

THE VALIDITY OF ASTROLOGICAL THEORY  
AS APPLIED TO PERSONALITY,  
WITH SPECIAL REFERENCE TO THE ANGULAR SEPARATION  
BETWEEN PLANETS.

by

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## ABSTRACT.

Astrology claims that personality varies with the birth positions of the planets within three main frameworks: the ecliptic circle of the zodiac "signs", the diurnal circle of the "houses", and the "aspectual" framework of the angular separations between pairs of planets. While considerable research has already been devoted to investigating the first two of these frameworks, the aspectual has been rather neglected. Thus, the research reported in this thesis pays particular attention to this framework, though gaps in the research on the other two are also investigated. The research employs a sample of 911 subjects and uses Eysenck's EPQ and Cattell's 16 PF as measures of personality.

Introductory chapters of the thesis discuss the popularity of astrology in the twentieth century, the psychology of belief in astrology, and previous research into, and the scientific status of, astrology.

Astrological doctrines concerning the angular separations between planets were investigated in a series of four studies. In the first, a group of astrologers was asked to specify how personality varies with specific angular separations - called "aspects" - between 32 pairs of planets and these predictions were tested against the data. In the second, a comparison of the traditionally categorised "soft" and "hard" aspects was made using multivariate methods, while the fourth study ignored the traditional categorisation into aspects and non-aspects and simply looked for any effect of angular separation. The third study was an attempted replication of a previous finding showing support for the 108th harmonic of the aspectual circle. No evidence of the validity of astrological ideas was found in any of these studies.

Evidence that personality varies with the positions of some of the planets in the diurnal framework has already been obtained but most of it is confined to eminent individuals. Therefore, a second series of two studies was designed to test for similar effects with ordinary people. The first of these studies tested 23 predictions concerning the personality correlates of planets placed in the Gauquelins' "key sectors" at birth. Only three of these predictions were supported and the results for two of these were only marginally significant. However, all three effects had been found on at least two previous occasions. The second study investigated whether personality varies in any manner according to the positions of the planets in 12 diurnal sectors. The rationale for this was drawn from a new analysis of some data published by the Gauquelins. This analysis shows that personality varies continuously with the diurnal positions of the planets. With personality questionnaires, however, significant results were only obtained for the sun. These suggest that personality varies on at least four dimensions according to the time of day of birth.

A third group of studies was devoted to two topics related to the signs of the zodiac. Firstly, the doctrine that personality varies with the signs occupied by the planets was tested. The only reliable result was one showing that people born with the sun in a "positive" sign tend to score higher on extraversion than those with the sun in a "negative" sign. This effect has been obtained several times previously but there have also been several failures to replicate it. Therefore a meta-analysis of most of the existing studies of this effect was undertaken. It was found that the effect can be reliably obtained though no influences from the sun need be invoked to explain it. It appears to be of the nature of a self-fulfilling prophecy.

"There is superstition in avoiding superstition."  
Francis Bacon.

For Linda, who has supported all my efforts.

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## GLOSSARY OF SYMBOLS.

<\*> Word defined in the Glossary of Terms in Appendix I.  
<Note N> Numbered footnote found at end of chapter.

### Astrological factors.

The following symbols were agreed as the Standard International Astrological Abbreviations at the 1975 Annual Conference of the Astrological Association, at Brighton.

<u>Planets&lt;*&gt;.</u>	<u>Signs of the Zodiac.</u>	<u>Angles&lt;*&gt;.</u>
SO Sun	AR Aries	AS Ascendant
MO Moon	TA Taurus	DS Descendant
ME Mercury	GE Gemini	MC Midheaven
VE Venus	CN Cancer	IC Imum Coeli
MA Mars	LE Leo	VX Vertex
JU Jupiter	VI Virgo	EP East Point
SA Saturn	LI Libra	
UR Uranus	SC Scorpio	
NE Neptune	SG Sagittarius	
PL Pluto	CP Capricorn	
	AQ Aquarius	
	PI Pisces	

### Personality Questionnaire Scales.

The traits associated with a high score on each scale are given first.

#### Eysenck Personality Questionnaire.

Ps Psychoticism - normality.  
Ex Extraversion - introversion.  
Ne Neuroticism - stability.  
Li Dissimulation - honesty.

#### Sixteen Personality Factor Questionnaire.

A Outgoing - reserved.  
B High intelligence - low intelligence.  
C Emotionally stable - unstable.  
E Dominant - submissive.  
F Enthusiastic - sober.  
G Conscientious - expedient.  
H Venturesome - shy.  
I Tender-minded - tough-minded.  
L Suspicious - trusting.  
M Imaginative - practical.  
N Shrewd - forthright.  
O Apprehensive - self-assured.  
Q1 Experimenting - conservative.  
Q2 Self-sufficient - group-dependent.

Q3 Controlled - lax.  
Q4 Tense - relaxed.

Higher-order 16PF factors.

QI Extraverted - introverted.  
QII Anxious - well adjusted.  
QIII Tough - responsive.  
QIV Independent - subdued.

THE REVIVAL OF ASTROLOGY IN THE TWENTIETH CENTURY.

1.1 Introduction.

Since astrology deals with explanations for human behaviour, it might be considered as part of psychology in the widest sense. However, it is not often so considered and few psychologists are aware of the nature and extent of popular belief in astrology or of the scientific investigation of its theories. The main body of this thesis reports on a series of experiments undertaken in order to test the validity of astrological theory as applied to personality. These experiments have a background in the work of many people who have devoted themselves to astrology in this century. Since this work is not widely known, it is outlined in the first three chapters.

The context of contemporary research into astrology includes, in the first place, the two great surges of popular interest that this ancient (and once moribund) theory has enjoyed during the present century. The first of these surges came in the 1930s and the second, even larger one began in the 1960s and has remained with us ever since. A brief, historical background to this growth in popular belief is given in this chapter. Psychologists and other scientists have responded to this popular enthusiasm in three main ways. Some have sought for explanations for the phenomenon in terms of the social conditions, or the psychological characteristics, of the believers. Their research findings will be reviewed in Chapter Two where an investigation of the author's will also be reported in its context. Of course, the psychological motivations of those who believe in astrology are peripheral to the issue of its validity but this issue has been pursued also, by a second group of scientists. The history of the various attempts to test the truth of traditional astrology, and the outcome of those attempts, will be surveyed in Chapter Three. A third

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group of scientists, feeling an understandable disquiet that this "superstition" from the middle ages should be revived in our supposedly enlightened times, have tried to warn off the public from giving it any credence. However, in their efforts to banish astrology to the dustbin of science, this third group has inevitably come up against the members of the second group, some of whom claim to have found evidence for a core of truth to the ancient theory. This confrontation has led to the claims of astrology being put to the severest tests. These tests will also be reviewed in Chapter Three. It has also led to a complex and frequently acrimonious controversy between those who claim that some of astrology has survived the tests and those who doubt that any of it has.

No detailed exposition of astrological theory will be given at first. What most readers know about it will suffice for the early chapters. Where technical terms are introduced, they are marked by an asterisk thus <\*> and an explanation is given in a glossary in Appendix I. The general nature of astrological theory will be discussed at some length in Chapter Four which deals with the status of astrology as a science. According to the view of science adopted there, both the structure and the scientific status of any theory can only be evaluated after considering the history of the research involving that theory. Hence the history of the research is given first. Particular hypotheses are tested in the experiments which are reported in the second half of the thesis and detailed accounts of these hypotheses will be given in the introductions to the experiments.

### 1.2 The revival of popular belief in astrology.

In the middle of the seventeenth century astrology achieved a level of general popularity that it had not enjoyed since the time of the Roman Empire, but by the end

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of the century it had fallen into complete disrepute as an intellectual pursuit and had even lost the major part of its popular following (Capp, 1979). During the next two centuries it was remembered and practiced only in Britain<sup><note 1></sup>. In continental Europe it was almost completely forgotten until around 1890 when it began to revive in France. Even in Britain there were very few practising astrologers during the eighteenth century and those who did acquire the necessary technical knowledge to cast and interpret horoscopes were mostly eccentrics who had no readership amongst the educated public. A small-scale revival began in the 1780s when a few books plagiarising seventeenth century authors were published and a few short-lived journals appeared, but it did not come to much. However, the publication of annual almanacs had never ceased since the seventeenth century and these continued to be surprisingly popular throughout this period. One outstanding example is furnished by the almanac called "Vox Stellarum". Originally published by Francis Moore (1657-1715), its circulation did not reach a peak until 1839, at which time it stood at approximately half a million copies. These almanacs did not give sufficient detail to serve as textbooks but they did ensure that at least a superficial knowledge of astrology survived.

Throughout the nineteenth century the number of individuals who studied to become practising astrologers gradually increased but it was not until the 1880s that monthly periodicals began to make a modest success. This new show of interest came largely from the lower middle and working classes and owed much to Spiritualism and the interest in arcane matters that it fostered. A second boost to the popularity of astrology came with the advent of the Theosophical Society, which was also greatly influenced by Spiritualism. Founded in 1875 in New York City, with a Spiritualist medium called Madame Blavatsky as its first president, the Theosophical Society rapidly gained devotees

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and spread to Europe. It was a chaotic synthesis of the ancient Hermetic and Gnostic traditions of the West with poorly understood versions of the religions of the East, but it was seminal to the twentieth century flirtation with occultism.

Astrology benefitted from the new interest in esoteric religion chiefly through the efforts of Alan Leo (alias William Allen, 1860-1917) who was both an astrologer and a Theosophist. It was because of his predilections that astrology now acquired a number of strange new doctrines, such as the Eastern doctrines of karma and reincarnation. During the previous two hundred years or so, astrology had generally been regarded by its supporters as a predictive science but with Alan Leo it began to take on occult and religious characteristics. This new blend was very successful and allowed Leo to become a full-time professional by 1898. He wrote six textbooks, all aimed at simplifying the subject so that anybody capable of simple arithmetic could cast and interpret horoscopes. They sold well at the time and have stayed in print ever since. He also organised a postal horoscope service, the first of its kind, and by 1903 was employing nine people full-time.

Initially, renewed interest in astrology was a British affair. In continental Europe, astrology revived first in France where, as in Britain, it drew its impetus from a renascent Hermetic tradition. Germany did not take long to follow the example of its neighbours. The Theosophical Society made a large impact in the German speaking world and in its wake came translations of British astrological textbooks. By 1909, Germany was publishing its own astrological periodical.

Astrology during this period was part of the widespread reaction against scientific atheism, as were all the occult movements of the time. It must have been particularly

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attractive to those who did not understand science but who felt threatened by it and by the industrialised society that science fostered. As presented by Theosophists, astrology was not only easy to understand but was more than a match for science and materialism. According to Leo (1903) it is "...the most gigantic mental study the mind of man could ever conceive" (page iii). Moreover, it is "...a study that no mortal mind could ever invent, it being the direct work of immortals who came from other worlds to teach its wisdom to our infant humanity" (page iii). Nevertheless, with the help of Leo's simplified and inveterately pompous manuals, almost anybody could get the hang of this "gigantic mental study". Thus an inadequate education could soon be made sufficient, atheism could be combatted, and privileged access to the highest wisdom could be rapidly acquired. With these assurances many bewildered and socially marginal people must have found great consolation and, as with so many religions, could even come to regard their own humble status as a mark of distinction. As Leo intoned in 1903: "The divine mysteries are only for those who are ready to renounce the world and claim their divine right to be heirs to the knowledge the Teachers have to impart"(page iii).

Enthusiasm for astrology continued to grow throughout the Western world but it was in Germany, in the 1920s, that interest increased particularly dramatically. Although it received its original impetus from Theosophy, German astrology did not retain a strong occult character for long. It was soon regarded as a predictive science again and was even seen by some as a psychological discipline. O.A.H.Schmitz, a follower of C.G.Jung, was particularly influential in promoting this latter view. His efforts to break away from occultism and the traditional horoscope delineation (which tended to focus on events in the individual's life rather than the dynamics of his personality) were helped by the contemporary popularity of



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Jung's book "Psychological Types" and Kretschmer's "Physique and Character", both published in 1921. Schmitz's lead was quickly followed by other German and American authors.

Such developments as these must have helped to make astrology more acceptable to the educated middle class and, in Germany at least, it began to appeal even to intellectuals. Indeed, the membership of one society, founded in 1924, was restricted to academics ("Herren Doktoren"), and there were well over a hundred of them. The first international congress of astrologers was held in Munich in 1922 and thereafter was staged annually until 1936. It has been estimated (Howe, 1967) that some 400 books and pamphlets on the subject were published between 1921 and 1935 in Germany alone. Twenty six different yearbooks ran concurrently and, by 1928, there were six periodicals available for subscribers. One of these, a monthly, achieved a circulation of 6000.

### 1.3 Popular astrology.

In 1930, astrology acquired a new kind of exposure and an altogether different kind of following. In that year the Sunday Express (London) published an article on the horoscope of the newly-born Princess Margaret. It was the first time that a national newspaper had featured anything of the kind but the response was one of immediate enthusiasm. A flood of appreciative readers' letters persuaded the editor to include a whole page of astrological forecasts each week. In no time "Lucky Stars" columns had appeared in almost all of the popular newspapers and magazines throughout the Western world. The stars had become an item of mass consumption and the era of sun-sign medallions and zodiac tee-shirts had arrived.

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At first the newspaper articles were written by professionals and reflected the full sophistication of traditional astrology. The editors soon learned, however, that this sophistication was unnecessary. The public could be satisfied with something much simpler provided the predictions and interpretations applied to the readers themselves. No such thing could be provided by traditional astrology, of course, because that depended on having an individual natal chart calculated for the exact time and place of birth, but this nicety did not deter the newspapers. They found that predictions and advice could be based on sun-signs alone and though this implied that one twelfth of the population of the entire world suffers the same fate daily, the public was not bothered by the absurdity.

The success of newspaper astrology grew rapidly. The lead given by the Sunday Express was soon copied many times over. Writing in 1941, Bok and Mayall estimated that approximately one in twenty of the newspapers in the U.S.A. carried "Lucky Stars" columns and the ones that did so were those with the largest circulations. Many weekly and monthly magazines also featured articles by leading popular astrologers and there were at least six mass circulation monthlies devoted to the subject, one of them with a readership in excess of 100,000. Furthermore, this new interest was not confined to backward and rural areas but was most pronounced in the large population centres.

