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Psychological Inquiry and Scientific Methodology in the Enlightenment: Unveiling the Insights of Jean Trembley

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Abstract This study delves into the intellectual milieu of the Enlightenment era, offering an in-depth exploration of Jean Trembley's seminal contributions to empirical psychology and scientific methodology. As a fervent protégé of Charles Bonnet, Trembley's work, first published in 1781, marked a significant milestone in the development of French-language discourses on empirical psychology's methodological approaches. This paper conducts a thorough examination of Trembley's methodological and epistemological underpinnings, elucidating his staunch advocacy for the centrality of psychology and the indispensable role of empirical evidence in scientific inquiry.

In particular, the analysis focuses on Trembley's multifaceted intellectual pursuits, encompassing domains such as mathematics, physics, psychology, aesthetics, theology, and politics. This exploration uncovers a cohesive philosophical thread that underscores his commitment to a form of cognitive morality, deeply rooted in psychological principles. The investigation highlights how Trembley's work championed the use of experience and the systematic application of cognitive processes like curiosity, attention, imagination, as well as the dynamics of habit formation and the association of ideas, thereby positioning psychology as a crucial cornerstone in the framework of scientific methodology.

Ultimately, this article offers a comprehensive evaluation of Trembley's lasting impact on the field of empirical psychology during the Enlightenment, illuminating his role as a pivotal figure in the evolution of scientific thought and practice during this transformative period in intellectual history.

Index Terms Empirical Psychology, Enlightenment, Scientific Methodology, Geneva, Charles Bonnet.

I. Summary

Jean Trembley, a devoted disciple of Charles Bonnet made a significant contribution to the realm of empirical psychology with his 1781 publication, marking the inaugural French-language work on this subject. Beyond his primary focus on psychology, Trembley's wide-ranging interests encompassed mathematics, physics, aesthetics, theology, and politics, all converging on methodological and epistemological beliefs that underscored the centrality of psychology and the paramount importance of empirical evidence. Trembley grounded a cognitive morality applicable across diverse knowledge domains in psychology, advocating for an approach built on experience and the deliberate utilization of curiosity, attention, imagination, as well as mechanisms fostering habit formation and idea association. This positions psychology as the linchpin in scientific methodology. This article delves into Trembley's methodological and epistemological concepts, shedding light on the pivotal role he ascribed to empirical psychology.

II. Introduction

In the 18th century, the discipline increasingly referred to as psychology acquired characteristics that were shared by most authors addressing the subject, albeit with variations. Continuity with treatises on anima was maintained, defining psychology as the empirical science of the soul united to the body. However, it diverged in two crucial ways from the predominant definition of the term "psychology" since its inception in the late 16th century [1].

First, adhering to Aristotle's conception, the soul was defined as the potential life-form of a body, making this psychology a generic science of living beings (or those endowed with souls) such as plants, animals, and humans—a perspective upheld until the end of the 17th century. Second, this psychology often incorporated metaphysical-theological discussions about the soul separated from the body. While Enlightenment works presenting themselves as psychology didn't entirely shy away from this terrain, they tended to emphasize distinctions from metaphysical and theological research, aiming to remain within the domain of natural philosophy. They approached their subject with a sensualist perspective consistent with "Baconian" epistemology, focusing on "fact" and "experience."

The metaphysical aspects of the soul, including questions about its origin, immortality, and post-mortem state, ceased to be integral to psychology in the 18th century.

Despite not adopting a materialist stance, Enlightenment psychologies largely adhered to the fundamental principle of Christian anthropology: man as a mixed being, composed of a soul and a body, understood only in their union [2]. *Essay on Psychology* encapsulates this methodological postulate: "We only know the Soul through its Faculties; we only know these Faculties through their Effects. These Effects are manifested through the intervention of the Body." Acknowledging the existence of the soul and its union with the body, psychologists refrained from delving into the essence of the soul and the nature of the union between the two substances [3]. Instead, they focused on observing and describing their "interaction." Aligned with John Locke's approach, the method employed was analysis an activity involving the "decomposition" of ideas and tracing them back to their origin in sensation. This method necessitated introspection, paying attention to the "states" of the soul and its internal processes, utilizing apperception, a reflective act by which the soul becomes aware of its perceptions and its capacity for thought. Concurrently, given the principle of the union of the two substances, 18th-century psychology frequently delved into neurology, recognizing that understanding the interaction of soul and body required comprehending their mutual influence through nervous "fibers."

