Any teacher of psychology in the 1980s would find it difficult to avoid a consideration of the current economic and employment climate in planning the curriculum and the teaching process. Undoubtedly, the romantic appeal which used to surround the study of psychology has recently been eroded, the very idea of becoming a professor of psychology has been all but removed from undergraduates' career plans, whereas preparation for finding a job in a nonacademic setting has gained equal status with the acquisition of research skills and factual knowledge. The psychology teacher of today thus has the dual goals of imparting an appreciation of psychology as a social and natural science as well as providing preparation for the task of finding professional employment.

These issues have been addressed in a recent article by Mann (1982), who suggested four orienting theses which might shape curriculum development and work in the classroom: the need to take a large and integrative view of psychology's origins and goals; the importance of appreciating its relationship with neighboring fields; the recognition of both academic and practical motivations of students; and a focus on the teacher's own development as a scientist-scholar and educator. Mann also distinguished three basic aspects of psychology: science, vehicle in the search for wisdom, and healing profession. These may represent three basic motives for studying psychology.

In this paper we address a number of the issues raised by Mann with respect to the teaching of psychology in the 1980s, based on an examination of the attitudes of undergraduates in introductory and advanced psychology courses. The specific procedure affords a means of evaluating the effects of different teaching strategies on students' perceptions of various aspects of psychology. Thus it permits an assessment of whether one's teaching is providing an adequately large and integrative view of psychology (Mann, 1982). It also offers an empirical test of the importance to students of the three aspects of psychology distinguished by Mann.

Our study of student attitudes in the 1980s has a dual function. On the one hand, it is descriptively oriented and seeks to summarize the perceptions, values and attitudes of students as described above. On the other hand, it has a prescriptive aspect, suggesting that an integrative view of psychology should include an appreciation of psychology both as a discipline and as a profession. By discipline we mean the study of psychology proper with its three constitu-

ent domains, phenomena, theory and method. By profession we mean something more complex than the client-oriented applied practice of the discipline. Rather, we mean the social underpinning of the discipline with its attendant role and reward structures. Moreover, we argue that both disciplinary and professional aspects of psychology should be openly discussed in the classroom. Active reflection concerning one's position relative to fundamental issues in psychology, such as the discipline-profession relationship, will help expose latent values and assumptions which may ultimately guide one's research and career decisions. Such understanding may thus help the student make decisions that enhance personal development and reduce frustration in the long run. For example, the student may come to realize that the dominant method-oriented attitude is not monolithic, and that other approaches (e.g., phenomenological) also have found a place in modern psychology. This realization may encourage students to explore academic and professional environments which may be more in line with their own particular interests or temperaments.

In the study reported here we sought to explore the attitudes and beliefs which undergraduates hold about psychology as a discipline and as a profession, as a function of both the student's academic level and the instructor's orientation. First, information was obtained about the students' goals and commitment to the field. Second, we attempted to determine whether psychology as a discipline is perceived differently from psychology as a profession and from other fields of inquiry. Third, we obtained information about the students' beliefs concerning the goals of psychology, the roots of progress in psychology and its future. Fourth, we examined differences in the attitudes of undergraduates from two introductory classes with two advanced classes. Fifth, we examined these attitudes as a function of instructors who taught psychology rather from a natural science perspective, emphasizing prediction and the collection of facts, or from a human science perspective (Giorgi, 1970) stressing the importance of description and context.

Method. The subjects were 409 students enrolled in introductory and advanced psychology courses at the University of Toronto, Scarborough Campus, and taught either by Professor A (who follows a natural science approach) or by Professor B (who adheres to a human science approach). The task was described as optional and 5% of the students chose not to participate. The sample from Professor A's
introductory class comprised 149 students (61 males and 88 females), and Professor B's class sample included 141 students (53 males and 88 females). Students were assigned to these classes during preparation of their timetables and did not know anything about the professors. The sample from Professor A's advanced course (Behavior Modification) included 62 students (20 males and 42 females) and from Professor B's advanced social psychology course comprised 57 students (18 males and 39 females). Thus, the composition of both samples from the introductory and advanced classes taught by the two instructors was very similar.

Students were given a 27 item questionnaire to fill out during regular class time. The instrument included a series of unipolar and bipolar 7-point scales assessing the students' attitudes toward and beliefs about psychology, the students' values, the students' perceptions of psychology in relation to other disciplines, and their perceptions of the difference between psychology as a discipline and psychology as a profession. Information concerning gender, current grade point in psychology and intention of specializing in psychology was also gathered.

