Value Profiles, Value Attributions and their Multiple Contingencies with Social Cognition effects.

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Experimental Methods in Psychology.

" Ὁ δὴ διώκει μὲν ἅπασα ψυχὴ καὶ
τούτου ἔνεκα πάντα πράττει, ἀπομαντευομένη
τι εἶναι, ἀποροῦσα δὲ καὶ οὐκ ἔχουσα λαβεῖν
ἱκανῶς τί ποτ'ἐστὶν ".

" This is then, what every soul pursues, the motive of
all its actions. And it is something the soul divines,
but what it is, she can never in her perplexity fully
comprehend. "

Plato, *The Republic, Book VI, 505 E.*

Abstract

The concepts of values and value systems have been examined for several decades and have constituted one of the major social-psychological research areas. Values have been explored mainly for their relative patterns or profiles corresponding to societal groups, such as occupational ones. Since values have been shown to be connected to social cognition, the way social perception phenomena are determined, shared false ideas and misconceptions about groups of people and ultimate attribution errors, the current study focused on the cognitive effects value systems produce for social comparison and value attribution processes, in conjunction to the specific value profiles observed within two vocational groups at the college level. 40 postgraduate students in the Departments of Psychology and Engineering and 21 academics from the same Departments were tested for their personal value profiles, using a modified version of the Allport, Vernon, Lindzey, 'Study of Values' paper and pencil test. The postgraduate students reported as well their value-estimates for 'typical' psychologists and engineers. Through a Multiple Comparisons design it was shown that small differences for postgraduate self value systems existed, especially for Aesthetic values, but the real differences were manifest in the way dominant and subdominant values were utilized by the postgraduates when attributing values to ingroup and outgroup professionals. Effects of value-assimilation to the ingroup profession and value-differentiation from the outgroup one, ultimate value-attribution errors, downward comparisons and pluralistic ignorance were shown to be active in the social cognition processes utilized by the postgraduates for 'typical' professionals and intragroup-intergroup value system comparisons. These effects, along with the expected inaccuracies in estimating professional value profiles, were shown to be partly produced by specific value patterns possessed by the two postgraduate vocational groups. The findings clearly demonstrated the importance of Self Value systems' influences on cognitive social interaction processes and accumulated evidence for occupational value maps.

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Introduction

General Theoretical framework

As *Mehrabian* (1972) has shown, social interaction between groups of individuals functions on many levels and in relation to a large number of interconnected-interacting concepts, giving rise to a highly complex network not feasible to explore or explain as a whole. Social Psychology has tried though to clarify some of these interconnected concepts by studying them one by one. *Cooperation-competition, social skills, attribution and stereotypic behaviour, social cognition, attitudes, beliefs, values* have constituted some of the major areas of social-psychological research. One of these aspects which has attracted quite a lot of attention for more than half a century is the concept of **values** and **value systems**. Researchers have attempted to explore and describe this notion by explicating its specific properties and possible causal relationships with behaviour, either on individual grounds or within a social context.

It is widely observed that different people perceive and process the same events or information in distinctly different ways, through different personality filters, thus arriving to diametrically opposite conclusions about these same events or information. A simplistic example would be that the political reality in each and every country is unique, therefore all citizens could be expected to maintain the same political ideologies but this is commonly known to be far from being true; people have always formed their own personal ideologies and theories about the *cosmos*, and even the mass media influence, although it does have quite strong effects in 'equalizing' life style in a flattening manner, is not enough to extinguish this differential handling of information. An enlightening example would be the one of conceptions and misconceptions of social psychology itself, held by the lay person. As *Furnham* (1983) points out, social psychology can be regarded either as common sense, or not concerned with human nature, or simply wrong when it contradicts a particular well-established view of mankind. Thus *'to the critical layman social psychological findings, if they sound unsurprising, they are dismissed as common sense; if they are not understood they are thought not to be part of the discipline of social psychology; and if they are surprising in that they contradict a widely held model of man, they are*

wrong.' In this situation, it could be said that it is the critical person, the one seeking the ultimate and absolute truth who is dismissing social psychology as common sensical; the 'hard scientist' or the lay person believing in 'hard science' is the one holding this view about social psychology. On the other hand, it is the lay person who is interested mainly in social welfare who will dismiss the discipline if its conclusions are not understood; finally, it is the lay person who holds a steady and stable view about the world, and would not like to see the *status-quo* altered, who will object when the findings are surprising and turn this *status-quo* upside-down. Even more, a lay person interested in the practicalities of life might dismiss the discipline by rendering it unable to offer immediate practical achievement, and a lay person interested in dominance and power might consider social psychology as a mass influence tool. This contingencies become extremely intricate if we consider that these lay people holding these conceptions or misconceptions about social psychology might be one and the same person, going through what *Tetlock* has portrayed as *integrative complexity* in his *value pluralism model* (1986). It is evident however, that one's personality and one's conceptions of life have a major influence on the way information is processed by this person.

G.W. Allport, who pioneered in the social-psychological study of values, thought of the concept as the best way for a researcher to understand personality. He and his colleagues embraced the idea that values represent basic interests or motives in personality and are much more central than related concepts such as attitudes which are in fact produced and shaped by values. *Allport* contended that a person lives by and for his or her values; for any individual, being in constant although without awareness defense of his or her values is an identity-affirmation process which is evident within the classification of groups observed in any society. These groups might be defined as *social class* groups, although this classification is under question, or as *ethnic groups*, an issue connected to *Cross-Cultural* research (see *Zavalloni*, 1980), or much more simply, as *occupational groups*.

But these social interaction phenomena should have their explanations within group mentalities and formed life-styles, so what *Allport, Vernon and Lindzey* did was to devise the *'Study of Values'* questionnaire, (AVL), a balanced, paired-comparison paper and pencil test, and standardize it for vocational groups at the college level and for gender. *Allport* was very much impressed by a very influential book by *Eduard Spranger*, professor of Philosophy and Pedagogics in the University of Berlin. This book, called *'Types of Men'* (1928), was an attempt to assess from a theoretical

viewpoint those individual characteristics common within major groups of people, thus allowing for a typology, taxonomizing people into different categories according to their dominant and subdominant interests, personality traits and values. By no means did *Spranger* mean that these types were existent in reality or even desirable; what he contended was that the six value types he described have relative importance over any individual and are in a continuous and a decision-making type conflict, and under this rationale this typology has no strictly defined borders, allowing for 'mixture types' as *Spranger* and *Allport* contended.

The relativity of importance of these types of values was exactly what *Allport* and his colleagues set out to study, in belief that by assessing the personal values of any individual, one could study this individual's personality better. For *Allport*, personality is a unique system, and since one unique system is never strictly and in totality comparable with any other unique system, common functions in personalities must be found and measured; these functions must be universal enough to provide a basis for comparison and this requirement was thought to be fulfilled through the values concept. This way, Allport forecasted what *Kluckholn and Murray* contended 17 years later, that *a man is a)like all other men b)like some other men and c)like no other man* (1948), and that the same holds for his values.In their **AVL** *manual of directions, Allport, Vernon and Lindzey* present the characteristics of the six value types by isolating each type's main functions and links to the other types; this information is a review of Spranger's theoretical views and is presented in *Appendix D* as it appears in the **AVL** *manual of directions*. In brief though, these six value types could be described as follows.

The *Theoretical type* has as a dominant interest the discovery of truth; this type takes a cognitive attitude, looking for identities and differences, seeks only to observe and reason, and to systematize knowledge.The *Economic type* is interested in what is useful. Practical affairs, wealth and financial standards of living are the main interests of this type.The *Aesthetic type* seeks harmony in every single experience. Symmetry and fitness in life constitute this type's chief targets, which are accomplished by an individualistic attitude and application of high organizational standards.The *Social type* prizes other people as ends having a main interest in the love of people. Helpful, altruistic, unselfish and sympathetic, the social type regards love as itself the only suitable form of human relationship. The *Political type* is interested primarily in power. This does not mean that the narrow field of politics is the main aspect in this case. Influence, by controlling all situations concerned with

his/her life, is this type's first goal. The *Religious type* is not necessarily 'religious' by the strict meaning of the word. What is of interest to this type is to 'comprehend the cosmos as a whole' and be embraced in its totality. This type seeks to justify his/her existence by uniting himself/herself with a higher reality.

The underlying assumption that college populations would hold different values depending on the fields of studies, which served as a standardization hypothesis, indeed proved to be a fact. Using this *contrasted-groups* validity assessment technique, *Allport* managed to demonstrate a series of different profiles amongst different vocational levels. As an example, *Engineering* students' value profiles differed from the ones obtained from *Medicine* students. Medicine students scored higher on *Theoretical, Aesthetic and Social* values, whereas Engineering students scored higher on *Political* and much higher on *Economic* values; both groups assigned equally low importance to *Religious* values[1]. The nature of the results though, and the nature of the AVL test itself (discussed in the *Psychometrics section, Appendix C, Section 2*), do not allow for definite conclusions to be drawn and replicating-validating evidence within the research efforts that followed the 1931 *Study of Values* needs to be briefly reviewed.

Allport, Vernon and Lindzey (1931) provided test-retest reliability coefficients which were fairly high, supporting the consistency and validity of the instrument, and replications that followed seemed to provide decisive evidence for the scale's validity and for the assumption that occupational groups would reveal different value

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[1] If one though would like to comment further on these differences, since the raw data are not available and the only statistics reported are the means, standard deviations and sample sizes, equations (1) and (2) have to be used in order to derive the Sums of squares necessary for reconstructing the Anova table.

$$\underset{Groups}{\overset{Between}{\sum}} (x-\bar{x})^2 = \frac{T_1^2}{n_1} + \frac{T_2^2}{n_2} - \frac{(T_1+T_2)^2}{n_1+n_2} \qquad (1) \qquad\qquad \varepsilon\sum (x-\bar{x})^2 = n\overset{k=1}{\underset{i=1}{\sum}} \bar{s}^2 \qquad (2)$$

The error Sums of squares due to unequal cells (n_{Eng}=53 and n_{Med}=93) had to be computed separately and then combined for the error term. This way, it was revealed that *Economic* differences were the strongest with an *F value of 62.77*, and then differences for *Aesthetic, Political and Theoretical values* followed. *Social values* did not show significant differences for the .01 alpha level despite the size of the samples but only for the .05 alpha level. Finally, *Religious values* did not differ at all.

profiles. *Whitely* (1933) administered the **AVL** test to 4 distinct vocational groups (*Natural sciences, Arts and literature, Social sciences and 'Business'*) and retested the subjects after a period of 100 days. The overall retest reliabilities were mostly satisfactory and differences among the various groups were observed, such as the high *Economic* values observed for the *'Business'* students, compared to the rest of the groups. *Harris* (1934) administered the test to *Arts, Engineering* and *'Business'* students, replicating the differences for four out of the six value types; the most intriguing finding apart from the observed group differences, was that for *Religious* values, the variability was much greater than for the other value types, an effect which was demonstrated by *Whitely* as well. *Schaeffer, B.* (1936), in agreement with the theory that personality should be explored through *synthetic* rather than *analytical* standpoints, administered the test to *Liberal arts students* only, expecting high *theoretical and aesthetic values*, which was clearly the case. He also cross-validated the scale by correlating the profiles with data collected via the *American Council of Education College Sophomore Test*, which includes a factor related to the subject matter the sophomores are mostly interested in. If the **AVL** test would correlate highly with this factor, convergence of the data would provide evidence for construct validity of the dependent variables; indeed, this was a fact for the *Liberal arts* students. *Seashore* (1947) also validated the scale for two college groups (*Health and Physical Education, Applied Social Sciences*) by demonstrating that the *expected profiles* for the two groups were actually observed via the scale, showing high *Political* values for the *Physical Education* group in combination with *Social and Religious* motivation, and high *Social* and low *Economic* values for the *Applied social sciences* group.

Both *Schaeffer* and *Seashore* though, were not aiming only in validating the scale but they were interested in its utility as well. Both suggested that perhaps one of the most useful aspects of the test was to be found in vocational guidance. *Dukes* (1955), in his 'sketchy' review of the literature up to 1955, agrees on this point as well, but notes that small differences, although significant, might be artefactual due to possible intervention of other confounding variables and that results obtained using the **AVL** test should be examined with extreme caution; however, it has to be mentioned that it is the paired-comparisons format of the scale itself which 'suppresses' the total scores by demanding, for large samples, an overall mean of 30, which corresponds to the 'norm' that emerged from the **AVL** standardization.(*Psychometrics section, Appendix C, Section 2*).

Mylonas conducted three studies (1990,1991a,1991b) using the **AVL** *Study of*

Values test; in one case the original (revised in 1951) form was used; two alternative enlarged forms were used in the second study; a short form implementing 'guiding principles' directly corresponding to Spranger's theory, was used in the third one; all three revealed approximately the same pattern for *undergraduate Psychology* students. *High Aesthetic and Social* values, *low Theoretical and Economic and moderate Political and Religious* values seem to form this pattern. Thus, the pattern takes the form shown in **Figure 1**, if we arbitrarily present values in the order of *Theoretical, Economic, Aesthetic, Social, Political and Religious*, that is in the way they were presented when describing Spranger's value types. Very briefly, the general conclusions from these three studies are that differences exist in the way Psychology students are assigning various importance levels to each value type, and the expected profile is consistently observed. Students assimilate with their *Ingroup* professional values and differentiate themselves from *Outgroup* professional values; the value-assessment itself is not affected by the measurement method (ranked and rated data revealed the same profiles for equivalent groups of students). It also has to be noted that the 1st and 3rd of the studies concerned students in academic settings in Britain but the 2nd one concerned two Greek samples (**Athens University**) which raises obvious considerations for Cross-Cultural research in the field. All three studies contributed to the current research effort in various and numerous ways. For this reason they are discussed in a separate section (*Appendix B, Section 3*).

Figure 1

Other ways of assessing value systems have been constructed especially after the second half of the century, and also theoretical frameworks and considerations have been proposed, exaggerating on the one hand the outmost problem of the area,that is incompatibility, but on the other hand, accumulating hard to combine but very useful evidence. In 1973 *Rokeach* published his widely cited book *'The nature of Human Values'*; in this book, he contended that the way values had been examined up to then was mistaken mainly because various instruments, techniques and theories had failed to account for a representative number of value types, types which instead had been simply ignored as if non-existent. His main objection was directed naturally towards the most commonly up to that time used instrument, the **AVL** test, which

he considered as being measuring a very limited set of values. *Rokeach* offered his solution by devising the *'Value Survey'*, a scale measuring 18 *instrumental* and 18 *terminal* values, but it has to be noted that even himself acknowledged that the overall procedure for selecting these 36 value-items was *'an intuitive one'* (1973, p.30) and he also admitted that other researchers might arrive at different value-items through their studies. Another problem with the **Value Survey** is that the subjects are obliged to rank the items and this creates apart from methodological, statistical problems as well, (discussed in the *psychometrics* section, *Appendix C, Section 2*). Finally, factor-analytic techniques have revealed that the *18 terminal values* fall into four dimensions (*Feather*, 1975, p.45), which tremendously resemble the *Spranger* classification with one possible exception, and this casts doubt on whether the **Value Survey**, is measuring anything at all different from the **AVL test** in the end.

However, *Rokeach's* contribution was of great importance and clarification power, opening the most promising paths for further exploration. He offered a sound theoretical base, by differentiating values from other related concepts such as *beliefs, attitudes, needs,* and by providing as well conceptual and operational definitions of the concept. He made researchers see and understand the centrality of values, their dynamic properties and their relation to cognitive theory. For *Rokeach,* values are fairly stable structures, conceptions of the desirable, preferences and 'guiding principles' in life; he also agrees with most other researchers that values are very few in number in contrast to attitudes or personality traits, for instance. The most important function of values is to provide standards of conduct, combining *means* with *ends,* guiding the ways we present ourselves to other people; thus, for *Rokeach,* values have a major role to play in social comparison theory, because standards are needed for the comparisons to be made and values serve precisely as such standards. Under the same rationale, social influence and persuasion are widely affected not only by the implementation of these standards but mostly by the preferred, precise use of each one of them in any given situation. The number of studies conducted, using the **Rokeach Value Survey** is overwhelming and it would not be possible to review even a small fraction; thus, we will restrict the current review to the most important for the current study findings and even those are to be briefly presented.

Feather has conducted a series of research projects within the *Flinders University Values Programme* (1970, 1971, 1972a, 1972b, 1973a, 1973b, 1979a, 1979b, 1982a, 1982b, 1985). In the 1970 study he concluded that differences in values do exist within different schools of a University and also across nations, among different Universities;

gender differences were reported as well. Apart from their association with vocational choice, values were also related to attitudes towards controversial social issues. Another study (1971) involving undergraduate students from *Humanities, Social Sciences, and Sciences* replicated the findings of the previous study revealing once again different value patterns for the various schools and also gender effects. This study tried as well to test for the *Value Match hypothesis*, as a determinant of educational choice, but failed to control for confounding variables due to poor methodology. Another indicative study conducted by the same author (1982) addressed the specific value patterns of students entering the *Medical* profession, showing that these students tend to endorse *social, altruistic* reasons for entering the specific school and they are also thrilled by the challenge the specific occupation has to offer. When comparing the value rankings of the medical students to the ones obtained from psychology students under the same academic status, *Feather* concluded that their value systems are very similar, especially as far as this concerns their terminal values, and that is perhaps the most interesting and contributing finding for the current study because it provides an indirect link to the findings concerning Medicine vs Engineering students reviewed earlier *(page 4)*.

Furnham (1988) showed significant differences as well between the value systems maintained by *nursing, medical and psychology* students; along a continuum, the nursing and psychology students possessed the two extremes and medical students fell on the middle of this continuum. *Furnham* demonstrated as well the problem of confounding variables and concluded that *gender, age, income, and socio-political beliefs*, along with *cultural differences* (i.e. Nationality) should be accounted for in any research project and if not possible to match for them, they should be built into the design as independent variables, in an attempt to account for the variation they produce.

In conclusion, the **Rokeach Value Survey** seems to be reconfirming the initial hypothesis that value differences indeed exist among different occupations, at least at the college level, suggesting that the next step should be to 'map' these differences as precisely as possible and connect them to the consequences they have within the social interaction context. In general, Values and their description, configuration, functions and the whole theory around the concept are an interdisciplinary issue; they are not detached from other areas in social psychology mainly, and even more, they have a lot to share with *Sociology, Occupational psychology, Philosophy, Political science, Educational research, Anthropology,* even *Historical analysis* and *Religion*. In short,

values are such a central issue in everyone's life that their importance becomes immense and is clearly exhibited in any human activity; this is re-confirming that they have to be studied within a broader theoretical framework, allowing for exploration of connecting links to concepts concerning cognitive and social phenomena.

A lot of research has been done on these grounds. The most interesting connections appear to exist between value systems and *social-cognition* processes and refer to the notions of ultimate *attribution errors* (*Pettigrew*, 1979), *pluralistic ignorance* (*Korte*, 1972), and *stereotypic attribution* (*Cohen*, 1981). The existing evidence verifies that impression formation and social perception are highly biased due to active stereotypic attributions (*Zebrowitz*, 1976; *Ross*, 1977), either referring to 'judgements' of certain social actions or to the mere existence of specific societal groups. The literature suggests that when a member of a societal group is confronted with the existence of another group and even more when is 'reminded of' the possible opinions and views this other group holds, then his/her stereotypic attributions produce either *assimilation or differentiation biases* (*Doise*, 1969). The notion has been described more generally as the *ultimate attribution error* towards members of ingroups and outgroups within the social interaction context. More specifically, it has been shown that intergroup and intragroup misconceptions and misattributions are directly dependent on the amount of their justification potential, just as personal attitudes have been shown to be justified by appealing to personal values (*Kristiansen*, 1988)[2].

Since values are expected to produce attitudes, and the evidence (*Brewster-Smith*, 1949; *Feather*, 1985; *Rasinski*, 1987) corroborates this, and since these attitudes are mostly biased within the social cognition framework, the obvious question of *whether group value patterns influence the perceptual processes this group utilizes when forming impressions about another group*, is raised. Even more, it is of specific interest to examine *vocational groups*, because the stereotypes held for occupational groups are accentuated and filtered through existing 'experience' criteria, as has been evidently shown (*Cohen*, 1981). The most interesting aspect to study, in conjunction with these

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[2] A more extensive review of the evidence portraying the connective links between values and social cognition phenomena is provided in *Appendix B, Section 2*.

pluralistic ignorance phenomena, is of course value systems themselves, because they constitute characteristics attributable to specific vocational levels, whether in a biased or a non-biased way. A number of studies have shown that the attribution of values to specific vocational groups is quite accurate on intragroup grounds and a *value-match hypothesis* has been supported (*Feather*, 1971, 1972a, 1972b), but the obvious *intergroup value attribution* has not been studied extensively. However, evidence connected to this intergroup attribution for other than value characteristics, has portrayed *group polarization and downward comparison effects*, accompanied by *self-esteem* intervention (*Crocker*, 1987; *Baumeister*, 1989).

In general outline, it seems that social cognition biases are interconnected with the existing value 'norms' within each vocational field, which accentuate these biases, either in an assimilating fashion on intragroup levels, or in a differentiating fashion on intergroup levels; consequently, as *Feather* has suggested, *two, at least, vocational fields should be tested for their self value systems, the values they attribute to their ingroup professionals and the values they attribute to a specific outgroup's professionals, in order to test for the accuracy of these estimates and, in order to examine whether self values indeed produce or affect cognitive-behavioural biases.*

Concluding remarks

From all the findings and theoretical notions reviewed up to this point, it is evident that values play a major role within a vast range of psychological phenomena. Not only it is of main interest to study the formation, pattern and modification of this pattern over periods of time, but it is also of great importance to examine specific effects that these formations of values have on social cognition, stereotypic ingroup-outgroup perception and polarization, attribution errors, and in completion of full circle, the effects that the surrounding environment has on these value system formations.

The studies reviewed on the formation and existence of value systems have one major, among others, conclusion to contribute to this *era*: vocational groups at the college level show differences in the patterns of value systems they possess. Therefore, vocational groups provide very convenient means for examining two different value patterns, which would be assumed to produce different cognitive processes of the type described above. Even if these 'initial' value differences do not exist, or are small in magnitude or are restricted to specific values and not the whole system, their predictive power in creating cognitive phenomena can be still assessed and examined because the value system still functions as a personality unit.

The social cognition research directs the current enquiry towards stereotypic attributions of value systems to ingroup and to outgroup professionals under conditions manipulated in such a way that the subjects will be at some point facing the existence and functions of the outgroup opinion. This direction is supported by the ingroup-outgroup literature, the ultimate attribution error biases, and the pluralistic ignorance and group polarization notions. All these along with the studies exploring the estimates given by one vocational group for another suggest that the differentiation in value systems perceived for one's self in contrast to ingroupers and outgroupers who typically and stereotypically represent these fields is of maximum importance on the grounds of social and functional relationships between these groups and of great utility in understanding and clarifying the functions produced by personal values in everyday situations.

This study focused precisely on these points; *what would the self value systems be for two vocational groups at the college level, and how accurately would each group predict the value systems of ingroup and outgroup professionals? How would these personal systems*

affect the assimilation, if existent, to the ingroup and how would they affect the differentiation, if existent, to the outgroup ? Would personal values function randomly or would they have at least some predictive power over the attributions of values made for ingroup and outgroup 'typical' professionals and cognitive functions toward those ? If all the above were assessed, which value or values could be decided to be most influential and decisively 'making the rules' for any observed effect for each group ? The two groups employed for this study were **Psychology** and **Engineering** students (the previous literature, although indirectly, suggested possible differences between these two vocational fields) **at the Postgraduate level of studies**; this postgraduate identity of the sample had advantages and disadvantages: the drawback was that postgraduate populations represent a wider group, subdivided by vocational field but still possessing other and strong commonalities, thus initial value differences might be superficially suppressed; the main advantage was that postgraduates are considering themselves, since they are considered by significant others as such, closer to the professional occupational field than undergraduates, and therefore there was no possibility for masked effects, such as the previous one, for ingroup and outgroup value attributions.

Hypotheses

The specific **null** hypotheses tested in this study were the following:

1) Postgraduate psychologists would not differ at all when compared to postgraduate engineers for their Personal value systems, as assessed for the six value types proposed by Spranger and utilized by Allport in the AVL test.

2) Personal values would randomly produce assimilation to the ingroup and differentiation from the outgroup; in other words, the way that postgraduate psychologists would attribute values to professional Psychologists would not differ from the way postgraduate engineers would attribute values to professional Engineers; the same would hold for outgroups, thus the way that postgraduate psychologists would attribute values to professional Engineers would not differ from the way postgraduate engineers would attribute values to professional Psychologists. In short, postgraduates in Psychology and Engineering would not perceive their ingroup's and outgroup's Values in a different fashion, but in a flat, undifferentiated, random one.

3) Postgraduates would be able to accurately estimate the self value systems provided by Outgroup Professionals, but they would not be able to accurately estimate the self value systems provided by Ingroup Professionals.