Since the Second World War the popularity of astrology has probably increased. A public opinion survey carried out in France in 1963 (DeFrance et al., 1971) and two Gallup polls conducted in the U.S.A. (Gallup, 1975, 1978) show that between 22% and 30% of the population are prepared to say that they believe in astrology. Of course, the exact percentage depends on how the question is phrased and what response options are provided. When graduated degrees of

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belief are allowed, typically some 5% say they believe in it strongly, while 40% believe in it to some degree. Only 50% give it no credence at all (5% "Don't know").

### 1.4 Modern serious astrology.

No doubt, serious astrology also benefitted from the mass publicity provided by the newspapers. In Germany it began to meet with the disapproval of the Nazi Party in 1934, waned rapidly, and was finally suppressed in 1941, but elsewhere it survived and picked up its following again after the war. Then, with the advent of the counter-culture and hippy movements of the 1960s, a fresh upsurge began which has remained with us ever since. A survey undertaken in 1975 (Louaisel, 1975) reported that there were then 18 major associations in Europe (8 countries) and three national bodies plus 150 local associations in the U.S.A. Another survey published in 1977 (Dean et al., 1977) estimated that there were some 100 periodicals in circulation at that time and major societies were flourishing in South Africa, Australia and New Zealand, India, Israel, Central and South America, and the Philippines, as well as in Europe and North America. Not a great many individuals manage to make a living as full-time professionals but Dean et al. estimate that the people actively studying serious astrology are of roughly the same abundance as psychologists; that is, one in every ten thousand of the population. Most of the countries with organised astrological societies also run courses teaching astrology and award graduated diplomas of proficiency. At present, annual international conferences are held in the U.S.A., Australia, India, and in most of the countries of western Europe.

Modern, serious astrology is intellectually very eclectic. Of all academic subjects, it is regarded by astrologers as being most closely related to psychology

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(Moore, 1960), of a Jungian and Humanistic brand rather than experimental psychology (Curry, 1983). However, the majority of astrologers also still have leanings towards a loosely Theosophical conception of the world and are basically idealistic, in the sense of believing in the primacy of spiritual principles, and theistic. They tend to believe in reincarnation, spiritual evolution, the moral order and ultimate justice (Moore, 1960). On the other hand, the majority also believes that astrology has practical value in that it provides a guide to living and a therapeutic tool for those with personal problems (Curry, 1983). Moreover, most serious astrologers consider astrology to be amenable to, and in need of, scientific research and most also claim to carry out such research (Moore, 1960).

Astrologers in the twentieth century have not been content merely to perpetuate the traditions of the past in terms of techniques any more than in their interpretations. They have criticised old ideas, developed new ones, and conducted a multitude of studies to validate their theories. An idea of the quantity of these studies may be gained from the critical review published by Dean and his co-workers (1977). This book covers the years 1900-1976. It summarises material from more than 300 books and 400 journal articles. It cites over 1,000 references and runs to some 250,000 words. Not all of the material covered was inspired by astrology, it is true, but by far the greater part of it was. Furthermore, the authors estimate that they failed to access perhaps one third of the extant literature. In the course of their continued efforts they had unearthed a further 1,000 previously missed titles by 1982 (Dean, personal communication).

Unfortunately, the great majority of the studies reviewed by Dean et al are rather worthless from a scientific point of view. In a review of methodological

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problems in astrological research, Eysenck (1982) has argued that the main shortcoming is that:

"Astrologers often follow the path taken by psychoanalysis, ie. they show little concern with the 'outcome problem', which means the validity of the claims made and the methods used, and are much more concerned with details of procedure, differential interpretations etc., but without decisive proof of the correctness of the different interpretations concerned." (Page 76)

Not all of the studies are marred in this way. It is probably not overstating the case to say that twentieth century research has changed astrology from a scientific heresy to a controversy, but this has been brought about by only a very few of the hundreds of individuals who have been involved. Their work will be the topic of Chapter Three where an overview of the truly scientific work will be given.

### Notes.

<1> This account of the survival of astrology in the 18th and 19th centuries and its revival in the early 20th century is based largely upon Howe (1967). Explicit references are given where other authors have been consulted.

BELIEF IN ASTROLOGY.

3.1 Introduction.

Psychologists were not slow to respond to the upsurge of interest in astrology that began at the end of the nineteenth century. Belief in astrology was included as an element of the psychology of "superstition", which was investigated as early as 1919. Research reports on "superstitiousness" were published regularly until 1940 or so but thereafter the topic rather loses its currency until interest was re-awakened by the second wave of occultism in the 1960s (Plug, 1976). However, the validity of the findings from the early research is open to serious doubt for two main reasons: the research was based upon poorly analysed conceptions of "superstitiousness" and upon haphazardly constructed measuring instruments. These two shortcomings will be briefly discussed next.

The problem with the concept of superstitiousness is that no means has ever been found for distinguishing objectively between putative superstitions and other beliefs. As the word is commonly used it has pejorative connotations but means only that the user regards some belief as false and probably as harmful as well. As Jahoda (1970) commented, "used in this way, the term is little more than a verbal bludgeon to trounce one's ideological opponents". Some scientists (for example, Heath, 1948) have suggested that superstitions can be identified on strictly objective lines by assessing the probabilities that the propositions in question are true. According to this view, scientific theories have very high probabilities of being true while superstitions have very low ones. However, most philosophers of science, following Popper (1959), now recognise that it is not possible to assign probabilities to the truth of theories. Indeed, Popper has even shown that all theories, even the best, have the same

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probability, namely zero. Nor is it possible to show unequivocally that some theories are false, for it is always possible to save a theory from refutation by some ingenious alternative interpretation of the evidence (Lakatos, 1970; Feyerabend, 1978). It does not follow that we have no grounds for preferring some theories over others but it does mean that facile distinctions between superstition and science are likely to be misleading. This is a complicated issue that will be pursued further in Chapter Four where the status of astrology as a scientific research programme will be discussed.

Another means that has been proposed for distinguishing between superstitious beliefs and scientific hypotheses is to study the characteristics of the supposedly superstitious person. For example, Plug (1976) states that superstitious beliefs are held more or less independently of empirical evidence, that they are accepted dogmatically rather than tentatively, and that they are maintained unchanged over long periods of time. However, this approach is also unhelpful even if we ignore for a moment that many scientists behave in these ways. It gives the appearance of characterising superstitious beliefs but in fact it characterises the believer instead. Thus it reverses the whole enterprise. If we define superstitions in terms of the typical manner of believing, then the task becomes one of discovering which propositions are adhered to in this manner or alternatively in a scientific or some other manner. Instead of investigating superstitious believers, we decide in advance what are their most salient characteristics, and the major task then becomes one of discovering what such people tend to believe in. Of course, we might be very interested in the causes and correlates of superstitious ways of believing but in that case we hardly need the concept of superstition. We can investigate wishful-thinking, dogmatism, and the rest without complicating matters with such a problematic term.

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Another possible approach to the study of superstition is to define it as any belief or action which reasonable people in contemporary Western society regard as superstitious. The reader will notice, of course, that this definition is circular, ethnocentric, and relative to a particular epoch. Jahoda (1970), who proposed it, himself regarded it as a "subterfuge" and recognised that it left everything unresolved. He felt, however, that it was sufficient for his purposes which were to "examine the psychological aspects of such kinds of belief" (page 10). This approach might appear to be question-begging but in science we often have to begin to investigate a field which at first we cannot characterise definitely but which appears promising. However, progress in such a field is generally very dependent upon adequate taxonomy and measurement, at least in the initial stages. Unfortunately, psychologists interested in superstition have tended to ignore these two fundamental pursuits. In the early studies it was assumed that superstitiousness is a unitary trait and that its measurement is not problematic. Only in the last decade have empirical studies shown how dubious these assumptions are.

Questionnaires have always provided the major method of measurement in this field but, until very recently, none were ever subjected to thorough psychometric analyses (Plug 1976). Almost all of them consisted of lists of common "superstitions" and subjects were required to respond by indicating which ones they believed in, or how firmly they believed in each. A single score was obtained for each individual. None of these questionnaires was ever factor analysed nor were response biases investigated. It is for these reasons as much as any others that the early research findings are of doubtful validity (Plug, 1976).

The first paper to address the idea that there might be different patterns of belief in religious, psychic, and



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other paranormal phenomena appeared only in 1982. Using data collected by the American Institute of Public Opinion (Gallup), Sobal and Emmons (1982) factor analysed responses to questions about twenty beliefs. They extracted three principal components and rotated them to an oblique solution. In line with their expectations, they found that belief in extrasensory, psychic types of phenomenon is reasonably independent of religious beliefs in angels, devils, and life after death. The third factor collected together belief in the Loch Ness Monster, Sasquatch, ghosts, and witches and so was labelled an "other beings factor". What is particularly interesting in the present context, though, is that belief in astrology was not highly loaded on any of these three factors. Thus it cannot be assumed without further investigation that explanations for other beliefs also apply to astrology.

Fortunately there have been a number of studies in recent years that have concentrated on belief in astrology separately from belief in other paranormal phenomena. Some of these have taken a more cognitive approach and have investigated why horoscope interpretations are perceived to be accurate. Other studies have been more concerned with the factors that predispose people to believe in astrology in the first place. These two lines of research, starting with the second, will be reviewed next.

### 3.2. Factors predisposing to belief in astrology.

The earliest detailed study of belief in astrology was undertaken in the 1960s by a French collaborative team led by DeFrance (DeFrance et al., 1971). Their work was essentially a sociological analysis of the function of astrology in modern society but also drew upon the results of a survey carried out in 1963 by the Institut Francais d'Opinion Publique on a random sample of six thousand.

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To summarise their views very briefly, DeFrance and his co-workers regarded widespread belief in astrology as a response to the great difficulties many people experience in adjusting to modern society. In the industrialised and bureaucratic world, people are daily faced with many fragmentary contacts with strangers but have little guidance of a moral or psychological kind to help them. In such a situation, astrology helps by reducing the uncertainty and ambiguity in personal relationships. It is a means of self-understanding, even if of an illusory kind, and is felt to satisfy a personal quest for meaning and certainty in an impersonal and complex world. In brief, it is a symptom of alienation from urban life and, at the same time, a constructive response to that alienation.

To support these views, DeFrance et al. referred to the French data showing that astrology has its greatest following in the densely populated urban centres and among white-collar workers rather than among the lower paid and the rural areas. They also drew attention to the fact that adherence to astrology is most prevalent among women and young people and suggested that this was because these sections of the population have been less conditioned by the belief systems of the dominant culture. Thus they are freer to adopt alternative systems.

DeFrance et al. are not alone in interpreting the contemporary enthusiasm for astrology in a positive light. For example, Tiryakian (1972) also views it as a constructive attempt to break with established values and to found an alternative culture based on a new value consensus. However, it is doubtful that the writers who champion such views are really concerned with explaining popular belief. They seem to be more interested in characterising the most positive aspects of esoteric ideas than in explaining what function these ideas have for the majority of people. No doubt astrology and other occult

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subjects do appeal to a small proportion of the well educated who are familiar with orthodox modes of thought but are dissatisfied with the culture that is based upon those modes. However, the available surveys of public opinion are agreed that the bulk of believers is not composed of such people. To understand what is the appeal of astrology to the majority, then, it is probably best to begin by establishing what sections of the population are most committed to it. It will be necessary later to make some distinctions among the believers according to the approaches they adopt to the subject but first we will examine the results of the available public opinion surveys.

The opinion polls are agreed that many more women than men believe in astrology and are interested in their horoscopes (eg. DeFrance et al., 1971; Gallup, 1975; Wuthnow, 1976; Sobal & Emmons, 1982). Of the racial groups it is the non-whites rather than the whites of the U.S.A. who are most inclined to believe (eg. Gallup, 1975; Wuthnow, 1976; Sobal & Emmons, 1982) and with respect to marital status, it is the divorced and separated, rather than the married, who show the most commitment, with the widowed and unmarried falling in between (Wuthnow, 1976; Sobal & Emmons, 1982). As regards the association with age, the findings vary a little according to how belief is assessed. Most surveys report that it is young people who are most likely to believe to some extent (DeFrance et al., 1971, Gallup, 1975; Sobal & Emmons, 1982) but Wuthnow (1976) found that, for the 8% of "firm believers", the proportion of adherents actually increases with age. Finally, with each increase in educational level above (American) high school, there is a (more or less) steady decrease in interest and belief (DeFrance et al., 1971; Wuthnow, 1976; Sobal & Emmons, 1982). Nevertheless, people educated to high school level and beyond, and those belonging to the three higher socio-economic (SE) groups,

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have more interest and belief than the lower educational and SE groups (Sobal & Emmons, 1982).

All except the last of these findings can be summarised by saying that it is the socially marginal, the deprived, and the powerless who tend to be most committed to astrology. That the least educated are not very committed need not be at variance with this conclusion if it is granted that a certain level of education is a prerequisite for exposure to, and for taking an interest in, this subject. At any rate, the picture that emerges from these surveys is not consistent with the view that astrology is primarily a countercultural interest of the educated and privileged.

An alternative interpretation of the popularity of astrology in the twentieth century is that it serves as a coping mechanism for the socially maladjusted. One version of the view was made the central message of a statement condemning astrology that was drafted by Gordon Allport and released in 1941 by the executive council of the Society for the Psychological Study of Social Issues (Bok & Mayall, 1941). In this statement, Allport suggested that

"The principal reason why people turn to astrology and to kindred superstitions is that they lack in their own lives the resources necessary to solve serious personal problems confronting them." (p.244).

As we have seen earlier, hardly any worthwhile research into the topic had been done at that time, but recently there have been three studies that tend to support this view.

In one of these studies, Wuthnow (1976) analysed the opinions of a random sample of 1000 persons living in the San Francisco area of the U.S.A. He found the same associations between belief in astrology and social marginality that had been found in other surveys (as reported above) but he also went beyond these. He argued

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that marginal persons are likely to be dissatisfied with their lot and therefore tend to resort to astrology as a means of coping with their frustrations. This led him to investigate the association between the experience of personal problems and the tendency to believe in astrology. As expected, he found that people who were bothered by problems connected with health, work, loneliness, and bereavement were more likely to be interested in their horoscopes and to believe in them than were those not bothered in these ways.