**Results.** An overall factor analysis with Varimax rotation was performed on the data obtained from the 409 subjects. The resulting output revealed 11 factors with eigenvalues of greater than 1.0 which accounted for 61.1% of the variance. In this paper we will confine our discussion to the first five factors, which jointly accounted for 34.2% of the variance in the students' responses.

The dominant factor had an eigenvalue of 2.19 and accounted for 8.4% of the variance. Six questions had weights of greater than .20 on this factor. They included: relative confidence that the student would obtain either an applied (.63) or research (.53) position, intention to specialize in psychology (.54), desire to heal (.28), belief that new ideas are easily published (.26) and personal importance of studying individual cases (.23). This factor reveals an overall faith in the profession and an orientation toward assisting individuals. We have labelled this factor PROFESSIONAL-HEALING ORIENTATION.

The second factor had an eigenvalue of 1.82 and accounted for 6.0% of the variance. This factor is characterized by two goals in psychology, the importance of growing in wisdom and understanding (.74) and the importance of becoming more self aware (.60). We have chosen to label this second factor WISDOM-SELF AWARENESS ORIENTATION.

The third factor is described by five questions including importance of scientific inquiry (-.48), perception of psychology as being different from the humanities (-.41), importance of predicting behavior versus understanding how people feel (-.40), importance of increased control over human behavior (.35), and importance of acquiring factual versus conceptual knowledge in psychology -.34). The bipolarity of scales suggests contrasting profiles which might be labelled HUMAN VERSUS NATURAL SCIENCE ORIENTATIONS, following Giorgi's (1970) terminology.

The fourth factor had an eigenvalue of 1.60 and accounted for 6.1% of the variance. This was the first factor for which scholastic performance played a significant role. The solution offers contrasting profiles for students with higher and lower grades. Lower student performance (.50) was associated with the belief that a single unifying theory will be achieved within the next 50 years (.38), a greater belief in the importance of behavioral control (.29), a lower probability of specializing in psychology (-.29), the belief that theories reveal truths about nature (-.28), and a lower perceived importance of healing and being of service (-.28). Conversely, higher grades were associated with a higher probability of specializing in psychology, a lower belief in the forthcoming unity of psychology, a lower emphasis on the importance of behavioral control, a more heuristic view of theory, and a higher value placed on healing and being of service. In view of these metatheoretical contrasts it was decided to label this factor CONCRETE VERSUS ABSTRACT ORIENTATION.

The fifth factor had an eigenvalue of 1.56 and accounted for 6.0% of the variance. This factor was characterized by responses to six questions. Psychology was perceived as similar to the hard sciences (-.47), discipline and profession were perceived as different (.40), psychology was perceived as different from the social sciences (.29), the quest for scientific knowledge was viewed as important (.24), progress was seen as requiring a receptive climate (-.24), and psychology was viewed as similar to the biological sciences -.24). This dimension reflects a DISCIPLINE-PROFESSION DIFFERENTIATION.

A discriminant analysis was performed to determine those items which maximally differentiated between the groups. Three pairs of groups were compared including introductory versus advanced students. Professor A's (natural science approach) versus Professor B's (human science approach) students, and males versus females.

**Introductory versus advanced students.** These two groups could be differentiated in terms of five questions. Advanced students ($M = 2.50$) had an even lower expectation than introductory students ($M = 3.13$) that psychology will have a single unifying theory within the next fifty years, ($F (1,361) = 12.98, p < .01$). Advanced students ($M = 5.48$) also had a greater tendency than introductory students ($M = 4.91$) to emphasize the heuristic value of theory rather than its truth value, ($F (1,361) = 11.56, p < .01$). Advanced students ($M = 5.20$) placed greater importance on healing and being of service than did introductory students ($M = 4.67$), ($F (1,361) = 8.18, p < .05$). Advanced students ($M = 4.66$) also had a greater tendency to differentiate between psychology and the humanities than did introductory students ($M = 4.25$), ($F (1,361) = 5.79, p < .05$). Finally, advanced students ($M = 5.19$) placed greater importance on the quest for knowledge than did introductory students ($M = 4.82$), ($F (1,361) = 5.07, p < .05$).