4) Finally, personal value systems would not have any predictive power on any effect produced if hypotheses 2 and/or 3 were rejected initially.

Method

Subjects

As mentioned in the introduction section, the sample was consisted of 20 **postgraduate** students in the Department of *Psychology, University College London,* and **20 postgraduate** students in the *Electrical* (n=13), *Chemical-Biochemical* (n=6) and *Fluid Mechanics* (n=1) Departments of *Engineering, University College London.* **21 faculty members,** *9 lecturing in the Psychology Department, U.C.L. and 12 lecturing in the Engineering Department, U.C.L.,* participated as well by providing data for their self value systems only.[3]

The postgraduate identity of the student sample, as discussed earlier, had advantages and disadvantages, but under the circumstances the postgraduate population was the only available one, since after the end of the academic year, undergraduate populations became an extinct species, and were no longer experimentally accessible.

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[3] The decision to collect data from academic psychologists and academic engineers was based on the assumption that these professionals are best acquainted to postgraduate students, mainly through supervision processes and everyday social activity. For this reason academic staff should represent closely the stereotypic consensus concerning 'typical' professionals held by postgraduates; therefore, data from these professionals would provide the best means for comparisons of attributed value systems and not only. Possible confounding effects due to the subdivision in the engineering sample were avoided by 'matching' the postgraduate distribution along this subdivision for the data collected from the staff members. Thus, since approximately 30% of the postgraduate engineering students participating in the study belonged to the Chemical-Biochemical engineering field, 30% of the engineering faculty data should come from the Chemical-Biochemical Department. The remaining 70% should come from the Electrical engineering Department. Obviously, there was no such problem for the professional psychologists' data, since all psychology postgraduates belonged to one and the same Department.

Materials

The questionnaire was consisted of 18 items asking the subjects to indicate their personal preferences (or 'guesses' for the attributed systems) on a 6-point Likert scale; each value type was represented by three items and all items were retrieved from the original AVL *Study of Values test*. As an example, one of the 18 items to be rated by the subjects was *"If you had sufficient leisure and money, would you establish a business or financial enterprise of your own ? "* [4]

Since *Self Esteem* effects had been previously demonstrated and since values and self esteem are considered to be two nodes within an intercommunicating network, possible artefacts produced by individual self esteem differences would have to be avoided or at least accounted for. For this reason the subjects' self esteem was measured by using the **Rosenberg Self Esteem Scale**. This way, if a significant covariation existed, by partialling out the effects of this covariation at any stage of the analyses, the true picture of the results should emerge and genuine significant effects should be observed.

Finally, personal information on each student's **gender, age, nationality, socio-economic status, political preference, family type (nuclear or extended), and postgraduate course being attended** was collected through 9 short questions appearing on the front page of the questionnaire. The need to assess the family type each student participant belonged to was imposed by the need to be at least partly aware of the outside the academic setting social-environmental influence on the participants' value systems. Family type *per se* after all is a separate matter of interest within the values research area and *Georgas* (1989) has shown that nuclear families influence offsprings' personal values in a very different way than extended families do. Thus, assuming that the familial social environment had affected and was still affecting the way students' values were formed, it was necessary to know the type of family each student was associated with (although as was obvious, postgraduates do not live with their families in most cases and this was hoped to yield only one type of family for the sample, namely nuclear), and if necessary account for the additional variation possibly produced by it. However, not all of the assessed

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[4] The decisions to use within the current design three original AVL items for each value type and a 6-point Likert scale, are more extensively explained and justified in *Appendix C, Sections 1 and 2*.

variables would be tested as independent variables within the actual analyses simply because the number of data points in many cells as defined by combinations of these variables along with the vocational 'split' would be zero due to the limited sample size. Only the useful ones should take part in the final analyses. In fact, only *gender and nationality* proved to be useful in the final design as probably interacting with the *vocation* between groups variable; the reasons for deciding to keep only these variables in the final analyses of variance designs are explained in the *Psychometrics* section, (*Appendix C, Section 3*), but the main point here is that if a significant variation existed due to these 'demographic' factors, it should appear by means of interaction effects when the data would be analyzed.

The questionnaire as administered to the postgraduate students is presented in *Appendix C, Section 2*. Next to each question a letter code denotes the type of value this items measures, T ▲ Theoretical, E ▲ Economic, A ▲ Aesthetic, S ▲ Social, P ▲ Political and R ▲ Religious. Obviously, these codes did not appear in the forms administered to the students or faculty participants. It has to be noted that the faculty members were asked to rate only the second page of the questionnaire (as presented in the *Appendix*), that is they provided ratings for their self value systems only and they obviously did not provide any personal data.

Procedure

The questionnaire was *self-administered*. Instructions appearing at the beginning informed the subjects on the nature of the items and urged them to proceed sequentially, that is they were informed that they should not turn to a next page unless the current one was fully completed. After answering the 'demographic' questions they were asked to rate the 18 items according to their personal preferences. The items' order was randomly predetermined and this order was held constant for all subjects and all conditions, thus keeping any possible order effects even for all subjects. In the second condition, the subjects were asked to 'guess' the ratings a 'typical' professional of their own profession would have given to these same 18 items. Finally, in the third condition, the subjects were asked to rate the same 18 items as they believed a 'typical' professional of the other profession would have rated them. Naturally, the subjects did not know how many professions were involved in the design or what the purpose of the study was. In the end, they were asked to rate themselves on the *Rosenberg* self esteem scale. Thus, the sequence of

'conditions' for postgraduate psychologists was:*Self* ⇒ *attributed to 'typical psychologist' values* ⇒ *attributed to 'typical engineer' values,* and the self esteem measurement followed. For the postgraduate engineers:*Self* ⇒ *attributed to 'typical engineer' values* ⇒ *attributed to 'typical psychologist' values,* and the self esteem measurement followed.[5]

Design

One of the most powerful aspects of the value concept itself is that it can be used as a *dependent variable and as an independent variable and* if needed *as a combination of the two,* as denoted by Feather (1975, p.11). This does not mean that self value systems' indication of the dominant value of each personality would classify this personality or subject in one of six different levels of the same independent variable; that would be totally non-justifiable and statistically erroneous. What it means is that values are affected and in the same time affect cognitive and social procedures. Therefore, in this study, self value systems could be treated as dependent variables initially, and then conceptually as independent variables, that is as characteristics of the subpopulation. Finally, if important predictions would have to be made for specific effects of the existent value formations, these value systems would have to be treated statistically as predictor variables in a *Multiple regression* design. These points though are the least complicated within the current design; the powerful complexity of the design will become apparent in the *results section* but in order to familiarise the reader we shall present it in a brief manner.

This type of design is by nature a **multivariate** one. Since for the current study multiple comparisons made by the subjects were manipulated, the design becomes a MULTI-TRAIT ≐ MULTI-METHOD *multiple comparisons* design. The term in this context refers to its conceptual identity and not to its mathematical definition or utilization which is not pursued here; the point is that these comparisons and attributions made by the subjects should be multivariately examined under specific contrasts between groups

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[5] The reader may wonder why these specific sequences were used and why they were not counterbalanced or at least administered in a randomized order to each subject; the answer is that the manipulation itself of assimilation to ingroup and of differentiation to outgroup imposed these sequences, that is, self ratings first, ingroup ratings afterwards to create the assimilation condition (if this was to be effectively manipulated, it had to follow the self ratings directly), and finally outgroup ratings to create the differentiation condition. In fact, no other combination of sequences would optimally create the necessary conditions. This is also why the second and third ratings were administered in the inverse order to each vocational group.

for several combinations. Thus, one should at first compare the self value systems for the two postgraduate groups and separately for the two faculty groups. Then, one should compare the attributed systems to the professional psychologists, as given by the two groups of postgraduates, if interested to see whether this professional is perceived in a different way by these two groups, or else ingroupers and outgroupers, and what form do these value attributions take; similarly for the 'typical engineer' attributed systems. Then one should compare the attributed to the ingroup value systems for the same reasons as before but here the point of interest would not be the attributed values towards a specific profession such as the 'typical engineer' but how do the perceptions about the **ingroup** profession differ as far as this goes for their value systems; similarly for the **outgroup**. Combining the outcomes of all these comparisons, one should be able to conclude on possible *assimilation, differentiation and ultimate attribution error* biases.

The self value systems **within** each occupation should be compared as well, that is it was expected that the self value systems of postgraduate psychologists and academic psychologists would be similar and the same would hold for the engineers, but this should have to be tested. The attributions for value systems made by each vocational group should be compared to the ingroup and, in separate, outgroup academic self systems, to examine the extent of accuracy of these attributions. Last, but by no means least, **within groups** comparisons for all groups and all conditions should be carried out to allow for determining statistically the gravity of the pattern of each self value system assessed. Several forms of multivariate and univariate *repeated measures, and profile analyses* designs would assist this purpose. An attempt to present the just described multiple comparisons design is presented in *Figure 2,* **page 19**.

Multiple Comparisons Design   **Figure 2**

'1'=Comparisons for SELF Values (PG and Faculty groups)
'2'=Comparisons for Estimated Professional Values by PGs
'3'=Comparisons for INGROUP and OUTGROUP estimated Values
'4'=Comparisons for SELF PG vs SELF equivalent profession
'5'=Comparisons for PGs'predictions for INGROUP Professions
'6'=Comparisons for PGs'predictions for OUTGROUP Professions
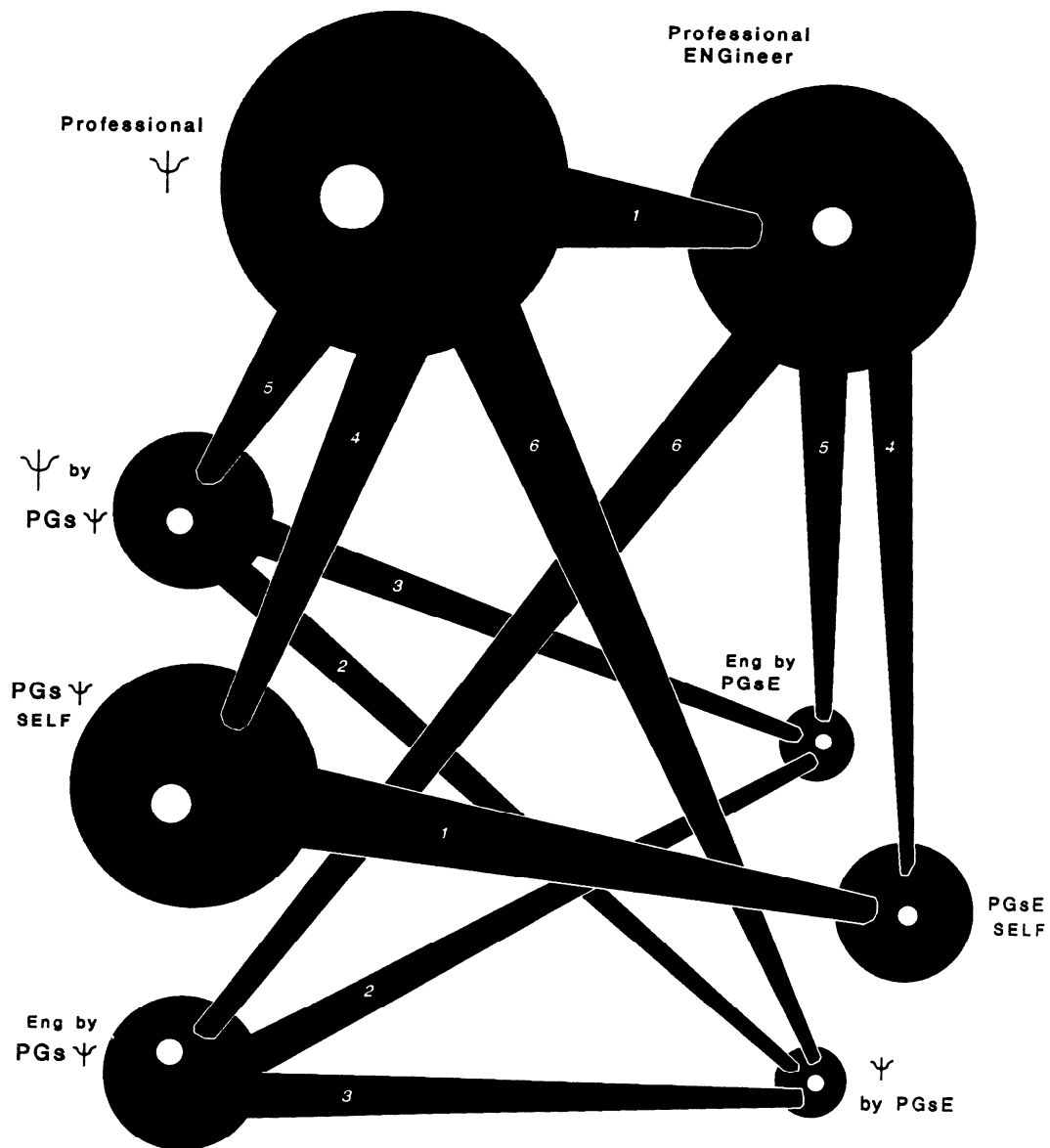
All the above cover the *Multivariate Analysis of Variance* part of the design only, although not in full-scale. The design allows for many more multiple comparisons but these were either theoretically irrelevant or unfortunately, non-testable due to the relatively small sample size.[6] One might wonder whether all these simultaneous comparisons are statistically legitimate. The answer is simple: the comparisons are **not** simultaneous. In fact each comparison is a different step and although same sets of data are used for different combinations participating in different comparisons and serving different purposes, statistical assumptions of any kind are not violated. This is because this design is precisely one step before the final form of a mathematical *multi trait* ⁎ *multi method* design where literally **everything** is combined into a single multidimensional matrix. The current design is not employing this ultimate multiple combination, but it is testing each combination separately, as if the data had been collected via separate studies addressing specific issues, such as self value systems, or attributed to ingroup and outgroup values. The reader should be alert as well, that from here and on, when the notion of *outgroup* is referred to, what is connoted by this is the specific profession which acted as **one** out of many possible outgroups for each postgraduate population. That is, it has to be remembered that for postgraduate psychologists, the specific outgroup contrasted to their ingroup and investigated was the 'typical engineers' and for postgraduate engineers the specific outgroup contrasted to their ingroup and investigated was the 'typical psychologists', not an outgroup in its general form and conceptualization. This should not escape awareness in the pages to come.

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[6] It has to be mentioned that the researcher's initial objective was a figure of 30 postgraduate students for each vocational group, which would allow for more effects to be tested, but even the 20 subjects finally employed for each group were very difficult to find because postgraduates started becoming an extinct species as well, as soon as summer commenced.

Results and Discussion

As soon as the data were collected, several decisions concerning subsequent analyses had to be taken. It had to be decided whether all 18 items would participate in the analyses to follow or whether some of these items had to be rejected if extensively non-reliable. Since the final data points for each assessed system (self or attributed one) should be six, that is one for each value type, it had to be decided which of the 18 items, if not all, would produce these averages. Also, the independent variables to be used had to be 'selected' from the five initially assessed grouping factors (GENDER, NATIONALITY, SOCIAL CLASS, FAMILY TYPE AND POLITICAL PREFERENCE). Naturally, the main *Psychology-Engineering* (VOCATION) between subjects factor was not under such considerations but it was necessary to discover which of the remaining between subjects factors were the most promising ones, elsehow, if testing for all, the multivariate comparisons would be applied on null cells with the obvious consequences. The final decision was to use all 18 items for retrieving the final 6 value scores and that GENDER and NATIONALITY BETWEEN SUBJECT FACTORS along with the VOCATION factor should be used within the comparison designs; (justification for these decisions is provided in *Appendix C, Section 3*).[7]

The data were explored initially through *Principal Component* and *Factor analyses*. These were performed for each vocational group separately in an attempt to discover any possible underlying patterns; these patterns emerged quite clearly for both vocational levels and explained a great proportion of variance as well. The varimax rotation results for postgraduate **Self-value systems** (PGsΨ -Postgraduates in Psychology and PGsE -Postgraduates in Engineering) are summarized in *Tables 1a and 1b, page* 22. Although the factors that emerged for PGsΨ were much stronger than those that emerged for PGsE and explained a great deal more sample variance, there is a very interesting comparison to be made for these revealed patterns; PGsΨ's Self value systems seem to function on three levels: one is what *Spranger* defined as *subjective values* namely *Religious, Political and Social*; these three have common grounds on the fact that they correspond to a subjective reality perceived by the

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[7] For the analysis of variance designs, two clarifications must be made: a) the two vocational groups were tested for *homogeneity of variance* and proved to be highly homogeneous, and b) the data reported in the *Figures* referring to these analyses of variance designs correspond to the *weighted means solution*; the reasons for that are explained in *Appendix C, Section 3*, as well. *Tables 5a, 5b and 5c, Appendix A*, present the **means, standard deviations** and **confidence intervals** for the **weighted means solutions.**

individual. The second level includes *Economic and Aesthetic* values; aestheticism is not only an appreciation of harmony and structure in life but also a deep individualistic-egocentric attitude. Psychology students constantly provide high *Aesthetic* values and if this is combined to the factor currently discussed, suggests that although the *Economic* scores might be low, PGsΨ comprehend and utilize these two values as two

Table 1a   (PGsΨ)

Values	Factor 1	Factor 2	Factor 3
Religious	.90		
Political	.74		
Social	.56		.47
Aesthetic		.91	
Economic		.71	.48
Theoretical			.92
Eigenvalues	2.16	1.21	1.17
Percentage of explained Variance	36.1	20.2	19.5

Total Explained Variance 75.9%

Table 1b   (PGsE)

Values	Factor 1	Factor 2
Religious	.86	
Aesthetic	.71	
Political	.47	
Theoretical		.75
Social		.72
Economic		-.62
Eigenvalues	1.77	1.58
Percentage of explained Variance	29.5	26.4

Total Explained Variance 56%

sides of the same coin; in short the *Aesthetic value* is seen to be active in a practical sense just as the *Economic* one; aestheticism is not at all subjective, but objectively relevant to everyday reality for PGsΨ. Finally, the third level is revealing what we

could call a 'norm' picture of psychology postgraduate students: a combination of *Theoretical* aspirations and *Social* welfare attitudes along with obvious *Economic* considerations for financial achievement.

For PGsE things look rather similar but in fact they are not; first, there is no 'norm' factor; these students have two clearly separated conceptions of values as corresponding to reality; second, the combination of *Religious, Political and Aesthetic values* in portraying the first factor, reveals that PGsE see aestheticism in an entirely different way than PGsΨ do. Apparently they connect it to subjective spheres, utilizing its structural appreciation component rather than the individualistic one. On the contrary, *Social values* are combined to *Theoretical* ones and the two contrast *Economic values*. It seems that PGsE see their profession as a means towards social welfare and this contingency counteracts with personal financial achievement.

Principal component analyses and orthogonally rotated factor analyses were performed for the *Attributed Value systems* as well. Again, these were performed separately for each vocational group and the results are presented in *Tables 6a, 6b, 6c and 6d,* in *Appendix A*. The factors that emerged for Self-value systems reported by the faculty members in Psychology and Engineering are also presented in *Tables 7a and 7b, Appendix A*. It should be mentioned that the *Economic-Theoretical* contrast was strikingly evident for both vocational faculty members, thus resembling on these grounds the factors revealed by PGsE more than the ones revealed by PGsΨ. Finally, *Aesthetic values* seemed to cooperate with *Social* ones for Psychology faculty members, whereas for Engineering academic staff these values belonged to the same factor but contrasted each other.

Apart from the underlying patterns in the formation of value systems, the commonalities among subjects within each vocation were of extreme interest. This approach would reveal whether individual differences within each group would be large enough to introduce noise in the data or not. The danger with this type of data, as with all quasi-experimental data, were the numerous confounding variables, which due to the nature of the study are very difficult to control for; however, if subjects were linked closely to each other within each vocational group the problem would seem to have been compensated for. These commonalities were estimated through *agglomeration cluster analytic techniques* which provided the distances and connective links among the subjects in each occupational field. The *dendrograms* corresponding to these analyses for *self* value systems are presented in *Table 8, Appendix A*. From

these, it was clear that some of the subjects in each group were distinctively differentiated from the majority and forming separate clusters; this suggested that caution should be taken when interpreting the analysis of variance results and that if necessary, these 'different' subjects should be traced, by having their personal value characteristics examined and by exploring, if possible, the reason for their difference to the majority within their vocational grounds. The issue that mostly deserved attention though, was the one concerning the self value differences between the two vocational groups, within the *Multivariate Analysis of Covariance* (**ManCova**) designs that followed, because these differences might have been suppressed by the additional variation produced by these extremely 'different' subjects.[8]

The first hypothesis to be tested concerned the self value systems reported by PGsΨ and PGsE. For this test, a ManCova design was implemented. Self esteem was controlled for as a covariate; the independent variables in the design were VOCATION (Ψ-E), GENDER and NATIONALITY; the dependent variables were naturally the six value scores computed by averaging the three items corresponding to each value type. The situation that emerged was what *Tabachnick and Fidell* (1989) describe as the 'very unhappy researcher' situation; one or more univariate F-tests were significant but the linear combination of the dependent variables represented by the multivariate effects was non-significant. This, in outline, suggested that the power of the univariate F-tests, although corrected for inflated type I errors via a Bonferroni type adjustment for the α levels, was somehow restricted, and that corroborative evidence was needed in order to be able to support the differences shown to be significant by the univariate tests.[9] Summarizing the results for this comparison, it was shown that Self esteem did not have a significant covariation with the dependent variables, producing slopes non-significantly different from 0, by means of multivariate regression. The VOCATION main effect was non-significant in the multivariate level but

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[8] It has to be said that the usual approach to such a problem is to locate these 'outliers' and exclude them from the sample; however, the author believes that such an approach breeds the potential danger of unconsciously biasing the results, because it constitutes an artificial *ex-post-facto* manipulation of the data.

[9] Tabachnick and Fidell suggest that in such cases outliers should be eliminated but although the results corresponding to this 'reduced' sample are going to be reported in *Appendix C, Section 4*, as an indication of what the outcome **would have been** if there were no outliers, the relatively small sample size did not allow anyhow to exclude these 'outliers' for the purposes of this study; this would reduce the cell sizes dramatically, reaching the other extreme, that is allowing for a larger amount of type II errors.

one clear-cut and one marginal univariate differences emerged. PGsΨ scored significantly higher in *Aesthetic* values ($F_A(1,31)4.26$, $p<.05$) and marginally significantly higher in *Social* values ($F_S(1,31)4.03$, $p=.053$). These effects were further explored by using *Stepdown Roy-Bargman F tests*. These tests allow for a type of hierarchical multiple regression (stepdown model) analysis, assessing the importance of each dependent variable as it enters the model, with the previous entries partialled out as covariates. This way, if these Stepdown Fs were significant for at least *Aesthetic* and *Social* value differences, the confidence in the reliability of these effects would be corroborated. Indeed the Stepdown F for *Aesthetic* was 4.48 with 1,29 degrees of freedom and $p<.05$; similarly for *Social* values (Stepdown $F_S(1,28)4.22$, $p<.05$), which this way escaped marginality. The means and confidence limits for all six values reported for Self by PGsΨ and PGsE are presented in *Figure 3*.

In summary, the self-postgraduate value systems comparisons, suggested that the PGsΨ and PGsE profiles were quite similar apart from *Aesthetic* and *Social* values, which were significantly lower for PGsE. For PGsΨ though, the same old pattern, observed for undergraduate psychologists, that is high *Social* and *Aesthetic* values and lower *Political* and religious ones, emerged. *Theoretical* and *Economic* values appeared somewhat higher, as one would expect from a postgraduate
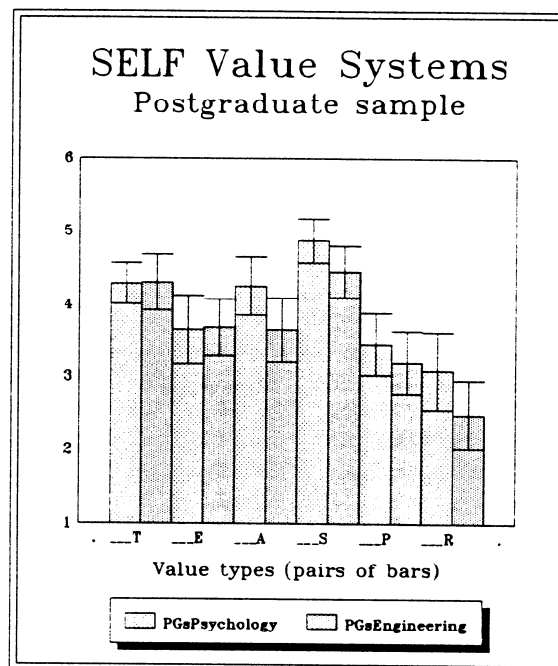
Figure 3

population. In testing more stringently for the Univariate and Stepdown F differences observed, the specific Self value profiles within each postgraduate sample had to be explored. The aim was to discover the *dominance hierarchy* for these value systems for each vocational group and combine these findings to the factor analytic results. A Repeated measures design with the six values as the levels of the within subject factor was applied in exploring these self value profiles. This was appropriate since each value type is a part of an overall personality profile for each individual, despite the fact that the properties measured by each of the six types are not identical.

