WUNDT AND AFTER: PSYCHOLOGY'S SHIFTING
RELATIONS WITH THE NATURAL SCIENCES, SOCIAL SCIENCES, AND
PHILOSOPHY

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Over the past one hundred years psychology has evolved into a major scientific
discipline. Nonetheless, psychology is presently in a state of considerable turmoil
regarding its proper subject matter and methods. Is psychology a natural science, a
social science, or a hybrid of the two? What relation should psychology maintain with
philosophy? These general questions, current in debate, were addressed by
Wilhelm Wundt, one of the founders of modern experimental psychology. This artic-
le is an attempt to specify Wundt's conceptualization of psychology and to place it
in its historical context. Secondary is also the extent of crucial developments since
the time of Wundt. The conclusion that is reached is that the apparent contempor-
ary "crisis" in psychology is really nothing new and that, in fact, the present condition
of psychology does not necessarily constitute a crisis. In its broad outline at least,
present-day psychology reflects the program which Wundt espoused one hundred
years ago.

It certainly does not take an historian to note that in 1979 the field of psychology,
after one century as an experimental discipline, seems to be in a state of crisis. At least
that is what a lot of people tell me; and wherever I turn I see psychologists searching
for that holy grail called a "paradigm" and arguing about the true nature, proper subject
matter, and relevant methods of psychology.

According to some commentators, the signs of this apparent crisis in psychology go
back at least thirty years, to the breakdown of the behavioristic program of theory and
research. In my own estimation, this is far too modest an assertion, for even during the
behavioristic era there was no real unity — no single set of theoretical assumptions and
practical maxims — underlying the day-to-day activities of psychologists. Rather, I
would argue that ever since the founding of experimental psychology there has never
been a single completely dominant view of the nature of psychology. This does not mean,
however, that there has been a perpetual sense of crisis within the discipline. On the con-
trary, there has not been, for on the one hand, many psychologists over the years have
managed to effectively divorce, or shield themselves from, the current alternative concep-
tions of psychological theory and practice; and on the other hand, other psychologists
have found it possible to accept the plurality of approaches within the discipline and to
assign a legitimate and autonomous place to each of them. Both procedures, for different
reasons, seem reasonable enough; and some combination of them may be best. But put-
ting aside this issue for the moment, it is more pertinent to note that the latter, more

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vancement of Science, Houston, Texas, 6 January 1979. Although I have added footnotes to the original
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particular emphasis upon the philosophical assumptions, issues, and debates underlying the "scientific
revolutionary" power within this tradition.
tolerant procedure was the one used by Wilhelm Wundt, the reputed founder of experimental psychology, and also, though less systematically, by William James, the founder in many ways of American psychology.

I intend first to discuss the context in which Wundt formulated his ideas about the nature and methods of psychology. Then I shall discuss Wundt's view of psychology, similarities between Wundt's view of psychology and that of James, and then I shall hop.

SUP., approximately three-quarters of a century of psychological thought, particularly since the bicentennial celebration. In its broadest form, the issue about the basic nature and methods of psychology revolves around the question of whether or not psychology is a natural science, a social science, or a branch of both.

As a consequence, any attempt to understand the nature of psychology at any given time must of necessity take into consideration the contemporary status of the various natural, social, and philosophical sciences. At the time of Wundt's student days in the 1850s and indeed throughout his life, each of these broad classes of disciplines was undergoing important and often rapid changes. In the natural (including biological) sciences, for instance, the names of Bernard, Müller, Darwin, Du Bois-Reymond, Helmholtz, Maxwell, and Pasteur are indelibly imprinted upon our conception of the 1850s and subsequent decades.

The modern disciplines of history, anthropology, linguistics, and what we now call social psychology were going through an exciting period of formulation. And in philosophy it was a time of very critical reassessment, during which psychology suffered widely differing evaluations regarding its fundamental tasks and even its chance and right of survival. All these changes were based upon Wundt's mind, and the minds of his entire generation, a wide range of metissages regarding the nature of science in general and of each of the branches of science in particular.

