was mostly devoted to measure psychological events. The 20s and 30s of the 20th century were lavish for the development of psychological tests in Brazil, applied in schools, factories, in the evaluation of train and car drivers. This assessment is consensual in most chronologies that deal with the history of psychology in Brazil. However, the so-called psychotechnics, today considered a branch of psychology that deals with testing, was not born with an explicit and defined purpose: its scope, uses and theorizations, were "put to the test" in institutions and in the daily lives of people as they were created. At the same time that psychotechnics was spread in the Brazilian training institutions, its knowledge was disseminated and appropriated, as the newspapers of the time show, supporting from music teaching and chess to the classification of children in reformatories (Reti, 1927). The object of psychotechnics, therefore, ends up conforming to the interests and possibilities of the society of the time.

In a pioneer assessment of the area, in the 1950s, Annita de Castilho Marcondes Cabral, professor of psychology at the University of São Paulo, says:

This quarter of century sees a movement in favor of testing, typically North American. Medeiros and Albuquerque started it with a conference in Rio de Janeiro, followed by an excellent book: *Tests*. In Bahia, Isafas Alves immediately orders in the United States and England the works recommended by Medeiros, and a few years later he will meet the new North American Psychology directly, at the famous Teachers College, at Columbia University. Shortly before, Lourenço Filho discovered in São Paulo the small educational library of an American institution and also started to work with tests. Shortly after the first Medeiros conference, psychologist H. Piéron came to offer courses in Brazil and his favorable influence on objective measures lends the traditional French prestige to the initiated movement. Claparède's book on the same subject brings the technical bases and a varied repertoire of intelligence and aptitude tests to a public not yet so familiar with English (Cabral, 1950, p. 34, freely translated from the original in Portuguese by L. Dadico).

The original English text, according to the author's note, was written as a chapter (Psychology in Brazil) of the book *World Psychology*, which would be published in the United States by the University of Cincinnati. Annita Cabral was in that country more than once to study in the 1940s. Writing to an American audience, the young professor was concerned with defending the role of American influence in the development of the discipline in Brazil, but also in giving a certain unity to the "testing movement" that, although American in origin, would be associated in Brazil to French academics, because of their "prestige" and linguistic affinity. In a different way, Lourenço Filho, in a 1956 report, sought to characterize psychotechnics as a confluence of interests of doctors, educators, and engineers, Brazilians and foreigners.

It is important to notice the way in which the disputes between schools and influences shape the representations about psychology in Brazil. The need perceived by Cabral to minimize the French participation in the local history of psychology seems to compose a narrative aimed at the consolidation of a discipline endowed not only with specific methods, but also due to American texts and authors: “In the second decade of this

century, the influence of North-America began to be felt, but still, through France” (Cabral, 1950, p.34).

According to Castro, Facchinetti and Portugal (2018), Lourenço Filho presents psychotechnics as “unified practice for convergent and similar areas” (Castro et al, 2018, p.8), even noticing the existence of asymmetries between its fields of application. In an article on psychology in Brazil, Lourenço Filho presents a long list of “foreign specialists” who have visited the country and, according to him, contributed to the shaping of the field. Cabral, in turn, separates those who “are trained empirically” and do not do research from those who do not cultivate “the method of arriving at statements”, characterizing the works of Mange and his disciples as “industrial psychology”, “oriented towards practical purposes, not research” (Cabral, 1950, p. 33).

Therefore, different solutions by Annita Cabral and Lourenço Filho, due to the strength of the field, which was undergoing a major reorganization since the passage of the American Otto Klineberg by the FFCL-USP, from 1945 to 1947, and to the wave of professionalism marked by the creation of the Associação Brasileira de Psicotécnica (ABP), in 1949, led by Myra y Lopez, which will culminate in the first regulatory draft of the profession of psychologist headed by the ABP in 1953.

For the purpose of a history of the constitution of the field, it is important, confronting the theses of Annita Cabral and Lourenço Filho, not only to find out how unified or divergent were the practices of the discipline at the time, but to discriminate in what they consisted. Therefore, there is an urgent need to shift the problem from the origin to the description of interests, theoretical approaches and representations mobilized around psychotechnics. Starting with the categories used to define the area: such as “applied psychology”, “tests”, “psychotechnics”, “psychometrics” or “technopsychology”, in a scenario in which psychology itself, as a scientific discipline, pleaded for safe ground. In addition to the description of the agents who managed the area, this leads us to other problems related to the genesis of psychotechnics in Brazil: the relevance of national identity in the configuration in the area (whether French, Swiss, German or American); what was meant by psychotechnics; and what is the role of universities and other institutions in shaping it.