Positioned at the crossroads of soul sciences and body sciences, psychology took on subjects previously explored in logic, metaphysics, and philosophy. It reminded other sciences of methodological principles by elucidating how humans think and acquire knowledge, and it played a crucial role in the reform of laws and education by describing human emotions, habits, tendencies, and needs. The restructuring of knowledge and the integration of psychology into diverse fields—from metaphysics to aesthetics, theology to the theory of science—earned the Enlightenment the moniker of the "century of psychology." However, among those considering the Enlightenment in this way, "psychology" often referred to a set of psychological ideas shaped by drawing on various applications of sensualist principles. This was at the expense of recognizing psychology as a distinct academic discipline, an empirical knowledge field separate from other discourses on the soul. While there were overlaps between psychological ideas and psychology proper, they represented two distinct conceptual spaces [4].

To comprehend the interaction between these spaces, exploring the diffusion of psychological ideas and the establishment of psychology as a scholarly discipline, it is essential to move beyond the well-known figures like Locke, Condillac, Wolff, or Bonnet. Instead, attention should be directed towards minor authors and their networks of communication and intellectual exchange. It is from this perspective that the focus shifts [5], a Genevan disciple of Bonnet, a polygraph, and a traveler who operated between French and Germanic cultures, embodying the spirit of the Republic of Letters and the Swiss Enlightenment. Trembley, despite being a secondary figure

in Geneva's scientific growth in the 18th century, became a notable participant in the Berlin Aufklärung for a few years. His diverse interests spanned mathematics, physics, psychology, aesthetics, theology, and politics, all converging around methodological and epistemological convictions highlighting the primacy of psychology and the moral and cognitive value of empirical facts. These convictions guided Trembley's various engagements, leading him to advocate against prejudices, including those perceived as threats to Christianity.

Jean Trembley's primary focus in his work was on analytical geometry and its applications to physics and mechanics. Instead of transplanting mathematical analysis into psychology, he sought to reconcile algebra and psychology, along with aesthetic judgment, within a framework defined by common methodological rules drawn from psychological analysis. This approach led him to establish psychology on a cognitive morality applicable to all forms of knowledge, grounded in experience and the deliberate utilization of curiosity, attention, imagination, as well as mechanisms fostering habit formation and the association of ideas. Here, psychology emerges as the sole science with a method based on the knowledge it generates. As this method is presumed to be suitable for all sciences, the very nature of its objects and its approach elevates it to the zenith of the hierarchy of knowledge.

III. Biographical Overview

Jean Trembley, born in Geneva in 1749, was the nephew of the renowned naturalist Abraham Trembley, known for his work on polyp regeneration. Initially studying law, Trembley shifted his focus to science, conducting astronomical observations guidance. He accompanied Horace-Bénédict de Saussure on several mountain expeditions. Enrolling as a student of Charles Bonnet in 1767, Trembley replaced Saussure in the philosophy chair at the Academy of Geneva in 1772-73 [6].

Geneva experienced political upheavals during this time, with Trembley actively participating. In 1780, he published a conciliatory proposal for new laws addressing contentious issues, reflecting his pragmatic conservatism.

The political landscape in Geneva was marked by conflicts between different social classes, with the aristocracy wielding political authority. Trembley's pragmatic approach aligned with his epistemology, emphasizing the accumulation of "facts" and rejecting overarching systems. He believed time was necessary for the formation of political systems and cautioned against attempting to eliminate prejudices abruptly, advocating for reform and preservation based on accumulated experience.