The intellectual background of Wundt's mid-nineteenth-century ruminations about the nature of science was set by the idealist conceptualization of science which had dominated German thought for the prior fifty years. As I have discussed elsewhere, the idealist philosophers stressed the unity of all knowledge; for them science, or Wissenschaft, included all that was known and systematically organized around basic a priori principles. The individual empirical sciences, whether natural or "moral," merely supplied the "matter." If you will, which filled the formal categories in the system of knowledge. For instance, psychology, as one of these sciences, was merely empirical, and its data had to be "overcome" (aufgehoben) by means of dialectical reasoning. And the same applied to the other sciences; their empirical contributions were necessary but clearly not sufficient to the total scientific endeavor. Philosophy, on the other hand, had as its specific task the analysis and critical synthesis of the "true," or "reworked," findings of the empirical sciences. Thus psychology was synonymous with Science, or Knowledge, and the empirical sciences were conceived to be a part of philosophy, though clearly its most rudimentary part.

This philosophy of science was reflected in the institutional structure of the German university system. In particular it was represented in the constitution of a single Philosophical Faculty as the institutional base for all the "pure theoretical sciences" — including the natural sciences, the social sciences, and philosophy. Thus, originally at least, there was no contradiction, and certainly no necessary conflict, between the natural, social, and philosophical disciplines.

This point is ably illustrated in the case of psychology. As I have argued elsewhere, it was philosophers, not physiologists, who evolved the conception of psychology as a natural science. Taking their cue from Kant's philosophy of science, three German philosophers — Jakob Friedrich Fries, Johann Friedrich Herbart, and Friedrich Eduard Beneke — progressively developed the notion of psychology as an empirical, mathematical, and experimental science. By the 1850s their arguments for a new kind of scientific psychology were commonplace. At the same time, certain natural scientists were just open to the proper demands of philosophy as Fries, Herbart, and Beneke were open to the possibilities of natural science. Helmholtz, for instance, was quite explicit in saying that his experimental work in sensory physiology was serving an important philosophical purpose. His work would, he said, provide an empirical basis for epistemology, that is, for a theory of knowledge that would "ground" all the sciences, whether natural, social, or philosophical. While critical himself of explicitly metaphysical systems, he was quite aware that a solid epistemological basis was a sine qua non for any and all true science.

Helmholtz never interpreted his physiological work as psychology. This is where Wundt, Helmholtz's one-time teaching assistant, entered the picture. It was Wundt's contribution to interpret his own research in sensory physiology as being "psychology."

That he could do so, I would argue, depended upon the conceptual preparatory groundwork laid down by Fries, Herbart, and Beneke, who had popularized the idea that psychology could and should become an experimental science. This is an important point for it implies that it is too simplistic to say, as many people have, that psychology became scientific by moving away from philosophy. There is an obvious sense in which this statement is true, but it is a half-truth which obscures the essential conceptual contribution of philosophers to the development of scientific psychology and even its very origins.

But now I have digressed. My point above was simply that in the formative period between 1850 and 1870 there was no necessary conflict between science and philosophy, particularly as regards psychology, even though as a matter of fact there were scientists and there were philosophers who rejected each other's enterprises. Wundt was not one of these.

But then, what was Wundt's view of psychology? Had I more time I could show that Wundt's institution of laboratory training in experimental psychology in 1879 was clearly influenced by his experiences in the chemical laboratories of Robert Bunsen and the physiological laboratories of Johannes Müller, Emil Du Bois-Reymond, and Hermann von Helmholtz. Furthermore, I have already mentioned that his "physiological psychology" grew out of his own experimental research in sensory physiology; and his interest in psychophysics, which Fechner had proposed in 1860, was another important stimulus to his development of an experimental psychology. However, whatever the influence of the natural sciences upon his conceptualization of psychology, Wundt did not think that psychology was only a laboratory science, nor did he think that psychology was simply one more branch of natural science. Although we must be careful here because Wundt's thought developed and became more explicit over time, it can be shown that from very early in his academic career Wundt made some fundamental distinctions to which he adhered until he died in 1920. In outline, his distinctions were the following:
1. Psychology is an experimental science insofar as (and only insofar as) it studies the basic processes involved in the lower mental activities such as sensing, perceiving, feeling, and willing.

2. Psychology is a social science (a Geisteswissenschaft) insofar as it studies the higher mental processes in the only way in which that is really possible, namely, through an analysis of the historical products of the human mind.

3. Psychology is not simply one among the many natural and social sciences. In fact it is the fundamental science supporting the natural sciences, the social sciences, and philosophy; and

4. The task of philosophy is to critically assess and synthesize the knowledge gained in the natural sciences, social sciences, and psychology.