For this design *a-priori* Helmert-type contrasts were implemented; this method tested for 5 orthonormalized contrasts; the highest rated value entered the model first and was compared to the mean of the remaining five value types; it was then excluded from the analysis, as the second high value type was entering the model and in turn this was contrasted to the mean of the remaining four value types, and so on, down to the last contrast comparing the two lowest rated value types. Since the profiles were shown by the significant overall multivariate effect to be non-flat, it was certain that series of significant contrasts would emerge. The point at which this series of significant contrasts would break, would specify the cut-off point in the profile, because the remaining values would be forming a separate 'team' with its similarities or dissimilarities within itself; this 'team' would clearly differ overall from the previous 'team' of values identified by the significant series of contrasts before the discontinuity had occurred. The self value systems of PGsΨ were examined first. The multivariate and univariate tests for the Helmert contrasts are summarized in *Table 2a*.

Table 2a (PGsΨ)

Hotellings T^2 (S=1,M=1½,N=6½)   F(5,15)10.83, p<.001
W=.38 ,   Greenhouse-Geisser ε =.77

Value Type	VS	Value type(s)	F	(df)	p
Social		T,E,A,P,R	46.69	(1,19)	<.001
Aesthetic		T,E, P,R	10.12	(1,19)	<.005
Theoretical		E, P,R	19.67	(1,19)	<.001
Economic		P,R	2.34	(1,19)	NS
Political		R	2.77	(1,19)	NS

From these results it was clear that the cut-off point was at the *Theoretical* value, that is one 'team' of highly rated values was *Social, Aesthetic* and *Theoretical* (in descending order of dominance) and the other 'team' of low rated self values was *Economic, Political* and *Religious* (still in descending order of dominance). The conclusion derived was that for PGsΨ the dominant values characterizing their personality and its functions are *Social, Aesthetic* and *Theoretical*. Their subdominant values are *Economic, Political* and *Religious*.

The same contrast procedure was followed for PGsE's self value systems as well. The results are summarized in *Table 2b, page 27*.

Table 2b (PGsE)

Hotellings T^2 (S=1,M=1½,N=6½)   F(5,15)14.46, p<.001
W=.60 ,   Greenhouse-Geisser ε =.86

Value Type	VS	Value type(s)	F	(df)	p
Social		T,E,A,P,R	31.16	(1,19)	<.001
Theoretical		E,A,P,R	19.77	(1,19)	<.005
Economic		A,P,R	6.89	(1,19)	<.05
Aesthetic		P,R	14.64	(1,19)	<.001
Political		R	7.06	(1,19)	<.05

These results did not reveal an obvious cut-off point, specifying the dominant and subdominant values for PGSE. The author's opinion was that in this case the only way to discover the 'teams' was to use similarity matrices and estimate the distances among the value types. *Scaling* techniques were used, only in one dimension though due to the relatively small sample size; it was revealed that the dominant values for PGsE were the *Social* and the *Theoretical* ones. The subdominant team was constituted by *Economic*, *Aesthetic* and possibly *Political* values (in descending order of dominance); *Religious* values seemed to be 'less' than subdominant, clearly differentiated from everything else. The stress of the configuration was .004 and R^2 was 1.000, in other words variance was accounted for and explained in totality. These findings are in fact in agreement with the results obtained via the Helmert contrasts Repeated measures design; as shown in the above table there is a large drop in the actual F-ratio for the *Social* value type, which hints a possible discontinuity at this point. These explications of the value dominance hierarchies within each of the two postgraduate vocational groups partially reconfirmed the results obtained from the initial ManCova design. Since *Aesthetic* values are dominant for PGsΨ and subdominant for PGsE, it can be argued that the two vocational levels differ for their *Aesthetic* values, and this is corroborated by the factor analytic results, although for the *Social* values no real differences seem to exist.

After all these, one thing was clear; discriminant analyses should be performed for each a-priori designed comparison in order to be aware of what to expect when the subsequent analyses of variance would be carried out and in order to see which of the attributed value systems was more consistently reported by members of different vocational groups. Thus, discriminant functions were computed for the attributed to 'typical Psychologist' and 'typical Engineer' systems, and also for the

'ingroup' and 'outgroup' designs, discussed in due course. The percentage of correctly classified cases in predetermined vocational groups was very high indeed for all but the attributed to 'typical Engineer' value systems, where only 55% of the subjects 'fell' into their predetermined groups. Thus, it was suggested that significant VOCATION effects were unlikely for this specific comparison.

The next comparison concerned the attributed to 'typical Psychologist' value systems; this comparison would answer the question of whether the two vocational groups would be in agreement in their beliefs about the professional psychologist's values or not. The design was identical to the one comparing the PGs' self value systems. Again, the covariate did not produce any significant effects; on the contrary, the VOCATION between subjects factor produced a highly significant multivariate effect. For the Hotellings T^2 criterion $(S=1,M=2,N=12)$,

Figure 4

$F(6,26)7.83$, p<.001), the univariate F tests showed that professional psychologists' value systems were perceived by the two postgraduate groups in a different way for *Theoretical, Economic, Aesthetic* and *Religious* values $(F_T(1,31)22.76$, p<.001; PGsΨ assigned much higher *Theoretical* values to the professional psychologist than PGsE), $(F_E(1,31)11.90$, p<.005; PGsΨ assigned much higher *Economic* values to the professional psychologist than PGsE), $(F_A(1,31)6.15$, p<.05; PGsE assigned higher *Aesthetic* value to the professional psychologist than PGsΨ) and $(F_R(1,31)23.82$, p<.001; PGsE thought of the professional psychologist as incredibly *Religious* in contrast to PGsΨ who gave moderate ratings for this professional); the means and confidence intervals for attributed to 'typical' psychologist values by PGsΨ and PGsE are presented in *Figure 4.*
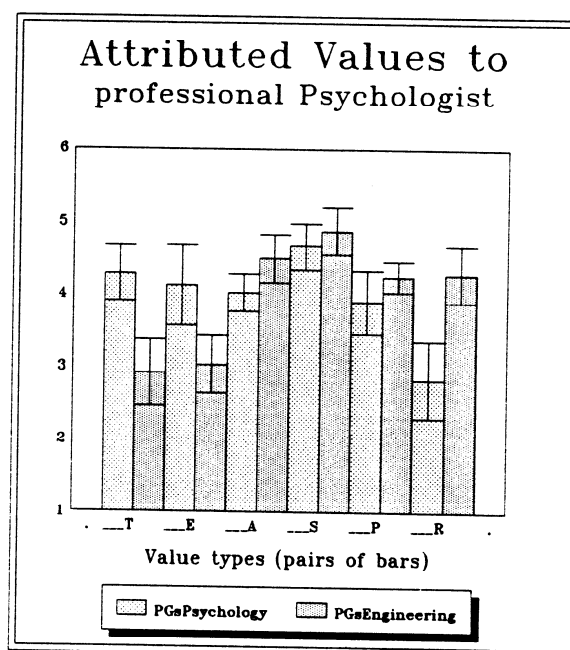
Stepdown F tests were performed as well; they revealed that *Theoretical* and *Religious* values effects were contributing most in producing the overall multivariate

effect (Stepdown $F_T(1,31)22.76$, $p<.001$, $\eta^2=.37$ and Stepdown $F_R(1,31)8.33$, $p<.01$, $\eta^2=.20$). There was a significant GENDER multivariate effect as well; for the Hotellings T^2 criterion ($S=1,M=2,N=12$), $F(6,26)3.50$, $p<.01$), the univariate tests showed that males assigned to the professional psychologist lower *Theoretical, Aesthetic, Social* and *Political* values than females did ($F_T(1,31)4.60$, $p<.05$, $F_A(1,31)4.96$, $p<.05$, $F_S(1,31)5.86$, $p<.05$ and $F_P(1,31)6.72$, $p<.05$). Stepdown F tests confirmed the contribution of effects for *Theoretical* and *Aesthetic* values to the significant overall multivariate effect (Stepdown $F_T(1,31)4.60$, $p<.05$, $\eta^2=.07$ and Stepdown $F_A(1,29)8.44$, $p<.001$, $\eta^2=.21$).

In summary, PGsΨ considered the 'typical' psychologist as a highly *Theoretically* and *Economically* motivated person, whereas PGsE attributed high *Religious* values to this professional. The *Aesthetic* differences, although significant, were not large enough to provide any meaningful differentiation in the way the two postgraduate groups attributed this value to the professional psychologist; both groups thought of the professional as possessing rather high *Aesthetic* values anyhow. Males were more restrictive in 'allowing' professional

Figure 5

psychologists to possess mainly *Theoretical* and *Aesthetic* values in contrast to females.[10] The weighted means for attributed values to 'typical' psychologist by males and females are presented in *Figure 5*. Finally, no significant multivariate interaction effects were present.

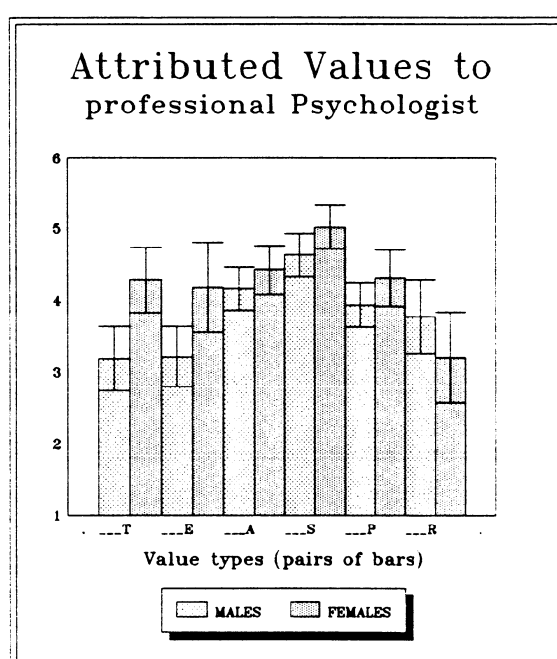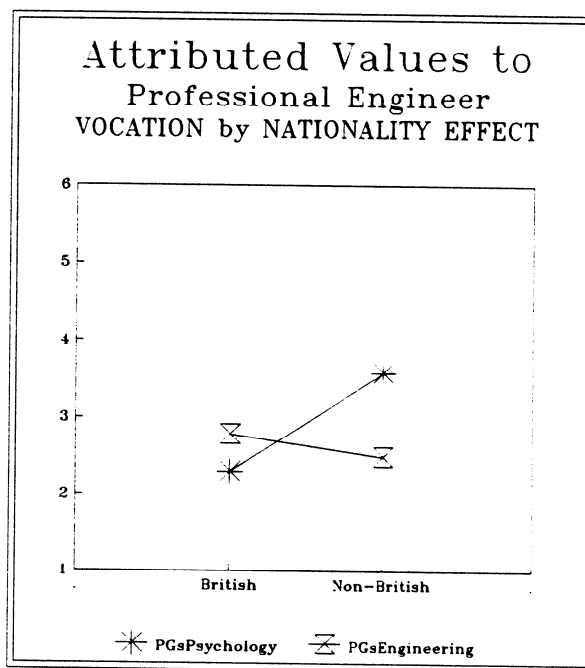[10] The *Aesthetic* effect is a strange one; the weighted means solution revealed a small actual difference and the confidence limits for males and females shared common variance but the univariate and Stepdown F tests were highly significant; due to this peculiarity this effect should be treated with caution.

The next comparison corresponded to the value systems attributed to the 'typical' engineer. This design did not reveal any significant effects, multivariate or univariate, for the VOCATION effect. Thus, it seemed that both PGsΨ and PGsE viewed the 'typical' engineers' values in a similar way. However, it was revealed that for the GENDER main effect, there were differences in the way males and females were attributing *Aesthetic* and *Social* values to this professional (the weighted means and confidence intervals for attributed values to 'typical' engineer by males and females are presented in *Figure 6*).
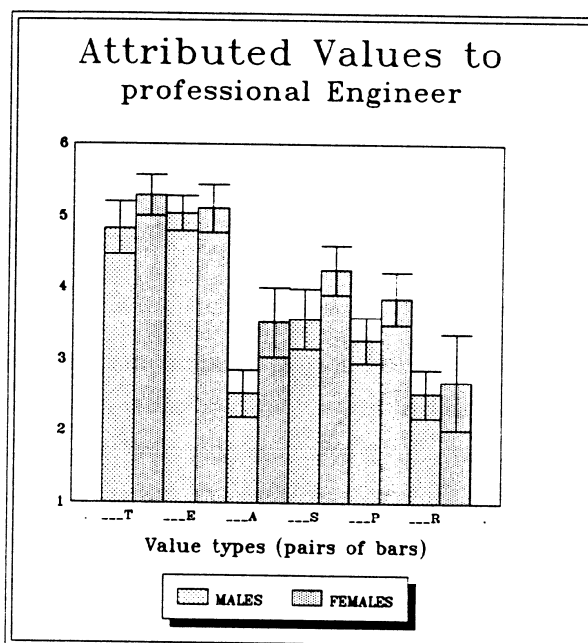
Figure 6

Females assigned higher scores for both value types, although these effects were significant only on the univariate level ($F_A(1,31)12.49$, $p<.001$ and $F_S(1,31)5.34$, $p<.05$). The equivalent multivariate effect was unfortunately marginally significant (for the Hotellings T^2 criterion (S=1,M=2,N=12), F(6,26)2.21, p=.074). The corresponding Stepdown F tests corroborated the evidence provided for *Aesthetic* value difference only (Stepdown $F_A(1,29)7.36$, p<.01, $\eta^2=.18$). Finally, there was a significant interaction effect, (*Figure 7*) only in the univariate level though, for the VOCATION BY NATIONALITY between subject

Figure 7
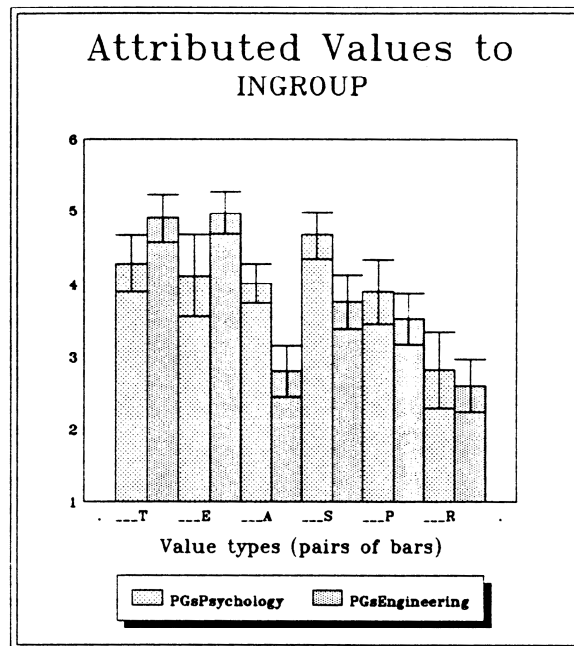
factors concerning *Religious* values ($F_R(1,31)4.47$, $p<.05$). Its Stepdown F was as well significant (Stepdown $F_R(1,26)6.17$, $p<.05$, $\eta^2=.18$). Although the *Religious* values assigned to the 'typical' engineer were quite low overall, it was clear that British PGsΨ believed that the professional engineer is not as *Religious* as the non-British PGsΨ did, and the British PGsE believed that this professional is more *Religious* than the non-British PGsE did. Finally, the covariate did not have any significant effect at all.

Summarizing the hypothesis-testing comparisons presented up to this point, it could be said that PGsΨ and PGsE did not seem to differ much for their personal value systems although they differed for *Aesthetic* values mainly; this result though should be examined under the light of the factor analytic findings which revealed different underlying patterns for the two vocational groups and the dominance hierarchies revealed via the Helmert contrasts Repeated measures designs. Secondly, the way that the two vocational groups attributed value systems to the 'typical' psychologist depended on the vocational identity of each postgraduate group. This did not happen for the 'typical' engineer comparison. Finally, gender seemed to influence the way the attributed to 'typical' engineer value systems were reported by the postgraduates.

Up to now, the data provided by the subjects were used in comparing 'equivalent identity' value systems, that is Self PGsΨ vs Self PGsE, 'Attributed' to psychologist by PGsΨ vs 'Attributed' to psychologist by PGsE and 'Attributed' to engineer by PGsΨ vs 'Attributed' to engineer by PGsE. For the next two hypothesis testing comparisons, the attributed data were crossed-over, that is the attributed to psychologist PGsΨ data and the attributed to engineer PGsE data were to be compared, testing for the way the two vocational groups viewed values for their ingroup profession. Similarly, the attributed engineer PGsΨ data and the attributed psychologist PGsE data were to be compared in order to test for the way the two vocational groups viewed an outgroup profession. For these comparisons, the main effects of GENDER and NATIONALITY and any possible interaction effects were obviously meaningless, but had to be included in the design for equivalency reasons; this way the degrees of freedom would be held compatible with the previous comparison designs. The attributed 'ingroup' systems were compared first.

It was shown that the way PGsΨ and PGsE viewed their ingroup's value systems was significantly and largely different. A highly significant multivariate effect

for the VOCATION between subjects factor showed that for the Hotellings T^2 criterion (S=1,M=2,N=12) the F value was 8.78(6,26) and p<.001. The corresponding univariate Fs concerned their ingroup's *Theoretical, Economic, Aesthetic* and *Social* values. PGsE regarded their ingroup's *Theoretical* and *Economic* values higher than PGsΨ (F_T(1,31)6.09, p<.05 and F_E(1,31)8.41, p<.01, respectively) (the means and confidence intervals for 'ingroup' ratings are presented in *Figure 8*); on the contrary, PGsΨ regarded their ingroup's *Aesthetic* and *Social*

Attributed Values to INGROUP

Value types (pairs of bars)

PGsPsychology   PGsEngineering

Figure 8

values higher than PGsE did (F_A(1,31)39.76, p<.001 and F_S(1,31)17.79, p<.001 respectively).

The Stepdown Fs revealed that the multivariate effect was mainly due to differences observed for *Theoretical* (Stepdown F_T(1,31)6.09, p<.05,η^2=.14) and *Aesthetic* values (Stepdown F_A(1,29)30.83, p<.001,η^2=.41). The self esteem covariate this time approached significance levels for the multivariate effects (p=.051) but since no Regression Fs were significant its influence on the remaining design effects was trivial.

The multivariate analysis for the outgroup comparison followed. Perhaps, this was the comparison that revealed the most significant multivariate and univariate effects; the Hotellings T^2 criterion ((S=1,M=2,N=12), F(6,26)23.54, p<.001) which corresponded to the VOCATION between subjects effect, and the univariate F tests revealed differences in the way PGsΨ and PGsE attributed all six value types to the outgroup profession (the means for 'outgroup' ratings are presented in *Figure 9, page 33*).

For reasons of convenience the univariate F tests, along with their equivalent, wherever significant, Stepdown Roy-Bargman F tests, are reported in *Table 3,page 33*.
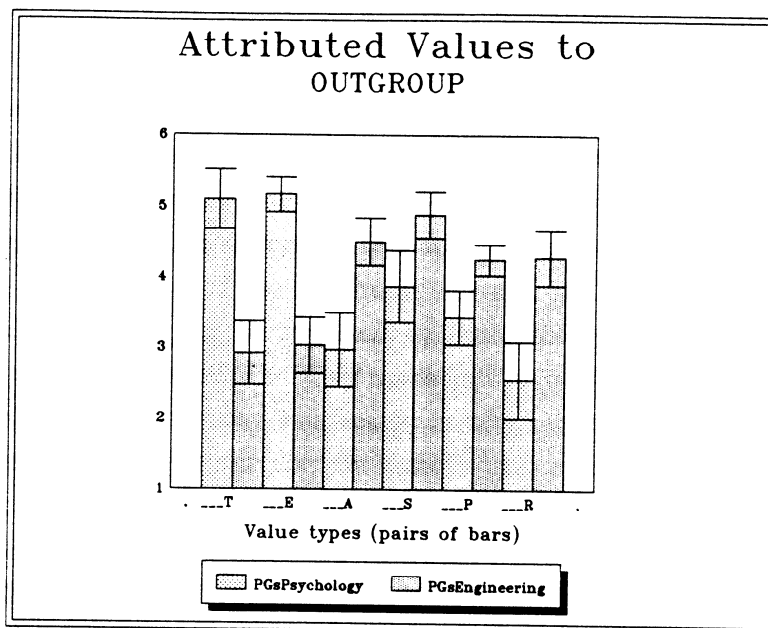
Attributed Values to OUTGROUP

Value types (pairs of bars)

◻ PGsPsychology ◻ PGsEngineering

Figure 9

Table 3

| Univariate F tests	Stepdown Roy-Bargman F tests
$F_T(1,31)\,57.76$, $p<.001$	$F_T(1,31)\,57.76$, $p<.001$, $\eta^2=.59$
$F_E(1,31)\,90.65$, $p<.001$	$F_E(1,30)\,11.55$, $p<.005$, $\eta^2=.29$
$F_A(1,31)\,35.07$, $p<.001$	NS
$F_S(1,31)\,14.19$, $p<.001$	NS
$F_P(1,31)\,22.10$, $p<.001$	$F_P(1,27)\,7.31$, $p<.01$, $\eta^2=.17$
$F_R(1,31)\,32.59$, $p<.001$	NS

In outline, PGsΨ viewed the outgroup as highly *Theoretically* and *Economically* motivated whereas PGsE assigned very low scores to these outgroup values indeed. The opposite was true for *Aesthetic, Social, Political* and *Religious* values where PGsΨ assigned low and very low scores to the outgroup and PGsE moderate to very high ones. The main contributor effects to the multivariate one were the *Theoretical* (with an immense association η^2 coefficient of .59), the *Economic* and *Political* value effects. Combining the stereotypic attribution effects shown by the 'attributed to a typical professional' comparisons with the differences portrayed by the Ingroup and Outgroup comparisons, it is clear that the way values were attributed to Ingroup and Outgroup professionals was not random or undifferentiated at all; on the contrary, it was suggested that value attributions indeed follow a social cognition path, determining its functions and being determined by them as well.

This was the end of the first phase of the multivariate analysis of covariance

hypothesis testing;[11] The next phase concerned possible differences between PGsΨ values and the value systems reported by the Psychology faculty members, and respectively, differences between postgraduates and staff members in the engineering vocational field. It also concerned the 'accuracy of prediction' designs which would involve comparisons of the attributed to one profession value systems by each postgraduate group to the reported by that profession (faculty data) system. For instance, the 'prediction' that PGsΨ made for the 'typical' psychologist systems would have to be compared to the Psychology faculty self value system to see whether this prediction was accurate or not; the same would apply for the attributed (by PGsΨ) to 'typical' engineer system compared to the engineering faculty data; similarly, the equivalent comparisons would be applied for the other postgraduate group as well. Naturally, this phase had to commence with a comparison of the self value systems provided by the faculty members between vocational fields.

This test revealed no significant between groups differences at all; it would seem as if the Psychology and Engineering faculty members' self value systems were identical (the means and confidence intervals for Self value systems of Ψ faculty and E faculty members are presented in *Figure 10*).

However, the researcher's suspicion was that the underlying patterns for these self values would be different, as was the case for the postgraduate self values, and therefore differences essentially existed but were non-manifest. This suspicion though could not be verified because
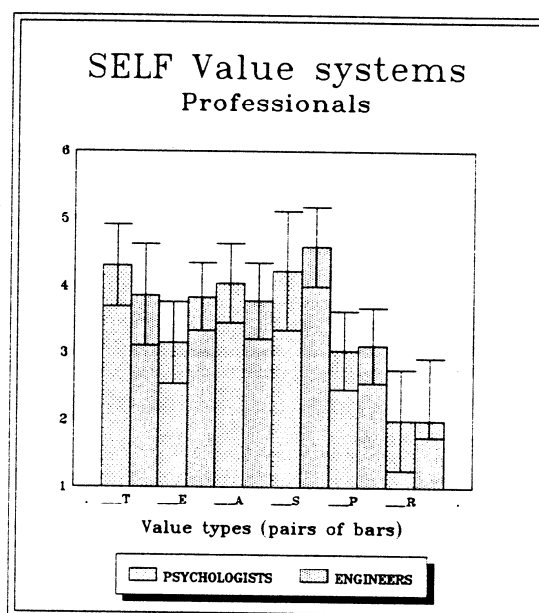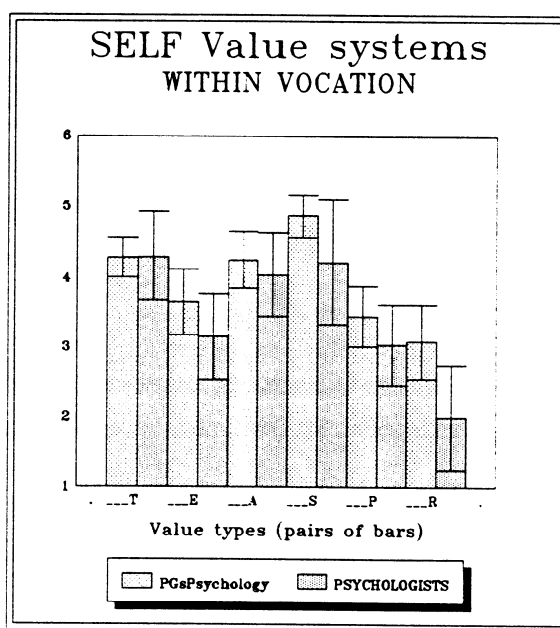

Figure 10

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the cell sizes (Faculty n_ψ=9 and Faculty n_E=12) did not allow for valid factor analytic techniques. Helmert contrasts via a multivariate repeated measures design could not be applied as well for the same reasons; this, once again, pointed out the necessity of a larger sample. For this study though, it was concluded that Psychology faculty members and Engineering faculty members did not differ for personal values at all, even univariately. The overall faculty means and confidence intervals are presented in *Table 5d, Appendix A*.