Tyson (1982b) also found personal problems to be important in a sample of people who were consulting a professional astrologer. Compared with a control group, the consultees in this study were suffering a significantly greater amount of stress, especially stress connected with impoverished social relationships. In possible contrast with Wuthnow's findings, unpleasant events that were out of the control of the individual, such as the death of a loved one, were found not to be influential. It was only those stresses which tend to be precipitated by inadequate social skills which differentiated the consultees.

In the third study referred to above, Plug (1975) used a questionnaire to measure degree of belief in astrology in a sample of South African psychology students. Although his sample was drawn from a very narrow section of the population that would not be expected to include many individuals with a deep commitment to astrology, he still found a significant positive correlation between belief and the neuroticism scale of the Eysenck Personality Inventory ( $r=.37$  ,  $p<.01$ ).

Putting these results together, there appears to be good support for the idea that belief in astrology is a symptom of maladjustment and that it is used as an aid in coping with personal problems. However, such a conclusion must be

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qualified to some extent because Wuthnow (1976) also found evidence for an association between counter-cultural involvement and interest in astrology. This association was independent of that between marginality and belief, though the latter was the stronger of the two. Using an index of marginality, which consisted of counting the number of ways in which individuals were marginal, Wuthnow found that those who scored high on this index were about ten times more likely to be interested in their horoscopes than those who scored low. On the other hand, those who were high on a similarly constructed index of counter-cultural involvement were only twice as likely to be interested in their horoscopes as those who were low. These two associations were independent in the sense that there was no statistical interaction between them. The tendency to believe in astrology was not increased amongst those who were both marginal and counter-cultural. It appears, then, that there are at least two distinct types of person who tend to take an interest in astrology.

An important point to note about all the surveys and investigations reviewed so far is that they have assessed only the degree of belief or interest in astrology without examining what activities the belief entails or the amount of associated knowledge. In the previous chapter the author differentiated between different types of astrology and Truzzi (1975) likewise has suggested that three relatively clear levels of involvement should be distinguished. Two individuals might both say that they are very interested in horoscopes but their knowledge of the subject, and the amount of active interest they take in it, might be quite different. One of them might know only about the superficial sun-sign astrology that appears in the newspapers while the other might spend a great deal of his spare time studying traditional astrology in all its complexity. Of course, the different approaches might only represent differences in intensity of belief but, on the

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other hand, they could be qualitatively different kinds of belief. If the former is the case then we might expect that the positive correlation that Plug (1975) found would extend into the higher range of belief shown by astrologers themselves. Alternatively, if the deeper commitment to the subject is qualitatively different, then astrologers might be similar not to neurotics but to other groups. In particular, since astrology is chiefly concerned with human personality and motivation, often involves counselling, and demands a willingness to grapple with some mathematical technicalities, its students might well be similar to psychology students.

The author tested these ideas in a study of 66 students of astrology (Startup, 1983a). These subjects were required to complete two personality inventories, the EPQ (Eysenck & Eysenck, 1975) and the 16PF (Cattell, Eber & Tatsuoka, 1970) and their mean scores were compared with the general population norms. It was found that the astrologers did not differ significantly on those scales that are related to emotionality. Further, their 16PF profile was significantly dissimilar to those of various neurotic groups published by Cattell et al. (1970) but proved to be very similar to that of a comparison group of psychology students. Thus the indications are that those who devote themselves to a serious study of astrology have quite different characteristics from those who believe in it but do not apply themselves to it in earnest. In particular, the former show no signs of neurotic maladjustment whereas the latter do.

However, there was one finding in this study which might indicate maladjustment of a sort, though not neurotic maladjustment. The astrologers' scores on the P scale of the EPQ were significantly higher than the population norms. According to Eysenck and Eysenck (1976), these high scores indicate a predisposition either to psychotic

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breakdown or to psychopathic disorders and, in terms of personality correlates, they indicate tendencies towards hostility and aggression, cruelty, lack of empathy, and a liking for odd and unusual things. Such a result might occasion considerable surprise in those who are familiar with astrologers for, as a rule, astrologers express a good deal of concern about other people and are often active in helping and counselling those who have problems. Moreover, this result is at variance with the astrologers' scores on the I scale of the 16PF, which showed them to be tender-rather than tough-minded. The solution to this mystery is probably that the P scale does not actually measure what it was thought to measure when it was first developed. For one thing, there has been considerable debate about the claim that it measures predisposition to psychotic breakdown (Bishop, 1977; Eysenck, 1977b; Block, 1977a, 1977b; Eysenck and Eysenck, 1977; Claridge and Birchall, 1978) and its relationship with psychopathy is also uncertain (Hare, 1982). Secondly, recent comparisons of the P scale with other established inventories have revealed that it does not in fact correlate with either hostility or lack of empathy (Forbes, 1980; Barrett and Kline, 1980a). When factor analysed with other appropriate scales, it loads primarily on lack of orderliness and non-conformity. Thus the high P scorer appears to be someone who dislikes order and routine, is impulsive, and has little respect for convention and social approval. He is also likely to be dominant and, intriguingly, has little belief in his ability to control his own fate.

It appears, then, that the association between belief in astrology and neuroticism, found in the general population, does not apply to the astrologers themselves. On reflection, though, this is perhaps not very surprising. One might expect to find a similar pattern with any widely known psychological system designed to give help to those in distress. For example, belief and interest in



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psychoanalysis might well be correlated with neuroticism in the general population but the psychoanalysts themselves would be expected to be stable. A system which offers help to the maladjusted is likely to be of greatest interest to just those people who are maladjusted, whether or not the system is scientifically well founded.

If people tend to have recourse to astrology as a means of coping with problems, then one would expect the general level of interest to increase at times of economic and political threat, when greater stress is experienced by almost everybody. This possibility has been examined in two retrospective studies using archival data. In the first, Sales (1973) compared the number of books on astrology appearing in various catalogues of American publications during the 1920s to those appearing during the 1930s. After controlling for the number of published books of all kinds, he found a significant increase in the number of astrological books in the latter period. This was, of course, the time of the Great Depression in the U.S.A., a period of economic disaster, while the earlier period was comparatively prosperous. Sales also replicated this study by examining similar indices of publication for the years 1959-1964 and 1967-1970. The latter period was judged to be one of high threat compared to the former, according to several criteria. As expected, the number of astrological books, as a proportion of all books published, increased during the high-threat years as compared with the previous, relatively stable period.

A similar study of the link between threat and interest in astrology has been conducted by Padgett and Jorgenson (1982), this time for Germany between the two world wars. The number of astrological publications for each two years between 1918 and 1940 was obtained from catalogues and these numbers were then adjusted to control for fluctuations in the total number of publications of all

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kinds appearing in the same years. Three indices of economic threat were also computed: percentage of unemployed trade union members, real wages of Ruhr miners, and industrial production. Together they accounted for a highly significant 27% of the variance in the astrological index, though only unemployment and industrial production were individually significant as predictors.

On the strength of the studies reviewed so far, it might be said that the link between anxiety and belief in astrology is now quite well established, at least as far as the general population is concerned. What has not been studied in any great detail, however, is why anxious people should find astrology to be a solace. Possibly the only suggestion to date is that astrology might reduce feelings of helplessness in situations where little of a practical nature can be done. This idea has recently received support from two studies of perceived locus of control. In one of them, Sosis, Strickland, and Haley (1980) hypothesised that individuals would use different strategies to increase the likelihood of receiving reinforcements according to their I-E beliefs. In order to test this, they employed Levenson's measure of locus of control which divides externals into Type Is, who believe that reinforcements are controlled by powerful others, and Type IIs, who believe in control by fate, chance, or luck. As expected, belief in astrology was found to be positively correlated ( $r=0.27$ ) with Type II, but not with Type I, externality. In the other study of locus of control, Tyson (1980) employed Rotter's I-E scale but factor analysed it to produce two subscales, one of personal, and the other of political, control. He then found that a sample of people who were currently consulting an astrologer were high on externality compared with a control group, but only for the political dimension.

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Finally, two other weak correlates of belief in astrology have been reported. Plug (1975) investigated the relationship between belief and suggestibility (as measured by Eysenck and Furneaux's (1945) ink-blot test) amongst a sample of first-year psychology students. He found a significant but very small positive correlation of 0.1. Salter and Routledge (1974) also employed first-year university students in a study of the relationship between intelligence and belief in the supernatural. Using the Scholastic Aptitude Test, they found a negative correlation of only -0.2 with belief in astrology. Because of the large sample size, this coefficient was highly significant. However, when the same subjects were retested a year later, the coefficient had dropped to a non-significant -0.11. Thus, additional education actually lowered what was already a weak inverse relationship.

### 3.3 Why people perceive astrology to be true.

Astrologers are inclined to say that astrology is perceived as being true because it is true and all that it requires is a certain acuity of perception to discover this for oneself. Now the studies to be reviewed in later chapters throw considerable doubt on the first part of this claim; although there is evidence that some features of traditional astrology are valid, there is very little evidence that it is valid in the manner or to the extent that is claimed. However, when faced with such a conclusion, many astrologers prefer to place more trust in their own intuitions than in the scientific evidence. In the words of Elwell (1982);

"(Astrologers) rightly feel that there ought to be more evidence than there is for signs, houses, aspects, and the rest of the factors which experience has taught them to regard as genuine phenomena. If astrology is essentially true, and the methods of science unimpeachable, there can only

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be one explanation for the alarming lack of corroboration - the methods have been misapplied."  
(Page 68)

Of course, this view could be right but if the only reason for maintaining it is that the scientific evidence is at odds with the personal validation of astrologers, then it is not very convincing.

Apart from the abundant evidence from all sorts of experiments that intuited validity is frequently unreliable (eg. Ross, 1977), there have been three studies in the astrological field showing that individuals cannot discriminate between genuine and spurious horoscopes (Cummings, Smith, Lovick, & Crosbie, 1978; Tyson, 1979; Lackey, 1981). In these experiments, subjects were given authentic interpretations of their own birth charts together with equally orthodox interpretations of one or more charts belonging to other people, but with no indication of the identity of each. Whether they were asked simply to choose the interpretation based on their own charts, or to rank or rate the horoscopes for accuracy of self-description, the subjects were unable to identify the genuine interpretations. Moreover, in the study by Cummings et al., the majority of all the horoscopes were rated as moderately or extremely accurate, even though only one in three was genuine. Of course, such experiments do not show that astrological interpretations are untrue but they do demonstrate that they do not need to be true to be accepted as accurate.

If astrology does not work in the manner in which it is supposed to work and if the perceived accuracy of horoscopes is illusory, as the evidence suggests, then it is a matter of some interest to discover what factors give rise to the illusion of accuracy. The previous section of this chapter has dealt with some of the personality correlates of a willingness to believe. Now we shall consider the evidence concerning features of the stimulus

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and of the situation that might change the willingness into actual belief.

Quite a number of explanations for perceived horoscope accuracy have been proposed. The most highly favoured one to date is that astrological interpretations have (unrecognised) universal validity. That is, they employ personality descriptions which have high base-rates of acceptance and which are taken to be true because people are generally insensitive to what constitutes an accurate description of their personalities. This explanation features prominently in reviews of the field by Tyson (1982a), Eysenck and Nias (1982), and Dean (1983b).

The evidence supporting this explanation comes from over three decades of research into the tendency of people to accept general and vague descriptions as true of their own personalities, a tendency which has come to be known as the "Barnum Effect", after Meehl (1956). The original demonstration of this effect was by Forer (1949). He asked 39 students to fill out a personality questionnaire and then, a week later, he presented them with what they took to be interpretations of their scores. In fact each student received the same profile consisting of 13 "astrological statements", that is vague, double-headed, and mildly favourable descriptions taken from an (unspecified) astrological publication. The percentage of students rating each statement as true varied between 13% and 97%, with an average for the 13 statements of 77%.

Since this early study there have been numerous others (reviewed by Snyder, Shenkel, and Lowery, 1977) which have consistently demonstrated that students are willing to accept such "universally valid" statements as accurate descriptions of their own personalities, under various conditions. Most importantly in the present context, it has been found that such statements are readily accepted even

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when ostensibly derived from astrological analyses (Rosen, 1975; Snyder, Larsen, and Bloom, 1976; Stachnik and Stachnik, 1980).

However, there are a number of reasons for doubting that the Barnum effect is very important in the explanation of perceived horoscope accuracy. Firstly, two recent studies have found that people are not as insensitive to what constitutes an accurate description of their personalities as earlier research had suggested (Hampson, Gilmour, and Harris, 1978; Greene, Harris, and Macon, 1979). In these studies it was found that, while "astrological" descriptions were perceived to be the most accurate, true descriptions derived from questionnaires were accepted more readily than false ones. Secondly, Hampson et al. also found that descriptions referring to characteristics shared by most other people are not accepted irrespective of their truth. This shows that people are not as gullible as was once thought. Thirdly, both Greene (1977) and Hampson et al (1978) discovered that people do not fail to recognise that Barnum statements apply generally. Their subjects rated a collection of "astrological" statements as highly accurate of people in general as well as of themselves. It should be noted, however, that the effects in all of these experiments were not strong and the subjects used were, as usual, university students, so their results may not be equally applicable to the general population.

If even university students are somewhat uncertain in their appreciation that highly generalised descriptions apply virtually universally, then consumers of astrological literature are likely to be even less discriminating. However, this literature is not all of one kind and what applies to one type of astrological description may not apply to them all. Truzzi (1975) has argued that one should distinguish three relatively clear levels of astrological belief. In a similar manner we might distinguish amongst

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personality descriptions, those typical of the Lucky Stars columns of the newspapers, those to be found in astrological textbooks, and those provided by astrologers during consultations.