Regarding Wundt's first proposition, that experimental psychology can only study the so-called lower mental processes, we must acknowledge that in 1862, when he published his *Principles of Physiological Psychology*, he expressed the hope that someday the higher mental processes might be submitted to experimental investigation; but this was apparently only a passing thought, perhaps thrown in for rhetorical purposes. To my knowledge, he never made this statement again; and in fact at the same time that he published this early work he was already broadening his view of psychology to include the dimension of "folk psychology." I should also mention that over the years Wundt's definition of experimental psychology changed. It always had to do with the fundamental psychological processes, but he progressively "purified" his view of what these entailed. In 1862 his "experimental psychology" concerned the psychophysical relations of sensation and the psychophysical relations between outer stimulation and inner perception. In his famous textbook of 1874 his "physiological psychology" still included the relations of the "inner" and "outer" dimensions of experience. But by 1879, Wundt's definition of experimental psychology was vastly enlarged. Finally, by 1896, in his Outline of Psychology, he completely dropped his earlier concern about physiological stimulation and presented a "pure" systematic psychology — a psychology, as he put it, "in its own coherence." Throughout this progressive shift in focus, however, he retained his thesis that only the lower mental processes could be experimentally investigated. Wundt's second proposition concerns his espousal of folk psychology. It was a broad intellectual context for his work in this area, which is to say that Wundt was one of many scholars in nineteenth-century Germany who were interested in the development of a social scientific (or Geisteswissenschaftliche) psychology that would be founded on quite different grounds from an experimental psychology. In Germany the distinction between the Naturwissenschaften (the natural sciences) and the Geisteswissenschaften (the "moral," mental, human, or social sciences) was much discussed in the 1860s and subsequent decades. In 1862, for instance, Helmholtz delivered a well-known address (probably heard by his assistant Wundt) in which he discussed these two kinds of science and defended the autonomy of the social sciences from the conceptual and methodological framework of the natural sciences. And in the same decade Wilhelm Dilthey began his explorations into the psychological foundations of the social sciences, utilizing in part the psychological researches of Wundt. Without further reference to the historical context, however, we can trace the development of Wundt's allegiance to a social scientific psychology, or what he called "folk psychology," back to the years between 1859 and 1863, that is, back to the very same years in which he was developing his conception of psychology as an experimental science. This goes against the mistaken notion that Wundt turned to folk psychology only late in life when he tired of experimental work. In fact, he began teaching a course directly related to folk psychology in 1859, made a first attempt at a social scientific psychology in a publication in 1864, clearly stated the autonomous role of folk psychology in the introduction to the first edition of his classic *Principles of Physiological Psychology*, and began to formulate his mature social psychology in 1874 — before he received his call to Leipzig. And so, although it is clearly true that his monumental ten-volume work *Folk Psychology* occupied a vast amount of the final thirty years of his life, Wundt clearly did not take up folk psychology as an escape from experimental psychology. Indeed, he continued to supervise experimental research, to revise his experimental publications, and to argue on behalf of experimental psychology throughout the last decades of his life. The point that must be made, though rather briefly, is that according to Wundt experimental psychology and folk psychology differed in both terms of subject and in terms of method. They were fundamentally different disciplines, and yet both were valid and necessary to give a rounded understanding of human experience and the psychological processes underlying that experience. There was simply no way, Wundt claimed, that social phenomena such as language, myths, and customs could receive a definitive treatment, or be understood, in terms of the more primitive psychological processes. Social phenomena are, in practice at least, sui generis; they are not amenable to experimental manipulation because, for one thing, it is impossible to know and control all the conditions which influence the higher activities of adult minds. The best that can be done is to provide careful generic and comparative descriptions as well as critical analyses of social phenomena. The categories derived from these analyses — that is, the conceptual framework of folk psychology — will of necessity be completely different from that of experimental psychology; but (and this is an essential point) these two psychological disciplines — experimental psychology and, if you will, social psychology — should nevertheless supplement rather than contradict one another. If I have been speaking here as if Wundt viewed one kind of psychology as a natural science and the other as a social science, this is not entirely accurate. As stated in the third proposition above, Wundt saw psychology as a rather special discipline — in fact, the fundamental science — supporting the natural sciences, social sciences, and philosophy as well. Often distinguishing psychology as the science of immediate experience from the natural sciences as the sciences of mediate experience, Wundt liked to point out that all the natural sciences abstract their subject matter from immediate psychological experience. In this way, they are derivative sciences in a way that folk psychology is not. In a similar fashion, all the social sciences are based upon some implicit understanding of how human beings operate. Therefore, Wundt felt, only a scientifically valid psychology could provide a truly secure basis for the social sciences. In proposing this thesis, Wundt agreed with the early Dilthey that psychology was the necessary foundation of all the Geisteswissenschaften. Finally, Wundt claimed that psychology was also a propaedeutic to philosophy inasmuch as it alone could supply an adequate basis for a theory of knowledge as well as for logic and ethics. Thus, in summary, psychology according to Wundt was an autonomous discipline which, although it does not really belong to either the natural sciences, the social sciences, or philosophy, nonetheless is intimately related to them all. The fourth and final proposition in the outline above gives further clarification of Wundt's view of the relationship between psychology and philosophy. Whereas psychology was the fundamental science for Wundt, providing empirical substance for
philosophical considerations, it was the task of philosophy to go beyond the mere facts and experiences gathered in psychology and the other individual sciences in order to develop "the ideal goal of all science — a coherent theory of the universe." These were Wundt's words as recorded in 1892, and the same point was made in earlier works — for instance, in an address published in the same year as the first edition of the Principes of Physiological Psychology, in his Logic, and in his System of Philosophy. The principal task of philosophy according to Wundt was the development of a Wissenschaftslehre, a general science or system of knowledge, including metaphysical knowledge, which is based upon, but goes beyond, the findings of empirical science. What philosophy was not supposed to do was to try to legislate in an a priori fashion to the sciences. What is particularly interesting about this view of philosophy is that it is fundamentally the same as the idealistic view of science which I discussed earlier. For Wundt, philosophy completes and systematizes the work of the empirical sciences.