Self PGsΨ and self PGsE value systems were also compared to the faculty data. It was expected that PGsΨ self values would not differ from the systems obtained by Psychology staff and similarly PGsE would not differ from the Engineering staff members on the grounds of personal values. These were examined via *Profile Multivariate analyses of variance*; the first one contrasted the self PGsΨ value systems to the ones reported by academic Psychology staff. The results revealed parallelism of profiles of the two subpopulations, in other words, there were no

Figure 11

multivariate differences for value systems (the means and confidence intervals for Self values for PGsΨ and Ψ faculty data are presented in *Figure 11*). It was also shown that the overall profiles for both PGsΨ and Psychology staff were significantly non-flat (for the Hotellings T^2 criterion (S=1,M=1½,N=10½), F(5,23)13.80, p<.001).

The same findings were revealed for the comparison of self PGsE systems to the ones provided by engineering academic staff, that is parallelism of profiles between subpopulations and non-flatness of the overall value profile (for the Hotellings T^2 criterion (S=1,M=1½,N=12), F(5,26)20.24, p<.001)-(the means and confidence intervals for Self values for PGsE and E faculty data are presented in *Figure 12, page 36*).

SELF Value systems
WITHIN VOCATION

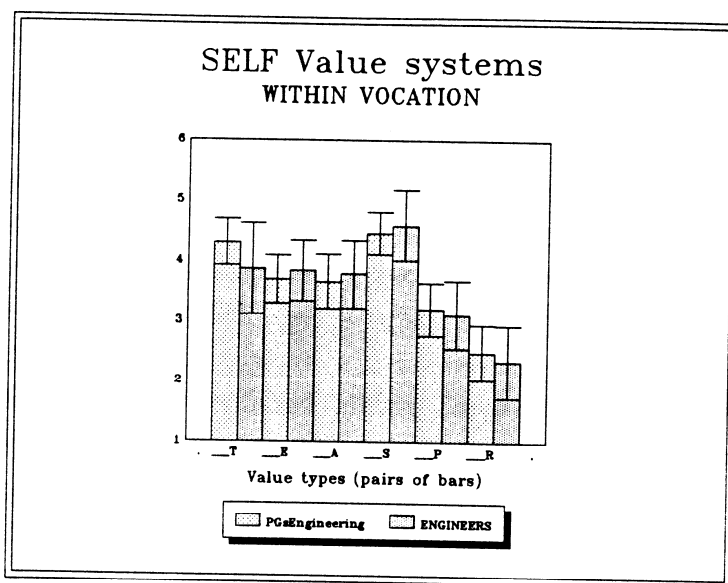Value types (pairs of bars)

PGsEngineering   ENGINEERS

Figure 12

Thus, it was concluded that both postgraduate groups did not differ at all in their personal value systems when compared to their equivalent professional groups.

The first 'accuracy of prediction' design referred to PGsΨ and their equivalent professional data (*means and confidence limits-Figure 13*). If the subpopulations were parallel then the 'prediction' by means of attributed to this profession value systems would have been accurate. Profile analysis showed that this parallelism existed but marginally (F(5,135)2.20, p=.058); this suggested that the prediction was generally accurate but some values might not have been accurately predicted and so univariate differences might exist. Since it was
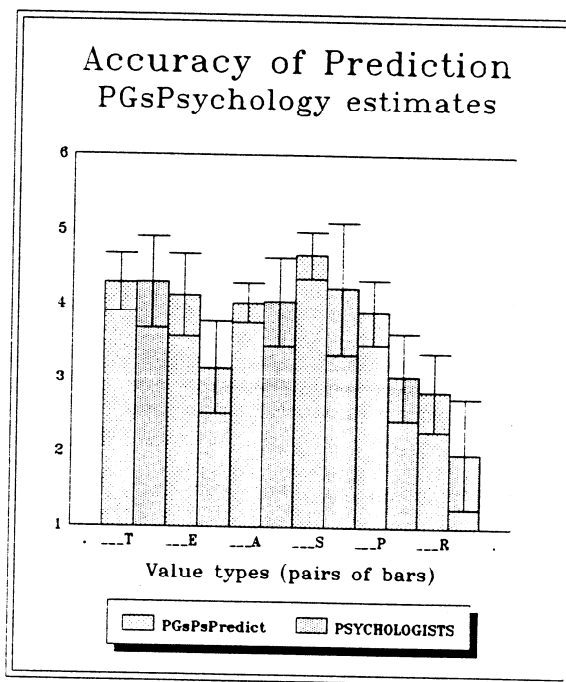

Accuracy of Prediction
PGsPsychology estimates

Value types (pairs of bars)

PGsPsPredict   PSYCHOLOGISTS

Figure 13

expected that the 'predictions' given by postgraduates for their ingroup professional values would be accurate in contrast to the ones given for outgroup professions, this had to be further explored. A *Manova* design helped by revealing that the overall profiles were parallel indeed (non-significant multivariate effect) but inaccuracies for *Economic* values ($F_E(1,27)5.00$, $p<.05$) and *Political* values ($F_P(1,27)5.94$, $p<.05$) existed, although only the *'Economic'* effect was confirmed by Stepdown F tests (Stepdown $F_E(1,26)6.23$, $p<.05$, $\eta^2=.19$).

In fact PGsΨ attributed higher *Economic* and *Political* values to 'typical' psychologists than it was actually reported by the faculty members. As usual, the overall profiles were non-flat, with large differences within the six values forming this system (for the Hotellings T^2 criterion ($S=1,M=1\frac{1}{2},N=10\frac{1}{2}$), $F(5,23)12.93$, $p<.001$), as shown by the profile analysis.

The attribution of value systems to 'typical' engineer made by PGsE was examined via profile analysis as well. The findings here were totally unexpected; the PGsE totally failed to 'predict' the values reported by the faculty members in their own department. The attributed profiles and the faculty ones were clearly non-parallel (for the Hotellings T^2 criterion ($S=1,M=1\frac{1}{2},N=12$), $F(5,150)9.29$, $p<.001$); overall profiles were non-flat here as well (for the Hotellings T^2 criterion ($S=1,M=1\frac{1}{2},N=12$), $F(5,26)22.09$, $p<.001$). The non-parallelism clearly had to be

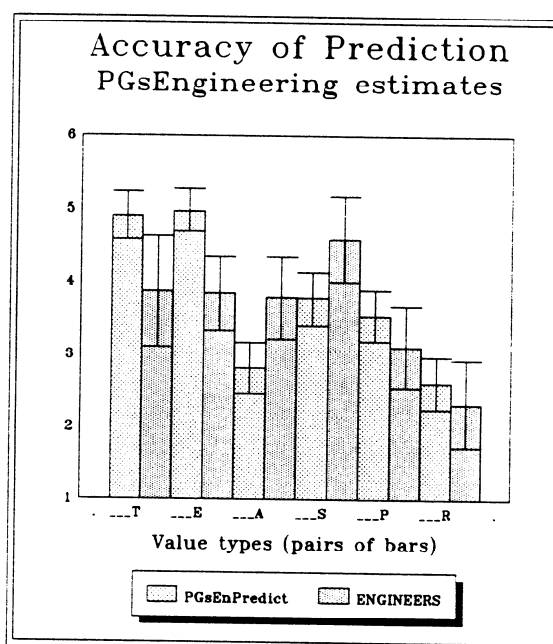*Figure 14*

examined through a pure Manova design; this revealed a highly significant multivariate effect (for the Hotellings T^2 criterion ($S=1,M=2,N=11\frac{1}{2}$), $F(6,25)7.07$, $p<.001$) and several univariate differences (the means and confidence limits for 'predicted' values for the 'typical' engineer made by PGsE versus the E faculty data are presented in *Figure 14*).

Attributed and faculty scores differed for *Theoretical* ($F_T(1,30)9.70$, p<.005), *Economic* ($F_E(1,30)19.58$, p<.001), *Aesthetic* ($F_A(1,30)10.65$, p<.005) and *Social* values ($F_S(1,30)7.09$, p<.01). The first three effects were corroborated by Stepdown F tests as well (Stepdown $F_T(1,30)9.70$, p<.005, $\eta^2=.24$ / Stepdown $F_E(1,29)14.19$, p<.001, $\eta^2=.33$ / Stepdown $F_A(1,28)5.70$, p<.05, $\eta^2=.16$). PGsE attributed higher *Theoretical* and *Economic* and lower *Aesthetic* and *Social* values to professional engineers than the ones actually reported by these professionals. This situation clearly demonstrated the magnitude of the effect that personal values have on social cognition, and especially on estimating a vocational group's values *per se*, since engineering postgraduates were not able to 'predict' the personal values of even the faculty members who belonged to the same department, were working under the same environment and were in constant social interaction with. The effect of personal values on social cognition was clearly demonstrated again when testing for the 'accuracy of predictions' made by PGsΨ and PGsE for outgroup professional value systems as shown by the findings reported next.

PGsE predicted 'typical' psychologist's values; it was expected here that they would fail to estimate the psychology faculty ratings accurately, and this was clearly supported from the profile analysis results. It was shown that the overall profiles were non-flat (for the Hotellings T^2 criterion ($S=1,M=1\frac{1}{2},N=10\frac{1}{2}$) $F(5,23)8.93$, p<.001); immense non-parallelism of attributed and faculty profiles of values emerged ($F(5,135)15.57$, p<.001). Manova revealed (the means and confidence limits for estimated by PGsE 'typical' psychologists values versus the Ψ

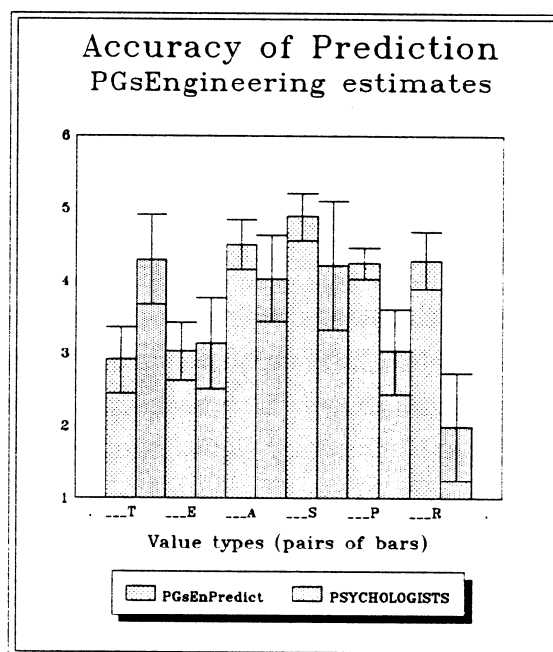*Figure 15*

faculty data are presented in *Figure 15*) a very strong multivariate effect (for the Hotellings T^2 criterion ($S=1,M=2,N=10$), ($F(6,22)9.71$, p<.001) and significant univariate effects for *Theoretical* ($F_T(1,27)$ 13.89, p<.001), *Political* ($F_P(1,27)28.95$, p<.001) and *Religious* values ($F_R(1,27)41.50$, p<.001) which were verified in producing the

multivariate effect via Stepdown F tests; respectively, Stepdown $F_T(1,27)13.89$, p<.001, $\eta^2=.33$, Stepdown $F_P(1,23)17.69$, p<.001, $\eta^2=.44$ and Stepdown $F_R(1,22)4.61$, p<.05, $\eta^2=.17$. PGsE attributed lower *Theoretical* values to professional psychologists than the ones actually reported by these professionals and higher *Political* and much higher *Religious* values than actually reported by the Psychology staff members.

Finally, PGsΨ's attributed to 'typical' engineer values were compared to the ones reported by engineering academic staff. The 'predictions' were again inaccurate and the overall profiles were non-flat (for the Hotellings T^2 criterion (S=1,M=1½,N=12), F(5,26), p<.001). For the non-parallelism of attributed and faculty data, an F of 7.93 with 5,135 degrees of freedom, significant at the .001 alpha level made it once again necessary to resort to Manova in discovering the specific effects. The multivariate effect was again highly significant (for the Hotellings T^2 criterion

Figure 16

(S=1,M=2,N=11½), F(6,25)7.98, p<.001) and univariate Anovas revealed differences for attributed vs faculty *Theoretical, Economic* and *Aesthetic* values ($F_T(1,30)11.13$, p<.005, $F_E(1,30)32,14)$, p<.001 and $F_A(1,3)4.55$, p<.05, respectively) (the means and confidence intervals for estimated by PGsΨ 'typical' engineers values versus the E faculty data are presented in *Figure 16*).
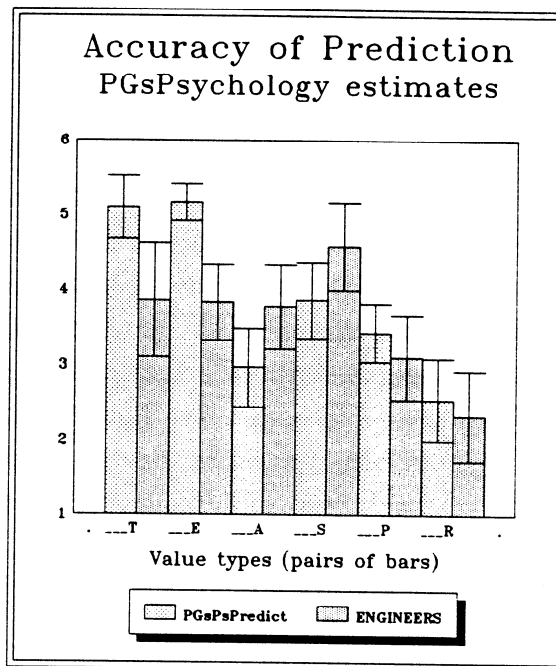
The first two were confirmed as producing the multivariate effect by Stepdown F tests; Stepdown $F_T(1,30)11.13$, p<.005, $\eta^2=.27$, and Stepdown $F_E(1,29)21.31$, p<.001, $\eta^2=.42$. As expected, the univariate effects were somewhat different to the ones demonstrated when the values attributed by PGsE to the 'typical' engineer vs engineering faculty data were compared; that is, in this case, there was no significant univariate effect for *Social* values, in other words, PGsΨ managed to predict the professional engineer's *Social* value, whereas PGsE failed to do so.

In summary, it was shown that neither PGsΨ nor PGsE were able to accurately estimate each other's faculty self value systems. Even more, especially PGsE, could not precisely estimate their own vocation professional value systems. The next step should be to define the way that personal value systems affect these cognitive procedures, and estimate as closely as possible, their predictive power over the value systems attribution to occupational groups and this was in fact the ultimate target of the whole research effort.

Consequently, after having applied all comparison designs and having examined the profiles and their differences, it was essential to explore the way that self values *per se* influenced the mistaken on the whole attributions of values to each professional level. Naturally, the two postgraduate groups were examined separately; it was hypothesized that each postgraduate group's self values would predict at least a part of the attributed systems provided by each group for professional psychologists and separately for professional engineers. Multiple Regression designs were applied, utilizing each postgraduate group's self values as a set of predictors and each attributed to professionals value separately as the predicted variable; in all, 24 *stepwise multiple regressions* were performed. The **significant** regression equations observed are summarized in *Table 4a* for PGsΨ and in *Table 4b* for PGsE (*page 41*).

R^2 coefficients, as expected were not very large for most of the significant predictions; this happened mainly because apart from personal values, numerous other factors influence the way other people's or groups' values are perceived, and because of the relatively small number of subjects for each multiple regression (n=20). Despite these problems though, there is still quite an important amount of variation explained by each significant prediction. In summary, PGsΨ and PGsE personal values affected the way values were attributed to the professional Psychologist more than they affected the way values were attributed to the professional engineer; in short, personal values for PGsΨ seem to affect mostly the way they perceive their ingroup and self PGsE values seem to influence mostly the way they perceive an outgroup profession. However, there were significant predictions for the attributed value to the 'typical' engineer as well; it was shown for instance that as self PGsE *Aesthetic, Political* and *Social* values increase, these postgraduates attribute higher *Political* values to the 'typical' engineer, and the variance accounted for in this prediction was .61, which showed a rather definite determinant function of the predictor *self values*.

Table 4a (PGsᵠ)

Predictor Self Value Type(s)	Predicted Value type, attributed to 'typical' professional	Regression Equation	R^2
Economic	Theoretical, attributed to Psychologist	$\hat{Y}=2.76\ +.41\,(E)$	.26
Economic	Economic, attributed to Psychologist	$\hat{Y}=1.87\ +.61\,(E)$	.27
Theoretical	Aesthetic, attributed to Psychologist	$\hat{Y}=2.10\ +.44\,(T)$	.21
Aesthetic AND Economic	Religious, attributed to Psychologist	$\hat{Y}=4.70-.92\,(A)+.56\,(E)$	.39
Economic	Theoretical, attributed to Engineer	$\hat{Y}=3.46\ +.44\,(E)$	.25

Table 4b (PGsE)

Predictor Self Value Type(s)	Predicted Value type, attributed to 'typical' professional	Regression Equation	R^2
Aesthetic AND Political AND Social	Political, attributed to Engineer	$\hat{Y}=\ -.40\ +.33\,(A)+\ .32\,(P)+\ .37\,(S)$	.61
Political	Economic, attributed to Psychologist	$\hat{Y}=1.55\ +.46\,(P)$	.26
Aesthetic	Aesthetic, attributed to Psychologist	$\hat{Y}=2.81\ +.46\,(A)$	.37
Religious AND Political	Social, attributed to Psychologist	$\hat{Y}=6.68-.32\,(R)-.31\,(P)$	.46
Aesthetic	Political, attributed to Psychologist	$\hat{Y}=3.33\ +.25\,(A)$	.27
Economic AND Social	Religious, attributed to Psychologist	$\hat{Y}=4.75+.45\,(E)-.48\,(S)$	.49

General Discussion and Conclusions

This study's design simulated a causality chain; initially, it was expected that postgraduate psychologists would possess different value systems from postgraduate engineers; this would in turn produce differences in the way the postgraduates assimilate to the *ingroup* and differentiate themselves from the *outgroup*, accompanied by stereotypic formations in perceiving professionals' values; both differences and stereotypic perceptions would be producing false attribution of values for the *outgroup*, a phenomenon which would act as well as a verification for the whole set of biased cognitive processes. Finally, by describing the *self* value profiles and connecting them to the expected cognitive effects, one should be able to identify the personal value or values affecting and shaping these processes and should be able to examine the extent of this effect.

The first link to the chain, that is, the expected differences between the two postgraduate groups on the basis of their self values, proved of being rather loose; these expected differences were not demonstrated overall but on the contrary, PGsΨ and PGsE value systems appeared quite similar with the exception of *Aesthetic* and *Social* self values, (although the actual differences for the latter were not very large). As discussed earlier though, these differences might have been affected by confounding factors; it seemed that a design error had occurred (*Appendix C, Section 4*); the students' *Religious background* was not assessed and built into the design, thus rendering the design unable to account for the additional variation exerted by this highly influencing factor. On the other hand though, it was clearly shown as well that the differential cognitive effects the personal value systems were expected to produce, indeed took place; this discrepancy, that is observing the outcome without having a clear-cut cause for it, showed the way to one of the most important conclusions derived from this study; *it is not only the raw-data value-profiles one should look at,* as most of the previous literature has attempted, *when trying to locate the startpoint of this causality chain, but it is very important to explore the conceptual patterns underlying these raw data profiles, because it is there where the differential functions of personal value systems are initiated.* The 'aestheticism' issue strikingly demonstrates the different filters through which a specific value can be viewed by different vocational groups, no matter how different or how similar the corresponding raw data are between the groups; in other words, it is not the *amount* of value possessed but its *utilization identity* which needs to be assessed and examined. Thus, it can be argued that the real

differences for self value systems between occupational groups lay exactly on these grounds, that is the different identities assigned to the same values by different vocational groups.

For the case of the two postgraduate groups tested, it was the postgraduate psychologists who assigned a 'practicality', everyday importance character to the *Aesthetic* value, in contrast to postgraduate engineers who viewed it as abstract and subjective. This distinction, supported by the univariate differences as well, was reconfirmed when the postgraduate value systems were examined separately for the concealed hierarchy to be assessed. Helmert contrasts showed that *Aesthetic* values for PGsΨ are located in the 'dominant value' region whereas for PGsE they are subdominant. Under this rationale, the *first null hypothesis was partly rejected*, concluding that postgraduate psychology students differ from postgraduate engineering students on the grounds of their *Aesthetic* values, although the raw profile scores did not differ for their overall linear combination; this was the reason for not rejecting this hypothesis on the whole anyhow.

It is clear though that a large number of vocational groups at the college level needs to be studied before finally concluding on differences of this kind for self value systems, but for the purposes of this study a few points deserve to be mentioned; the profiles for postgraduate psychologists are in agreement to the *Allport et al* (1931) findings, when indirectly combined to the findings reported by *Furnham* (1988) and by *Feather* (1982). The profiles observed for postgraduate engineers though do not share the same benefit; these values seem to be different to whatever has been previously reported in the literature, but one has to take into account that the research projects comparing psychology and engineering students are virtually non-existent. Thus, it is very difficult to compare the currently observed value profiles to recently observed ones, in the best case, although this was not one of the main aims of the current design. Indirectly though this 'instability' of engineering value systems turns the spotlight towards the stability observed for psychology value systems. This 'psychology value constancy' (although it is not a perfect one) seems to be cross-cultural, when considering the pilot studies' findings and appears also to be enduring time; this becomes apparent when we consider the amount of years that have passed since the AVL test was standardized and validated for vocational levels.

One more point deserves attention before moving to the second link of the chain; it appears that undergraduate psychologists differ from postgraduate ones.

This was never tested in the current design but it becomes clear when considering the very low *Theoretical and Economic* values reported by undergraduate psychologists (*Mylonas*, 1991b) in contrast to the moderate-high equivalent values reported by the postgraduates. Assuming that college impact, just because of longer time span, is stronger on postgraduates one could argue that the longer the student has the opportunity to assimilate to his or hers vocational environment and values, the more he/she starts using these vocational values as a guiding tool, forming life styles and utilizing them by making them nodes in a hierarchical network. Thus, superficial similarity to other vocational groups' values might emerge in future research, but still the question of **how** these values are utilized by each different vocational group needs to be asked. This is precisely what the next links in the chain served for, anyhow.

The faculty members' value systems did not differ between the two vocations at all; despite that, the rationale corresponding to the postgraduates could be active for this case as well but the restrictively small number of participating academics did not allow for this to be tested. Thus, it is concluded that although doubtful, professional psychologists' values do not differ to the professional engineer ones. The similarity though observed for value systems within each vocational group between postgraduate and faculty members was profound. On these grounds, it can be argued that postgraduates assimilate to their *ingroup* values and this might be the outcome of two possible causes:'predispositional' values, which have directed the student to this vocation, or simply conformity to the *society-accepted, ingroup-imposed* value systems. Despite the fact that postgraduates are indeed assimilated to their *ingroup* values, the issue of importance here is how they perceive this assimilation and even more, how they perceive and realize their differentiation to an outgroup's values.

The differences shown to exist for the way postgraduates attribute values to their respective *ingroups* implies two things; first, that stereotypic attribution of values in fact takes place, and the manipulation of this stereotypic process was successful in the design; second, it reveals that PGsΨ and PGsE attributed *Theoretical* values as dominant for their *ingroup* but PGsΨ stressed as well *Social* values in contrast to PGsE who stressed *Economic* values for professional engineers. A closer look reveals that PGsΨ attributed values to professional psychologists which resembled their own ones closely. On the contrary, PGsE attributed different to their one values to the professional engineer. For these two to be tested, a multivariate repeated measures design, testing for overall differences between the self and attributed systems for each

vocational group was applied. Indeed, this revealed a non-significant effect for the psychology vocation and a highly significant one for the engineering vocational field (for the Hotellings T^2 criterion (S=1,M=1½,N=6½), $F_{PGsE-Ingroup}$(5,15)8.83, p<.001); both results verified the above observations, showing that PGsΨ perceive themselves as possessing the same values as the professional psychologists, but this does not hold for postgraduate engineers. Although one could jump to concluding that an *assimilation bias* exists for PGsΨ, this is not the case at all, because their similarities to their equivalent profession values are a reality. On the other hand though, it is certain that PGsE fall in an attribution error which could be described as 'dissimilarity bias', because the findings show that there is no reason to assume that PGsE are indeed different from professional engineers on the grounds of self values.