It is probable, though it has never been demonstrated, that most of the astrology that appears in mass circulation publications makes use of highly generalised statements. This was, after all, the source of Forer's original material. However, when it comes to explaining the perceived accuracy of newspaper astrology, the Barnum effect runs into trouble again. If all Lucky Stars descriptions are universally valid, why should people accept the one that is ostensibly true for themselves as more accurate than any of the others? One possible answer to this has been provided by Silverman (1971). He suggested that the way in which astrological descriptions achieve their apparent validity might be explained by membership group theory. That is, self-perceptions might be influenced by sun-sign descriptions because sun-signs define membership groups, just as attitudes have been found to be influenced by the imposition of other membership groups. In order to test this idea, Silverman asked a sample of students to select, from 12 standard sun-sign profiles, the four that best described themselves. For half of the subjects astrological affiliation was made salient by labelling the descriptions with their appropriate names, and these subjects tended to choose their own sun-sign. The remaining subjects, on the other hand, were given no indication of the source of the descriptions and they chose their own sun-signs no more often than chance would predict.

Snyder (1974) has also found that students tend to accept descriptions as true of themselves if the descriptions are ones that they believe are predicted by astrology. In his experiment, three independent groups of

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subjects were given the same generalised personality profile to rate for accuracy of self-description. All subjects were led to believe that the profiles were astrologically derived but while the first group was told that the profiles were generally true of people, the second and third groups were told that the profiles were based on data for the year and month of birth, or the year, month, and day of birth respectively. The mean acceptancy ratings for these three "specificity" conditions showed, as expected, a highly significant linear trend which increased from group one to group three and which accounted for almost all of the treatment variance. Thus, the more specifically the profile was apparently tailored to the individual, the more it was accepted as accurate.

Although this experiment of Snyder's agrees with Silverman's (1971) finding that an apparent astrological derivation of a personality profile is highly influential, it is not actually consonant with Silverman's interpretation of his result. According to the latter, people are influenced by their knowledge that they are supposed to belong to a group and they change their self-images to bring them more in line with the purported personality of the group. However, Snyder's finding shows that it is the specificity of the description that is important; subjects were more influenced the more they supposed that the description was specific to themselves. Thus membership within a sun-sign appears to be less important for defining similarities with one twelfth of the population than it is for distinguishing the individual from the remaining eleven twelfths.

It should be noted, in passing, that the effect of perceived specificity is not confined to astrologically derived descriptions. Whether the generalised personality profile is said to be obtained from a questionnaire, a projective test, an interview, or from graphology, it is



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judged to be more accurate than when it is presented as being true of people in general (Snyder, 1974; Snyder, Larsen & Bloom, 1976).

While no one, presumably, would claim that the Barnum effect is a sufficient condition for perceived horoscope accuracy, it has never been made clear whether it is a necessary condition. Coming now to the second form of astrological profile, the textbook profile, we find that highly generalised descriptions are not even necessary for acceptance. For example, Eysenck and Nias (1982) presented subjects with 69 trait-words and asked them to select the words that best described themselves. Unbeknown to the subjects, the words had previously been chosen to represent each of the 12 sun-signs and to distinguish one sign from another. If all astrological descriptions were equally universal, words should have been selected at an even rate from each of the signs but in fact some of them were chosen far more frequently than others. Dean et al. (1977) have reported a similar experiment, conducted by the Opinion Research Centre, in which some sun-sign descriptions were chosen as much as nine times as often as others. Nevertheless, sun-signs, being the foundation of popular astrology, are widely accepted as valid. Thus, if we are to explain the perceived accuracy of sun-signs, it cannot be on the basis of universal applicability.

The third type of horoscope mentioned above was the professional interpretation derived from an individual's birth chart. In this case it is possible that most of the descriptions provided by astrologers are highly generalised, as Dean (1983b) has stated (though without presenting evidence). Of course, in theory the descriptions should be highly individualised but if general statements are more acceptable to the client, then it would not be surprising if theory were frequently ignored. However, the point to be addressed here is not whether the descriptions

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are usually very general, for which there is no data in any case, but whether they need to be general. In order to answer this, we will examine an interesting experiment by Dean (1983b).

Dean was concerned to discover if genuine horoscopes could be distinguished from false ones. Previous experiments (reviewed above) suggested that they could not but there were two main reasons for thinking that the subjects' opportunities in those experiments had not been maximised. Firstly, the horoscopes provided were not as clear and unambiguous as possible; they employed the lengthy prose that is typical of professional astrologers rather than simple adjectives and short phrases. Secondly, the interpretations were conventional ones in which factors that research has shown to be (almost certainly) invalid were given equal weight with those factors that are more likely to be real.

In order to correct these deficiencies, Dean included only aspects<sup><\*></sup> and angularity<sup><\*></sup> and for each factor he gave very clear-cut interpretations. Clarity was also increased by listing the opposite trait for each interpretation. For each astrological factor, the subjects had to choose between these opposites, though the identity of the supposedly true interpretations was clearly shown.

For the control group, "reversed" charts were constructed. That is, the planets and angles<sup><\*></sup> of the authentic chart were manoevered so that, when interpreted in an orthodox manner, the meaning would be as nearly opposite to the meaning of the genuine chart as could be contrived. The purpose of this subterfuge was to make it possible for the astrologer to behave normally when giving his interpretation to the subject. The reversed charts were handled in an identical manner to the genuine charts; the same factors were interpreted in the same clear-cut

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language and the interpretations were again presented along with their opposites.

The subjects were asked to consider each pair of interpretations of their chart, the supposedly applicable ones and their opposites, and to say which of each pair was true and which false (though they were allowed to judge both as true or both as false). The astrologer/experimenter guided this procedure and answered any questions that arose. Before the subjects tackled any of the ratings, however, the experimenter tried to induce a critical and sceptical attitude by explaining that horoscopes needed to be tested rigorously, and by warning (twice) of the effects of generality and other sources of judgement error. Throughout each session he himself adopted "an aggressively critical attitude towards astrology".

Despite all of these warnings, the subjects accepted an extremely high proportion of all the putatively true descriptions. For the eleven subjects in the "authentic chart" condition, the average acceptance of descriptors was 96% for "true" interpretations and only 14% for the opposite traits. In the "reversed chart" condition similarly, the average acceptance of the eleven control subjects was 97% and 17% for "true" and "opposite" descriptors respectively. Thus interpretations of reversed charts were accepted as readily as those of authentic charts even though the former could hardly have been more inaccurate according to astrology.

The results of this experiment are in agreement with previous studies of genuine and false horoscopes in showing that interpretations do not need to be true in order to be perceived as accurate. However, Dean's experiment also showed that interpretations do not even need to be vague, general, or universally applicable. His subjects were presented with clear-cut trait-terms and their opposites.

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Moreover, one and the same statement was accepted or rejected, by different subjects, depending solely on its status as a "true" or "opposite" descriptor. That is, these statements were endorsed frequently only if they were presented as true interpretations of the horoscope.

### 3.4 Sufficient conditions for the acceptance of horoscopes.

Although the Barnum effect has been given the most emphasis in explanations of perceived horoscope accuracy, various other factors are undoubtedly influential. Dean (1983b) and Tyson (1982a) have, between them, suggested some 20 factors that might have some part to play in the personal validation of astrology. Most of them have been researched quite thoroughly by psychologists in various contexts, even if their importance to astrology has not been demonstrated, and all are plausible. Some of the factors may apply in most of the situations where astrology is encountered while others could only be relevant where an astrologer is consulted or, even more specifically, where an astrologer is acting as a counsellor. As these influences have been discussed at length in the cited papers, they will not be reviewed again here.

It may be important to identify all of the many factors which increase the perceived accuracy of horoscopes but it would also be instructive to discover what are the minimum requirements for acceptance. Probably these requirements differ according to different situations, whether it be reading horoscopes in newspapers or textbooks, or consulting an astrologer out of curiosity or because of particular personal problems. Little research has been directed so far at discovering these essential requirements, but Dean's (1983b) experiment with reversed charts suggests that they may be surprisingly few,

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especially in the situation where a client consults an astrologer.

In Dean's experiment none of the factors which apply only to counselling could be relevant because no counselling was sought and none was offered. It has been suggested that astrologers often gain acceptance for their interpretations by adjusting them in accordance with feedback from the client (eg. Dean, 1983b) but this could not account for Dean's results either since the interpretations were prepared before the subjects met the astrologer. Barnum effects were controlled, as has been shown above, and social desirability effects were also eliminated. Indeed, most of the situation factors that may play a part at times were controlled. The experimenter adopted a very self-confident manner and this probably encouraged acquiescence. The subjects had to provide very precise times of birth and presumed that their horoscopes had been derived from this information. As we have seen earlier, such specific time-referents encourage the acceptance of interpretations. However, these are the only situation factors that can be identified at present.

Dean's results may be partly explicable by person factors. It is important to note that all of the subjects had an interest, and probably a strong belief, in astrology prior to the experiment. The experimental subjects had all applied for horoscopes for which they were prepared to pay. The control subjects were contacted via an advertisement in an occult magazine and were offered a free horoscope in return for their co-operation in the research. Presumably such people would be averse to having their beliefs disconfirmed. This may go some way to explaining why the horoscopes were accepted in this particular experiment but it is not very helpful in explaining perceived horoscope accuracy in general since the subjects must have perceived

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horoscopes to be accurate before they came to believe in astrology in the first place.

It seems, then, that where there is a willingness to believe, very little is required to induce acceptance of particular interpretations apart from an apparent astrological derivation. We saw earlier that belief is associated with a number of personality characteristics, such as neuroticism and externality of control, and can be enhanced by stress and environmental threat. However, the associations with all of these variables are quite weak and do not provide an adequate account of the immense popularity of astrology the world over. To provide a fuller explanation, perhaps more attention should be paid to the structure of astrology as a theory of human nature, to its aesthetic qualities and to its ability to provide apparently meaningful insights into human life. Dean et al. (1977) have commented on these qualities in the following terms;

"Astrological concepts have undeniable beauty and appeal; individually they are attractively simple, yet in combination they can match every complexity of human experience. In complexity and sophistication they far exceed that of any existing psychological system. Certainly they feel right." (Page 24)

Eysenck and Nias (1982) have also expressed similar views, as in the following passage:

"Unlike ids and superegos, the aggressive energy of Mars and the loving harmony of Venus are open to understanding by all." (Page 212)

Astrology has evolved over more than three thousand years of human history. During that time the concepts and procedures which have most appeal and which provide the greatest apparent meaning have had ample opportunity to be selected by the succeeding generations. Astrological descriptions and predictions may be almost wholly unrelated to the objective world but for many people this appears to be unimportant. Far more crucial may be the framework that astrology provides for thinking about people and situations in understandable and very human terms.

RESEARCH INTO ASTROLOGY - AN OVERVIEW.

3.1 The seventeenth century background.

The idea that the claims of astrology need to be tested in an empirical and controlled manner did not originate in the twentieth century but over three hundred years earlier (Curry, 1981b). William Gilbert, who pioneered the scientific study of magnetism in the sixteenth century, kept records of the weather from 1540 to 1547 in order to test astrological predictions. Queen Elizabeth's counsellor, John Dee, and the great astronomers Tycho Brahe and Johannes Kepler kept weather records for the same purpose. Indeed, Kepler devoted a considerable part of his professional life to trying to reform astrology on a scientific basis and was a major influence on the attempts of the philosopher Francis Bacon and his followers to develop a reformed astrology ("astrologia sana") based on observation and consistent reasoning. These "Baconian astrologers" pinned their hopes chiefly on "natural astrology", the branch dealing with the general cosmic influences that affect everybody irrespective of their time of birth, hence their interest in meteorological phenomena. Even Robert Boyle collected data for these purposes. Yet Bacon and others amongst the new scientific fraternity also allowed that it might eventually be possible to reconstruct scientific versions of "elections" (the art of choosing the astrologically appropriate moment to begin enterprises) and of natal astrology (the branch dealing with individual destinies). For the sake of the latter, John Gadbury (1627-1704) compiled a large collection of horoscopes and John Aubrey (1626-1697) wrote his "Brief Lives".

The astrological reformers of the seventeenth century had an admirable understanding of the need for empirical checks on the astrologers' inflated claims. "...one real experiment is of greater worth and more to be valued than

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one hundred pompous predictions", wrote Gadbury in 1665. Yet, in their eagerness to drag astrology forward into the new age of Natural Philosophy, they were in no small part a cause of their own undoing. As Capp (1979) put it:

"Gadbury and other leading astrologers joined in the work of destroying other branches of supernatural explanation and divination, in order to create a pure astrology, freed from superstition. Their efforts did much to popularise and publicise the new science but also, by a fatal irony, helped to destroy the assumptions on which astrology itself was based."(page 214)

A further irony is that, even if there are genuine astrological influences, as some of the current evidence suggests, these early researchers would hardly have been able to detect them. The absence of well kept public records, the rarity of accurate clocks, and the undeveloped state of experimental methodology all made their task difficult enough but it was for lack of a science of statistical inference that their enterprise was doomed to failure. Probability theory was, at the time, only in its infancy.

### 3.2 Research in the twentieth century.

When interest in astrology revived in the late nineteenth century, it was reborn into a culture that placed a high premium on scientific research. The Theosophical astrologers, like Alan Leo, may have believed that the truth of astrology was guaranteed by its ancient pedigree, but many others felt that it needed to be investigated objectively, or at least to be demonstrated to a sceptical public. The way was now open for astrologers to investigate their art and, in the course of this century, there have been many who have recognised the need for large samples, objective sampling procedures, and statistical evaluation.

The first attempt at scientific investigation was made as early as 1900 (Choisnard, 1921). This pioneering French



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effort was soon emulated in both Germany and the U.S.A. In 1923 a German called Krafft published the first of a number of statistical studies and in the same year an institution called the Central Statistical Office was established in Germany with the sole purpose of collecting and analysing astrological data (Howe, 1967). A similar programme of data collection was initiated in the U.S.A. in 1924 by an organisation called the Church of Light. It continued its activities until 1969, by which time large numbers of enthusiastic volunteers had collected many thousands of nativities and catalogued them under innumerable headings (Dean et al., 1977). Throughout the last five decades many other organisations and individuals have amassed vast amounts of objective data for statistical analysis. The people involved are too numerous to be listed, though Tobey, Bradley, and Van Deusen in the U.S.A. and Firebrace, Gleadow, and Addey in Britain deserve special mention.