As materializations of this emerging disciplinary culture, some printed materials begin to feature in their frontispieces the word “psychotechnics” in the 1920s and 1930s: the “Notes on psychotechnics”, by Roberto Mange, from 1926; “Psychologia e psychotechnica”, by Henri Piéron, 1927; the “Psychotechnical study of some aptitude tests”, by Ulisses Pernambucano, from 1927; the class notes “Psycotechnica”, by Roberto Mange, from 1934; and “Psychotechnical assistance, technical study of man at work”, by Raul Rocha, from 1940. Among these, Roberto Mange, at the Liceu de Artes e Ofícios, in 1926, and at the Escola Livre de Sociologia e Política de São Paulo, in 1934, and Henri Piéron, at the Escola Normal de São Paulo, in 1926, are those engaged in producing class notes and organize a discipline called psychotechnics, exercising direct influence on the training of professionals and institutionalization of the subject.

In this article a comparative analysis of these three courses is presented, focusing on the arguments used by their professors to justify the importance of psychotechnics; how the discipline was defined and circumscribed in relation to other areas (psychology, philosophy, mathematics / statistics, physiology and ergology); the similarities and differences between these courses; and the evidences this comparison give us about issues

at stake in the constitution of psychotechnics in Brazil, considering its repercussions for the future of the discipline.

### **Mange and Piéron in São Paulo**

In the first decades of the twentieth century, there was a shift in the country's economic axis, following the industrialization process of São Paulo (Suzigan, 2000). This justifies why the so-called “psi knowledge” has found uses in São Paulo beyond the scholar and medical-psychiatric predominance in Rio de Janeiro at the same time (Castro et al, 2018). The local concern with the formation of labor, workers and specialized, as well as an intellectual elite, boosted the foundation of schools, colleges and the Universidade de São Paulo, in 1934, so that courses given by foreigners in the federal capital also arrived to the city of São Paulo.

Henri Piéron had already taught a psychotechnical course in Rio de Janeiro in 1923, at the Policlínica Geral, on the initiative of the Instituto de Alta Cultura in Rio de Janeiro - as part of a project aimed more at illustrating the enlightened society of Rio de Janeiro than university education. Piéron's visit to São Paulo followed the founding of the Instituto Técnico Franco-Paulista in 1925, which had become the main organ of academic collaboration between France and Brazil and would be the institution responsible for sponsoring the course on psychotechnics taught at the Escola Normal de São Paulo in 1926 (Petitjean, 1996, p. 106-107). According to Antunes (2012), the testing movement in Brazil begins at that time, and colleges for teachers were an important substrate for its development.

Piéron is remembered today as one of the founders of scientific psychology. With a degree in Philosophy and Science, he worked for more than twenty years at the Experimental Psychology Laboratory of the École de Hautes Études (linked to the Sorbonne), assuming its direction in 1912. In 1921, he had already created the Institut de Psychologie and, in 1923, assumed the chair of Physiologie des Sensations at the Collège de France (Paicheler-Harrou, 1992). In the period before his arrival in Brazil, he was grappling with the disputes for the establishment of psychology as an academic discipline and in French laboratories.

The trajectory of Roberto Mange, professor responsible for the courses of psychotechnics at the Liceu de Artes e Ofícios, in 1926, and at the Escola de Sociologia e Política, in 1934, was quite diverse. Graduated in engineering in Switzerland, Mange had spent his childhood in Lisbon due to his father's professional activities (as a commercial representative of the Factory Watch, later as an honorary consul of Switzerland in Portugal), and his youth in Germany, where he attended high school. In 1913, he accepted the invitation of Paula Souza, director of the Escola Politécnica de São Paulo, to join its body of professors, becoming professor of applied mechanics. In 1923, Mange participated in the foundation of the Liceu, aimed at training apprentices for the industry, as superintendent, and, in the following year, in the inauguration of the professional orientation and selection service, where he began to employ tests to select candidates for the mechanics course. Still in 1923, Mange made a long trip to Europe, to learn about studies and applications of psychotechnics. The professional selection service of the German Trams Company would inspire him to implement psychotechnical tests in the selection of workers (Serviço Nacional da Indústria, 1991). Piéron's arrival in Rio de Janeiro coincides with the moment when Mange was committed to expanding the use of psychotechnical tests in São Paulo.