Moving on, the *outgroup* attributions were of extreme interest. Again, both postgraduate groups attributed totally different values to the *outgroup* professionals, but this time PGsΨ attributed much higher *Theoretical* and *Economic* values than their own ones to the 'typical' engineer; the opposite was observed for PGsE attributing values to professional psychologist, along with striking differences for *Political and Religious* values for which professional outgroupers were rated very high in contrast to the low self PGsE scores. This, seems to be in agreement with the 'liked-disliked stimuli' hypothesis, as proposed by Fensterheim (1953) but had to be verified as well. Indeed, multivariate results confirmed the above observations (for the Hotellings T^2 criterion (S=1,M=1½,N=6½), $F_{PGsΨ-Outgroup}$(5,15) 7.96, p<.001 and respectively for the Hotellings T^2 criterion (S=1,M=1½,N=6½), $F_{PGsE-Outgroup}$(5,15)13.15, p<.001). A close examination of the attributed profiles reveals that there are attributional errors when postgraduates are estimating an outgroup's values. In agreement to Moscovici and Zavalloni (1969), *group polarization* effects indeed seem to exist being caused by just the fact that the existence of the outgroup and the outgroup's opinion is 'reminded' to the postgraduates. However, it seems that two forms of categorization errors exist, a different one for each vocational group in the design. PGsΨ seem to regard *Aesthetic* and *Social* values as their own 'privilege' but allow for *Theoretical* values to be possessed by the 'hard scientists'. *Economic* values are considered high for professional engineers clearly revealing that this value is not the ' favourite' one for PGsΨ. On the other hand, the attribution errors that PGsE make for outgroup values are much more connected to prejudicial issues and a sort of 'exaggerated hostility', as Campbell (1967) described it, towards this outgroup. PGsE 'dump' all unwanted values to the outgroup, including *Aesthetic, Political and mostly Religious*, although they

seem to 'keep' *Theoretical* values for themselves and their *ingroup* profession.[12] On the whole, PGsE allow for their exaggerated hostility to flourish in a much more wider extent than PGsΨ do.

These conclusions were supported as well by the findings shown for comparisons of attributed value systems directly relevant to specific professionals, where it was shown that the professional engineer is perceived for his/her values by both postgraduate groups in the same way, but this was not the case for the professional psychologist; this showed that stereotypic formations are very strong for professional engineers (although a GENDER effect showed that when it comes to Male-Female comparisons, they are not strong any more). Both PGsΨ and PGsE tended to view this professional's values in the same manner, but in contrast, the stereotypic formation about the professional psychologist is not so vivid because the two groups were holding totally different views about this professional's values.

For all the above reasons, the *second null hypothesis had to be rejected.* It was self evident from the just presented conclusions that the attributed values for the professional psychologist differed vastly between the two postgraduate groups and even more, their assimilation to ingroup and differentiation from the outgroup did not vary randomly but corresponded to implementations of specific cognitive functions by the postgraduates and these functions produced everything else apart from flat, undifferentiated effects between the two vocational groups.

Overall, it is clear that *ultimate value-attribution errors* do exist and are more severe for PGsE; these postgraduates are reaching the extremity of applying *downward comparisons* when it comes to comparing their identity to another one. These phenomena though, should have their origin in shared ideas and conceptions, thus after *rejecting hypothesis 2,* and after stabilizing this link within the chain, the *accuracy of prediction* of the actual professional value systems has to be taken into consideration. Although PGsΨ were more or less able to predict their equivalent professional values, and this could explain their assimilation through the *value match*

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[12] It has to be mentioned that this type of hostility is not necessarily restricted to cognitive behaviour and value attribution errors, but has manifest behavioural effects as well; the researcher experienced this hostility (not for the first time) when administering the questionnaires to postgraduate engineering students. Two postgraduates refused 'politely' to respond by saying (quoted): " a psychology experiment ? 2 o'clock in the afternoon ? go away, we've got better things to do..."

hypothesis, they were not able to predict the professional engineers' values; thus, once again, it was shown that *pluralistic ignorance* had its own share in the way values were attributed to this professional. Even more, PGsE not only were unable to predict the professional psychologists' values, but were not able as well to predict their own vocation professional values, which again could, on the side, explain their lack of assimilation through the *value match* hypothesis. Thus, inaccurate overall predictions corroborated the evidence for attributed fallacies, misconceptions and stereotypic utilization of already accumulated formations, and suggested that *hypothesis 3 should be rejected* as well.

The final and most crucial step in the chain path was to locate the self values that produced all these errors and 'intuitive psychologist' conclusion derivations. The multiple regression designs revealed a number of effects, mainly for the value attribution to the 'typical' psychologist; the picture for this professional was quite sparse, but in contrast, for professional engineers, only two significant regression slopes were observed, one of which corresponded to an R^2 of .61, thus the picture here was quite dense instead. In general, it seems that the most important self values producing the attributional mistakes are the *Aesthetic* and the *Economic* ones. One would expect the *Aesthetic* values to be producing these effects, because of the conclusions already drawn for this value, but why *Economic* ? This value was not in the dominant regions for any of the postgraduate groups, so how could these self *Economic* values play such an important role in value-cognitive phenomena ? It seems that value systems are not called like that for nothing; they indeed are network formations and whatever the factors in any vocational group, they have a job to do, no matter if dominant of subdominant. It is clear then that all six values have a major role to play, each one in its own way, in social cognition procedures. For the current study though, it was concluded that for PGsΨ it is more their *Economic* and less their *Aesthetic* values which produce the *ultimate attribution errors*, and the opposite for PGsE where other values such as *Social and Religious* intervene as well. One must be very careful though not to assume that only *values* are producing these cognitive phenomena; that would be totally unjustified and would be contradictory anyhow to the relatively small R^2 coefficients for the observed significant equations.

Finally, two general issues should be briefly discussed. Self-Esteem did not seem to function this time the way it did in pilot studies. This did not create any problems but it seems that postgraduates are on the whole motivated, or willing, or even forced by their 'postgraduate' identity to report high self esteem scores, on

average. Thus, self esteem did not have any significant effect on the actual value comparisons, despite the fact that it proved useful as a 'correction' figure for the reliability levels for the individual, one by one, value items (*Appendix C, Section 3*); this, if nothing else, renders the concept and its measurement, useful in future designs.

The second point refers to the AVL *Study of Values* test. The current study has demonstrated that the instrument can be used in a 6-point scale Likert format, and that even a representative number of items is valid enough to measure the six value types proposed by *Spranger*. However, the author believes that the AVL requires a closer examination and probably a reformulation in order to fit the criteria set by the reality of the '90s.

Important conclusions for future research were drawn as well; the serious mishandling of religious background information should not be repeated, because as many as possible confounding factors have to be controlled for in such designs in order to avoid type II errors, and religious background information proved to be crucial on this matter. Also, larger experimentally accessible populations are needed, in order to be able to rigorously test for multivariate effects that require linear combinations of repeated value profiles, allowing for clearer conclusions to be drawn; this way also, problems of matrix singularity and problems referring to the independent variables to be used can be resolved because this way one can avoid null cells.

This research effort aimed at unlocking link doors, standing between values and their cognitive elements. Although *Tetlock* and other cognitive social psychologists are more or less attracted to this pursuit, they tend to filter their research through purely cognitive oriented models, that is they commence their search at the cognitive end of the continuum, sometimes underestimating the crucial social factors involved. This study attempted exactly the opposite; starting from basic personality-value profiles it tried to connect those to cognitive phenomena within causal-chain links. It is hoped that, despite its drawbacks, this effort has demonstrated the importance of values and value systems for cognitive functions and for studying personality and it is also hoped that it will be an aspiring starting point for future research efforts.

Appendix A

Means, Standard Deviations and Confidence limits
for Multivariate and Univariate effects

For Tables 5a, 5b and 5c, WEIGHTED means are reported.

Table 5a

Effect : VOCATION

Legend: **X̄** (bold)   * denotes a significant univariate effect
     S (italics)   (**M**) denotes a significant multivariate effect
     LOW Confidence limits
     HIGH Confidence limits

	PGsΨ				PGsE	
	SELF	**Attrib. to Ψ**	**Attrib. to E**	**SELF**	**Attrib. to Ψ**	**Attrib. to E**
Theor	**4.283**	**4.283**	**5.100**	**4.300**	**2.917**	**4.900**
	.585	*.826*	*.899*	*.816*	*.967*	*.702*
	4.009	3.897	4.679	3.918	2.464	4.572
	4.557	4.670	5.521	4.682	3.369	5.228
		(1)(2)	(3)		(1)(3)	(2)
Econ	**3.650**	**4.117**	**5.167**	**3.683**	**3.033**	**4.967**
	1.011	*1.176*	*.537*	*.841*	*.844*	*.639*
	3.177	3.566	4.916	3.290	2.638	4.688
	4.123	4.677	5.417	4.077	3.428	5.266
		(1)(2)	(3)		(1)(3)	(2)
Aesth	**4.250**	**4.017**	**2.967**	**3.650**	**4.500**	**2.817**
	.851	*.567*	*1.118*	*.952*	*.721*	*.753*
	3.852	3.751	2.443	3.204	4.162	2.464
	4.648	4.282	3.490	4.096	4.838	3.169
	(*)	(1)(2)	(3)	(*)	(1)(3)	(2)
Soc	**4.867**	**4.677**	**3.867**	**4.450**	**4.883**	**3.767**
	.643	*.684*	*1.089*	*.744*	*.695*	*.788*
	4.566	4.347	3.357	4.102	4.558	3.398
	5.168	4.987	4.376	4.798	5.209	4.135
	(*)	(2)	(3)	(*)	(3)	(2)
Pol	**3.450**	**3.900**	**3.433**	**3.200**	**4.250**	**3.533**
	.932	*.931*	*.824*	*.933*	*.457*	*.737*
	3.014	3.464	3.048	2.763	4.036	3.189
	3.886	4.336	3.819	3.637	4.464	3.878
			(3)			(3)
Rel	**3.083**	**2.833**	**2.550**	**2.483**	**4.283**	**2.617**
	1.144	*1.127*	*1.161*	*.982*	*.840*	*.767*
	2.548	2.306	2.007	2.024	3.890	2.258
	3.619	3.361	3.093	2.943	4.676	2.976
		(1)	(3)		(1)(3)	(2)

In this case (1) is the Attributed Psychologist effect, (2) is the Ingroup effect and (3) is the Outgroup effect.

Table 5b

Effect : GENDER

Legend:**X̄** (bold)　　　　　　* denotes a significant univariate effect
　　　　S (italics)　　　　(**M**) denotes a significant multivariate effect
　　　LOW Confidence limits
　　　HIGH Confidence limits

		Males (n=25)			Females (n=15)	
	SELF	**Attrib. to Ψ**	**Attrib. to E**	**SELF**	**Attrib. to Ψ**	**Attrib. to E**
Theor	**4.213**	**3.187**	**4.827**	**4.422**	**4.289**	**5.289**
	.757	*1.089*	*.898*	*.597*	*.825*	*.517*
	3.901	2.737	4.456	4.092	3.832	5.002
	4.526	3.636	5.197	4.753	4.746	5.575
		(1)			(1)	
Econ	**3.560**	**3.213**	**5.040**	**3.844**	**4.178**	**5.111**
	.859	*1.018*	*.588*	*1.015*	*1.133*	*.613*
	3.205	2.793	4.797	3.283	3.550	4.772
	3.915	3.633	5.283	4.406	4.805	5.451
Aesth	**3.693**	**4.160**	**2.520**	**4.378**	**4.422**	**3.511**
	.967	*.721*	*.794*	*.744*	*.610*	*.863*
	3.294	3.862	2.192	3.966	4.084	3.033
	4.092	4.458	2.848	4.790	4.760	3.989
		(1)	(*)		(1)	(*)
Soc	**4.440**	**4.627**	**3.560**	**5.022**	**5.022**	**4.244**
	.737	*.729*	*1.013*	*.527*	*.556*	*.623*
	4.136	4.326	3.142	4.731	4.714	3.899
	4.744	4.927	3.978	5.314	5.330	4.590
		(1)	(*)		(1)	(*)
Pol	**3.213**	**3.933**	**3.267**	**3.511**	**4.311**	**3.844**
	.917	*.745*	*.764*	*.950*	*.707*	*.665*
	2.835	3.626	2.951	2.985	3.920	3.476
	3.592	4.241	3.582	4.037	4.702	4.213
		(1)	(*)		(1)	(*)
Rel	**2.653**	**3.773**	**2.520**	**3.000**	**3.200**	**2.689**
	1.136	*1.242*	*.823*	*1.024*	*1.146*	*1.205*
	2.184	3.260	2.180	2.433	2.565	2.022
	3.122	4.286	2.860	3.567	3.835	3.356

In this case (1) is the Attributed Psychologist effect

Effect : VOCATION ⊗ NATIONALITY　　　　　　Table 5c

Religious

	British			Non-British		
	Self	**Attr.to Ψ**	**Attr.to E**	**Self**	**Attr.to Ψ**	**Attr.to E**
PGsΨ	**2.958**	**2.604**	**2.292**	**3.583**	**3.750**	**3.583**
	1.039	*.975*	*1.017*	*1.572*	*1.371*	*1.258*
	2.405	2.084	1.750	1.081	1.568	1.581
	3.512	3.124	2.834	6.085	5.932	5.586
			(*)			(*)
PGsE	**2.148**	**4.333**	**2.778**	**2.758**	**4.242**	**2.485**
	.899	*.913*	*.764*	*1.001*	*.818*	*.780*
	1.457	3.632	2.191	2.085	3.693	1.961
	2.839	5.035	3.365	3.430	4.792	3.009
			(*)			(*)

Table 5d

Means, Standard deviations and confidence intervals for the data provided by Psychology and Engineering professionals (Self Value systems).

Legend:$\overline{X}$ (bold)
      S (italics)
      LOW Confidence limits
      HIGH Confidence limits

	Psychology Lecturers	**Engineering Lecturers**
Theoretical	**4.296**	**3.861**
	.807	*1.193*
	3.676	3.103
	4.917	4.619
Economic	**3.148**	**3.833**
	.801	*.798*
	2.532	3.326
	3.764	4.340
Aesthetic	**4.037**	**3.778**
	.772	*.891*
	3.444	3.211
	4.360	4.344
Social	**4.222**	**4.583**
	1.155	*.922*
	3.335	3.997
	5.110	5.169
Political	**3.037**	**3.111**
	.754	*.850*
	2.458	2.552
	3.616	3.670
Religious	**2.000**	**2.333**
	.972	*.943*
	1.253	1.734
	2.747	2.932

Table 6a

Value systems attributed by PGs𝚿
to 'typical Psychologists'.

Values	Factor 1	Factor 2
Economic	.91	
Theoretical	.83	
Political	.63	.55
Aesthetic		.79
Social		.79
Religious		.55
Eigenvalues	2.95	1.07
Percentage of explained Variance	49.2	18.0

Total Explained Variance 67.1%

Table 6b

Value systems attributed by PGs𝚿
to 'typical Engineers'.

Values	Factor 1	Factor 2
Aesthetic	.94	
Political	.85	
Social	.84	
Economic		.87
Theoretical		.75
Religious		-.72
Eigenvalues	2.63	2.00
Percentage of explained Variance	44.0	33.5

Total Explained Variance 77.4%

Table 6c
Value systems attributed by PGsE
to 'typical Psychologists'.

Values	Factor 1	Factor 2
Economic	.90	
Theoretical	.84	
Social	-.70	
Political		.83
Religious		.69
Aesthetic	-.47	.66
Eigenvalues	2.48	1.58
Percentage of explained Variance	41.4	26.4

Total Explained Variance 67.7%

Table 6d
Value systems attributed by PGsE
to 'typical Engineers'.

Values	Factor 1	Factor 2	Factor 3
Aesthetic	.91		
Religious	.73		
Social	.50	-.48	
Theoretical		.86	
Economic		.76	.40
Political			.92
Eigenvalues	1.95	1.50	1.02
Percentage of explained Variance	32.6	25.2	17.1

Total Explained Variance 74.8%

Table 7a
Self Value systems provided by
Psychology Faculty members.

Values	Factor 1	Factor 2
Aesthetic	.92	
Political	.78	
Social	.51	
Religious		.78
Economic		.74
Theoretical	.55	-.66
Eigenvalues	2.31	1.55
Percentage of explained Variance	38.6	25.8

Total Explained Variance 64.4%

Table 7b
Self Value systems provided by
Engineering Faculty members.

Values	Factor 1	Factor 2	Factor 3
Theoretical	-.82		
Economic	.69		
Social		.91	
Aesthetic		-.66	
Religious			.95
Political			.57
Eigenvalues	1.75	1.57	1.11
Percentage of explained Variance	29.2	26.2	18.7

Total Explained Variance 74.0%

Table 8   Cluster Analyses Dendrograms

Psychology Postgraduates
Dendrogram using Average Linkage (Between Groups)
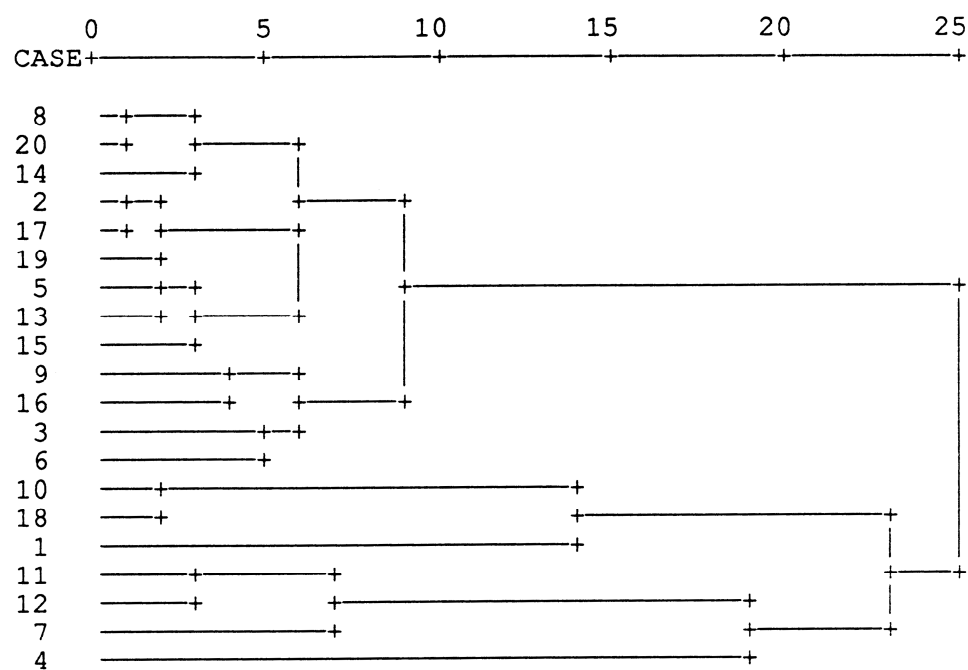
```
             0         5        10        15        20        25
CASE+---------+---------+---------+---------+---------+

  8    -+---+
 20    -+   +-------+
 14    ----+        |
  2    -+-+      +------+
 17    -+ +------+      |
 19    --+        |
  5    ---+-+     +------------------------------+
 13    --+ +-----+                               |
 15    ----+                                     |
  9    -------+----+                             |
 16    ------+ +------+                          |
  3    ------+-+                                 |
  6    -------+                                  |
 10    --+----------------------+                |
 18    --+            +---------+    +---+       |
  1    -------------+                 |   |
 11    ---+------+                  +---+
 12    --+      +----------------+   |
  7    --------+            +------+
  4    --------------------+
```

Engineering Postgraduates
Dendrogram using Average Linkage (Between Groups)

```
             0         5        10        15        20        25
CASE+---------+---------+---------+---------+---------+

  6    -+----------+
 12    -+          +--------------+
  2    ----+-+     |              |
 19    ----+ +-----+              |
 16    ------+                    |
  8    ------+----------+         |
 11    ------+          |       +---------+    +
 10    --+----+         +-------+         |
 20    --+    +---+              |
  3    -+----+ | |              |
 14    -+  +-+ +-+    +---+      |
 13    ------+        |   |      |
  4    -+--------+    |   |   +-------+
  7    -+    +-+ +----+---+---+       |
  5    ---+    +                      |
 18    ---+    |                      |
  1    -----------+                   |
  9    ---------------+               |
 15    -----------------------+
 17    ----------------------------+
```
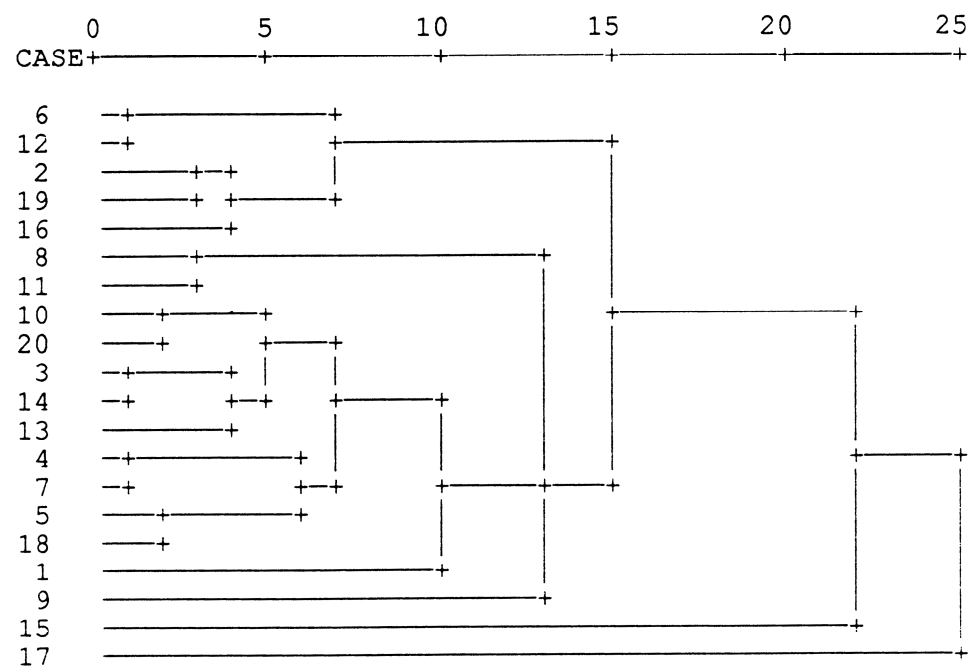
Means for SELF and Attributed Values