In 1784, Trembley became a correspondent of the Royal Academy of Sciences in Paris, embarking on travels across Prussia, Poland, Saint Petersburg, Sweden, Denmark, Holland, and Brussels from April to November 1786. In 1790, he married Marie-Elisabeth de Riveau-Pierre [7].

Facing political unrest in Geneva, Trembley moved to Rolle in 1792. He believed Rolle to be less exposed than Geneva to potential dangers. In 1794, he became an ordinary member of the Royal Academy of Sciences and Belles-Lettres of Berlin,

taking the chair of Johann-Georg Sulzer. At an unspecified date but no later than 1807, Trembley left Berlin, settling in France under picturesque circumstances.

IV. The disciple of Charles Bonnet

Jean Senebier, the Geneva pastor and librarian, characterized Jean Trembley as a "Student of Mr. Charles Bonnet worthy of being." Likewise, in 1786, Charles Bonnet himself regarded Trembley as one of his closest friends and dearest philosophy students, emphasizing his role in directing Trembley's early philosophical endeavors. Bonnet marveled at Trembley's intellectual journey, likening it to that of a giant, and acknowledged Trembley as a master from whom he continued to learn.

In 1767, shortly after Trembley defended a thesis on generation presided over by Horace-Bénédict de Saussure, Bonnet, in a letter to Albert de Haller, recognized Trembley's significant talents in higher sciences. They engaged in a Rational Philosophy Course together, delving into the depths of metaphysics and intertwining it with religious exploration. Their collaboration included an examination of Baron d'Holbach's System of Nature, which they found to be "horrible," "monstrous," and "anti-logical" [8].

Trembley, adopting Bonnet's ideas on the physiological aspects of resurrection in his 1767 thesis, actively defended Bonnet against accusations of plagiarism. When Bonnet faced allegations from Abbot Pierre Signorine, Trembley staunchly supported him, leading Bonnet to oppose the publication of Trembley's response. Following Bonnet's passing, Trembley wrote his first biography, highlighting the profound impact Bonnet had on him.

Methodological considerations became a focal point for Trembley, influenced by Bonnet's teachings. Bonnet's emphasis on the "art of observing" as a method for both physics and metaphysics inspired Jean Senebier to write an influential "Essay on the Art of Observing and Making Experiments." Trembley, sensitive to methodological issues, echoed Bonnet's beliefs in his own pursuits [9].

In the eyes of contemporaries such as Benjamin Carrara, Jean Senebier, Abraham Trembley, and Horace-Bénédict de Saussure, Bonnet's art of observation represented true logic. This approach, evident in Bonnet's works on natural history and the Essay analyzing the faculties of the soul, aimed not only to establish truth in natural history but also to demonstrate the existence of God, the immortality of the soul, and the teleological character of the world order.

Bonnet's methodological teachings profoundly influenced his educational practices, as evidenced by the extensive reading guide he crafted for Trembley's Analytical Essay. Comprising 2045 questions, the guide aimed not only to imprint the Essay in Trembley's memory but also to facilitate a deeper understanding and development of its principles. Bonnet considered attention, especially in psychology, as the key to forming abstractions and viewed it as the "mother of Genius."

Bonnet, like many Enlightenment thinkers, advocated for accumulating facts through repeated observations and experiences, combining them with analysis and synthesis. He be-

lieved that imagination, curiosity, and hypotheses were valuable, as long as they were guided by reason and the spirit of observation. Bonnet viewed his metaphysics as almost entirely physics, emphasizing the importance of this method not only in the sciences of nature but also in metaphysics [10].

In conclusion, the methodological attitude of Enlightenment psychologists like Bonnet, who pushed beyond the facts to explore obscure subjects, remains integral to understanding their contributions to philosophy and science.