**Natural science versus human science professors.** The two professors could be differentiated in terms of four questions. Students studying with the human-science professor ($M = 3.39$) had a greater tendency than those studying with the natural-science professor ($M = 4.02$) to disagree with the idea that researchers can easily get new ideas or theories published in professional journals, ($F (1,361) = 16.80, p < .01$). Students studying with the natural science professor placed greater emphasis on the quest for knowledge through scientific inquiry ($M = 5.16$) and an increased
control over human behavior through empirical knowledge ($M = 4.96$) than did students studying with the human science professor ($M = 4.67$ and $M = 4.61$ respectively), $F(1,361) = 10.59$, $p < .01$ and $F(1,361) = 6.18$, $p < .05$, respectively. Finally, students studying with the human science professor ($M = 5.63$) valued the importance of growth in wisdom and understanding more than did those studying with the natural science professor ($M = 5.37$), $F(1,361) = 4.63$, $p < .05$. It is well worth noting that the differences are only a matter of degree and that the students did not display opposing views on these issues.

Male and female students. The male and female students could be distinguished in terms of six questions. Female students had a greater tendency to emphasize the importance of understanding how people feel ($M = 5.58$) as opposed to predicting how they behave than did the male students ($M = 4.83$), $F(1,361) = 26.72$, $p < .01$. The females ($M = 3.87$) also had a higher probability of specializing in psychology than did the male students ($M = 2.80$), $F(1,361) = 21.86$, $p < .01$. The female students ($M = 5.58$) had a higher tendency than the males ($M = 5.06$) to disagree with the statement that all events, psychological or physical, can be explained with the same laws, $F(1,361) = 10.45$, $p < .01$. Finally, female students ($M = 4.69$) placed greater importance on the study of individual cases as opposed to new theories and laws than did male students ($M = 3.96$), $F(1,361) = 4.41$, $p < .05$. In contrast, male students ($M = 4.83$) had a greater tendency than females ($M = 4.46$) to stress the role of the individual rather than the intellectual climate in determining the progress of psychology, $F(1,361) = 7.86$, $p < .01$. Male students ($M = 3.10$) believed that there is a lower probability of finding work in an applied field than did the female students ($M = 3.52$), $F(1,361) = 4.89$, $p < .05$.

Discussion. The results of this study have provided some insights into the diverse values, attitudes and beliefs of a sample of undergraduates in the 1980s. The diversity is clearly revealed in the number of factors (11) which emerged from the factor analysis with eigenvalues of 1.0 or more. Consequently, the five most important factors in this study accounted for only about 34% of the variance.

The dominant factor, PROFESSIONAL-HEALING ORIENTATION, presumably reflects the employment concerns of undergraduates. Students who are committed to specialization in psychology also believe that it will result in employment, either in a research or applied setting. It is in this context that the students are dedicated to service and healing. The second most important factor reflected a desire to grow in WISDOM AND SELF AWARENESS. As might be expected, this factor was not associated with professional aspirations but expressed a personal quest.

The third factor, HUMAN VERSUS NATURAL SCIENCE ORIENTATION, reveals two opposing attitudes which seem to characterize the study of psychology. On the one hand, students value scientific inquiry, enhanced prediction and control over behavior, and the collection of facts. Alternatively, students value understanding how people feel, learning how to think about psychology, and acknowledge the similarities between psychology and the humanities.

The first three factors are consistent with Mann's (1982) distinction between three aspects of psychology, science, healing and wisdom orientations. These three themes are found to be dominant in the values, beliefs and attitudes of undergraduates. However, only the wisdom aspect corresponds exactly in the two analyses. The healing orientation is bound up with professional aspirations, but the science factor appears to subdivide two divergent attitudes toward the discipline characterized by Giorgi (1970) as the natural and human science orientations.

The fourth factor, CONCRETE VERSUS ABSTRACT ORIENTATION, is the only factor in which academic performance plays a role. Students with lower grades anticipate the imminent unity of psychological theories, value control over behavior, and believe that theories reveal truths. Students with higher grades adopt a more heuristic attitude toward theory and value service toward others. This distinction suggests an opposition of concrete and abstract approaches toward psychology.

The fifth factor, DISCIPLINE-PROFESSION DIFFERENTIATION, expresses the traditional "hard-soft" distinction in psychology. On the one hand, psychology is allied with the physical and biological sciences, scientific inquiry is valued, progress is seen as the product of a receptive intellectual climate and discipline is distinguished from profession. On the other hand, the perception that discipline and profession are similar is associated with the belief that psychology is similar to the social sciences and that progress is the result of insights by creative individuals.