The ideas about psychotechnics woven by Piéron and Mange in their courses forged knowledge and uses that integrated the training of the first generations of professionals dealing with psychology and psychotechnics in Brazil. Considering the varying degrees in which memorialistics have placed these authors as forming the canon of Brazilian psychology, the analysis of these courses provides an important clue to the issues at stake in the constitution of psychotechnics and psychology as disciplinary fields.

## From Psychotechnics to psychology: Henry Piéron

The notes of the Piéron psychotechnics course at the Escola Normal de São Paulo in 1926 were published in the form of a book, printed in 1927, with the name of *Psychologia e Psychotechnica* - Publicação do Laboratório de Psychologia Experimental. In the introduction, Lourenço Filho tells the story of the laboratory and the moment when Piéron's lectures are part of the Brazilian pedagogical project. The publication contains 23 chapters, divided into three parts. In the first part, there are classes on psychology; in the second, those of psychotechnics; and in the third, a description of laboratory practices.

When weaving a snapshot of the history of psychology, Piéron presents the discipline as heir to philosophy, which would have meant that thirty years before psychology did not contain “anything practical, only aprioristic concepts and abstractions”. In the search for “more positive knowledge of man”, scientific psychology would start to rely on the laws extracted from the psychophysiological experiments inaugurated in Germany and to undertake comparisons between races, men and animals, adults and children. In this context, the enunciation of Fechner's law on psychological perception was not surprising: “the intervention of the phenomenon of consciousness grows in proportion to the logarithm of the intensity of excitation” (Piéron, 1927, p.12).

The objective of psychology was to create formulas and measures of physiological mental functions, contributing to stipulate standards, and to enable the comparison and hierarchization of individuals. Having delimited the scope of the discipline, the chapters that follow are dedicated to the exposition of the “sensorial foundations of psychometry”. In this context, he was less devoted to explore the origins of stimuli and explanations for operations of consciousness than to scrutinize laws, mathematics, sensation and perception. Psychotechnics would reveal “its value”, thus, in relation to the “general notions of psychology” (Piéron, 1927, p.15), which would provide psychotechnics with scientific substrate, and on which this would depend for the same reason.

Piéron dedicated a good part of his lectures to the measure of intelligence, referring to the scales of Binet and Claparède. Confessing the difficulty of defining intelligence, defended the assertion that intelligence was nothing but the ability to solve problems. The differences of this conceptualization in relation to that of Alfred Binet would be the result, according to Huteau (2006), of fundamental conceptual and methodological divergences: while Binet understood intelligence from an associationist paradigm, based on laboratory practices, Piéron opted for the analytical approach, decomposing psychological functions into independent elements.

Explaining the idea that psychotechnics dealt with psychological measures, Piéron argued that what cannot be measured, such as conscience or affectivity, would be measured by its effects. The usefulness of numerical expression would be the possibility of assessing normality, comparing individuals and groups and promoting the adaptation of individuals. In the impossibility of isolating psychological functions, mathematical equations would be

in charge of establishing relations between them. It is in this way that the significant values (“essential end of the whole psychometric process”) started to compose the vocabulary of Psychotechnics, the center of gravity of the curve, the arithmetic mean, the median, the quartiles, the standard deviation, the correlations.

That the place chosen for the Piéron course in São Paulo was the Escola Normal provided evidence of the character that was sought to impose locally on the matter. Census conducted by Sampaio Dória at the beginning of the decade indicated that about 40% of school-age children were out of school (São Paulo, 1920; Mathieson, 2018), revealing a huge gap between the schooling of the São Paulo population and the project ongoing industrialization. In parallel with the educational reforms that followed, the solution at hand was to optimize the use of trained labor, forming students to fill specific positions in industry, public administration and the service sector, tasks for which psychotechnics showed promising results, with scientific support from the developing psychological discipline.