This concludes my review of Wundt's view of the nature and methods of psychology, but before moving on to a abbreviated review of subsequent developments in the United States, I must discredit the common assumption that Wundt made a fundamental about-face, or led a split life, because he was offered and accepted a chair of philosophy and systematizes the work of the empirical sciences.

There were, of course, other psychologists in Germany who wanted to make psychology a completely natural science, just as there were others who wanted to make psychology into a totally social science, and still others who favored the traditional philosophical approach to psychology. These alternate viewpoints were expressed freely in the debates which raged in the 1890s and early 1900s. One interesting thing about the debates in the first decade of the twentieth century is that more and more often one would hear philosophers decrying "psychologism" and arguing that the alliance between psychology and philosophy should be broken. There were some intellectual reasons for them to do so, of course, but economic motives were also clearly apparent. There were simply no longer enough chairs of philosophy to go around, and the philosophers perceived that the psychologists were getting more than their fair share of them. Whether this was true or not, the point is that the movement toward an institutionally independent psychology was supported and led by philosophers as well as psychologists. It is a final indication of Wundt's perspective regarding psychology that this situation prompted him to write a stinging diatribe in 1913. In an article entitled "Psychology in a Struggle for Existence," Wundt vehemently opposed the proposed split between philosophy and psychology, arguing that both disciplines would suffer from such a divorce. Neither empirical experiment nor rational analysis alone, he emphasized, could constitute true, complete science. Neither psychology nor philosophy could intellectually flourish without its complement. For the economic problem Wundt recommended the establishment of new chairs in philosophy specifically designated for psychologists. This would reserve the traditional chairs for philosophers and would help maintain the necessary balance.

So much for Wundt and the situation in Germany around the turn of the century. I would prefer now to discuss at length James's view of psychology and the myriad of views which have been entertained since that time in the United States, but, as I noted at the beginning, I will have to make my remarks about James and the subsequent trends in American psychology as brief as possible.

Despite the fact that James was highly critical of Wundt, their general views about psychology had much in common and the developments in their careers proceeded along strikingly parallel lines. Both admitted a disparity between an experimental and a more human-oriented, or social, psychology; both were willing to allow each type of psychology to have its proper role; both argued for an essential relationship between psychology and philosophy; and both of them moved in their careers from a more predominantly laboratory and physiologically oriented psychology to more social and philosophical concerns. It must be admitted, however, that James's view of psychology was far less systematically organized than Wundt's; but nonetheless the similarities between Wundt's and James's points of view are too striking to be overlooked.