It has been estimated that some half a million births have been sampled merely in order to demonstrate a link between sun-sign and professional occupation (Dean et al., 1977), and this is only one of the many research projects undertaken. Considerable research effort has also been directed at validating most of the other tenets of astrology such as houses<\*>, aspects<\*>, and angularity<\*>, and the characteristic influences of planets, asteroids, comets, stars, eclipses, nodes<\*>, and even hypothetical planets<\*>. Since most of this work has been meticulously reviewed by Dean et al., no attempt will be made to cover the same ground here. However, previous scientific studies of aspects, angularity and the zodiac will be reviewed below in Chapters Seven, Eight and Nine respectively, where the author's present investigations of these topics are reported.

As a result of all this effort it seems that one or two of the "pearls or golden corns" anticipated by Kepler have

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at last been found. After reviewing the evidence, Dean and his co-workers felt able to conclude: "The picture emerging suggests that astrology works but seldom in the way or to the extent that it is said to work." However, this conclusion was based on only a handful of the many experimental studies undertaken. In their critical review of the subject, Eysenck and Nias (1982) have listed three methodological flaws which are particularly common in this research. The most prominent one is the failure to replicate positive results. The second and third types of common error are the failure to control for astronomical and demographic factors. These errors have frequently led researchers to proclaim as astrological, effects which are really due to the non-uniform motions of the planets, to unrecognised fluctuations in birth-rates, or some other non-astrological cause. Other common errors include the failure to employ control groups, the failure to estimate the overall significance of a few positive results among many negative ones, the failure to report studies in sufficient detail to permit evaluation, and the tendency to ignore previous related research carried out by others (Eysenck, 1982).

In connection with this last shortcoming, it is notable that the first comprehensive review of the field did not appear until 1977 (Dean et al.) and the first specialist journal to insist on the systematic citation of previous relevant research ("Correlation: Journal of Research into Astrology") was first published only in 1981. In view of all the foregoing, it is not surprising that Eysenck (1982) remarked: "...astrology, sadly enough, has remained at a low level of scientific respectability".

Fortunately, not all of the research efforts have been marred by such methodological flaws. The major exception is undoubtedly the work of Michel and Francoise Gauquelin who have provided astrology with the best evidence

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corroborating several of its fundamental tenets. This evidence is by no means uncontroversial, as we shall see below, but it has won the respect of some eminent scientists. Eysenck and Nias (1982), for example, went so far as to state:

"The work of the Gauquelins...stands up to a careful degree of scrutiny, and compares favourably with the best that has been done in psychology, sociology, or any of the social sciences." (Pages 220-1).

The Gauquelins' research is so central to the scientific study of astrology that an overview of the most important studies, and of the independent replications of some of those studies, will be given here. More detailed examinations of some of it will also be given in later chapters. Since it provides perhaps the only really convincing evidence for astrological effects (Eysenck and Nias, 1982), it is also central to an evaluation of astrology as a scientific research programme. Hence it will be examined in that light in Chapter Four.

### 3.3 The work of the Gauquelins.

Michel Gauquelin's <note 1> first discovery was that eminent doctors are born more often than chance allows when either Mars or Saturn have just risen above the eastern horizon or have just culminated at the midheaven<\*>. Following his initial success, Gauquelin embarked upon a massive programme of data collection. Between 1949 and 1958 he gathered data for over 16,000 births of eminent people in ten different professional groups and for nearly 25,000 births of ordinary professionals. These latter were used in the control groups for the eminent professionals. The initial studies were based on French subjects but for the sake of subsequent replications, fresh data were obtained from Germany, Italy, Belgium, and Holland. In recent years the research has been extended to include Scotland and the

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U.S.A. and the number of nativities collected now exceeds 100,000.

Gauquelin found that his original observation on the birth-patterns of eminent doctors could be reproduced reliably with fresh samples from France and from other countries. He also found that at least one planet was present in the rising or culminating positions (with either above or below chance frequency) for each of the other nine professions that he studied (Gauquelin, 1955, 1960).

Following these early successes, Gauquelin (joined now by his wife) extended his work in two main ways - by investigating possible links with heredity and with personality. It seemed obvious that planetary influences on career must be mediated by personality and since heredity is known to affect personality, it seemed plausible that similar planetary patterns might prevail at the births of children as at the births of their parents.

For their studies of "planetary heredity", the Gauquelins collected and analysed a new sample of 30,000 French births. (This time the births were of ordinary people rather than eminent ones). In accordance with their expectations, they found that children tend to have the same planets rising or culminating as their parents had at their births (Gauquelin and Gauquelin, 1972). Furthermore, the same effect was found independently for the father and the mother, but if both parents had the same planet in one of the crucial positions (henceforth called "key sectors" for convenience), then their children were twice as likely to have that planet in a key sector also. A number of other important discoveries were made but these will be described later. The findings have been replicated recently on an independent collection of 37,000 births (Gauquelin and Gauquelin, 1977c).

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The third major area that the Gauquelins have investigated is that of personality traits. This work stemmed mainly from the commonsense observation, supported by various psychological studies, that individuals who succeed in different occupations tend to vary in personality. Since success in a number of occupations had been found to be linked with the planets, the possibility existed that these planets were somehow linked with different temperaments, as astrologers have always asserted.

This possibility was investigated by analysing brief biographies of a selection of the celebrities who had featured in the earlier career studies. This method was adopted in preference to the usual personality questionnaires because the career studies had shown that planetary effects could only be obtained for the most eminent individuals in each profession and, of course, only a few of these individuals would have been available and willing to fill out questionnaires. The method and results are too complicated to give here but will be described later in Chapter Eight. Suffice it to say, for now, that the Gauquelins' anticipations have been well supported; they have shown that the real planetary link is with personality and only indirectly with career (Gauquelin and Gauquelin, 1973, 1974a & b, 1976, 1977), and they have been able to epitomise five of the planetary temperaments with lists of traits which appear to form psychologically coherent groupings (F. Gauquelin, 1980).

Not all of the Gauquelins' results support astrological theory, however. Although they have found some evidence in favour of angularity<sup><\*></sup>, the planetary temperaments, and a kind of planetary heredity, the Gauquelins have consistently failed to corroborate several of the other basic ideas such as houses<sup><\*></sup>, and the zodiac signs. Indeed, they have claimed at times that even their positive

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results do not support astrology but disprove it, since what they have found does not coincide exactly with what astrology predicts. However, there are strong arguments against this claim and these will be outlined later in Chapter Four.

### 3.4 Independent investigations of the Gauquelins' findings.

**3.4.1. The Committee Para.** There have been two independent replications of Gauquelin's results to date. The first was by the Comite Belge pour l'Investigation Scientifique des Phenomemes reputes Paranormaux - generally referred to as the Committee Para for short. At the insistent urging of Gauquelin himself, this committee undertook, in 1968, to replicate the finding that sports champions tend to be born with Mars in key sectors, a finding that has come to be known as the "Mars Effect". Protocols for the replication were agreed by both parties before any data were collected.

A fresh sample of 535 champions was assembled and a planetary effect almost identical to Gauquelin's was observed - 22% in key sectors compared with 17% expected. However, the Committee Para did not conclude from this that the planetary effect was real. Far from it, they did not even publish their results and have not done so to this day (though Gauquelin (1976b) has done so in their stead).

The reason for the Committee Para's reticence was that they were uncertain about the relative frequencies to be expected in each sector of the diurnal circle in the absence of a Mars Effect. There are two main factors that complicate this issue. One is an astronomical factor; Mars spends more time close to the sun than far from it (elongation of Mars). The other is demographic; people are not born at an even rate throughout the day. The curve that describes the probability of being born at different times of day is called the nycthemeral curve. For natural births

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it has a peak in the early hours of the morning and a trough in the afternoon (Kaiser and Halberg, 1962). Since Mars tends to be close to the sun and the sun is rising at the time of the peak of the nycthemeral curve, then the probability of being born with Mars rising is greater than for any other position of Mars.

Now, the Gauquelins had taken these two factors into account when calculating expected frequencies (Gauquelin and Gauquelin, 1957). Francoise Gauquelin (1959) had determined the nycthemeral curve for tens of thousands of Europeans and had discovered that it was the same for eminent people as it was for less distinguished professionals. It was also the same for athletes as it was for non-athletes. However, the Committee Para believed it possible that the curve might vary from year to year or from place to place and, when at last they made the reasons for their doubts publicly known (Anon, 1976), they claimed that the Gauquelins had not controlled for these possibilities nor for possible temporal variations in the elongation of Mars.

To these criticisms Gauquelin (1976b & c) replied that he had never based theoretical frequencies solely on the mean nycthemeral curve, as the Committee alleged, but had always calculated them from the nycthemeral curve of the group under study, as had been documented in various places. He also revealed the hitherto undisclosed fact that the Committee had run a number of control tests which had confirmed the accuracy of his methods. The most crucial of these tests employed the independent sample of champions assembled by the Committee. While retaining the same years, months, days, and places of birth of the sportsmen, the hours of birth were shuffled on an alphabetical basis. That is, each champion retained his own date and place of birth but the hour was given to an adjacent champion on an alphabetical list. Thus the control group had the same

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astronomical and demographic conditions as the original sample. This procedure was repeated nine times, with the birth-hour shuffled from one champion to the next each time, and in each case Gauquelin's claims were upheld.

The Committee Para did not report these control tests in any of its publications, not even in its long-delayed official account of its investigations of Gauquelin's work (Dommanget, 1976). As a result, one of the co-founders of the Committee, Luc de Marre, resigned in protest. He was no longer prepared to contribute, he wrote, to "a distortion of the truth to save, cost what it may, the interests of anti-astrology" (de Marre, 1982, p.72).

**3.4.2. The Zelen Test.** The second independent investigation of Gauquelin's results was undertaken by three members of the American Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) called Kurtz, Zelen and Abell (referred to as KZ&A for convenience). The investigation was in two parts. The first part consisted of a test, originally proposed by Zelen (1976), designed as a means of deciding whether the Committee Para's doubts about expected frequencies were justified. Specifically, it involved comparing the Mars sector distribution for a sub-sample of Gauquelin's sportsmen with the distribution for a control group born close in time and in location to the champions. This would control for any possible temporal or spatial anomalies in the nycthemeral curve or in the elongation of Mars.

A sub-sample of 303 champions was agreed upon and the control data consisting of 16,756 timed births, all from the same locations and within three days of one or another of the 303 champions, were assembled by the Gauquelins. It was found that about 17% of the controls had Mars in key sectors, just as predicted, compared with 22% of the champions. Naturally, the Gauquelins (1977b) interpreted



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this as unequivocal support for their methods. However, Zelen, Kurtz and Abell (1977) disagreed. They virtually ignored the results for the control group, which is what the test was all about, and concentrated on the sample of champions instead. Of course, this was already a small sub-sample of the Gauquelins' full collection of 2088 champions, but Zelen et al. proceeded to split it further into sub-samples on an ad hoc basis. They even discarded champions (females) arbitrarily. They then attempted to show that the Mars Effect only obtained for champions born in Paris and argued that this result could be regarded as a mere anomaly. However, Tarkington (1978) has demonstrated that even this analysis is incorrect since the Paris sub-sample does not differ significantly from the rest of the sample.

Zelen et al.'s analysis has proved to be extremely controversial. In several lengthy articles it has been criticised for its multiple statistical errors (Tarkington, 1978; Krips, 1979; Rawlins, 1981; Curry, 1982) and for its lack of good faith (Rawlins, 1981; Curry, 1982). After a long delay, Abell, Kurtz and Zelen (1983) have admitted to many of the errors (though not to wilful misrepresentation).

**3.4.3. The American replication.** KZ&A were so sure that the Mars Effect must be spurious that, when the Zelen Test showed that the expected frequencies had all along been correct, they came to suspect that bias must have entered into the original sampling of champions (Kurtz et al, 1979a). Consequently, they decided to conduct an independent replication with a sample of American sportsmen. This was the second part of their investigation of Gauquelin's findings.

Birth times for a total of 408 sportsmen were obtained from state registers and it was found that Mars was in key

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sectors for only 55 (=13.5%) of them. This was well below the expected 17% but not significantly so (though 13.5% differs from the predicted 22% at the .0001 level; Rawlins, 1979). Hence Kurtz et al. (1979a) concluded that there was no evidence for a Mars Effect in American sportsmen. The Gauquelins (1979b) however, responded by turning the tables on Kurtz et al. and questioning their sampling.

They pointed out that it had long been established that the Mars Effect can only be observed with champions of the highest achievement and even then the effect disappears for those born after 1950. The reason for the latter condition is that since 1950 a large proportion of births have been medically induced while the planetary effects appear to depend on natural births. In KZ&A's sample, some 10% of the births were post-1950 and, according to the Gauquelins, far too few top-grade champions were selected. It is only fair to note that this situation might never have arisen had it not been for the 1974 US Privacy Act which prevented many states from providing the necessary birth-data from the registers. This meant that, out of a sample of 605 champions originally selected, birth-times were available for only 128. The Gauquelins had little quarrel with this sample, of which 20.3% had Mars in key sectors once post-1950 births had been excluded. However, KZ&A had considered the sample too small and had proceeded to select more sportsmen who were born in those states that were prepared to provide birth-data. The extra 280 cases were obtained in two batches. The first (197 cases) showed a Mars Effect of 12% and the second (83 cases) showed one of only 7% which, on its own, is a significantly low result.

The Gauquelins (1979b) considered that the second and third of these batches diluted the sample with too large a proportion of lesser sportsmen. Therefore, they provided their own, post hoc, analyses of the data showing that the Mars Effect is present when the sportsmen are sampled

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correctly. Kurtz et al. (1979b) contested the claim that they had neglected the Gauquelins' sampling stipulations and they, in turn, offered post hoc analyses which supported their original conclusion. The claims and counter-claims were continued, together with further post hoc analyses, in subsequent articles (Gauquelin, 1980; Kurtz, Zelen and Abell, 1980) and reached a degree of confusion that few could hope to disentangle without long hours of study.

Fortunately, this welter of conflicting claims has been carefully examined by Curry (1982) in order to reach a balanced view of the evidence, but large volumes of private correspondence had to be consulted in the process. One of his most important conclusions was that the confusion could easily have been avoided by the simple means of protocols, agreed upon in advance by all the parties concerned. Above all, such protocols should have stipulated exact sampling criteria. KZ&A have insisted that such prior agreements were obtained but after a careful scrutiny of the private correspondence, Curry had to conclude that this was almost certainly untrue.