## **Psychotechnics as a projet**

In July 1926, Mange published in the newspaper O Estado de S. Paulo a series of reports describing the use that had been made of psychotechnics at the Liceu de Artes e Ofícios. The newspaper used to present a summary of lectures given in the city in the section “Leituras e Conferências” and psychotechnics was the subject of the column at various times. The natural interest that the theme aroused at the time was, therefore, built on the confluence of academics involved with the theme, from an audience eager for novelties. The newspaper was, therefore, part of the space for the legitimation of intellectuals at the time.

Mange emphasized the lack of qualified workers for the industry and the need to prevent accidents in the transport system, presenting psychotechnics as a solution. In these texts, he affirms not only that psychotechnics would constitute a body of knowledge consolidated in Europe and the United States, a “modern science”, but capable of “opening new horizons for the use of man's work faculties” (Mange, 1926b, p.4). The target audience of the newspaper article included the cry of the industrialists for the lack of capable workers, but also the government, capable of financing the enterprise.

Soon afterwards, the Mange's effort would bear fruit. In 1930, with the then director of the Railway Company Sorocabana, he participated in the inauguration of the Serviço de Ensino e Seleção Profissional (Teaching and Professional Selection Service), where he would put into practice training projects involving psychotechnics. In 1934, the year in which he began to teach the psychotechnics course at the Escola Livre de Sociologia e Política, Mange was invited to head the newly created Centro Ferroviário de Ensino e Seleção Profissional (Railway Center for Teaching and Professional Selection). Already recognized as an authority on vocational education, Mange became the protagonist of the foundation of SENAI (Brazilian service for industrial learning) in 1942, assuming the direction of the Regional Department of São Paulo, a position he would hold until his death in 1955 (Serviço Nacional da Indústria, 1991).

In 1926 at the Liceu, professional selection based on psychotechnics was defended as capable of “(...) putting each man in the exact place that suits his aptitudes” (Mange, 1926a, p.31). It is interesting to note the emphasis given by Mange to the assessment of “aptitudes” at the expense of “intelligence”, considered by him (in agreement with Stern

and Spearman) a concept of a broader and more imprecise nature. In the course of 1934, when Mange devoted himself to the theoretical discussions surrounding the discipline, he treated “general intelligence” itself as an aptitude, in reference to Claparède (Mange, 1934, 25th class, p.1). In contrast to Piéron's formulations, he highlighted the little use of a general intelligence coefficient, in favor of the need to isolate psychological functions for their specific evaluation.

According to Turbiaux (2017), in the early twentieth century, discussions in the area, with the involvement of major European psychotechnical names, such as Lahy, Remy, Claparède and Franziska Baumgarten, were being shifted to the concept of professional aptitude. The mention of many of these authors in Mange's courses provides an indication of both how up-to-date the Swiss was in relation to these debates, as well as how he positions himself in relation to the disputes on the agenda.

By dividing, both in the course of 1926 and in the course of 1934, the psychotechnical tests into "synthetic" and "analytical" (for investigating specific psychomotor functions), Mange agrees with the Piéron's theoretical formulation. Mange followed the course of the French specialist, as shown in the photo on the back cover of the edition of Piéron's course. In fact, Mange had been following Piéron's work for some time. Melo (2016) found some letters from Mange to Piéron. In this first moment and under the impetus of Taylorism in vogue, the development of the discipline found in both directions confluent: it was a question of characterizing psychotechnics as a science of man's adaptation to the task.

Eight years after its offer at the Liceu, in 1934, the discipline "Psychotechnics" made its entry into the academy through the hands of Mange. Yearbooks from the Escola Livre de Sociologia e Política show that the Mange course was successful, and lasted until 1944. The 1940 course program, which also contains some bibliographic indications, helps in our reading of the 1934 course (and vice versa), and to better observe some of its differences in relation to the 1926 course. The courses' descriptions listed in the Yearbooks of the Escola Livre de Sociologia e Política between the years 1940 and 1943 are identical, so we took the 1940 course description for comparison with the previous courses.

The notes of the 1934 course were typed by an unknown student, bound and given to Mange. Zanetti (2001) had already analyzed the first six classes available in the Roberto Mange dossier, placed in the Edgard Leurenroth Archive, at Universidade de Campinas. The analysis performed here encompasses the full text, with the 27 classes, which was found in the library of the Faculdade de Direito of the Universidade de São Paulo.