V. Proposals, Empirical Evidence, Computations

Jean Trembley also underscores the significance of hypotheses. In 1773, during his role as a logic instructor, filling in for Horace-Bénédict de Saussure at the Academy of Geneva, he highlighted the necessity of hypotheses in experimental physics, mathematics, psychology, natural law, and politics. He referenced the discovery of the aberration of light as an example of how hypothesis plays a crucial role in various domains of study. Charles Bonnet, in his Analytical Essay on the Faculties of the Soul, mentions the "art" of education manipulating the "fibers of the understanding" but clarifies, through Jean Trembley, that it involves a figurative meaning, symbolizing the master's impactful approach to the student rather than a direct manipulation of intangible fibers [10].

While not strictly a hypothesis, the allowance of figurative language in scientific discourse aligns with the acknowledgment of the vital role of imagination in formulating hypotheses and advancing genuine research. Responding to criticisms that Bonnet adheres too closely to hypotheses, Jean Trembley argues that banning hypotheses from physics would render it futile, as even confirmed aspects derived from experience and calculation were once hypothetical.

Trembley maintains that the progression of knowledge hinges on the interplay between hypotheses and experience. He contends that knowledge should be attained through meticulous observation and varied experiments before formulating laws, emphasizing the importance of facts preceding mathematization. He criticizes instances where mathematical theory preceded observations, emphasizing the need for meticulous examination of phenomena before reaching conclusive mathematical truths.

In various disciplines, including hydraulics, chemistry, and astronomy, Trembley advocates for an empirical approach where facts precede theoretical frameworks. He emphasizes the universality of these principles, encouraging scholars to collect materials, compare testimonies, prioritize accuracy over generality, and conduct specific observations analogous to the role of facts in physics.

Trembley's commitment to empirical observation extends to his critique of Johann Heinrich Lambert's architectonic principles. While appreciating Lambert's method, Trembley simplifies the exposition, emphasizing the importance of basing principles on observations and experiences, ultimately aiming to reform metaphysics on a mathematical model that aligns with empirical sciences.

VI. The classical thinkers, contemporary psychologists

Trembley expands the reach and applications of his epistemology and methodology beyond investigating the conditions for research and progress in geometry and mathematics. He harbors a deep fondness for antiquity, holding the Ancients in high esteem and regarding them as precursors to modern philosophy. This sentiment is evident in his interpretations of Plato and the Greek tragedians [?].

In October 1799, Trembley presented "Observations" on a passage from Meno⁶⁰ to the Berlin Academy. This dialogue explores the nature of virtue, delving into whether it can be taught and how it is acquired. Embracing the concept of reminiscence, Meno and Socrates seek to understand virtue itself. Socrates proposes a method akin to that of a geometer determining if a specific triangle can be inscribed in a given circle—beginning with a hypothesis, a supposition whose consequences are then examined⁶¹. In the case of virtue, it involves supposing, in turn, whether virtue can be taught or not. Trembley meticulously examines the geometric problem, aligning himself with a tradition that has spurred various interpretations from philologists and historians of mathematics.

Central to our focus is Trembley's conception of the hypothesis. For him, the hypothesis is "a condition that necessarily influences the result of the research," as the outcome hinges on whether such a condition is verified or not (p. 1). Consequently, the answer to Meno's question—what is virtue?—reduces to solving another problem—if it can be taught. Trembley elucidates that the art of analysis involves formulating the problem in a way that facilitates a more straightforward solution. It is about "moving from the known to the unknown," a realm where "logical methods" are ineffective.

In Trembley's view, the hypothesis doesn't emerge from a normative logic of science but from a practice linked to the psychological conditions of seeking truth, particularly in invention and discovery. This perspective is apparent in his analysis of Aristotle's "Meno's problem," where Trembley recognizes the psychological truth in Socrates' defense of reminiscence rather than a metaphysical or transcendent one. This aligns with his rejection of Cartesian methods and the "art of thinking" as claimed by formal logic. Trembley contends that neither Descartes nor logic provides the means to elevate sciences "to an indefinite degree of perfection". In contrast, Socrates' approach, rooted in experience, history of discoveries, and scientific progress, resonates with Trembley, emphasizing empirical psychology over formal logic.