The results of the discriminant analyses reveal those questions which differentiate among the groups. The advanced students are even less hopeful than the introductory students about the imminent theoretical unity of psychology, whereas the introductory students believe in the imminent theoretical unity of psychology, value theory in a more heuristic manner, and place a greater stress on the value of scientific inquiry and the difference between psychology and the humanities. The concrete and idealized views of undergraduates appear to evolve and become more abstract over time. However, the advanced students also have a greater tendency than their introductory counterparts to be committed to healing and service.

The results also reveal that the two instructors affected their students in predictable manners, although the differences are only a matter of degree. Students exposed to the professor who emphasized a human science orientation were more doubtful about the readiness with which new ideas are published and also tended to stress the importance of wisdom and self awareness. Students whose professor emphasized a natural science orientation tended to stress the need for a stable body of empirical knowledge and the control of behavior.

The differences between the male and female subjects conform to our cultural stereotypes. The female students placed a greater emphasis on the study of feelings (as opposed to behavior) and individuals (as opposed to the study of laws), whereas the males tended to stress the individual researcher (as opposed to the intellectual climate). Again it should be noted that for the most part these differences are a matter of degree and do not reflect opposing tendencies.

In summary, this study provided us with an occasion to explore the attitudes of undergraduate psychology students.
An Evolutionary Model Applied to Teaching

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Over the last 25 years, a substantial focus in the literature has been devoted to understanding scientific productivity. Works like *The Structure of Scientific Revolutions* (Kuhn, 1962) and others (Deutsch, Platt & Senghass, 1971; Toulmin, 1972) have increased our understanding of the role of the researcher and the nature of scientific processes as they contribute to the expansion of conceptual domains, like that of psychology. Although they have received less attention, other reports have extended our understanding of the role of college and university professors and the functioning of higher educational institutions in the transmission of knowledge within the conceptual domains of the disciplines Jencks & Reisman, 1968; Blau, 1973; Horan & Sampson, 1977). Although the focus on understanding scientific processes has outpaced the development of our understanding of the contributions of pedagogy to the transmission of knowledge, the two areas have demonstrated parallel progress that leads us toward an integrated understanding of the mutual activities of science and education. A continuing limitation of the current literature is the lack of attention paid to the contributions that the professoriate makes to the advancement of science. Few articles address the question, "In what way do college teachers contribute to the advancement of scientific knowledge?"

The college and university community are not merely major consumers of scientific research. Teaching involves important search, selection, and evaluation procedures which modify in a significant way how science evolves with successive generations of scientists, scholars and citizens. One area of theorizing that holds promise for the integration of research and pedagogical advances is the population approach. An investigation such as that suggested by the works of Campbell and Toulmin (Campbell, 1965; Toulmin, 1972). As biological models, the population and evolutionary approaches deal with a pool of genetic material upon which the pressures of natural selection operate to select subsets of the gene pool which then constitute the subsequent generation or population.

An examination of the models that employ an evolutionary or population approach suggests new ways of viewing the activities of teachers of higher education (Cavalli-Svorza & Feldman, 1973). The transmission of knowledge from a population approach is part of a broader process of evolution that characterizes change in social institutions, including education and the professions. The population approach seeks to establish (a) what elements of a system are changing, and (b) what the mechanisms are by which elements of systems change or are replaced through time. Philosopher of science, Stephen Toulmin, suggests more specifically that we examine "the channels of intellectual innovation by which 'conceptual variants' enter the current scientific debate and the role of periodicals and textbooks in the formation and transmission of a conceptual tradition" (1972, p. 505-507). Toulmin states that it is fruitful to investigate "the selection criteria, procedures and/or prejudices to which those variants are exposed, in competing for an established place in a particular science" (1972, p. 505, 506). Campbell (1965) also specifies the necessity of observing how elements are preserved, propagated or reproduced. In the present study, these elements of the evolutionary or population models proposed by Campbell and by Toulmin are illustrated by examining teachers' information habits, particularly how teachers gather and select current concepts in psychology.

Through the process of selection, college teachers are continually reconstituting the population or pool of ideas that comprise the domain of psychology. An investigation such as that suggested by the works of Campbell and Toulmin can reveal how ideas are selected in such a way that some perish and others survive. Specifically, sources of variation in psychology are explored using indices of teacher information or communication channels. Also, several indices of...