The semester course, which started on February 19 and ended on May 28, 1934, was taught twice a week. While the 1926 course emphasized the application of psychotechnical tests, the 1934 course sought to expose its insertion in the industrial and work areas, including a narrative about the historical development of the discipline. In the third class, we noticed a shift from the old concern to defend professional selection as a field of action for psychotechnics, towards professional training - which will be important to support the field that Mange seeks to establish in education for work.

To explain how psychology fits into the field of work, Mange drew on the knowledge of techno-psychology and its subdivisions. The list of “recommended books” from the 1940 course description elucidates the origin of the term: Walther's techno-psychology of industrial work appears on all Mange's course descriptions in the Yearbooks. News in

periodicals of the time show that León Walther, a Russian professor at University of Geneva, had been in Brazil in 1929, giving a conference at the Associação Comercial de São Paulo. Although we do not know whether Mange was involved with Walther's visit to the country, we perceive in the reading of the 1934 book of the month an approximation to the Russian author.

The insertion of techno-psychology in the course of 1934 implies a relevant change in the characterization of psychotechnics. Constant definition in the 4th. class, "Tecno-Psicologia is the adaptation of the elements of work to the individual" (Mange, 1934, 4th class, p.2), in the opposite direction to what was previously proposed, when the purpose was to adapt the individual to work. Although the two objectives of man-work adaptation do not seem incompatible, there is a change in focus when the need to adapt the individual to work or work to the individual and, consequently, strategies for achieving it, are highlighted.

Six years after the first course taught by Mange, and fourteen in relation to the inaugural course at the Liceu, Mange's psychotechnics showed consolidation in the area of work, finding both application and justification. Making the preoccupation - central in the course of 1934 - with the defense of professional training unnecessary, suggesting that the professionals specialized in psychotechnics would, at the turn of the decade, be absorbed no longer only by SENAI, Liceu and other schools, but directly by industry. In the Yearbook of the seventh academic semester of 1940, the psychotechnics course had the following presentation:

This chair elucidates factors of man's adaptation to work and those of work adjustment to the worker. The methods of determining the skills necessary to perform the work, the means of researching them for the purposes of professional selection, the processes of acquisition of the work technique and the way of adapting the work elements and the environment to the physical and psychological constitution of workers are all studied. These studies aim at greater efficiency of the human factor at work in addition to lower energy expenditure (Escola Livre de Sociologia e Política, 1940, p.42, freely translated from the original presentation in Portuguese by L. Dadico).

A brief comparison of this course description with the notes of previous courses shows that Mange had incorporated the precepts of techno-psychology, and that dialogues with ergology, initiated in the course of 1934, became more intense. The topic “Professional Skills” shrinks, and moves to the middle of the course, which now ends with the “Techno-Psychological Work Organization” (no longer “scientific management”, which moves to the beginning of the course, illustrating the historical development of the discipline) and the "Social mission of psychotechnics in the country's production activities".

Analyzing the mention of other authors in the 1934 book, we find references to a set of names frankly opposed to the taylorism, such as that of the German Otto Lipmann and the French Jules Amar.

In France, Amar is considered one of the precursors of ergonomics. Researcher active in the early twentieth century, proposed a scientific study of physical and physiological data related to efficiency at work. In addition he directed the laboratory for investigations of industrial work at the Conservatoire National des Arts et Métiers de Paris. Amar argued that environmental factors such as light, temperature and noise influenced human

performance. According to Alves, Queiroz & Paschoarelli (2010), Amar endeavored to experimentally verify Taylor's principles, which were accused at the time of lack of foundation, by using, among other devices, chronophotography. This technique used to capture the various phases of the movement in a single photo, allowing him to analyze the movement progression.

It is important to note that Taylor's work had not been well received by workers, but in France, in particular, reactions against the Taylorism precepts paralyzed factories like Renault, and Amar was among the movement's supporters. According to Reuchlin (1971), psychotechnics names like Jean-Maurice Lahy would already be anti-Taylorists, although they argued that the problems of work needed to be considered in respect of the characteristics and qualities of each worker. Ouvrier-Bonnaz (2006) goes even further, arguing that psychotechnics itself would have emerged as a critical response to Taylorism.