There were other American psychologists in James's generation who had similar opinions regarding the relationship between psychology, the natural sciences, the social sciences, and philosophy. Ladd, Baldwin, and the immigrant Münsterberg come to mind. But such unanimity regarding the general nature and methods of psychology did not last into the twentieth century. Even from the start, to be sure, there had been differences in emphasis, but soon there were also differences in kind. Titchener, for instance, began with a conviction that psychology and philosophy should be marshalled in a common endeavor, but by the turn of the century he disassociated any traffic with philosophy. Hull followed the same pattern, although he also came to reject experimentation and what he called "mathematical methodism" in favor of a purely inductive gathering of questionnaire and observational statements. Dewey, meanwhile, turned his social psychological interests toward education (as indeed did James himself) and thus took the nascent Jamesian social psychology out of the mainstream of psychological thought. McDougall's social psychology, for all its attendant fanfare, failed to rally many troops, and psychology took a headlong plunge into a predominantly biological (or natural scientific) orientation. Yerkes and Watson were surely representative of the trend in American psychology in the first decades of the century, even though a constant diapason was sounded by Titchener and his structuralists. The Chicago functionalists, for all their merit, were chiefly notable from our perspective for the logical step they took toward a behavioral psychology. In this regard they corroborated the move toward a biologically oriented psychology. Insofar as they were also concerned about the functional success of behavior in social environments, however, they pointed to the more distant development of a more socially oriented psychology.

Not coincidentally it was Dewey's urgent call for a social psychology in 1917 that heralded a turn toward the neglected social view of behavior. Throughout the 1920s the manifestos and contributions toward a social scientific psychology increased in number and confidence so that by the 1930s the scene was set for a virtual explosion of interest in social phenomena among psychologists. This interest has never waned since that time.

In the meantime psychology has maintained its affiliation with the natural (and particularly the biological) sciences. But increasingly since the 1920s, those psychologists who have taken a socially oriented approach have tended to ignore and often even to deprecate the expenditure of effort on the so-called "pure science" aspects of psychology; and the same sort of provincialism has typified the attitudes of the more biologically oriented psychologists as well. Interestingly, it has been the behaviorists (neo, neo-neo, and post-neo) who seem to be in the vanguard of reuniting the biological and social-environmental approaches to psychology.
Turning to the relation between psychology and philosophy, there is an interesting story to tell, though it must be told briefly. In the early decades of this century the umbilical cord between the two disciplines was cut, and speculative philosophy was banned from the domain of psychology. However, in the 1930s a restricted trade agreement was initiated such that psychologists could share their results with philosophers as long as the philosophers in turn would polish these results with their logical and methodological shammies. That any rapprochement at all could take place testified both to the growing sophistication of philosophy and to the disciplinary confidence of psychology. In more recent years the trade agreement has been expanded in remarkable and interesting ways. As positivistic philosophy of science has come under sustained attack from philosophers and psychologists alike, existentialism, phenomenology, and the so-called “critical theory” of knowledge have come to influence various areas of psychology. More generally influential has been ordinary language philosophy and its procedures of conceptual analysis; and from the history and philosophy of science has come a new appreciation of the scientific role of what has been called “silent metaphysics.” In the history of all the sciences, we now know, including even the hallowed field of physics, metaphysical notions have been instrumental in the advancement of knowledge, not peripherally but right in the heart of the matter, in “theory-laden” description. And so it is fitting that there has been a return among psychologists to metaphysics, though surely of a critical and exploratory kind. In place of the purely semantic discussions of not so many years ago, for instance, psychoneurologists such as Roger Sperry, Karl Pribram, and John Eccles have invested serious effort in discussing the mind/body distinction, and the notions of self, agency, choice, intention, determinism, consciousness, value, and motivation have received similar analyses.

What all this means, I suggest, is that in many ways we (namely, psychologists) are now back in a position very much like the one in which Wundt found himself. For all the shifts and shimmies in emphasis over the past one hundred years, we now find ourselves once again nurturing psychology’s growth along three rather than one or two fronts. From a heavy emphasis upon psychology as a natural science, and then a similarly concentrated emphasis on psychology as a social science, we now seem to have healthy, vibrant commitments to both orientations. And even more notable, because so unexpected fifty years ago, is the renewed interest in philosophy, and the new doors which this opens for the future. Not that psychology will become once again a branch of philosophy, but rather philosophical analysis might once again serve, as Wundt envisaged, as a means of critically assessing and synthesizing the findings and the conceptual frameworks of psychology.