A second important conclusion was that the actual sampling, and the astronomical and statistical calculations should have been performed by disinterested third parties and they should have been performed blind. In fact, sole control over all three selections was in the hands of Kurtz, KZ&A's denials notwithstanding. Furthermore, the astronomical calculations were relayed to Kurtz in three batches so that he knew the results of his first and second selections before choosing his second and third respectively (Rawlins, 1981). Curry (1982) commented,

"In this context, the dramatic drop in the Mars Effect over the three sub-samples - from 19.5% to 12.5% to a significantly low 7% - may pose much less of a problem for Gauquelin...than it adds to a host of reservations about Kurtz's sampling." (page 44)

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Not surprisingly, Curry was unable to come to any firm conclusions about the outcome of this replication. Yet he did observe that the majority of all the post hoc sub-samples, especially the uncontested ones, showed a Mars Effect in the predicted direction, though most of these samples were too small to reach statistical significance.

**3.4.4. A new European replication.** When it became clear that the US Privacy Act would place great restrictions upon the American data, Zelen suggested that a new replication should be conducted in Europe where few such restrictions are imposed. The Gauquelins readily agreed to help with this task, the control of which was to be entirely in the hands of the CSICOP. However, in the event, KZ&A would not undertake the experiment, despite repeated urgings from the Gauquelins and it was left to the latter to conduct it on their own. They collected a fresh sample of 432 sportsmen from seven countries and found a highly significant Mars Effect of 24% (Gauquelin and Gauquelin, 1979a).

Kurtz et al. (1979b) responded to these results with a new flurry of post hoc criticisms to which Gauquelin (1980) replied, only to have his replies contested yet again by Kurtz et al. (1980). The details of this controversy will not be given here as they have been adequately documented by Curry (1982) but instead Curry's three main observations on this replication will be summarised. First, although no firm conclusions about the outcome of this replication can be reached, it is clear that the responsibility for this situation belongs solely to KZ&A. They had ample opportunity to make this test definitive, by agreeing protocols in advance, by enlisting disinterested referees, and by supervising all procedures themselves, but they ignored all requests to do so. Secondly, the objections raised against the Gauquelins' sampling are often weak and, in some cases, perverse. Thirdly, the Gauquelins have provided a means by which all of the disputes over the

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sampling of European champions could be settled and yet KZ&A have steadfastly refused, for over three years now, to take advantage of it.

In his general evaluation of the CSICOP's investigations of the Mars Effect, Curry noted that Kurtz, Zelen and Abell had violated the normal standards of scientific inquiry so often and so badly that their good faith was in doubt. In his estimation; "Rawlins and Gauquelin are...the only two major figures to emerge with scientific credibility intact" (page 49). This is a very sorry state of affairs not only because of the doubt it throws on the ability of the scientific community to remain impartial in the face of results that go against accepted ideas, but also because it means that the factual status of Gauquelin's results is less clear than it might have been. Curry concluded that; "On the strength of the work we have covered, the Mars Effect on balance stands as corroborated" (page 50), but with better conducted investigations the conclusions could have been much firmer.

#### 3.5 Harmonics.

Although the Gauquelins' research provides the only convincing evidence for planetary effects, there has been one other development which appears to be very promising, at least from a theoretical and methodological point of view. It is called "Harmonics" and was developed by the late John Addey, a British astrologer. During a search for a scientific basis for astrology, Addey (1976a & b) noted that most researchers in this field have been hampered not only by their ignorance of research techniques, but also by their desire to show that the age-old tradition is basically correct. Consequently, many of their experimental designs would have been incapable of revealing planetary influences differing from the expected ones even if such influences were there. Instead of grouping data according

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to the categories that are hallowed by tradition (eg. by zodiac signs, houses<sup><\*></sup>, or aspects<sup><\*></sup>), Addey advocated that they should be plotted in much smaller intervals. When this is done, the resulting frequency distributions show fluctuations both within and across the traditional boundaries. This is sufficient to show that the tradition is incorrect. However, these fluctuations are not necessarily random. When submitted to harmonic (Fourier) analysis, they sometimes exhibit waves whose amplitudes are greater than would be expected by chance. Addey also claimed that these waves, in combination, are characteristic of the particular homogeneous groups (usually occupational groups) being examined. For example, one combination of harmonics might characterise the distribution of the sun in the ecliptic<sup><\*></sup> for a group of doctors but a different combination would prevail for clergymen (Addey, 1970).

There is no doubt that harmonic analysis can be a useful method for the analysis of astrological data. Addey, however, has presented it as far more than that. He has incorporated it into a general theory of planetary influences, called "Harmonics". On the philosophical side, this theory leans heavily on Pythagorean and Neo-Platonic conceptions of the world and places great emphasis on number symbolism (eg. Addey, 1971). According to Addey, astrology was established in ancient times on the basis of a theory very like Harmonics but this theory has been lost and astrological doctrine has since become over-simplified and distorted. In its scientific aspect, Addey's theory suggests that planetary influences have a wave-like structure which can be regarded as the harmonics of cosmic periods. The periods are defined relative to the angles<sup><\*></sup> of the geocentric framework or to the positions of the other planets (Addey, 1976a).

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No doubt, most scientists would not hesitate to dismiss Harmonics as unintelligible or as "metaphysics". Just what it has achieved, or could hope to achieve, is not clear at present. Certainly it has generated interesting research and, at times, a number of intriguing results (see section 7.7 and Appendix III below). Some highly critical commentators consider that the evidence in favour of some of its predictions is already quite good (Dean et al., 1977). On a theoretical level, it holds out the possibility of reducing the chaos of astrological doctrine to a limited number of fundamental principles (see section 7.7). This makes it very relevant to the evaluation of astrology as a science, which will be considered in Chapter Four.

### 3.6 Contributions by psychologists.

This brief introduction to astrological research has so far concentrated on investigations carried out by astrologers. However, important studies have also been conducted by psychologists and other scientists, usually, but not always, with the purpose of showing astrology to be false. These began as early as 1938 when Farnsworth and Bok became interested in the subject (Bok and Mayall, 1941). In 1955, Carl Jung conducted a (somewhat inept) study of synastry<sup><\*></sup> and, in the 1960s, Vernon Clark organised an important series of blind-matching trials to test astrologers' abilities to match horoscopes with case-histories. Then, in the 1970s, for whatever reason, articles on astrology started appearing quite regularly in the psychology journals. By 1982, at least 67 academics had together published more than 70 papers on the subject in 30 or more recognised academic periodicals (Startup, 1983b) and at least 13 postgraduate theses on the factual basis of astrology had been accepted by as many universities around the world (Startup, 1982b).

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Naturally the standard of the psychologists' research has generally been far higher than that of the astrological amateurs, and the approach adopted has been far more critical. Important psychological techniques have been introduced (eg. personality questionnaires, the method of blind trials), and statistical tests well beyond the expertise of most astrologers have been employed. On the other hand, the effective contribution from psychologists, either to support or to refute astrological claims, has not been as great as one might expect. The main reason for this is that too much attention has been paid to testing the validity of sun-signs and too little has been paid to the other fundamental tenets. A thorough knowledge of the literature would have indicated that sun-signs were not a promising field for further inquiry whereas other areas, such as the diurnal circle<sup><\*></sup> or aspects<sup><\*></sup> are either under-researched or else have already yielded results that need to be followed up. It must also be said that psychologists have occasionally failed to follow up their own positive results, have sometimes employed unrealistically small samples, and some of their experiments have been vitiated by an inadequate understanding of astrology.

### 3.7 Related fields of inquiry.

In addition to the research on astrology proper, this century has seen the rise of a number of related fields of inquiry that ought to be mentioned, if only briefly. These include the study of the effects of season of birth on a number of human characteristics, the study of cycles, especially terrestrial cycles that appear to be linked with the 11-year sun-spot cycle, the possible influence of the planets on variations in the sun, and the effects of the moon on various terrestrial phenomena. When dealing with plants and animals, these studies are coming to be known as "Cosmobiology". Relevant reviews have been provided by



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Gauquelin (1973), Playfair and Hill (1979), and especially Eysenck and Nias (1982). The basis for distinguishing these studies from astrology will be elucidated in Chapter Four.

The study of season of birth effects began in earnest when Huntington published the results of a massive survey in 1938. He had found evidence for seasonal variations in the birth rate itself and in the birth rates for people with a number of different characteristics including eminence, intelligence and insanity. Many of these findings have been followed up over the years and there now seems to be good evidence for links between season of birth and both professional eminence and schizophrenia. Definite causes for these effects have not been identified though climatic conditions are the most likely candidates. The evidence for other traits is often suggestive but at present remains inconclusive.

Concerted efforts to study cyclic variations in terrestrial phenomena also began about 40 years ago when the Foundation for the Study of Cycles was established in 1940 by Edward Dewey. In the intervening years thousands of cycles of different lengths and involving many diverse phenomena have been identified. Many of these are likely to be fortuitous and, of those that are real, some may be caused by the internal dynamics of the situation while others could be externally caused. Amongst the latter, the most interesting are those with an eleven year period, for this is the average length of the sun-spot cycle. For example, there is some evidence for eleven year cycles in world temperature and world rainfall. Piccardi (1962) has shown that the speed of certain chemical reactions in an inorganic colloid is affected by daily and long-term variations in solar activity. Takata's flocculation index of blood serum has also been shown to vary with sun-spot activity (Takata, 1951) and similar variations in the

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percentage of lymphocytes in the blood has been demonstrated by Schultz (1960).

A number of studies have investigated the possibility that variations in solar activity might be caused or triggered by the planets, and that the planets might trigger events on earth, such as earthquakes. However, the evidence for such effects is not good and has not been accepted by the great majority of astronomers. One long-term investigation of the quality of short-wave radio reception on earth, by an employee of R.C.A. called J.H.Nelson, has been widely acclaimed by astrologers. Nelson (1974, 1978) claims to have found that certain planetary configurations cause (via the sun) disturbances in the earth's ionosphere but this effect has recently been shown to be spurious (Ianna and Margolin, 1981; Eysenck and Nias, 1982; Dean, 1983a).

Finally, there has been a large number of studies of the effects of lunar cycles on diverse terrestrial phenomena such as the weather, growth patterns in plants, and the behaviour of many animals including man. All too often with these investigations, promising results have either not been replicated, or when they have been repeated, findings from different investigators have been contradictory. In almost all cases, the observed effects have been very weak and, in the case of humans, might well be of the nature of self-fulfilling prophecies since it is widely believed that the moon does affect behaviour. However, a balanced judgement on these matters has yet to be reached.

#### Notes.

<1> The sources for this account of the Gauquelins' work are chiefly Gauquelin (1972, 1976a). It is not always clear in which studies Francoise Gauquelin took part. In this account, the early work is attributed to Michel Gauquelin

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alone and the later work to a collaboration between the two of them but apologies are here offered if this is incorrect.

THE SCIENTIFIC STATUS OF ASTROLOGY.

4.1 Introduction.

Whether or not astrology can be considered scientific is rapidly becoming a vexed question. In this chapter I shall discuss five important approaches to the question, each of which adopts a different characterisation of astrology. I think it is possible to show that the arguments of the first four approaches meet with grave difficulties because they misrepresent astrology. (In these cases it would appear that science is also misrepresented and the two sets of misrepresentations may not be unconnected.) In section 4.6 the fifth approach to the scientific status of astrology will be presented in some detail. This uses the Methodology of Scientific Research Programmes (MSRP for short; Lakatos, 1978) to "make sense" of astrology and, it will be argued, it makes a good job of it. The goodness of its job resides chiefly in the coherence of its account of astrological theory and the sense it makes of the activities of astrological researchers. In the process it also shows that astrology satisfies many of our intuitions of what a belief system requires in order to be scientific. However, it does not satisfy all of them. Whether astrology is regarded as scientific or not then depends on whether the intuitions about science that it fails to satisfy are seen as more important than the ones it does satisfy. It is assumed here that the search for a single demarcation criterion for science is a forlorn one.

Analysed according to the MSRP, astrology can be construed as a legitimate scientific research programme. As with practically all such programmes, it has its competitors - rival research programmes. The remainder of the chapter, then, deals with the nature of these rivals, their successes to date (compared with those of astrology),

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their shortcomings, and the implications of all these considerations for future research.

### 4.2 Falsifiability: Popper's view.

Among the prominent modern philosophers of science, none has commented on astrology as often as Popper. For him it is paradigmatic of "pseudo-science". In just one of his books (Popper, 1963) there are eight references to astrology, of which the following is typical:

"By making their interpretations and prophecies sufficiently vague they <the astrologers> were able to explain away anything that might have been a refutation of the theory had the theory and the prophecies been more precise. In order to escape falsification they destroyed the testability of the theory." (page 37)

However, this characterisation of astrology is simply false. Astrologers have made any number of precise prophecies in the past (Kuhn, 1977; Curry, 1980) and their textbooks are filled with testable predictions (Eysenck, 1979) as the research into astrology shows. Even Goldberg (1979), whose "contempt for astrology knows no bounds" (!), felt forced to admit that it was scientific because it passed the test of falsifiability.

It is true, however, that astrologers have generally refused to regard the innumerable failures of their predictions as refutations of their theories. One might argue then that, although astrology is literally falsifiable, Popper has captured its essentially unscientific nature by reminding us that astrologers never admit to having been decisively falsified. However, this can hardly be used to distinguish astrology from science either. Kuhn (1960) and others following him (eg. Lakatos, 1978), have often pointed out that all scientific theories, even the most respected ones, are always faced with apparent counter-examples. These are rarely allowed to count as refutations, especially if they challenge the core of the theory. Instead, they are treated as "anomalies"

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which, it is hoped, will be successfully explained in the fullness of time. It is this sort of observation of the way in which scientists actually behave which, as much as anything else, has led to the abandonment of Popper's demarcation criterion in recent philosophy of science.

### 4.3 Puzzle-solving: Kuhn's view.

In Kuhn's (1977) view, astrology was justifiably rejected as a science in the seventeenth century because it could not support a "puzzle-solving" tradition; such a tradition being a necessary condition of a field's being a science. It failed in this because only its most uncertain predictions could be tested and the failures of these were uninformative since they could have been due to innumerable factors apart from the incorrectness of the theory. For example, they could have been due to the notoriously unreliable astronomical tables of the time, to inaccurate birth data, or to the incompetence of the particular astrologer.