Bertolli Filho (2003) defends that Brazilian industrialists sponsored the coming of names of world psychotechnics to Brazil because they believed that there was a convergence between the goals of psychotechnics and Taylorism, and Mange used this enthusiasm to open paths for psychotechnics. However, companies ended up showing little willingness to "bear the costs represented by the multiplicity and scope of the guidelines prescribed by psychologists" (Bertolli Filho, 1993, p. 43), despite the greater concern with occupational diseases and accidents among Brazilian businessmen and government in the 1920s and 1930s (Almeida, 2015). More concrete possibility of social insertion for psychotechnics, on the other hand, has opened up, as we have seen, in the educational area - which led Mange to direct his efforts in psychotechnics for the education of workers.

In a study of Mange's work, Zanetti (2005) maintains that the educational turn taken by Mange would in itself be anti-Taylorist, since in no passage of his writings did Taylor manifest an intention to train manpower. One of Taylor's projects involved the expropriation of workers' knowledge, while Mange's proposals oscillated between replacing / allocating workers (via professional selection) and raising the technical level of workers.

In 1940, Mange proposed a historical line of development of psychotechnics, starting from his relationship with the scientific management, through professional selection and training, in the direction of "psychotechnical adaptation of the elements of work to man" - then seen as the most advanced psychotechnics he had been able to produce. The fourth part of the course, which unfolded Mange's ideas about the "Techno-Psychological Work Organization", would explore elements of adapting work to the individual and rationalizing the workplace. Probably, not only the incorporation of Walther's works, but also his readings of both Amar's and Lipmann's works are related to this change.

When considering Mange's work in a dynamic way, subject to the influences of his time, we can problematize the assertion, disseminated in narratives from the history of education to work psychology (Dominschek, 2011; Sato, 2003), which establish a association between psychotechnics and Taylorism, placing the name of Mange at the same time as a precursor and promoter of Taylor's ideas in Brazil.

In 1944, the psychotechnics course description underwent a new transformation. Now, two parts of the discipline were dedicated to ergonomic issues: the sixth, relating working conditions to worker efficiency; and the seventh (and last), dealing with the conditions of the work environment. The recommended bibliography, more extensive than before, now includes several titles of work psychology, guidance and professional advice - constituting

the bases for the internal segmentation of the psychology that was beginning to establish itself.

## Final Considerations

The presentation of psychology as a scientific discipline today gives us the impression that areas such as psychotechnics constituted a branch of the "psi" trunk. By investigating the history of the area, however, we found that both were intertwined at the beginning of the constitution of the field in Brazil. More than that, psychotechnics was institutionally consolidated more consistently between 1920 and 1930, making Brazilian psychology grow in its wake. Psychologists were trained in institutions that emerged with the spread of psychotechnics (IDORT, SENAI, companies and experimental laboratories in schools), placing psychotechnics at the center of disputes over the place in psychology in the role of science. This hypothesis, in the Brazilian case, is attested to: a) the simultaneous occurrence of psychology and psychotechnics in the course proposed by Piéron; b) the movement of intellectuals between these areas; and c) the first class organization of the local professionals in an institution, both for psychologists and psychotechnicians, the Associação Brasileira de Psicotécnica. With an evident application scope, psychotechnics achieved dizzying success, leveraging the psychological company at a time when the university was looking for justification for its role in fostering economic development.

If, at first glance, because they are engineers and doctors, or because they are engaged in industrial work and school, Mange and Piéron seem to defend different projects, our analysis showed, on the contrary, a theoretical and practical convergence of both authors in many points, with Mange using the analytical method of psychological functions proposed by Piéron, and with both building institutes with similar functions on the two sides of the Atlantic. Piéron had his biography linked to the foundation of the Institut National D'Orientation Professionnelle (INOP), responsible for school and professional guidance in France (Martin, 2017), while Mange strove to build railway training courses, IDORT and SENAI .

A global project of discipline, not specifically located, was reproduced, therefore, thanks to its analytical assumptions: testing did not take into account the cultural particularities of the tested person; intelligence and psychological skills were thought of as biological characteristics, unevenly distributed across the planet; statistical and mathematical tools were able to measure, load and reproduce results elsewhere, enabling the circulation of intellectuals, texts and testing equipment worldwide. The coexistence of a set of reference authors in the texts by Mange and Piéron, such as Binet, Claparède, Fechner, Galton, symbols of the overlap between statistics and testing in the search for mathematical bases for human behavior corroborate this hypothesis.