Figure 17

Value Types

■ SELF PGsPs	☐ SELF PGsEn	●▨ LPbyPGsPS
★▨ LPbyPGsEn	★▨ LEbyPGsPs	●☐ LEbyPGsEn
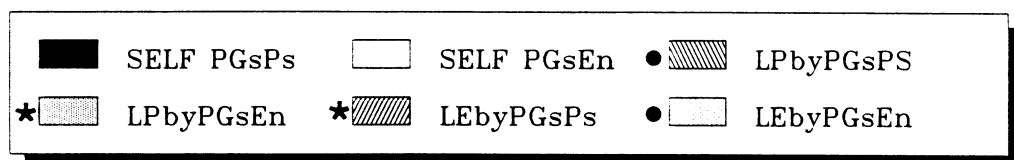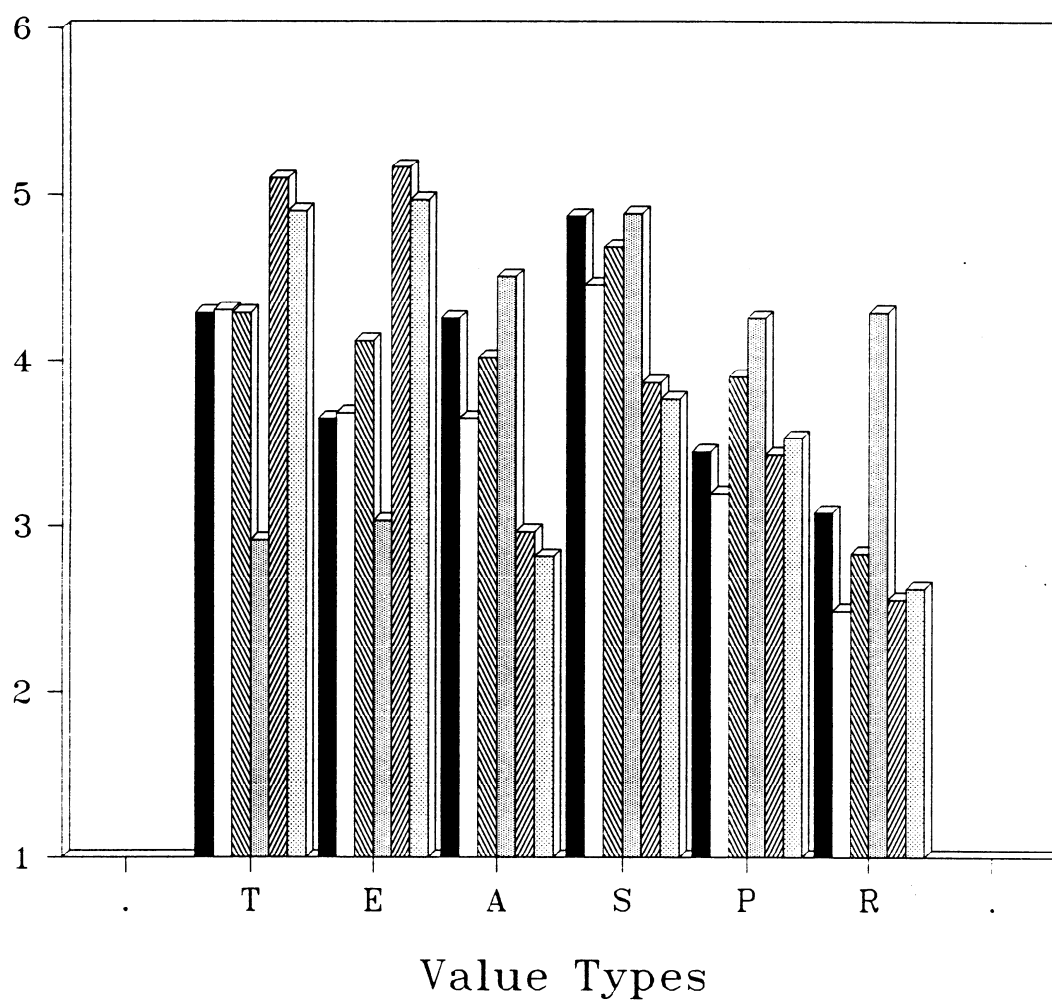
Bars marked ●=estimated INGROUP values
Bars marked ★= estimated OUTGROUP values

LP■Lecturers/Psychology   PGsPs■Psychology Postgraduates,
LE■Lecturers/Engineering   PGsEn■Engineering Postgradutes

Appendix B

Section 1: *Other theoretical approaches to the Value concept.*

Although the **AVL** test and the *'***Value Survey*'* test have dominated the literature for many years, there have been other theoretical and methodological

Figure 18

Hexagonal Model Showing the Relationship between Personality Types

Realistic   4 6   Investigative

Conventional   Artistic

Enterprising   5 4   Social

36 18 30 34 16 16 11 21 35 68 30 38 42

Source: John L. Holland (1971) A counselors Guide to the
Self Directed Search, Consulting Psychologists Press, Inc., Palo Alto, CA 94306
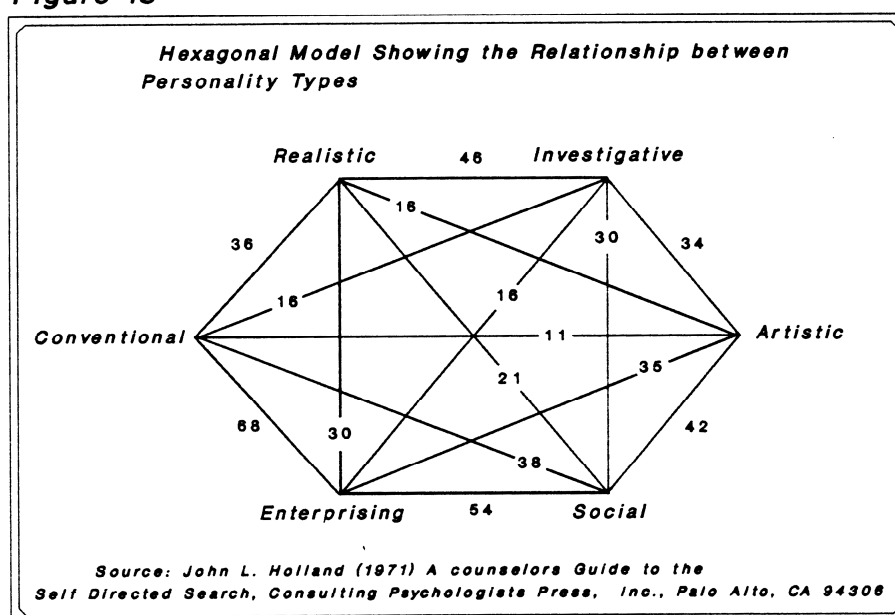
approaches, to the concept of values; the most representative and perhaps the most interesting from an occupational viewpoint is the *hexagonal model* (*Figure 18*) proposed by *Holland* (1966). Holland devised and validated this model, arriving at connecting and interconnecting coefficients for the six types of personality he proposes. It is not a coincidence that his *personality types* are six; a closer look reveals that with the possible exception of *conventional*, which cannot be readily considered as a transformation of Spranger's *religious* type, the remaining 5 personality types correspond quite closely to the ones proposed by Spranger and Allport: **Realistic** $\cong$ *Economic*, **Investigative** $\cong$ *Theoretical*, **Artistic** $\cong$ *Aesthetic*, **Enterprising** $\cong$ *Political*, and obviously **Social** $\cong$ *Social*. Through this model, Holland tried to account for the *person-environment fit*, thus giving rise to research on *job-satisfaction* as indicated by studies by *Furnham* (1984), *Harrison* (1978), *Kasl* (1973), but the model is also useful through the similarity-dissimilarity indices provided, for

assessing one's personality profile, in other words his or her values. Despite this fact though, and despite its usefulness as a social-psychological tool, few research projects in the area of values have been attempted using this tool, mainly because the model has decisively more to offer to the exploration of the work-situation itself, which shades its advantages in measuring values.

From a *cognitive social-psychological* point of view, *Tetlock* has conducted a number of studies, but the most interesting for the current purposes is the one proposing the 'Value Pluralism Model' (1986). His conceptual differentiation and integration, the two elements of *integrative complexity*, serve as cognitive structural variables, determining the amount of differentiation among similar or connected life-aspects and the amount of network-formation among these differentiated aspects. The network represents Tetlock's *ideological reasoning* and serves in resolving the internal conflicts 'fired' by the pluralistic identity of values; at this point he contrasts previous approaches which he regards as *monistic* and absolute. Tetlock's work obviously raises the issue of value conflict, which has methodological, implications for the current study and the overall research, since it is clearly providing support for ranking or paired-comparison measures in assessing values, since those are 'forcing' these conflicts to the surface. However, Tetlock's model has theoretical importance as well, since it stresses the intimate connections between values and cognitive life and suggests that there is a feedback loop between the two.

Another point that deserves attention is the one of Value change within academic-vocational settings. *Feldman and Newcomb* (1969) reviewed the values' literature up to that year, from the standpoint of the impact that college has on its students. They reported that although Whitely was very impressed with the stability he had observed within his 100 day period, other studies done by *Huntley* (1965), *Arsenian* (1943), *Stewart* (1964), *Heath* (1968), *Burgemeister* (1940), *Klingenhofer* (1965), *Tetford and Plant* (1963,1966) and *Todd* (1941), using the AVL test longitudinally, all demonstrated significant college impact on the students' value profiles during their academic training. This sub-area is mostly interesting and has caused a major line of debate which has been described by *Feather* (1973a) as one of studies trying to prove that already existing values facilitate a prospective student's vocational choice, and of studies assuming that regardless of someone's reasons for entering a certain profession in the college level, it is the college setting and the specific profession itself shaping students' values. This controversial matter has by no means an easy solution, because designs involving testing of a generation through various life time-periods

(such as pre-school, secondary and high school, college, professional level time periods) are not practically feasible, and for this reason, even the conducted longitudinal studies are quite limited. Despite the problems though, it seems that both 'truths' have a merit in the final one; both 'pre-dispositional' values **and** the environmental setting are very strongly determining a person's values with all the effects this has for his personal and social life.

Section 2: *Cognitive and Social-Cognitive links to the Value concept.*

Early research connecting values and perception showed that value leads to perceptual accentuation, regardless of its positive or negative identity. *Bruner and Postman* (1948) conducted an experiment by presenting subjects with value symbols and asking them to judge them for their actual size. It was shown that values affected the way the symbol sizes were perceived and Bruner and Postman concluded that *'the organism maximizes the reward value of the object'*, therefore value is a determinant of subjective size. Their conclusion that what is important to a person looms larger in his or her perception was challenged though by *Klein et al* (1951). They showed that the conditions under which the size estimation is made can affect the magnitude-accentuation phenomenon and that it is not only personal values that affect these size estimates but also the unique environmental parameters active and functioning around the whole perceptual procedure.

Combining these findings to the salience factors shown to be highly influencing person perception (*Zebrowitz et al*, 1976), one can conclude that personal values along with situational and environmental factors have effects on perceptive functioning and that even the perception of personal characteristics are filtered through these specific processes. From the above, it is clearly suggested that values and value systems, via the interaction with environmental factors, are closely connected to *social cognition*. As defined in the *Concise Encyclopedia of Psychology*, **'the field of social cognition is concerned with the cognitive activity that mediates and accompanies social behavior.'** An early approach by *Heider* (1944), concluded that any change in the environment gains its meaning from the source to which it is attributed. Similarity and proximity factors influence the attribution of such changes to specific persons and the whole procedure of social causal integration is affected by 'tension' within the person attributing the acts to people. The phenomenal causality, in other words, underlying each act and event is directly dependent on perceived similarities and dissimilarities of the perceiver with the source of the action and is directly relevant to the perceiver's impression formation procedures. This social constructivistic view, which for *Jussim* (1991) includes self-fulfilling, self-sustaining prophecies, accuracy of prediction and biasing effects on judgements of targets' behaviour, raises the question of *whether already processed information about persons or groups of individuals will stereotypically produce specific and stable patterns of cognitive*

behaviour towards these individuals or societal groups.

Cohen (1981) has shown that prior stereotypic knowledge of occupational groups facilitates memory on the grounds that subjects remember features of the persons that are consistent with the prototype or typical representative of an occupational field more accurately than the inconsistent with that prototype features. This *prototype-consistency* effect suggests that when receiving information about a person, this information is processed through a possibly biasing integration filter, where the perceived person is compared and contrasted to the already formed impressions attached to the group he belongs to. In short, no matter what these groupings could be, occupational, ethnic, socio-economic, etc., they function as a comparison standard to incoming information about people. Biases in social perception processes may be ultimately the result of a fundamental attribution fallacy; any individual is an *'intuitive psychologist'*, he jumps to conclusions underestimating the potential impact of environmental factors. As *Ross et al* (1977) have contended, this tendency to underestimate the role of situational determinants is backed-up by the tendency to *'overestimate the degree to which social actions and outcomes reflect the dispositions of relevant actors.'* After all, the lay person is not refraining from constructing his or her own personality theories for individuals and groups. *Semin* (1987) has argued that models of personality are to be derived from and must refer to lay conceptions of persons anyhow, if a social constructive path is to be followed. *Secord et al* (1963) have shown that implicit personality theories are stable structures and are directly related to stereotypic traits; they concluded that biases existing in these implicit theories are more likely to operate in the everyday situation, where there is little pressure for precision in judgement, since there was no observed shift for these biases under stringent laboratory manipulations.

These biases have been described by other researchers under the notion of *ultimate attribution error*. This error occurs between groups of individuals and refers to negative *outgroup* acts which are attributed as *"expected by that outgroup"*, or even genetically determined in extreme cases, and positive *outgroup* acts which are perceived and attributed as *"exceptional cases"*. Thus, the so commonly experienced remarks of the type *'he's a journalist,it's typical of them to be nosy, what did you expect?'*, or in contrast *'I can't believe he's a Mexican, he's so hard-working !'*. Pettigrew (1979) has argued that intergroup misconceptions and misattributions exist as well and research on the mediating cognition of these biases is needed in order to allow for explication of the existing links. *E.Wells's* findings (1977) on consensus information producing

specific attributions towards social actors confirm the function of stereotypic traits within the ultimate attribution error effect. *Campbell* (1967) has also argued that active stereotypes do not only reflect the character of the group being described but projectively the character of the group doing the describing and holding the stereotypes, a view initially supported by G.Allport. The differentiation between ingroups and outgroups is based for Campbell on four attributional mistakes: the phenomenal absolutism of the normal ingroup member's imagery of the outgrouper, the exaggeration of homogeneity of traits within ingroups or outgroups, an erroneous causal perception based on predispositional rather than environmental factors, and a causal misperception related to a kind of hostility towards the outgroup. *Floyd Allport's pluralistic ignorance* notion could describe the previous attributional errors in short; this radical bias was shown to be overexaggerated for outgroups (*Korte*, 1972) along with an *assimilation bias*, a tendency to presume more similarity between the norm and one's own position than actually exists. Although the researchers' approaches to the pluralistic ignorance phenomenon have been challenged by *O'Gorman* (1986), it is more than evident that the phenomenon exists, and shared false ideas and misconceptions are apparent in any social interaction setting.

Fensterheim (1953) embracing the idea that the way people perceive other people, the stereotypes applied during that perceptual process and all errors and attributional misconceptions should have their origin *somewhere* and cannot just exist, tried to explore the influence that personal value systems have directly on person perception and found that subjects used their low values (as measured by the AVL test) to describe the stimuli, although the opposite was expected initially, and that there was a *halo* effect for liked stimuli, to which subjects attributed values resembling closely their own ones.

Personal values have been shown by *Brewster-Smith* (1949) to be determinants of political attitudes; when one is judging these attitudes by comparing them to the most important values he or she possesses, the scope and the broadness of these values determine the judgement outcomes, in other words, a causal relationship between values and political attitudes exists under these specific conditions of scope and broadness available.Views about social justice have been shown as well to be influenced by personal value systems (*Rasinski*, 1987), concerning citizens' evaluations of authorities and governmental policies on the basis of a sense of *fairness*. *Feather* has demonstrated (1985) that different values, linked to the cognitive-affective system produce different attributions and explanations about unemployment, explanations

which are not merely a product of a neutral information-processing system.

These findings have been corroborated by *Kristiansen et al* (1988) who showed that different attitudes within people are justified by these people by appealing to different values these people hold; the *value-justification* hypothesis, which is connected to Tetlock's *value pluralism model*, was supported by facts such as that subjects who favoured nuclear weapons regarded **national security** as a more important value and subjects opposed to nuclear weapons viewed **wisdom** as their dominant value.

Feather has conducted a number of studies comparing vocational and not only groups on the basis of their personal values. In 1979 he examined the value systems of two 'ethnic' groups and the judgements that each group made about the value systems of the other group. He found that apart from the initial differences in personal values systems between groups, neither group was able to accurately predict the other group's values. He concluded that these effects were caused by the limited contact between the two national groups, a situation accentuating stereotype formation as contended by *Newcomb* (1961). However, the experimental methodology used failed to account for 'ingroup' value attributions and had several drawbacks (i.e. the instrumental values checklist was not used) due to practical problems, such as limited time.

Another study (1971) conducted by the same author addressed value system and attributed value systems differences for three vocational groups. Feather split each vocational group to two conditions, one ranking the **Rokeach Value Survey** for themselves and one ranking it for what they thought a student completing work in their professional field would emphasize (the same study was reviewed earlier, in page 8, as well, but from a different angle). The results supported the hypothesis that self and attributed value systems would be similar within each occupational field (*Humanities, Social sciences, Sciences*). Feather acknowledged though the fact that students in this study did not function as their own control in the design, because they did not rank values both for themselves **and** for the equivalent professional level, and he suggested that **studies implementing this 'improved' design were needed**. He pursued this goal himself in two studies that followed (1972a ,1972b) by testing the *value match* hypothesis again by itself and in connection to school adjustment. For these designs though, secondary school students were used as subjects, but results verified the similarities between self and attributed to the

ingroup systems observed in the previous study; as predicted in the second study, school adjustment was positively correlated with the extent of this *value match*.

The above studies raise the obvious question: *what about vocational groups indicating their own values systems, their attributed to the equivalent profession systems and the systems that they think are possessed by a specific outgroup profession?* Furnham (1981) has conducted a relevant study, not within the values framework though, but addressing perception *per se*, for vocational groups within the medical profession (*General Practitioners, Nurses, Health visitors, Social workers and Occupational therapists* indicated their perceptions about their own occupation and eleven other health care occupations). The results showed that groups varied in their perception of accessibility and status of the occupational groups; perception had a negative character if groups have competitive roles in real life, and self perceptions had a more positive character than they did for any outgroup perceptual indications. For *Moscovici and Zavalloni* (1969), the group formation and existence *by itself* is polarizing and biasing attitudes. They have shown that the consensus information provided by the group on opinions and judgements is adopted by individual members of that group, a variant notion of the *group conformity* hypothesis, predominant in the social psychology of group-dynamics. Another study conducted by *Doise* (1969) argued that group opinions are more extremistic than the ones given by individuals alone; the same *polarization* effect was observed as well, and it was argued that this holds for the situation when subjects find themselves faced with the presumed opinion of another group. *Doise et al* (1973) compared two possible theoretical explanations of this polarization process, the *conflict of convergence of interests* approach, as proposed by *Sherif* in 1961 and the *categorization* approach, as proposed by *Tajfel* in 1971 and 1972. Intergroup relations were shown to be better explicated via the categorization approach than via the convergence of interests approach. The categorization process as summarized by *Tajfel* under the label *'deductive categorization error'*, contends that when stimuli are known to belong to different categories, they will be judged as more different for certain characteristics than when the subjects do not know that the stimuli belong to different categories. In short, the mere knowledge that a stimulus, or in this case a person, belongs to a certain category, in this case an occupational group, is enough to trigger accentuation of the polarization effect, extremizing the individual's judgements about this specific person and its characteristics, traits or values.

The group polarization effect is attached to other psychological phenomena as

well. One of these is what *Crocker et al* (1987) have described as *downward comparison*. For them, when group boundaries have evaluative implications and especially under situations of threat or even when subjects are facing the mere existence of the other group's opinion, evaluations are triggered in a negative way towards this outgroup. Effects of **Self-Esteem** were found for this process, indicating that subjects with high Self esteem will derogate outgroups more than subjects low in Self esteem will. This complicates things further, because it points to the extensive range of possible factors interacting within the social comparison process. However, as *Baumeister et al* (1989) have argued, people **scoring** high on self esteem scales (that is, they do not necessarily possess a high self esteem status) are people who do not avoid taking risks and would attempt a positive self-presentation motivated by self enhancement and self protection. The same applies for social interaction situations, when those people will not avoid taking the risk of their claims being falsified as the interaction proceeds. On the other hand, people scoring low on self esteem scales are still motivated by self protection, but in a cautious, conservative way, and the same holds for social interaction processes. Thus, it would be naive to ignore the effects that self esteem has on social comparison processes, and even more, it would be methodologically and theoretically incorrect to simply 'erase' any expected self esteem influence on the manner that self value systems are reported. In fact, *S. Jones* (1973) showed that the need for approval by people within the same group with an individual is tautologous with his/her need for high self esteem status and that disapproval by the ingroup frustrates and disappoints the individual. Jones contrasted this theory, namely the *social psychological self esteem theory* to the *self consistency theory*, which suggests that the individual adjusts himself in order to match his perceptions about himself to the feedback he receives from the social environment he belongs to; Jones found evidence supporting mainly the self esteem theory, but his findings allowed for the suggestion that a basic individual need within a group is to satisfy self esteem by receiving continuous and stable approval by ingroupers. This in turn, suggests a sort of individual conformity to ingroup laws and behaviours, which is an attempt to reach a *'good enough'* situation as *Rosenberg* (1965) puts it. The definition of self esteem *ad hoc* is suggesting a social comparison procedure, as *Ziller* has argued, and its personality function is stressed by the fact that *'one of the basic features of the self esteem construct is that it is a conceptual component of the more inclusive process of self conception '* (*Wells,G.L. and Marwell*, 1976, p. 229), which indicates clearly the contingency between the way values are reported and self esteem.

Section 3: *Pilot studies.*

Three studies that were conducted within a period of one and a half years, although only the last one was a direct pilot study for the current project, had a lot to offer on theoretical considerations, future methodological improvements and directions towards concepts of outmost interest in relation to value systems.

The first study (1990) was conducted in *Polytechnic South West (Plymouth Polytechnic)*. For this study the **AVL** test was administered in its revised 1951 edition to undergraduate psychology students. The results indicated dominant *Aesthetic and Social values*, moderate *Theoretical and Political values* and low *Economic and Religious values*, although some of the differences were non significant, mainly due to the small sample size. The most interesting finding though was that Self esteem as measured by the *Rosenberg* scale was covarying significantly with the six value types measured, producing a significant effect between students in their first and third academic years. This study offered a lot as well by testing for connections of value systems' formation to concepts such as **Fear of success** as measured by the Concern Over the Negative Consequences of Success scale-*Ho and Zemaitis*), **motive to avoid failure** (Achievement Anxiety Test-*Alpert and Haber*), **individualism-collectivism** (Who Are You scale-*Triandis*), and **trait anxiety** (STAI-*Spielberger*), and by directing future research efforts.

The second study (1991a) is probably the most interesting from a methodological and test-construction point of view. For this study two forms of a 240 item questionnaire were used for an undergraduate population of psychology students in the *Department of Psychology, University of Athens*. The 240 items were the original 120 AVL items plus 120 more devised by *Mylonas* under supervision by *Professor J. Georgas*. The two forms differed in the measurement scales implemented; one form was in the **paired comparison** version (as originally in the **AVL**) and the other presented the same items but this time to be rated on a 6-point **Likert** scale. The two forms were administered randomly to the undergraduates and the results revealed self system patterns which looked very much alike; that is, the profiles obtained by the two different forms did not differ, despite the fact that the underlying factors for the average profiles did, an issue connected to the different advantages and disadvantages of the two measurement procedures. The second important contribution of this study was that it provided data for **item analyses and**

item selection procedures, necessary for arriving at the 18 items used in the current study, via reliability estimates and factor analytic techniques.

Finally, the third study (1991b) was conducted as a direct pilot for the current project, implementing the design of multiple comparisons (to the equivalent and non-equivalent professional levels) but using students from one vocational field only. First year and third year undergraduate students in the Department of Psychology, UCL, completed a short, 6-item questionnaire, first for themselves, then for what they believed 'a typical Psychologist' would emphasize and then for what they believed 'a typical Accountant' would emphasize. The six items this time had a 'guiding principles' form (but corresponded to the value types provided by Spranger) and were to be ranked by the subjects. Approximately the same pattern for self systems emerged again, with a slight increase in Religious values, confirming once again the larger underlying variabilility for this value type observed since the early days of research in the area. Theoretical values were surprisingly low, which raised doubts about the specific item used in assessing this value; in general though, the observed pattern had a lot in common with the previous studies' results suggesting that this specific vocational group steadily supports certain values and 'rejects' others. One very important finding was that interaction effects between first and third year students with gender suggested that values indeed go through major or minor changes and shapings during academic training, thus if one was to avoid noise in the data in future research he should match his subjects for their academic status. The other very important finding was that the attributed Psychologist system did not differ from the reported student self systems, although the value system 'guessed' for 'typical Accountants' revealed as expected, large differences for all but Theoretical values. A Shift coefficient estimating the amount of differentiation as a whole for self-typical Psychologist and self-typical Accountant systems was devised, and comparisons for these coefficients revealed significant differentiations in the overall way students assimilated themselves to their ingroup professionals compared to the way they regarded their relationship to an outgroup profession, in this case Accountants. Finally, this study showed the need of assessing the 'professional' self value systems, for this would provide a point of reference and comparison for accurate and non-accurate predictions made by students.

Appendix C - Psychometrics

Section 1: *How many items ?*

The theoretical background and different inventories reviewed earlier have demonstrated one of the most difficult problems that a researcher in this area is confronted with; it is very difficult first to decide which of the available inventories to use and then to decide if the measurement technique selected is to be used in its original or in an altered form.

For the current study, the decision to use the theoretical framework initially provided by Spranger and utilized by Allport was more than compelling to the researcher since it represents a measurement tool of immense interest *per se*, it is supported empirically and even other theoretical formations (*Rokeach, Holland*) indirectly support it by arriving more or less at the same basic value types; the availability of pilot data and conclusions drawn from previous use of the AVL scale by the researcher was also a decisive factor in implementing Allport's theoretical approach for this study.