However, this characterisation of astrology is contradicted by current astrological research which, as we saw in the previous chapter, shows every sign of puzzle-solving as Kuhn (1960) defined it. Kuhn (1977) writes only about seventeenth century and earlier astrology and seems to be unaware of recent developments. The reasons he gives for the rejection of astrology 300 years ago may be at least part of the historical truth but he fails to see that astrology could make a recovery once various auxiliary disciplines had been sufficiently developed. In the twentieth century, puzzle-solving has been made possible by the advent of reliable astronomical information, accurate clocks, good public records, a mature theory of probability, and sophisticated statistical tests and experimental methods. Thus astrology cannot be ruled out as a science on Kuhn's criterion.

4.4 Astrology as magic: Jerome's view.

A third approach is to exclude astrology from the sciences on the basis of the type of thinking that enters astrological theorising. According to Jerome (1975), the main exponent of this view, "astrology is false because it is a system of magic, based on the magical 'principle of correspondences'" (page 10). Unfortunately, Jerome does not explain why this type of thinking is incompatible with science.

Jerome has been criticised for confusing the origins of a science with its current status. For example, Sagan (1976) pointed out that the origins of many well-established sciences are also "shrouded in mysticism", but they are not disqualified on that account. However, this criticism misses the point which is not that astrology grew out of magic but that it is magic even today.

Jerome is misleading, nevertheless, in calling astrology "magic" since that term normally refers to procedures which are undertaken with the intention of bringing about some state of affairs external to the magician. Astrology, by contrast, is an attempt to understand the natural relationships between cosmic and terrestrial events and to affect the terrestrial ones only through normal, not magical, actions guided by the understanding gained. As Neugebauer (1951) has put it;

"The concept of predictable influence between (heavenly and earthly) bodies is in principle not at all different from any modern mechanistic theory. And it stands in the sharpest contrast to the ideas of either arbitrary rulership of deities or of the possibility of influencing events by magical operations." (page 171)

Astrological symbols have often been used in magical procedures but this is beside the point.

However, Jerome was correct that astrology uses the "principle of correspondences". At least this is what most

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astrologers affirm. Jerome does not explicate the term and clear explanations by astrologers are also rare. Thus, a recent linguistic analysis of astrology by Budd (1981) might be useful here. Budd agrees that astrology involves a different kind of thinking to science since it is basically rationalist (in the narrow sense of the term) rather than empiricist. According to his analysis, astrology begins by assigning "root meanings", that is very general and vague meanings, to the planets, which are treated as symbols, and then extends these meanings to make them applicable to particular contexts by two linguistic devices: metaphor and metonymy. To give an example (not Budd's), the root meaning of Mars could be expressed as the preservation of the identity of an entity through energetic activity. When Mars is interpreted in terms of human personality the relevant entity is the individual and Mars then stands for the traits of energy, self-assertion, activity and so on. When applied in some other context, such as the life of a nation as shown in a mundane chart<\*>, the meaning has to be changed by metaphor. Mars then signifies the military because, of all the factors in this context, the military is most concerned with preserving the integrity of the nation through energetic activity. Further extensions of meaning arise through metonymy, that is, on the basis of real associations between things so that the one immediately suggests the other. Thus, to continue the example, Mars also signifies war, weapons and iron because the armed forces fight wars, use weapons to do so and have much of their weaponry made of iron.

If this is a true characterisation of astrological thinking, one can sympathise with Jerome for declaring it to be unscientific. Science might be able to accommodate metonymy by reinterpreting in terms of causality. For example, Mars may be "connected with" the armed forces because, when present in Gauquelin's key sectors at birth it promotes energy and courage, and individuals who have



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these traits are likely to prosper in the military. However, metaphor seems quite outside scientific reasoning since it involves no causal chains. Moreover, the rationalism of astrology, as Budd presents it, is antagonistic to scientific empiricism in that it involves the belief that there is a necessary connection between the structures of human consciousness and the physical structure of the universe. (Though not many astrologers would dispense with empiricism as thoroughly as this.)

However, there are a number of factors to consider before astrology is excluded from science because of the nature of its theorising. Firstly, Budd is probably mistaken in declaring empiricism to be unimportant in the development of astrology. The present author has argued elsewhere (Startup, 1981) that it is plausible that astrology was developed through mutual feedback between theory and observation, as with all sciences. Secondly, it is not certain that the use of metaphor really does divide astrology from science. Some modern philosophers (eg. Hesse, 1980) have argued that metaphor is also central to scientific thought. It may be that metaphor is used in radically different ways in science but there has not yet been sufficient detailed analysis to make this certain. Thirdly, even if such a radical discontinuity were shown, one might still hesitate to call astrology a non-science for two reasons; (1) it might have sufficient other features in common with well-established sciences that an exclusion on the basis of one dissimilarity would seem arbitrary, and (2) it might have true consequences though the theory itself is false.

The first of these numbered points - the similarities between astrology and accepted sciences - will be discussed in section 4.6 below. The second point has been promoted by Gauquelin (1973, 1976a), Dean et al. (1977) and Eysenck and Nias (1982), among others, and constitutes the fourth

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approach to astrology, to be discussed in the next section. Since Eysenck and Nias have given the clearest expression to this approach, most of the discussion will centre on their views.

### 4.5 Astrology as facts without a theory.

The fourth approach, then, places all the emphasis on whether or not astrology has a basis in fact. Eysenck and Nias (1982) reject Jerome's criticisms because erroneous theories can lead to the discovery of important facts, as the history of science repeatedly shows. In their opinion, since sciences are built up from verified facts, the scientific status of astrology depends on the verification of the astrologers' beliefs. If at least some of these beliefs are verified, then one has the makings of a science and one can begin to construct theories to explain the facts.

At the end of their inquiry into astrology, Eysenck and Nias conclude that "astrology is largely (but not entirely) superstition" (page 213) meaning, presumably, that most of the hypotheses that have been investigated have not been verified. Yet they also state unequivocally that "a new science is in process of being born" (page 209). In order to understand what is intended by these two statements, we must first examine what they mean by the term "astrology".

Eysenck and Nias make a distinction between two types of astrology. One is traditional astrology as incorporated in the textbooks and the other, which they suggest calling "cosmobiology", concerns "the factual study of relations between planetary movements and other cosmic forces, and events on this earth" (page 210). The latter, provided it does not involve the positions of the planets at birth, was once called "natural astrology", and still is in some quarters.

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Now, of the evidence that they examine, Eysenck and Nias consider that supplied by the Gauquelins to be the best of all<note 1>. Yet the science that they proclaim to be "in process of being born" is not astrology but cosmobiology. This is perhaps surprising since, on the face of it, the Gauquelins' research appears to have led to the discovery of some "novel facts" which are clearly astrological in nature and it is normal in science to have respect for a theory that is capable of predicting novel facts and of finding empirical evidence in support of them (Lakatos, 1978). However, Eysenck and Nias give a number of reasons for preferring to regard this work as support for cosmobiology.

One reason is that Gauquelin (1976a, 1979) himself denies that his work supports astrology, and Eysenck and Nias mostly go along with this disclaimer. However, this can hardly be taken seriously. Though Gauquelin has been unable to verify zodiac signs, mundane houses<\*>, or the importance of the angular houses<\*>, his work supports three fundamental ideas of astrology. He has provided evidence that the positions at birth of (five of) the planets are predictive (ie. of personality and career choice), that each of these planets has a qualitatively distinct effect, and that the positions of these planets within a geocentric framework (ie. the diurnal circle) are important. Moreover it has been shown that five of the planetary types identified by astrologers since at least the 2nd century AD are very similar to the planetary personality types discovered by the Gauquelins (Gauquelin, 1980; Startup, 1982a). None of these findings would have been predicted on the basis of modern astronomical or biological knowledge, yet all of them are predicted by traditional astrology. Thus, pace Gauquelin, it is difficult to view this research in any other light than as corroboration for astrology.

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A second reason Eysenck and Nias have for rejecting astrology as largely superstition seems to be that they can find little evidence of a theory within it. What they do find they, like Jerome, regard as wholly implausible. One can easily sympathise with this view. Textbooks present astrology as a set of interpretations for the components of a horoscope. The interpretations are set down as if they were established facts but the supporting evidence, even in those few cases where there is some, is rarely discussed. They are presented without convincing statements of how they were discovered and, from the scientist's point of view, without any plausible suggestions as to how the effects might be caused. Even worse, the textbooks do not appear to deal with physical forces at all but only with symbols to be interpreted. Moreover, there are differences of opinion among astrologers on almost every technique and interpretation. The fact that some use the tropical<sup><\*></sup> zodiac (most Western astrologers) while others use the sidereal<sup><\*></sup> zodiac with equal conviction (most Indian astrologers), is perhaps only the most notorious of the many contradictions.

Yet, if there is no astrological theory to speak of, how are we to explain Gauquelin's corroborations of astrological doctrines? How are we to account for the presence, in the core of the tradition, of beliefs which are so unlikely to be true in the light of accepted theories but which we now have good reason to believe are true? Eysenck and Nias (and Gauquelin, 1976a) suggest that the answer to this is that early astrologers may have simply noticed the relationships between the positions of the planets at birth and later character development. Subsequently, the astrologers incorporated these observations into elaborate theological schemes in order to provide (pseudo-) explanations for the (genuine) facts.

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This theory about the origins of astrology may be correct but there are several reasons to doubt it. One of them comes from the general position in philosophy and cognitive psychology that holds that observations are not possible without the aid of at least a rudimentary theory (eg. Popper, 1979). A second objection is that the planetary effects that have been (re-)discovered recently are so weak that they could hardly have been observed in ancient times without a quite high-level theory to guide the observations (Startup, 1981). Thirdly, this theory of the origins of astrology conflicts with the opinions of historians of astrology (eg Cumont, 1960; Neugebauer, 1951; Lindsay, 1971). Since the author has discussed these three arguments elsewhere (Startup, 1981), they will not be elaborated further here.

Possibly a third reason can also be identified why Eysenck and Nias prefer to view Gauquelin's work as support for cosmobiology rather than astrology, though this is more in the nature of a proposal for future research than an argument from the evidence. It has been noted in several places above that astrological theory, such as it is, seems to ignore physical explanations for its postulated effects. To be sure, astrologers have frequently suggested that the effects could be explained in terms of various forces that have been accepted by the scientific orthodoxy at different times but, as Jerome (1975) has noted, these suggestions have always been ad hoc rationalisations. Astrology involves interpreting symbols not searching for mechanisms. Eysenck and Nias, on the other hand, are convinced that "some transfer of matter or energy must take place" (page 136) and that explanations should be in terms of physical mechanisms. They argue as follows; since Gauquelin's planetary effects are strongly supported by the evidence, there must be a chain of physical causes and effects mediating these effects. Therefore it is best to study Gauquelin's effects alongside the other cosmobiological

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effects that have been discovered, in the hope of finding a common explanation for them all, and to ignore the mystifications of astrology.

It cannot be denied that there is a good deal of force and commonsense in this proposal. Nevertheless, I think it needs to be emphasised that, in expounding these beliefs, Eysenck and Nias are, on the one hand, providing only an ad hoc explanation for Gauquelin's findings and, on the other, are offering guidance in the highly selective search for evidence that is the normal course of scientific inquiry. In Lakatos' (1978) terms, they are promoting a "positive heuristic" for a new "research programme".

It is probably best to call this programme "cosmobiology" but following Curry (1980, 1981) we might also call it the neo-Astrological Research Programme (neo-ARP for short). The point of this terminology is to highlight the contrast with the Traditional Astrological Research Programme (Trad-ARP, or simply ARP, for short) that Curry (1980) has identified. According to Curry, astrology has been persistently misunderstood because its nature has been misrepresented by a succession of philosophies of science which have themselves been shown to be flawed. Curry argues that astrology has a structure very like that of any of the established sciences when analysed according to the Methodology of Scientific Research Programmes (MSRP), one of the leading modern philosophies of science. The importance of the distinction between the neo-ARP and the Trad-ARP is that these are alternative and rival programmes seeking to investigate domains that overlap. We will return to the neo-ARP in section 4.7 below but first Curry's (1980) analysis of the Trad-ARP, and some of the strengths and weaknesses of this research programme, will be considered in the following section.

4.6 Astrology as a scientific research programme.

The MSRP was founded by Lakatos (1970) and then extended by Zahar (1976), Worrall (1976) and Urbach (1978). It is in the Popperian tradition of critical rationalism but takes account of the criticism of Popper's position by Kuhn (1960, 1970) and others. In the MSRP the stress laid on refuting instances by "naive falsificationists" is rejected because "exactly the most admired scientific theories simply fail to forbid any state of affairs" (Lakatos, 1970, p.100). Further, appraisal is directed to series of theories because any individual theory can be saved with the help of auxiliary hypotheses which satisfy certain well defined conditions and still represent scientific progress. Such series of theories, if they have continuity, are referred to as "scientific research programmes" (SRPs). Now SRPs have methodological rules which dictate what paths of research are to be avoided ("negative heuristic") and what paths are to be pursued ("positive heuristic"). Most importantly, SRPs also have "hard cores" which comprise the central ideas that give the programme its continuity.

The negative heuristic directs those working for the programme not to allow any evidence to count as falsification of the hard core. They are to use their ingenuity instead to develop "auxiliary hypotheses" to form a protective belt around the core and negative instances are only allowed to falsify these. The positive heuristic, on the other hand, consists of suggestions, which may be more or less precise, as to how the auxiliary hypotheses are to be changed and developed in order to keep the programme progressive. SRPs are to be appraised not as scientific versus pseudo-scientific but as progressive or degenerating. To put it briefly, they are progressive when they lead to the discovery of hitherto unknown and unexpected facts and are degenerating when they fabricate theories only in order to accommodate facts which they did

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not predict. "What really counts are dramatic, unexpected, stunning predictions : a few of them are enough to tilt the balance" (Lakatos, 1973).