Trembley asserts that understanding the scientific method requires studying the approach of "inventors" in the manner of Plato. This involves recognizing a "tortuous and painful road, gropings, retrogrades," and the combination of ideas difficult to grasp. The scientist, to Trembley, is a psychologist to some extent, relying on introspective attention and awareness of intuitions and trial and error. While scientific discovery involves a reflective psychology of scientific practice, it doesn't adhere to a continuous law but is marked by "lively and sudden impulses, flashes of light which were not preceded by any

twilight". Trembley contends that this depiction of scientific activity isn't a work of fiction but a shortcut reflecting scientists' statements and findings in their works. He deems it a reflection of "the march of the human spirit"—a universal spirit unchanged over time. In essence, "the ancients reasoned like the moderns," and while methods have evolved, "the progress of the inventors has remained the same".

In summary, Trembley upholds Plato's philosophy not as speculative but grounded in facts and real knowledge, appreciating the Greek philosopher's insights derived from empirical observations. Trembley perceives Plato's understanding of the function of the hypothesis as stemming from a psychology of discovery, aligning with his own epistemology [1].

In his last known publication, "Considerations on the Present State of Christianity," published in 1809, Trembley emphasizes that being a logician isn't sufficient to enrich the sciences. He critiques existing logic as a mere nomenclature of reasoning rather than an art of thinking. Trembley argues that notions about the nature of ideas within logic are prolegomena taken from psychology. To comprehend the scientific method, Trembley advocates replacing normative science theory with the history of science and an empirical psychology of discovery.

Trembley extends his methodological and epistemological approach to aesthetics. In his work "Research on the Faculties of Feeling and Knowing," published in 1776, Trembley applies a psychologized and cognitive perspective to the problem of beauty. He contends that beauty is not appreciated by purely feeling beings, and the pleasures derived from contemplating it stem from the perception of relationships converging towards an end. This aligns with thinkers of Wolffian inspiration, where aesthetic pleasure results from the rational apprehension of perfection. Trembley emphasizes the empirical character of psycho-physiological explanation, focusing on cognitive content, and separates himself from other authors within a sensualist aesthetic framework.

The integration of aesthetics and epistemology is a recurring theme, and Trembley employs the same criteria when evaluating literary works and authors. He places classic authors, such as Plato, Sophocles, and Virgil, on a pedestal, considering them superior due to their adherence to empirical psychology and observance of nature. Trembley values "real philosophy, that which results from facts," and sees it as favorable to poetry. He contrasts the Ancients' meticulous observations and adherence to models with the Moderns, whom he views as less observant and more attached to abstractions.

Trembley's aesthetic judgments are guided by his appreciation for the "philosophy" of poets, specifically their depiction of passions and the human heart. His preference for certain classical authors over others is rooted in their ability to portray these aspects accurately. For Trembley, Plato, Sophocles, and Virgil epitomize real philosophy in literature, presenting a faithful description of the agitations of the soul and a violent passion.

VII. Psychology and Method

In his inaugural exploration into psychological discourse with the "Essay on Curiosity" in 1775, Trembley defines curiosity as "the desire to explore new connections between things about which we already possess some ideas". The merit or risk associated with curiosity, he argues, depends on the type of connections sought. Venturing into "inaccessible realms" can lead the mind astray, fostering narrowness, and generating false or chimerical notions. Trembley contends that the remedy lies in cultivating curiosity in a genuinely philosophical manner, guided not only by logical rules but also by an understanding of how observation enriches memory and illuminates understanding. He proposes drawing on psychology, asserting that its practical examples surpass precepts in guiding the art of directing curiosity. In the modern era, curiosity undergoes a transformation, evolving from a moral weakness to the driving force behind legitimate knowledge, steering the "moral economy" of scientific research.