The second decision was even more important but also more difficult to take; should the AVL be used in its original paired comparison form with all its 120 items? This would increase the length of the questionnaire to be administered immensely because as the reader recalls, the subjects would rate it three times, first for themselves, then for the 'typical psychologist' and then for the 'typical engineer'. This, apart from the practical problems it would produce, would also breed the potential danger of subjects getting bored and weary by answering a huge amount of the same questions over and over again; this might make them start randomly rating the questions asked. For these reasons a short version was decided to be used, entailing three items for each value type. The number of items to be used for each value was not decided to be 3 *ad lib.*; one item per value would be too little, not including different possible facets within each value; it would also be very risky to use just one item per value if this item was not perfectly measuring the intended value, as had happened in one of the pilot studies. Two items per value would not allow for reliability coefficients to be computed after the data would have been collected, thus restricting the conclusions of the utility of these items to mere

speculation; and four items per value would simply increase the amount of the total questions asked from 54 to 72. Also, since the manipulation itself of the three 'conditions' required that subjects would not be aware of what would be asked on the next page, the questionnaire format should be such as to allow for this manipulation to be possible; 18 questions, in other words, would fit within one page without creating chaos but 24 would not. Leaving blank spaces after each manipulated condition, beginning the next condition on a fresh page would solve this problem but it would make the questionnaire appear longer than it actually was, with obvious problems in locating willing to participate subjects. For all the above reasons, it was decided to use three items per value type but the next question was the most important one: *what should the 'contents' of these items be ?* It was decided to use original **AVL** items, slightly altered in some cases in order to fit the British reality; as for the rating scale to be implemented, there was no doubt that a 6-point *Likert* scale was appropriate; the rationale behind these decisions is presented in the next section of this *Appendix*.

Section 2: *Which items and Why a Likert scale ?*

Neither the *Study of Values* nor the *Value Survey* test are flawless. Both have advantages indeed, but also impose serious limitations as far as this concerns the nature of the results *per se* and the statistical analyses that can be legitimately applied.

The way the AVL test is constructed, if nothing else, clearly differentiates it from the majority of scale-types used in social-psychological research. Its paired comparisons format requires subjects to 'weigh' their preferences and report the 'weights' by assigning them to 2 or 4 contrasted value items within each question. An example for each of the two parts of the AVL test is reproduced in *Figure 19*.

```
Part 1. The two alternatives are rated 3 and 0, if respondent agrees
with one and disagrees with the other; if respondent has only a
slight preference for one over the other, they are rated 2 and 1,
respectively.
        Example:

Would modern society benefit more from      |   |    |    |    |    |
(a) more concern for the rights and         a   b
welfare of citizens; (b) greater
knowledge of the fundamental laws of        ☐  ☐
human behaviour ?                           |   |    |    |    |    |


Part 2. The answers are rated in order of personal preference,
giving 4 to the most attractive and 1 to the least attractive
alternative.
        Example:

To what extent do the following persons     |   |   |   a    b
interest you -
a.Florence Nightingale                      |   c        ☐  ☐
b.Napoleon                                  d
c.Henry Ford                                     ☐
d.Galileo                                   ☐
                                            |   |   |    |    |    |
```

Figure 19

The first problem refers to the nature of the results obtained by the test. For large samples, it is assumed by Allport that the norm for each value falls between 25 and 35 when all scores for that value are summed. It follows that the larger the sample, the closer the 'norm' for each value is met, therefore the more flat the overall value profile will be. Despite the fact that these 'norm' scores were defined as such through the standardization procedure, it is not certain whether these scores would

still hold for the total population, since the corresponding *parameter estimates* were never computed; even more, population norms change and we have to remember that the scale was originally constructed in 1931 which renders this 'tendency towards normality', as utilized by Allport, invalid. In short, just because of this attempt to achieve normality as the sample increases, variation is artefactually suppressed, producing 'flat' overall profiles for the population. The conclusion from all these is that the paired comparisons procedure can produce artefactual effects by trying to approach equivalency of the value scores to the assumed 'norm' profiles, disregarding the probability that these norms may have changed or might not even exist.

Another problem concerns the statistical analyses possible for this set of data. As soon as 5 out of the 6 value totals have been assessed, the 6th one is *a-priori* determined. This does not allow for several parametric techniques to be applied because it gives rise to singular matrices (see also *Mylonas*, 1991b). The same applies to the **Value Survey**. Ranked data do not allow for parametric techniques at all, let alone multivariate statistics. Although researchers have tried to overcome this obstacle by standardizing the raw data and resorting to correlational analyses mainly, the problem still remains because there are still doubts on whether such transformations of the data are statistically legitimate in the first place and even if they are, the question of what amount of information is lost still needs to be asked.

Clearly then, paired comparison or ranking procedures do not seem attractive solutions. The only remaining possible solution is to use rating scales, although Tetlock would object to that on the grounds that such scales would suppress the conflict manipulated among values when using paired comparison or ranking procedures. This is not entirely definite though, since this conflict does not necessarily have to be manipulated; it can be argued instead that this conflict among values is a normative procedure, if one accepts Spranger's notions, therefore it is always active regardless of 'cognitive misery'. Thus, not only the conflict issue is still assessed when using rating scales but another major advantage appears; by allowing the scores to vary 'freely' one can assess the extent of intercorrelation among different value types, a fact allowing for interaction among values to be examined and for linear combinations of these values to be used in multivariate analyses.

Finally, a number of studies have compared different types of measurement scales (*Penner*, 1968; *Feather*, 1973b; *R.Jones*, 1978; *Rankin*, 1980) and have concluded that all different values' assessment procedures yield more or less the same results;

advantages and disadvantages naturally exist for all these measurement techniques, but there are suggestions that the rating procedures allow for better handling of the data and enhance the retrieval of information practically and in quantity. The study conducted by *Mylonas* (1991a) for the two Athenian samples verified the above suggestions by showing that paired comparison and Likert rating procedures reveal approximately the same profiles for Psychology students at least. It was for all these reasons that the decision was made to use a six point scale for the current design. The questionnaire used in this study is presented in its administered to the postgraduate students form, next (*pages 73 to 77*).

Dear colleague,

I am an M.Sc. student at the Department of Psychology, University College London; the questionnaire you have in hand concerns my M.Sc. thesis.

Would you please be so kind as to help me by filling in the questionnaire. There are no right or wrong answers and obviously your answers are strictly confidential.

The questionnaire consists of simple items to be rated, and it will not take more than a quarter of an hour to complete. For each page, please follow the instructions at the top of that page.

It is very important that you fill in the questionnaire page by page, that is DO NOT turn over until you have finished each page. Please, do not omit any items.

Thank you very much,

Kostas Mylonas.

~~~~~~

1.Gender _____   2.   Age _____

         3.   Nationality _____

4.Which Social class would you say that
  you belong to ? (tick one)
                              [] Working class
                              [] Lower-middle class
                              [] Upper-middle class
                              [] Upper class
                              [] Other (please specify)
                                      _____

5.What is your father's occupation ? (please be as specific as possible) _____

6.If there was a general election tomorrow, which party would you vote for ? _____

7.Who of your relatives (close ones or not) do you see on average twice a month or more ? _____
_____
_____

8.Postgraduate course you are attending: [] M.Sc.   [] Ph.D.

9.Field of studies _____
~~~~~~

PLEASE, ANSWER THE FOLLOWING 18 QUESTIONS. PLEASE, DO NOT TURN TO
THE NEXT PAGE UNLESS YOU HAVE FINISHED RATING THE STATEMENTS ON THIS
PAGE. THE RATING SCALE IS PROVIDED BELOW.

6 = Definately YES 3 = Unlikely	6	5	4	3	2	1
5 = Most likely 2 = Highly unlikely						
4 = Perhaps 1 = Definately NO						

	6	5	4	3	2	1
1/If you had sufficient leisure and money, would you establish a business or financial enterprise of your own ? (E)	[]	[]	[]	[]	[]	[]
2/Would you be interested in studying the life and deeds of Napoleon ? (P)	[]	[]	[]	[]	[]	[]
3/Would you attend a series of popular seminars on contemporary painters ? (A)	[]	[]	[]	[]	[]	[]
4/Would you like to conduct a study on the comparative merits of the forms of government in Britain and the United States ? (P)	[]	[]	[]	[]	[]	[]
5/Would you think that a good government, in any country, should chiefly aim at more aid for the poor, sick and old ? (S)	[]	[]	[]	[]	[]	[]
6/Would you read a book titled 'The story of Religion in the U.K.' ? (R)	[]	[]	[]	[]	[]	[]
7/At an evening discussion with intimate friends, would you be interested when talking about developments in science ? (T)	[]	[]	[]	[]	[]	[]
8/Would you say that your closest friends are (E) efficient, industrious and of practical turn of mind?	[]	[]	[]	[]	[]	[]
9/Would you like to attend a series of lectures on the comparative development of the great religious faiths? (R)	[]	[]	[]	[]	[]	[]
10/Would you like to be teaching Chemistry & Physics as a University Professor ? (T)	[]	[]	[]	[]	[]	[]
11/Would you be interested in a newspaper section concerning picture galleries and exhibitions ? (A)	[]	[]	[]	[]	[]	[]
12/Spending some time in a waiting room, would you read a magazine called 'Scientific Age' ? (T)	[]	[]	[]	[]	[]	[]
13/Assuming that you have sufficient leisure time, would you spend it in doing volunteer social or public service work ? (S)	[]	[]	[]	[]	[]	[]
14/Would it be important to you to be married to someone who is gifted along artistic lines ? (A)	[]	[]	[]	[]	[]	[]
15/If you lived in a small town and had sufficient income, would you help in advancing the activities of the local religious groups ? (R)	[]	[]	[]	[]	[]	[]
16/Would you think that the most important function of education is to prepare students for practical achievement and financial reward ? (E)	[]	[]	[]	[]	[]	[]
17/Would you consider unselfishness and sympathy as a mostly desirable character trait ? (S)	[]	[]	[]	[]	[]	[]
18/Would you make friends that possess qualities of leadership and organizing ability ? (P)	[]	[]	[]	[]	[]	[]

THE QUESTIONS YOU HAVE ANSWERED PREVIOUSLY HAVE BEEN RATED BY A TYPICAL PSYCHOLOGIST, POSSESSING ALL THE TYPICAL CHARACTERISTICS OF PSYCHOLOGISTS. PLEASE, TRY TO GUESS THE RATINGS THAT WERE GIVEN BY THIS PSYCHOLOGIST AND REPORT YOUR GUESSES BY MARKING THE APPROPRIATE BOXES.

| 6 = Definately YES   3 = Unlikely | 6 | 5 | 4 | 3 | 2 | 1 |
| 5 = Most likely   2 = Highly unlikely | | | | | | |
4 = Perhaps 1 = Definately NO						
1/If you had sufficient leisure and money, would you establish a business or financial enterprise of your own ?	[]	[]	[]	[]	[]	[]
2/Would you be interested in studying the life and deeds of Napoleon ?	[]	[]	[]	[]	[]	[]
3/Would you attend a series of popular seminars on contemporary painters ?	[]	[]	[]	[]	[]	[]
4/Would you like to conduct a study on the comparative merits of the forms of government in Britain and the United States ?	[]	[]	[]	[]	[]	[]
5/Would you think that a good government, in any country, should chiefly aim at more aid for the poor, sick and old ?	[]	[]	[]	[]	[]	[]
6/Would you read a book titled 'The story of Religion in the U.K.' ?	[]	[]	[]	[]	[]	[]
7/At an evening discussion with intimate friends, would you be interested when talking about developments in science ?	[]	[]	[]	[]	[]	[]
8/Would you say that your closest friends are efficient, industrious and of practical turn of mind?	[]	[]	[]	[]	[]	[]
9/Would you like to attend a series of lectures on the comparative development of the great religious faiths?	[]	[]	[]	[]	[]	[]
10/Would you like to be teaching Chemistry & Physics as a University Professor ?	[]	[]	[]	[]	[]	[]
11/Would you be interested in a newspaper section concerning picture galleries and exhibitions ?	[]	[]	[]	[]	[]	[]
12/Spending some time in a waiting room, would you read a magazine called 'Scientific Age' ?	[]	[]	[]	[]	[]	[]
13/Assuming that you have sufficient leisure time, would you spend it in doing volunteer social or public service work ?	[]	[]	[]	[]	[]	[]
14/Would it be important to you to be married to someone who is gifted along artistic lines ?	[]	[]	[]	[]	[]	[]
15/If you lived in a small town and had sufficient income, would you help in advancing the activities of the local religious groups ?	[]	[]	[]	[]	[]	[]
16/Would you think that the most important function of education is to prepare students for practical achievement and financial reward ?	[]	[]	[]	[]	[]	[]
17/Would you consider unselfishness and sympathy as a mostly desirable character trait ?	[]	[]	[]	[]	[]	[]
18/Would you make friends that possess qualities of leadership and organizing ability ?	[]	[]	[]	[]	[]	[]

THE QUESTIONS YOU HAVE ANSWERED PREVIOUSLY HAVE BEEN RATED BY A TYPICAL ENGINEER, POSSESSING ALL THE TYPICAL CHARACTERISTICS OF ENGINEERS. PLEASE, TRY TO GUESS THE RATINGS THAT WERE GIVEN BY THIS ENGINEER AND REPORT YOUR GUESSES BY MARKING THE APPROPRIATE BOXES.

6 = Definately YES 5 = Most likely 4 = Perhaps 3 = Unlikely 2 = Highly unlikely 1 = Definately NO	6	5	4	3	2	1
1/If you had sufficient leisure and money, would you establish a business or financial enterprise of your own ?	[]	[]	[]	[]	[]	[]
2/Would you be interested in studying the life and deeds of Napoleon ?	[]	[]	[]	[]	[]	[]
3/Would you attend a series of popular seminars on contemporary painters ?	[]	[]	[]	[]	[]	[]
4/Would you like to conduct a study on the comparative merits of the forms of government in Britain and the United States ?	[]	[]	[]	[]	[]	[]
5/Would you think that a good government, in any country, should chiefly aim at more aid for the poor, sick and old ?	[]	[]	[]	[]	[]	[]
6/Would you read a book titled 'The story of Religion in the U.K.' ?	[]	[]	[]	[]	[]	[]
7/At an evening discussion with intimate friends, would you be interested when talking about developments in science ?	[]	[]	[]	[]	[]	[]
8/Would you say that your closest friends are efficient, industrious and of practical turn of mind?	[]	[]	[]	[]	[]	[]
9/Would you like to attend a series of lectures on the comparative development of the great religious faiths?	[]	[]	[]	[]	[]	[]
10/Would you like to be teaching Chemistry & Physics as a University Professor ?	[]	[]	[]	[]	[]	[]
11/Would you be interested in a newspaper section concerning picture galleries and exhibitions ?	[]	[]	[]	[]	[]	[]
12/Spending some time in a waiting room, would you read a magazine called 'Scientific Age' ?	[]	[]	[]	[]	[]	[]
13/Assuming that you have sufficient leisure time, would you spend it in doing volunteer social or public service work ?	[]	[]	[]	[]	[]	[]
14/Would it be important to you to be married to someone who is gifted along artistic lines ?	[]	[]	[]	[]	[]	[]
15/If you lived in a small town and had sufficient income, would you help in advancing the activities of the local religious groups ?	[]	[]	[]	[]	[]	[]
16/Would you think that the most important function of education is to prepare students for practical achievement and financial reward ?	[]	[]	[]	[]	[]	[]
17/Would you consider unselfishness and sympathy as a mostly desirable character trait ?	[]	[]	[]	[]	[]	[]
18/Would you make friends that possess qualities of leadership and organizing ability ?	[]	[]	[]	[]	[]	[]

THESE 10 STATEMENTS CONCERN YOU (NOT A PSYCHOLOGIST OR AN
ENGINEER). PLEASE RESPOND BY MARKING EITHER YES OR NO
FOR EACH OF THEM.

1/ On the whole I am satisfied with myself.

YES []   NO []

2/ At times I think I'm no good at all.

YES []   NO []

3/ I feel that I have a number of good
   qualities.

YES []   NO []

4/ I am able to do things as well as most
   other people.

YES []   NO []

5/ I feel I don't have much to be proud of.

YES []   NO []

6/ I certainly feel useless at times.

YES []   NO []

7/ I feel that I am a person of worth,
   at least on an equal plane with others.

YES []   NO []

8/ I wish I could have more respect for
   myself.

YES []   NO []

9/ All in all, I am inclined to feel that I
   am a failure.

YES []   NO []

10/ I take a positive attitude toward myself.