In the middle of this list of authors, we will also see Americans, Germans and Englishmen, who from a training perspective cannot be considered “national”. In the United States, the psychotechnical project was born out of the appropriation of Binet by the Americans (Gould, 1996), many of whom, in turn, were guided by German professors, now in Germany by Wundt, now in Harvard, by Münsterberg (Paicheler-Harrous, 1992). It is not, therefore, about defending the affiliation of Brazilian psychology to the Americans or French, as some memorialistics wanted. The discussion of foreign affiliation finds context only if we consider the appropriations that local elites would make of cultural policies for Latin America and Brazil, managed by European and American

organizations. During the 19th century, it is France that holds the hegemony of foreign cultural exchanges in Brazil, while in the first decades of the 20th century, other countries opened up fronts, so that in the 1930s, the foundation of universities would take place from the entry of other international actors, such as Italy, Germany (Silva and Siqueira, 2018; Cândido da Silva, 2013) and the United States (Marinho, 2001).

Annita Cabral and Lourenço Filho would each raise and defend the symbolic capitals arising from the association of their works and their names with the translations of works by foreign professors. But also by including their own profile in the cultural sections of local newspapers, and in offering connections with international personalities to the local history of the disciplines. Such intellectuals built upon these meetings a cultural international capital, financed by the geopolitical game of the period. These were fundamental capitals in the organization of the field in the early 1950s in Brazil.

Initially, we agree that the use of psychotechnics by Mange in industrial education gave expression to what Antunes (2012) and Moraes (2000) consider part of a movement to rationalize the educational practices, less coincident with an ideal of individual development, and more with that of individual-work integration - a view consistent with the search for consolidation (including ideological) of the industrialization model in São Paulo at the time. The sense of this integration, however, changes with the evolution of Mange's psychotechnics course, echoing readings of the work of authors such as León Walther and Jules Amar. That change has been noticed by Annita Cabral, when classifying the work of the engineer as "industrial psychology", no longer as psychotechnical (Cabral, 1950, p.40). Analyzing the psychotechnical courses at the Escola Livre de Sociologia e Política, we are thus led to question the way Roberto Mange has been considered in the game of contradictions, tensions and resistances that make up the history of ideas in Brazilian psychology - a process that is sometimes denied or relegated to the background in the construction of more or less critical or edifying narratives in the area.

In this paper, I highlight the way in which the areas are being reconstructed, in permanent movement, influenced by the material circulation of works and characters, reception of their ideas and interests at stake - including those geopolitical and local, and their combinations, contributing decisively to the unique conformation of the country's professional and academic institutions. Measuring the human activities was in the core of the public recognition of the psychological field, so the criticism of this history is important in order to understand how Psychology took part in building our current way of life. Such approach implies in refusing consolidated models for thinking and research in Psychology, in favor of more interdisciplinary and critical methods.

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### About the author:

**Dr. Luciana Dadico** is currently professor at the Department of Psychology of the Universidade Federal de Mato Grosso, Brazil, teaching also at the Research Program in Cultural Studies of the Universidade de São Paulo, Brazil. She received her PhD in Psychology at the Institute of Psychology, University of São Paulo, after a period as visiting scholar at the Scuola Normale Superiore of Pisa, Italy. Dr. Dadico developed postdoctoral studies at the Program in Critical Theory – University of California, Berkeley, under the guidance of the Emeritus Professor Martin E. Jay. She is bachelor both in Psychology and Philosophy. Along her career, she was awarded with many grants from Italian and Brazilian agencies for research. Her publications include themes and areas such as Critical Theory of Society, Social and Educational Psychology, Gender Studies, Cultural History, History of Psychology, Literature, Reading and Digital Humanities.

*Contact:* Programa de Estudos Culturais da Universidade de São Paulo. Escola de Artes Ciências e Humanidades. Rua Arlindo Bettio, 1000, Ermelino Matarazzo, 03828-000, São Paulo, SP. Email: [ludadico@usp.br](mailto:ludadico@usp.br)

ORCID: <http://orcid.org/0000-0001-8577-6892>