Am I suggesting that psychology is precisely back where it started? Of course not. If there is a continuity between Wundt’s and James’s time and ours, there is also an obvious discontinuity. Over the past century we have, after all, accumulated some knowledge, and perhaps even more important we have developed methods (particularly mathematical/statistical and field observational) which could allow us to enter much further into the complexity of psychological processes. If only we now learn to use them and to ask the right questions! Methods are, after all, only tools, and G. Stanley Hall’s early critique of what he called “methodism” was on the mark. But good tools in the hands of intelligent craftsmen can produce works of beauty, and we have not yet begun to achieve the fullest use of our tools in the service of good ideas.

So, on the occasion of this centennial, I conclude this historical survey with the hope that the reunion of psychology and philosophy, and our enduring relations with the natural and social sciences, will provide ideas apposite and plentiful as we enter a future just as uncertain as the one faced by Wundt and James one hundred years ago. And I hope that we will continue to allow — and not decry — the diversity of approaches within psychology. For if this diversity does constitute a “crisis” in contemporary psychology, surely it does so only in the eye of the beholder.

Notes

1. Although Sigmund Koch among others has presented cogent arguments to the effect that psychology must in principle remain a pluralistic discipline, or group of disciplines, it does not seem to me that the issue can be decided definitively on a priori basis. Besides, even if Koch is correct, the goal of unification is a useful heuristic which should motivate each psychologist to push his/her own unique approach as far as it can go. Only in so doing can each investigator discover the limits of his/her approach and thus be confronted with the need for revision or supplementation. Thus, I would argue for a middle position in which one advocates rigorous attempts to achieve unification in psychology while at the same time allowing a diversity of approaches to flourish and admitting that this diversity may in fact be a necessary and permanent condition of what Koch calls “the psychological studies.” This proposal assumes that the competition and mutual influence of a variety of approaches is the best way to enrich our knowledge of things psychological. For a vastly stimulating presentation of Koch’s thesis, see his “Language Communities, Search Cells, and the Psychological Studies.” Nebraska Symposium on Motivation 23 (1975): 477-539.

2. It is pertinent to note that three of the above figures (Miller, Du Bois-Reymond, and Helmholtz) were teachers and associates of Wundt.

3. Incidentally, the idealist conceptualization of science remained effective for many German scientists, even though anti-idealistic materialism became popular between 1850 and 1870.


11. Although I shall conform to custom and translate PSYKHERPASIOLOGIE as “folk psychology,” the reader should be aware that “folk” is to be taken as an adjectival equivalent of “cultural” and “social” rather than of “popular.” I thank Arthur L. Blumenthal for alerting me to the possibility of misunderstanding this term (personal communication, 5 January 1979).


14. In later years the influence between Dilthey and Wundt increased. The successive editions of Wundt's Logic, 2 vols. (1919-1920), which was largely a treatise on the positive level of specific interests, which occurred in the 19th century, was aware of Dilthey's work is clear. General presents a true critique of the thought of the time. About which delicits easy reading. 29. There were notable differences about which delicits easy reading.


17. Wilhelm Wundt, Wissenschaften, 10 vols. (1874), pp. 4-3.


23. Later histories of psychology have not preserved the first decades of experimental psy.

24. See, for example, Edmund Husserl, Logische Philosophie: "Logos und Wissenschaft" (1891).

25. This is true in the United States as in Germany where psychology and philosophy have grown in parallel. In the United States, the American Psychological Association was founded in 1901.


27. I thank George Macario and Karen Tow for interesting information about this issue. Unfortunately, I am unable to cite their work in this paper.

28. As a pluralist in psychology as well as in philosophy, which does not admit class hierarchy and has inspired a commentator on James has been the duality of his ideas illustrated in his Principles of Psychology, 2 vols. (New York: Macmillan, 1902), p. 28.


31. Grönholdt reported the success of the investigation in which this paper was originally presented, in the service of "questions of consequence." As regards the actual use of these tools, it is interesting to note that psychologists who have recently begun to make wide use of a variety of multivariate techniques that have been available for four decades, clearly, R. A. Fisher predicted the proper use of such techniques has had to wait the development among researchers of a theoretical and intuitive understanding — i.e., "idea" regards what kinds of questions can be profitably asked by means of these methods.