YES []   NO []

~~~~~~

Thank you very much

The author appealed to his *Theoretical* values in deriving the items used in the questionnaire, and in justifying this selection. A stringent procedure, based on the Athenian sample data was followed including reliability techniques, item and factor analyses in order to arrive at the final 18 items to be used. Reliability coefficients pinpointed out of a pool of 120 the most stable and constant items; these 120 items were also examined through the internal consistency procedure by correlating each item with the total derived by each corresponding value (the same technique was used by Allport as well). Reliable and consistent items were factor analyzed through orthogonal rotation. The factor loadings were examined in order to retrieve at least three items for each value type; the items to be finally selected had to load high on one factor and not on any other one; if different value items loaded on the same factor they were excluded without reservations. This way, 18 items, best discriminating among values were retrieved and then re-examined through internal consistency and reliability tests. Finally, a confirmatory factor analysis using orthogonal and oblique rotations placed these 18 items in 6 factors, as desired, with high Eigenvalues, thus providing reassurance for the use of these items. It has to be stressed though that the whole procedure of item selection was too rigorous and this might have led to selection of items which in fact corresponded to more different than desired facets within each value, an 'error' partly suggested to have occurred when the data obtained for the current study were analyzed for Cronbach alpha coefficients, as explained in the *3rd section of this Appendix*. An important point is that for the whole procedure, only the original AVL items were examined since one purpose of this study was to test for the utility of at least a part of the AVL study of values test. The 120 items devised by Mylonas were not considered at all in the item selection procedures for the above reason.

A final point is that alternative forms were also considered. A 'guiding principles' form, based on Spranger's classification was devised as well. This form was referring to more general life styles but although it seemed quite promising it failed on tests for validity; in one of the pilot studies (1991b) it had been also observed that this type of items produced an unusual kind of variation and this might be due to inadequately selected or formed items; for these two reasons this alternative questionnaire was rejected but should be presented, along with clarifications on the way it was devised and its possible future implementations.

Alternative Questionnaire and manual of directions.

The following items correspond to the 6 Spranger types, Theoretical, Economic, Aesthetic, Social, Political and Religious and were constructed in the following way: A sample of 50 Psychology students (Athens University) were tested using the original Allport-Vernon-Lindzey questionnaire plus 120 new items constructed on the same grounds. From the pool of 240 items, the ones showing the highest reliability were isolated and their contents were combined to form 3 items per value type, thus arriving at the 18 items below. It has to be mentioned that these 18 items correspond more or less to the originally proposed theory, that is to the types as defined by Spranger in 1928 and to the way that the characteristics of these types were used by Allport. Although the previous points suggest that the instrument is quite reliable, it has to be stressed that a pilot study could show whether some items need to be altered or replaced, and this caution must be taken to ensure that the questionnaire possesses the necessary ability to discriminate between value types and reveal high consistencies within each subscale.

Theoretical
1-Acquiring knowledge is the ultimate life target.

2-Behind every situation or event, there is an underlying truth to be discovered.

3-If we reflect on the laws of nature we will understand our lives more fully.

Economic
1-People should take a practical, down-to-earth approach to resolving everyday problems.

2-'Making money' is not everything in life.

3-Knowledge is useful only when it can be applied profitably.

Aesthetic
1-It is important that people appreciate art.

2-There is a natural pattern underlying everyday events and experiences.

3-It is important to have a structured life.

Social

1-The world would be better if we all were less selfish and unsympathetic.

2-Scientific advances are worthwhile only when their goal is to serve humanity rather than destroying it.

3-There is no point in trying to help other people by being altruistic, since nobody else does.

Political

1-The only way to succeed is to keep all life situations under strict control.

2-The world would be much better off without any sort of political leadership.

3-We should not try to influence other people's opinions.

Religious

1-The only knowledge that matters is the ultimate knowledge of one's self and his/her existence.

2-Being in touch with a higher power, such as God, is the only way we can make sense of our lives.

3-All the progress of the last century has not really affected what is important in our lives.

These 18 items were refined and finally came to their present form through Dr. P. Lunt's kind help; for this, the author is grateful to him.

A final point concerns 'inverse' items; it must be taken into account that the following items are measuring value types in the inverse order and should be inversely coded for the analysis: Economic 2, Social 3, Political 2 and Political 3.

Section 3: *Reliability and Grouping factors considerations.*

Having collected the data, the first aspect to be examined was which of the 18 items in each condition, if not all, were to be used in deriving the final six value scores for the subsequent analyses. In general, the reliability analyses performed for each subscale corresponding to each of the six value types did not reveal extremely satisfactory *alpha coefficients*. The analyses were performed obviously for each vocational group separately; the *Cronbach alpha coefficients* along with *non-additivity analysis of variance tests* are reported in **Table 9, page 82**. The average alpha over all value systems assessed for *Postgraduate Psychologists* was *.61* and the average alpha over all value systems assessed for *Postgraduate Engineers* was *.50*. As evident in **Table 9** though, these overall averages were not very high ones because they were suppressed by low alpha coefficients observed for specific value types; for example, it was observed that the *3 Social value items* for PGsΨ self value systems were non consistent at all. The same was the case for the *Political value items* when rated for the 'typical' Engineer by PGsE. In contrast, value items such as the *Theoretical* ones rated by PGsΨ for themselves and the *Religious* 'typical Psychologist' items rated by PGsΨ too, along with other value items revealed extreme alpha coefficients (i.e.PGsΨ *Self-Theoretical* | *alpha* | =1.00). The fact that alpha coefficients were in general higher for attributed to 'typical' psychologists and engineers systems than for self systems, suggested that the noise produced by individual differences in combination with the possibly different value facets measured within each subscale (as mentioned in *section 2*) could have raised this picture of consistencies and inconsistencies. For this reason, the issue had to be further explored before deciding to exclude any superficially inconsistent items. After all, the additivity tests were in most cases non-significant, which implied that even for subscales which did not seem absolutely consistent the items could still be summed without violating any statistical assumptions; this was quite strange, because if the scales were really inconsistent they would naturally be non-additive as well. Thus, these illusive inconsistencies might not be produced by incompatibility of subscale items but possibly by some other interacting concept, exaggerating initial individual differences.

Table 9

	Psychology Postgraduates		Engineering Postgraduates	
Values	Alpha	Non-additivity	Alpha	Non-additivity
T	-1.00	p<.001	.35	NS
E	.59	NS	.32	NS
A	.57	NS	.58	NS
S	-0.09	NS	.34	NS
P	.55	NS	.37	NS
R	.69	NS	.51	p<.005
ΨT	.55	NS	.80	NS
ΨE	.83	NS	.57	NS
ΨA	.16	NS	.76	NS
ΨS	.45	NS	.61	NS
ΨP	.58	p<.005	-0.69	NS
ΨR	.76	NS	.68	NS
ET	.81	NS	.57	NS
EE	.42	p<.05	.23	p<.05
EA	.86	NS	.60	NS
ES	.84	NS	.56	NS
EP	.34	NS	-0.05	p<.05
ER	.92	NS	.47	NS
	avS=.60,avP=.55,avE=.69 Grand Alpha average=.61		avS=.41,avP=.68,avE=.41 Grand Alpha Average=.50	

Reliability coefficients and Non-additivity Analysis of Variance estimates for value subscales composed of 3 items each. Each value is denoted by letter codes T,E,A,S,P,R, corresponding to *Theoretical, Economic, Aesthetic, Social, Political and Religious.* If it corresponds to *Self systems* each code is presented as one of these *single* letters. For *Attributed to typical Psychologist and typical Engineers* systems though, each letter code is preceded by a Ψ or an E for *estimated Psychologist* and *estimated Engineer Values* respectively.

avS=average alpha corresponding to *Self* systems, avP=average alpha corresponding to *attributed to typical Psychologist* systems and avE=average alpha corresponding to *attributed to typical Engineer* systems; the *Grand Average* corresponds to *all three collapsed.*

The author's suspicions were that this concept was Self-esteem. Thus, if any possible artefactual effect that each individual's self esteem had on the ratings this individual provided was partialled out, the true *standardized* alpha coefficients could be derived for each value subscale by using equation (3).

$$Standardized\ \mathbf{A} = \frac{k\bar{r}}{1 + (k-1)\bar{r}}$$ (3)

where k is the number of items and $\bar{r}$ is the average correlation between the three value subscale items (for instance the three Social value items as rated by PGsΨ).

By performing partial correlations, the Pearson product moment coefficients after the removal of the variation produced by self esteem provided in turn new $\bar{r}$ for the computation of standardized alphas; when these were computed an important improvement in cases such as the *Social value items* rated by PGsΨ was observed (in this case, | *alpha* | increased from .09 to .33). These improvements, shown when the effects of self esteem on each item within value subscales were partialled out, supported the suspicion that it was not the items producing inconsistencies but these inconsistencies were produced just by individual differences and the not very high alpha values were produced by the relatively small number of subjects.

But still, this remained just a suspicion which had to be proven of being true if it was to be accepted as an adequate reason for retaining all subscale items (and thus using the six value averages produced by all 18 items) in the subsequent analyses; for this reason, the self value systems correlation matrices for each vocational group had to be compared. If there was a match of 'strange' correlations concerning items from different subscales for both groups, then something would have gone wrong with the construction of these items; elsehow, any of the inconsistencies observed would be the result of individual differences only, and should not raise doubts about the items *per se*. In a way, this approach resembled the 'internal consistency' approach that Allport, Vernon and Lindzey applied, but here the correlations involved, did not have anything to do with the totals of each subscale but with each and every item across subscales. The correlation matrices for each vocational group, showing the Pearson product moment coefficients for each subscale item as rated for *Self* with all items belonging to the other five subscales are presented in *Tables 10a and 10b, page 84*.

Table 10a

Psychology Postgraduates (N=20)

	E1	E2	E3	A1	A2	A3	S1	S2	S3	P1	P2	P3	R1	R2	R3
T1	.21	.21	-.19	.32	.19	.14	.03	-.02	-.37	.03	-.08	.17	.00	.06	-.43
	.18	*.17*	*.19*	*.08*	*.20*	*.26*	*.44*	*.45*	*.05*	*.44*	*.36*	*.22*	*.50*	*.39*	*.02*
T2	.31	-.05	.16	.15	-.30	-.29	.18	.40	-.17	.02	.07	-.24	-.40	-.23	.24
	.08	*.40*	*.21*	*.26*	*.09*	*.10*	*.22*	*.03*	*.23*	*.25*	*.37*	*.14*	*.03*	*.16*	*.14*
T3	-.02	.58	-.07	.02	.28	-.23	-.06	.30	-.10	-.02	.49	.36	.52	.23	-.04
	.45	*.00*	*.38*	*.45*	*.11*	*.16*	*.39*	*.09*	*.32*	*.46*	*.01*	*.05*	*.00*	*.16*	*.42*
E1				.56	-.21	.03	.29	.32	-.64	-.23	-.09	.14	-.11	-.18	.10
				.00	*.18*	*.43*	*.10*	*.07*	*.00*	*.16*	*.35*	*.27*	*.31*	*.21*	*.32*
E2				.44	.33	.32	-.08	.29	-.20	-.05	.15	.54	.17	.37	.17
				.02	*.04*	*.08*	*.35*	*.10*	*.19*	*.41*	*.25*	*.00*	*.22*	*.05*	*.22*
E3				.22	.24	.34	.53	.19	.19	.13	.04	.19	.16	.41	.65
				.17	*.14*	*.07*	*.00*	*.20*	*.21*	*.28*	*.42*	*.20*	*.24*	*.03*	*.00*
A1							-.01	.24	-.23	.20	.12	.33	.00	.16	-.03
							.47	*.14*	*.16*	*.19*	*.30*	*.07*	*.48*	*.24*	*.43*
A2							-.22	.02	.21	.34	.36	.28	.32	.35	.03
							.16	*.45*	*.18*	*.07*	*.05*	*.11*	*.08*	*.06*	*.44*
A3							-.17	-.19	.11	.06	-.32	-.03	-.19	.16	.03
							.23	*.21*	*.30*	*.39*	*.07*	*.11*	*.20*	*.24*	*.44*
S1										-.01	.00	-.05	-.01	-.07	.32
										.46	*.49*	*.40*	*.47*	*.37*	*.08*
S2										-.21	.22	.09	-.00	.10	.17
										.18	*.16*	*.34*	*.48*	*.32*	*.22*
S3										.24	.21	-.02	.24	.40	.18
										.15	*.18*	*.45*	*.14*	*.03*	*.21*
P1													.20	.34	.23
													.19	*.07*	*.16*
P2													.48	.27	.08
													.01	*.12*	*.36*
P3													.56	.56	.24
													.00	*.00*	*.14*

Table 10b

Engineering Postgraduates (N=20)

	E1	E2	E3	A1	A2	A3	S1	S2	S3	P1	P2	P3	R1	R2	R3
T1	-.37	-.29	.09	.20	.34	.06	.20	.39	.11	.23	.02	.21	.37	.29	-.24
	.05	*.10*	*.37*	*.19*	*.07*	*.39*	*.18*	*.04*	*.31*	*.15*	*.45*	*.18*	*.05*	*.10*	*.14*
T2	-.27	.01	.14	-.15	-.21	.01	.35	-.08	.06	-.43	-.13	-.45	-.03	-.15	.12
	.12	*.47*	*.27*	*.25*	*.18*	*.47*	*.06*	*.35*	*.39*	*.02*	*.28*	*.02*	*.43*	*.25*	*.30*
T3	-.11	-.04	.29	.03	.32	.12	.00	.16	.22	.10	-.18	-.10	-.37	-.03	.01
	.30	*.43*	*.10*	*.43*	*.08*	*.30*	*.49*	*.24*	*.16*	*.32*	*.22*	*.33*	*.05*	*.44*	*.47*
E1				-.00	-.29	-.01	-.24	-.01	-.26	.43	.50	-.12	-.19	.26	.17
				.49	*.10*	*.46*	*.15*	*.48*	*.13*	*.02*	*.01*	*.30*	*.20*	*.13*	*.23*
E2				-.02	.18	.51	-.19	-.07	.15	.06	-.32	.14	.05	.32	.53
				.46	*.21*	*.01*	*.20*	*.37*	*.25*	*.38*	*.08*	*.27*	*.40*	*.07*	*.00*
E3				-.04	.08	-.29	.02	-.24	-.21	-.08	-.21	.01	-.25	.06	.34
				.41	*.36*	*.10*	*.45*	*.15*	*.18*	*.36*	*.18*	*.48*	*.13*	*.38*	*.06*
A1							-.28	.28	.22	.14	.31	.13	.32	.46	-.08
							.11	*.10*	*.16*	*.27*	*.09*	*.29*	*.08*	*.02*	*.35*
A2							-.15	.15	.24	.10	-.37	.06	.43	.34	.18
							.25	*.25*	*.14*	*.33*	*.05*	*.38*	*.02*	*.06*	*.21*
A3							-.20	.20	.17	.03	.06	.14	.12	.10	.29
							.19	*.19*	*.23*	*.44*	*.38*	*.26*	*.29*	*.32*	*.10*
S1										-.30	.15	-.00	.21	-.00	.07
										.09	*.26*	*.49*	*.17*	*.49*	*.38*
S2										.16	.17	.04	.26	.24	.03
										.24	*.22*	*.41*	*.12*	*.14*	*.44*
S3										.19	-.07	-.20	.21	.21	-.02
										.19	*.36*	*.19*	*.17*	*.17*	*.46*
P1													.11	.45	-.37
													.30	*.02*	*.05*
P2													.07	.17	-.19
													.37	*.23*	*.21*
P3													.12	.21	.00
													.29	*.17*	*.48*

Error correlation matrices for Psychology and Engineering postgraduates. Each self value item is correlated with all other self value items (between subscales). Significance levels are denoted in *italics*.

It was clear that all of the 'strange' correlations were *randomly* associating different subscale items, in other words there was no correlation match for the two vocational groups; also, wherever it appeared that a common strange correlation existed, it was non-significant for one of the two groups. For these reasons and also because the inconsistencies observed initially represented less than 12% of the total number of items, it was decided to keep all items in the subsequent analyses by averaging them for each subscale and using these scores as representing the final score in the value profiles assessed for all conditions for any individual.

The second decision concerning which of the initially assessed independent variables were going to be used in the subsequent analyses was taken on the grounds of isolating those variables that would offer most by means of interaction with the main VOCATION between subjects factor. This, for one thing, would not create null cells, thus enhancing the analyses and allowing for trustworthy multivariate comparisons, and for another it would allow for the most interesting available interactive variations to be studied. On the first step, *descriptive statistics* showed that some of the independent variables had very small variance; for instance, the FAMILY TYPE variable revealed only 6 subjects (15%) coming from extended-like families and this for both vocational groups. For this specific variable, the situation was expected and hoped for, but for the remaining independent variables it should be decided whether they were representing true population distributions or whether they were non-representative due to chance fluctuation. GENDER was intuitively representing the two vocational subpopulations truthfully. ($n_{Males(V)}=9$ / $n_{Females(V)}=11$ and $n_{Males(E)}=16$ / $n_{Females(E)}=4$). NATIONALITY varied, split into *British* ($\approx63\%$) and *Non-british* students ($\approx37\%$); this seemed quite promising but it had to be verified as a useful between subjects factor before the analyses would commence. SOCIAL CLASS did not vary much; most students placed themselves in the *Lower-middle and Upper-middle* classes, and a comparison to the data provided for *father's occupation* rendered this variable a probably non-representative one and clearly a non-promising one. The same happened for the students' POLITICAL PREFERENCE, although the variation here was larger. The majority (70%) favoured the *Labour and the Liberal Democrats* parties; only 10% favoured the *Conservative* party and the remaining 20% either did not respond at all or reported that they did not favour anyone. Due to this variation -and this applied to the SOCIAL CLASS variable as well- these two grouping factors had to be given more extensive attention in the attempt to clarify whether they had anything to offer in the current

design.[13]

Non-parametric techniques were applied expecting the GENDER-VOCATION contingency to be distributed unequally within the four data cells; thus, for the whole sample there should be no significant departure from GENDER distribution normality, but when combined to the VOCATION factor there should be evidence that males and females are unequally distributed for Ψ and E departments. If this was the case then it would fit the idea that these vocational populations are unequally distributed for Gender anyhow; NATIONALITY was expected not to be significantly differentiating between British and Non-British students; if so, it would be regarded as closely representing the postgraduate population overall, and would be considered useful in the design; elsehow, it would not be used. The same applied for SOCIAL CLASS and POLITICAL PREFERENCE. The author did not naively assume that the postgraduate populations are equally distributed for SOCIAL CLASS or POLITICAL PREFERENCE; that would be an inconsistency with reality, but if a highly significant sparse pictures were revealed for these two variables, then this would cast doubt on their use in subsequent analyses and would render any possible interaction effects suspect. Finally, the FAMILY TYPE grouping factor was disqualified because of its very small variation.

Chi-squares, through goodness of fit tests revealed that SOCIAL CLASS and POLITICAL PREFERENCE were unequally distributed within the whole sample ($\chi^2_{Sc}=15.050$ $p<.05$, $\chi^2_{Pp}=9.800$ $p<.05$). On the contrary, GENDER and NATIONALITY showed high goodness of fit (χ^2 were non-significant). In order to examine possible interrelationships between VOCATION, GENDER, NATIONALITY, SOCIAL CLASS and POLITICAL PREFERENCE, Spearman correlations were computed; the results are presented in Table 11, page 87.

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[13] Table 13, at the end of this section, presents several cell combinations for these independent variables and the respective number of cases in each cell; up to double variable combinations are reported because in most cases, when combining three or more variables the number of null cells clearly rendered the contingencies useless for linear combinations of these variables in multivariate designs.

Table 11

Spearman Rhos	VOCATION	GENDER	NATIONALITY	SOCIAL CLASS	POLITICAL PREFERENCE
GENDER	−.36 *.011*	1.000			
NATIONALITY	.36 *.011*	.04 *NS*	1.000		
SOCIAL CLASS	.09 *NS*	.27 *.046*	.36 *.010*	1.000	
POLITICAL PREFERENCE	.01 *NS*	.01 *NS*	−.07 *NS*	.08 *NS*	1.000
FAMILY TYPE	.00 *NS*	−.18 *NS*	−.03 *NS*	.10 *NS*	−.10 *NS*

All significant correlations that emerged had to be further explored. Thus, *crosstabulated* χ^2 tests would help clarify which of the independent variables interacted significantly. These would be the most promising ones for use in the design, since they would represent the experimental population closely, they would be interconnected (satisfying one of the major statistical assumptions in multivariate analyses), and their distributions would be possibly interacting in producing analysis of variance effects. The results are presented in *Table 12*.

Table 12

Pearson χ^2	VOCATION	GENDER	NATIONALITY	SOCIAL CLASS	POLITICAL PREFERENCE
GENDER	5.22 (df=1) *.02*	2.50 (df=1) *NS*			
NATIONALITY	5.22 (df=1) *.02*	0.06 (df=1) *NS*	2.50 (df=1) *NS*		
SOCIAL CLASS	3.39 (df=2) *NS*	2.98 (df=2) *NS*	5.35 (df=2) *NS*	15.050 (df=2) *.001*	
POLITICAL PREFERENCE	3.08 (df=3) *NS*	1.96 (df=3) *NS*	5.07 (df=3) *NS*	7.83 (df=6) *NS*	9.800 (df=3) *.020*
FAMILY TYPE	0.00 (df=1) *NS*	1.30 (df=1) *NS*	0.05 (df=1) *NS*	2.02 (df=2) *NS*	2.97 (df=3) *NS*

Above diagonal, Goodness of Fit tests

As evident, the only initially assessed grouping factors satisfying all the criteria set were the GENDER and the NATIONALITY ones; for this, they were to be used as interacting Between subjects factors along with the VOCATION factor in the analyses to follow.

Another point had to be verified before entering the hypothesis testing phase; since the analysis of variance designs would include three between subjects factors, the two of which were creating unbalanced designs due to unequal cells, *homogeneity of variance* should be achieved at least for the VOCATION factor where the cells were equal. If the two vocational groups were homogeneous then data transformations would not be needed; otherwise, lack of homogeneity for this primary between subjects factor in combination to the unequal cells produced by the other two between subjects factors would constitute a serious violation of analysis of variance assumptions. *Box's M tests* were applied to test for homogeneity; the results revealed that the two differentiated on the grounds of their VOCATION groups, were highly homogeneous. This suggested that data transformations were not required in the end; possible confounding effects produced by the unequal cell sizes of the other two Independent Variables would be accounted for by using Sequential Sums of Squares for the variance partitioning. Although VOCATION and NATIONALITY would require an unweighted means solution,the GENDER grouping factor required weighted means solutions and since all three were interacting the weighted means solution was adopted; the means, standard deviations and confidence intervals presented in *Tables 5a, 5b and 5c* in *Appendix A* correspond to this weighted means solution for the analysis of variance and the same applies for any figures and data presented in the *Results and Discussion Section*.

Table 13
Cell sizes for between subjects factors for single variables (tables a and b) and for double combinations of variables (table c).

a) VOCATION GENDER NATIONALITY

Psychology	Engineering	Males	Females	British	Non-British
20	20	25	15	25	15

b) SOCIAL CLASS POLITICAL PREFERENCE FAMILY

Lower-Middle	Upper-Middle	Upper Class	Conserv.	Lib. Dem.	Labour	Other	1	2
14	23	3	4	12	17	7	14	6

Family type 1=Nuclear, 2=Extended.

c) VOCATION GENDER NAT. SOC.CLASS POL. PREF.

	Ψ	E	M	F	B	NB	LM	UM	UC	C	LD	L	O
Gender	9	16	M										
	11	4		F									
Nationality	16	9	16	9	B								
	4	11	9	6		NB							
Social Class	7	7	11	3	12	2	LM						
	13	10	13	10	12	11		UM					
	0	3	1	2	1	2			UC				
Political Preference	2	2	2	2	2	2	2	2	0	C			
	5	7	9	3	6	6	4	7	1		LD		
	11	6	9	8	14	3	5	12	0			L	
	2	5	5	2	3	4	3	2	2				O
Fam. Nucl.	17	17	20	14	21	13	13	18	3	4	9	14	7
Fam. Extd	3	3	5	1	4	2	1	5	0	0	3	3	0

Key: Ψ=Psychology, E=Engineering / M=Males, F=Females
B=British Students, NB=Non-British Students /
LM=Lower-Middle Class, UM=Upper-Middle Class, UC=Upper Class
C=Conservative, LD=Liberal Democrats, L=Labour, O=Other
Fam=Family, Nucl=Nuclear family, Extd=Extended family.

Section 4: *Exploring the value characteristics of the vocational within group 'majorities-minorities'.*

As shown, despite the fact that PGsΨ clearly differed from PGsE for their Aesthetic values, the overall multivariate effect for this comparison was non-significant. The suspicion was that standard deviations for the dependent variables were artificially increased by different from the majority subjects; since this loomed in the experimenter's mind, it was decided that the issue should be further explored; it has to be stressed though that whatever the results derived from a reduced sample ('outliers' excluded), they would not be used as conclusive evidence; the exclusion *per se* of these subjects was an *ex-post-facto* action, thus an artificial one, since there was no built-in control factor accounting for these subjects. The procedure described next was performed only in order to see whether indeed self value systems differences were suppressed initially, and which members of the samples were 'responsible' for the immense increase of the standard deviations; on these grounds, it would be possible to study any available characteristics of these different subjects and especially their own value systems in comparison to the majority of each vocational group. Of course, this would be pursued if and only if the 'new' reduced-sample comparisons for self value systems proved significant; and in fact, they did. The 'outliers' were discovered through *Mahalanobis's* distance and through *Discriminant analyses* that pin-pointed the subjects that could not be correctly classified by means of their self values in their predetermined vocational groups. When these subjects were excluded form the analyses, a massive multivariate main effect for the VOCATION between groups factor emerged (for the Hotellings T^2 criterion (S=1,M=2,N=8), F(6,18)6.70, p<.001). Univariate F tests showed that the 16 remaining PGsΨ (4 were excluded) had significantly higher *Aesthetic, Social* and *Religious* values from the remaining 15 PGsE (5 were excluded). Stepdown F tests confirmed that *Aesthetic* and *Social* values were contributing significantly to the multivariate effect (Stepdown $F_A(1,21)22.64$, p<.001, $\eta^2=.65$, Stepdown $F_S(1,20)=8.99$, p<.01, $\eta^2=.36$).

As these differences for specific value types appeared for these reduced samples, the interest on **why** did these 9 people differ from the majority in their respective vocational fields in the first place, increased; it could be possible that they were different in some 'demographic' factor; indeed the PGsE which differed from the majority of the PGsE sample were 4 females and 1 male. Possibly, one might think, this produced the individual differences; in occupations such as engineering,

females may be scarce and thus they are bound to be different, for several reasons, in their personal values from what could be a 'norm' within the profession. This solution, though, seemed too easy and if true, then a significant GENDER BY VOCATION multivariate effect should have emerged in the first place, which was not the case. Even more, for the PGsΨ there was no such straightforward solution; the 'different' subjects, in other words, did not appear to have a common characteristic such as being of the same gender or nationality.

By splitting each vocational group into 'majority' and 'minority' groups, the characteristics of personal values corresponding to these majorities vs the minorities within each group could be studied more extensively; a comparison of the means (ANOVA) showed that the 4 different PGsΨ had lower Aesthetic and Religious values from the remaining majority $(F_A(1,18)6.08, p<.05$ and $F_R(1,18)10.01, p<.005)$; the situation was exactly opposite for the 5 PGsE that possessed higher Aesthetic and Religious values from the remaining majority in their vocational field $(F_A(1,18)12.01, p<.005$ and $F_R(1,18)5,17, p<.05)$. It seemed that if those different postgraduates were 'swapped' across vocational levels, they would fit perfectly well their 'new' vocational values. These results aided clarifying why these students differed from their colleagues and they also suggested that Religious values are a very important factor within the self value system of an individual. Since the subjects that differed initially for their Religious values from their within-vocation colleagues were rendered by the discriminant analyses non-correctly classifiable in their respective vocational groups, it became clear that Religious background is probably a very influencing source of variation in the value system shaping procedure. This observation strongly demonstrated the design's failure to account for such an important influencing factor, which failure was a result of the difficulty to assess this background appropriately. The moral is clear though; future attempts should definitely account for this factor by building it into the design, elsehow an important source of controlled variation and all the information it provides are lost. Despite this drawback though, any significant effects should not be considered artefactual but on the contrary suppressed and restricted; in other words, loosing information by not accounting for it in this design allowed for possible type II errors, not type I errors. This could have been avoided if the experimental population was larger, because then, statistical normality (not an Allport-like though) could be achieved.

Appendix D

Spranger's types

In discussing the *Study of Values* with his subjects, the examiner may find it convenient to have at hand the following brief characterization of Spranger's type. For a fuller account he should of course refer directly to Spranger's *Types of Men*.

In selecting his six types, Spranger may be said to hold a somewhat flattering view of human nature. He does not allow for formless or valueless personalities; nor for those who follow an expedient or hedonistic philosophy of life. The neglect of sheerly sensuous values is a special systematic weakness in his scheme. His attempt to reduce hedonistic choices partly to economic and partly to aesthetic values seems unconvincing. If the present scale appears to the user to take a somewhat exalted view of the organization of personality—neglecting both the "baser" values and values that are not permitted to reach the level of conscious choice— the limitation must be regarded as inherent in Spranger's original formulation.

1. *The Theoretical*. The dominant interest of the theoretical man is the discovery of *truth*. In the pursuit of this goal he characteristically takes a "cognitive" attitude, one that looks for identities and differences; one that divests itself of judgements regarding the beauty or utility of objects, and seeks only to observe and to reason. Since the interests of the theoretical man are empirical, critical, and rational, he is necessarily an intellectualist, frequently a scientist or philosopher[1].His chief aim is to order and systematize his knowledge.

2. *The Economic*. The economic man is characteristically interested in what is *useful*. Based originally upon the satisfaction of bodily needs (self-preservation), the interest in utilities develops to embrace the practical affairs of the business world—the production,marketing, and consumption of goods, the elaboration of credit, and the accumulation of tangible wealth. This type is thoroughly "practical" and conforms well to the prevailing stereotype of the average American business man.

The economic attitude frequently comes into conflict with other values. The economic man wants education to be practical, and regards unapplied knowledge as waste. Great feats of engineering and application result from the demands economic men make upon science. The value of utility likewise conflicts with the aesthetic value, except when art serves commercial ends. In his personal life the economic man is likely to confuse luxury

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[1].It must not be thought that a high degree of talent or attainment is necessary to qualify a person for classification in this, or in any, type. According to Spranger a person can best be understood not by his achievements but his interests and intentions.

with beauty. In his relations with people he is more likely to be interested in surpassing them in wealth than in dominating them (political attitude) or in serving them (social attitude). In some cases the economic man may be said to make his religion the worship of Mammon. In other instances, however, he may have regard for the traditional God, but inclines to consider Him as the giver of good gifts, or wealth, prosperity, and other tangible blessings.

3. *The Aesthetic*. The aesthetic man sees his highest value in *form* and *harmony*. Each single experience is judged from the standpoint of grace, symmetry, or fitness. He regards life as a procession of events; each single impression is enjoyed for its own sake. Heed not be a creative artist; nor need he be effete; he is aesthetic if he but finds his chief interest in the artistic episodes of life.

The aesthetic attitude is in a sense diametrically opposed to the theoretical; the former is concerned with the diversity, and the latter with the identities of experience. The aesthetic man chooses, with Keats, to consider truth as equivalent to beauty, or else to agree with Mencken, that "to make a thing charming is a million times more important than to make it true." In the economic sphere the aesthete sees the process of manufacturing, advertising and trade as a wholesale destruction of the values most important to him. In social affairs he may be said to be interested in persons but not in the welfare of persons; he tends toward individualism and self-sufficiency. Aesthetic people often like the beautiful insignia of pomp and power, but oppose political activity when it makes for the repression of individuality. In the field of religion they are likely to confuse beauty with purer religious experience.

4. *The Social*. The highest value for this type is *love* of people. In the *Study of Values* it is the altruistic or philanthropic aspect of love that is measured. The social man prizes other persons as ends, and is therefore himself kind, sympathetic, and unselfish. He is likely to find the theoretical, economic and aesthetic attitude cold and inhuman. In contrast to the political type, the social man regards love as itself the only suitable form of human relationship. Spranger adds that in its purest form the social interest is selfless and tends to approach very closely the religious attitude.

5. *The Political*. The political man is interested primarily in *power*. His activities are not necessarily within the narrow field of politics; but whatever his vocation, he betrays himself as a *Machtmensch*. Leaders in any field generally have high power value. Since competition and struggle play a large part in all life, many philosophers have seen power as the most universal and most fundamental of motives. There are however, certain personalities in whom the desire for a *direct* expression of this motive is uppermost, who wish above all else for personal power, influence and renown.

6. *The Religious*. The highest value of the religious man can be called *unity*. He is mystical, and seeks to comprehend the cosmos as a whole, to relate himself to its embracing totality. Spranger defines the religious man as one "whose mental structure is

permanently directed to the creation of the highest and absolutely satisfying value experience." Some men of this type are "immanent mystics," that is, they find in the affirmation of life and in active participation therein their religious experience. A Faust with his zest and enthusiasm sees something divine in every event. The "transcendental mystic" on the other hand seeks to unite himself with a higher reality by withdrawing from life; he is ascetic, and, like the holy men of India, finds the experience of unity through self-denial and mediation. In many individuals the negation and affirmation of life alternate to yield the greatest satisfaction.

Mixtures. Spranger does not imply that a given man belongs exclusively to one or another of these types of values. His depictions are entirely in terms of "ideal types," a conception fully explained in his *Types of Men.*

Source: Allport, G.W., Vernon, P.E. & Lindzey G. (1931). *Study of Values: A scale for measuring the Dominant Interests in Personality,* (Revised edition), Houghton-Mifflin Company.

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