While legitimate curiosity in the 17th century delved into the secrets of nature and hidden causes, Trembley narrows its focus to verifiable facts. The ideal, according to Trembley, is an empirical psychology that serves as the foundation of logic. This concept is not groundbreaking, but Trembley underscores the propaedeutic role of psychology over synthetic approaches. He sees psychology as a genuine medicine of method, capable of diagnosing pathologies, revealing etiologies, and establishing rules of hygiene and health.

Trembley's second psychological work, "Research on the Faculty of Feeling and That of Knowing," expands on the principle outlined in the "Essay on Curiosity." Having won first place in a competition by the Berlin Academy in 1773, this research delves into the original determinations and laws of the faculties of feeling and knowing. It also examines their mutual dependence, influence, and their role in the development of genius and character.

Trembley begins by acknowledging the challenges of introspection, advocating for an analytical method that eschews synthesis and system formation. While Trembley doesn't dismiss the importance of introspection, he insists that it must adhere to the rules of good method. He envisions a radical reform of metaphysics through the application of analysis to the study of the soul. This, he believes, would lead to a transformation of metaphysical method and vocabulary, essentially merging with psychology itself.

The epistemic supremacy of analysis, for Trembley, extends to language. He argues that the meaning of terms like "force" has become arbitrary due to vague designations, and a proper method involves purifying the vocabulary through psychological analysis. The right method purifies language, framing the approach of science.

Trembley's rejection of ultimate causes is accompanied by a desire to maintain a "purely empirical" philosophy. He identifies a universal psychological principle—the pleasure the soul finds in exercising its activity—combined with self-love, sufficient to explain human phenomena. He avoids delving into the unknowable real essence of man and dismisses



Figure 1: (The method not to follow: the psychologist begins his research by giving the statue a flower to smell. Frontispiece by Jean Henri Samuel Formey, Interview spsychological, taken from the Analytical Essay on the Faculties of the soul, by Mr. Bonnet, Berlin, at Joachim Pauli, 1769. Public and university library of Geneva. Photography: Jean-Marc Meylan)

the formation of hypotheses relying solely on imagination. Trembley advocates for experimentation, observation, and the reduction of facts to principles Figure 1.

These considerations extend beyond the realm of knowledge production. Trembley sees psychology, acting as the medicine of method, as a remedy for the entire society and culture. He goes beyond denouncing prejudices, aiming to dismantle their mechanisms. Trembley contends that political and religious prejudices are naturally connected to philosophical prejudices rooted in definitions and systems. This prompts him to criticize Kant and advocate for a simpler, more circumspect philosophy closer to the nature of things.

Trembley's concrete observations on child development challenge contemporary philosophers like Condillac and Bonnet. By carefully studying children, he critiques the synthetic approach of imagining a statue organized like a human being but initially devoid of sensations and ideas. Trembley emphasizes the importance of time and critiques the lack of attention to child development, aligning with his methodological and

epistemological principles. He underscores the significance of the penchant for imitation in child development, essential for learning language and behavior. This inclination, for Trembley, has far-reaching consequences, affecting educational theories, laws, morals, and even political and religious fanaticism.

In conclusion, Trembley's psychological writings reveal a comprehensive approach that extends from individual understanding to societal conduct. He advocates for an empirical psychology as the foundation of logic, emphasizes the importance of analysis, and critiques synthetic approaches. Trembley's ideas on curiosity, empirical psychology, and child development demonstrate their relevance not only to individual knowledge but also to broader social, cultural, and political contexts.

VIII. The usefulness and progress of psychology

Following his induction as a foreign member of the Dutch Society of Sciences in 1765, Charles Bonnet assumed a pivotal role in shaping the Society's public competitions. Expressing gratitude to his esteemed colleagues for submitting his question on the art of observation to the competition and for sharing the winning dissertation with him, Bonnet introduces a new inquiry. He describes it as a logical extension or elaboration of the previous one:

"What is the significance of psychological science in the education and governance of humanity, contributing to societal well-being; and how can we optimize this captivating discipline to enhance its development and progress?"

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