When applying the MSRP to astrology, the first point to make is that it is from the existence of research in the seventeenth and twentieth centuries that one can justify postulating an SRP. Then, the first task is to characterise the core of the ARP by identifying those propositions on which all the researchers in the field agree. As we saw in the section above, there are not many of these. In fact Curry (1981a) believes there to be just three, which he formulates as follows;

- "(1) There exists a meaningful correlation between
  - (i) the positions and movements of the planets and
  - (ii) entities and events on earth.
- (2) This connection exists by virtue of a set of metaphysical principles which systematically relate the members of both domains.
- (3) It can be discovered and interpreted, in principle, by examining the planetary positions at a time taken to be the beginning of the entity (or the occurrence of the event) in question". (page 8)

As is usual with hard cores, these propositions are very vague (and open to reformulation) but explications for them can be found in Curry's writings. What is perhaps most important is that so little is required to give the ARP its identity. It requires only planets with qualitatively different "meanings" or "influences", a time of inception (eg. birth moment) and at least one frame of reference to define the positions of the planets at the time of inception. All other ideas, such as zodiac signs, houses and aspects, are ultimately dispensable. That is, they can be sacrificed without losing the identity of astrology.

From this point of view, the doctrines that fill astrological textbooks do not constitute the theory but are merely auxiliary hypotheses which have been developed in response to the positive heuristic of the programme (though



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without the possibility, until recently, of putting any of them to decisive tests). Thus failures to corroborate these doctrines, while they make the hypotheses themselves doubtful, do not damage the core. The SRP as a whole is only damaged if its auxiliary hypotheses constantly lag behind the discovery of facts and if the adjustments that are made to the hypotheses in response to new facts are consistently ad hoc.

In Curry's (1981a) estimation, however, the ARP is not degenerating but progressing reasonably well and this is largely due to Gauquelin's findings. These findings are in accord with the three core propositions - the importance of the moment of birth, qualitative differences between planets, and variations in planetary effects with their positions within a (geocentric) framework. The failures on the other hand - failures to corroborate hypotheses concerning signs and houses, for example - merely count as failures of some of the peripheral hypotheses. Even if the latter are consistently refuted it only means that planetary effects do not vary according to the positions of the planets within these specific frameworks, but there is no general agreement among astrologers about these issues anyway.

Nevertheless there have been some notable failures for the ARP and a tally of these should be kept. Chief among them are (1) the failure so far to find any effects associated with the sun, Mercury or the three recently discovered planets, (2) the failure to find any clear evidence for planetary effects on personality for ordinary as opposed to eminent people and (3) the failure to find effects with individuals whose births were not spontaneous. All three of these failures tend to refute the core of the theory which does not make allowances for some planets not being effective or for all of the planets failing to be effective with some people. In accordance with the negative

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heuristic, of course, these failures are not allowed to reflect on the core but are blamed on the auxiliary hypotheses. Inadequate measuring instruments or inappropriate experimental designs might be held responsible or else it can be claimed, quite legitimately, that research has not yet been extensive enough to solve all problems. Of course, the problems will eventually have to be solved in a non-ad hoc manner or else the programme will become degenerate.

However, the ARP suffers from other problems that cannot be dealt with so lightly. Of special importance is the absence of a comprehensive theory of how planetary positions are to be interpreted. In this respect astrology is in a curious position. It has its core propositions and it has specific, testable predictions but what it lacks is unbroken lines of necessary inference leading from the one to the other. To see what form these lines of inference need to take we will need to consider the positive heuristic of the programme.

The positive heuristic of an SRP guides the construction of successive theories in the series or, in other words, states what most needs to be done and suggests ways of going about it. Presumably the positive heuristic of the ARP instructs astrologers to discover (a) the "root meaning" (see section 4.4 above) of each planet and (b) how that meaning is modified according to (b1) the type of entity under consideration (eg. a person, a nation, an institution), (b2) the frame of reference that defines a planet's position (eg. zodiacal, mundane, or aspectual circle) and (b3) the precise position of the planet in that framework.

In order to fulfil this heuristic, a feedback process is clearly needed. The root meaning of a planet cannot be discovered without having some idea of the significance of

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the various positions it can occupy, and vice versa, because the planets are always found in particular positions. The research shows that astrologers have been remarkably successful in discovering the meanings of five of the planets (Gauquelin, 1980; Startup, 1981).

Theories of how these meanings vary when applied to different types of entity (b1 above) depend on the acquisition of non-astrological knowledge about the components and behaviours of these entities. For example, astrology can only be applied to nations if the astrologer knows what nations consist of and how they interact with each other. As we saw in section 4.4, this part of the theory also involves the "principle of correspondences". That astrologers can fail simply through misunderstanding the phenomena to which they apply their theories, has recently been shown by Eysenck (1983). When dealing with marriage compatibility (a branch of astrology called "synastry") astrologers have generally assumed that couples who are similar in personality will be happy together. However, psychological research shows this assumption to be mistaken (Eysenck and Wakefield, 1981).

It is in the theories developed to fulfil part b3 of the positive heuristic that astrology appears to be most vague. This involves the ways in which the meanings of the planets vary with their precise positions within different frameworks. One vague idea, that the planets are particularly "prominent" or "strong" when close to the angles<\*> of the diurnal circle, has proved to be spectacularly successful (ie. in Gauquelin's research) but this does not appear to be part of a coherent theory. Other ideas, such as zodiac signs and houses<\*>, have been completely unsuccessful and, furthermore, appear to have been derived by crude analogy, partly from ancient mythology and partly from the philosophical systems of ancient Greece (eg. the doctrine of the four elements).

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Moreover, it is unclear from what little historical evidence we possess, whether a coherent theory of planetary positions ever existed. Ptolemy and Kepler believed that the doctrine of aspects<sup><\*></sup> was the product of Pythagorean theorising, and Kepler himself developed Pythagorean theory further in order to predict additional aspects to those sanctioned by Ptolemy (Brackenridge, 1979), but whether the whole of astrology was originally developed along these lines is uncertain.

Important steps towards rectifying this situation have been taken by Addey (1976a & b) who began to develop "Harmonics" (see chapter 3) specifically to provide the missing theory of planetary positions. Although it was not developed initially in conscious imitation of Pythagorean harmonics, Addey recognised the many similarities between the two systems, including the number symbolism and the harmonic divisions of the circle, and came to believe that harmonic theory must have been integral to astrology from the beginning. Unfortunately, he did not manage to develop Harmonics sufficiently before his death in 1982 so that testable consequences could be confidently derived from it (though some specific, as yet untested, predictions have been possible - see Addey, 1974, 1975). Nevertheless, the heuristic power of the theory seems indisputable. For example, the idea that personality must vary continuously with the planets' positions in the diurnal circle has led to the detailed examination of Gauquelin's data on personality (Addey, 1979a & b, 1981a & b, 1982) and this (uncompleted) research shows promising signs of empirical success (Dean et al, 1977), as we shall see in Chapter Eight and Appendix III below.

Of course, to most scientists the weaknesses of particular parts of astrological theory, and even the fact that astrology has a structure much like that of any orthodox SRP, are irrelevant because astrological thought

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is flawed ("irrational") throughout. According to this view, it is flawed because it deals with symbols and meanings rather than mechanisms and causes, and only makes sense, if at all, within the superseded Aristotelian cosmology which viewed the solar system as a special place, the planets as being composed of a special substance and the earth as holding a privileged position within the universe. Possibly it is this sort of consideration as much as any other which has led some scientists, such as the members of the American CSICOP, to reject the evidence in favour of astrology en tout. However, there are other scientists who accept that some of the evidence is almost certainly genuine but do not allow that this evidence supports traditional astrology. In the terminology of the present analysis, these are the scientists who are promoting the neo-ARP which was introduced in section 4.5 and to which we turn our attention next.

### 4.7 Cosmobiology and Neo-astrology.

The aims of cosmobiology are to seek out associations between biological and cosmic events, and to attempt to explain these associations mechanistically. Cosmobiology is thus a rival to the ARP but only to the extent that it attempts to account for the sort of associations that are predicted by judicial<sup><\*></sup> astrology. There is little or no rivalry over the associations that were once covered by natural<sup><\*></sup> astrology since it is almost universally accepted, even by astrologers, that these are best accounted for mechanistically (eg. the moon's effects on tides, the possible role of comets in causing influenza). What we will be concerned with in this section is that part of cosmobiology that overlaps with, and therefore conflicts with, judicial astrology. This consists of two theories which are themselves in conflict to some extent, though they also share many of their elements.

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One of these has been elaborated chiefly by Gauquelin (1973, 1976a) and so will be referred to as "Gauquelin's theory" (GT for short). The following account of this theory will occasionally draw on another analysis of it by Krips (1979) since the latter also employs the MSRP. This has the advantage of unifying our analytical terminology and facilitating comparisons with the ARP.

The aim of GT is to account for the associations that the Gauquelins have discovered between the positions of the planets at birth and the subsequent personality development of individuals. It begins its explanations by postulating a process that tends to take place in the fetus as it comes to term; the fetus' ability to initiate its own birth is triggered by a particular planetary configuration. Which configuration acts as a trigger depends on the genetic endowment of the fetus and it is the same genetic endowment which largely determines the later personality of the fetus. These ideas are so central to GT that they can probably be regarded as "hard core", according to Krips.

GT then develops further by suggesting mechanisms via which radiations from the planets could affect the fetus and by invoking experimental evidence for the heritability of personality traits. It suggests that the fetus might trigger labour in response to changes in the geomagnetic (gm) or electromagnetic (em) fields in its vicinity, that such changes in the gm/em fields might tend to be caused by earlier changes in the em or corpuscular output of the sun, and that such changes in the sun might in turn be caused by specific planetary configurations. GT offers various suggestions as to the identity and mode of action of the components of this explanation - the fields, configurations and so on - but, as Krips warns, these are only tentative hypotheses that require independent confirmation. In other words they are part of the belt of "auxiliary hypotheses".

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When it comes to evaluating this theory it might seem, at first sight, that support of a dramatic kind is provided by the Gauquelins' (1972, 1977c) findings concerning planetary heredity (see Chapter Three). These are consistent with that part of GT that invokes genetic agencies. However, they cannot count as preferential corroboration for GT rather than for the Trad-ARP if the latter deals exclusively with acausal connections between celestial and terrestrial events, as most modern astrologers assert (eg. Mayo, 1964, pp.2-5; Hand, 1976, p.46). From this perspective, astrology does not deny or even conflict with ordinary causal connections, such as heredity. If personality characteristics are indeed heritable and if an individual's personality is related to the configuration of the planets at birth, then there should be links between the horoscopes of parents and their children according to the Trad-ARP. Indeed, Kepler specifically predicted such links from his understanding of astrology (Eysenck and Nias, 1982).

However, this is not to say that none of Gauquelin's findings provide preferential support for GT. In fact there are two which are at variance with astrological theory. One is the discovery that the heredity effect does not apply to individuals whose births were medically induced (Gauquelin and Gauquelin, 1972, 1977c). According to astrology, the manner of birth should be irrelevant; the links between terrestrial and celestial events should not be disturbed by a sequence of terrestrial events. It is important to note, though, that this finding does not provide crucial evidence against astrology; although the heredity effect may not apply to induced births, it does not follow that these individuals' personalities are unrelated to their horoscopes.

The other finding that could be seen as preferentially supporting GT is the discovery that the planetary heredity

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effect is stronger at times of geomagnetic disturbance than it is at other times (Gauquelin and Gauquelin, 1972). It is difficult to see how the Trad-ARP can accommodate this result. However, the degree of support this gives to GT is also uncertain because the explanation GT provides for the involvement of geomagnetism is itself implausible. To make this clear it will be necessary briefly to examine the weaknesses of that part of GT that links the configurations of the planets with the initiation of parturition by the fetus.

Firstly, although there is good evidence that the fetus of some species of mammals initiates parturition through its control of hormonal levels in the mother (Kaiser and Halberg, 1962), it is not certain that this is the case with humans (Vermes, Kajtar and Szabo, 1980). Even if it is found to be the case and even if it is found that the fetus does respond to variations in the gm field, it is difficult to imagine how the planets could bring about the appropriate variations. Takata (1951) and Schultz (1960) have shown that some biochemical processes are extremely sensitive to variations in solar radiation but this can hardly count as even analogical evidence in support of GT since none of Gauquelin's effects involve the sun. It is possible, though there is no evidence for it yet, that variations in solar radiation could be controlled to some extent by the configurations of the planets but even if this were the case it would not be relevant because Gauquelin's effects depend on the positions of the planets relative to the horizon which is itself relative to particular locations on earth. Although it has been shown that ambient extra-long frequency radiation varies locally on earth with the diurnal position of the sun (Persinger, 1974), this does not help in the explanation since Gauquelin's effects have been shown to be independent of local solar time (Gauquelin, Lampe and Paruta, 1975). Thus any effects that the planets might have on the relevant



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gm/em fields can hardly be brought about through the planets affecting solar output.

Gauquelin (1976a) has suggested two other ways in which the planets might affect geomagnetism. One involves the well known fact that the planets cause disturbances in the solar wind. The disturbances take the form of magnetic tails in the wake of the planet and shock waves radiated out from the planet against the wind. These form an "aura" which is many times larger than the planet itself. The suggestion then is that the quality of the solar wind that impinges on the earth is modified by these planetary auras. However, this theory is unsatisfactory because Mars, Jupiter and Saturn, three of the relevant planets, are downwind of the earth and the shock waves that they radiate do not have a net positive velocity against the wind. Gauquelin's other suggestion draws upon the finding that the heredity effect is strongest for the moon, Venus and Mars, weaker for Jupiter and Saturn and altogether absent for Mercury and the outer planets. Thus the effect only applies for planets which are either close to the earth or else very massive, and so may be said roughly to obey the "mass-distance law of physics" (Eysenck and Nias, 1982). The idea here is presumably that gravitational attraction may be the relevant force. However, this too is extremely implausible. For one thing, the gravitational attraction of the moon at the earth's surface is orders of magnitude greater than that of any of the other planets and yet the moon's effect on heredity is no greater than that of Mars or Venus. Secondly, the mean gravitational attraction of Mercury is about the same as that of Mars (Ratzan, 1975). Thirdly, the gravitational forces exerted on the fetus by each of the planets are extremely small and are easily swamped by other bodies in the vicinity. For example, Ratzan (1975) has calculated that the gravitational attraction on the newborn of the physician attending a birth would be greater than that of all the planets except

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the moon and Jupiter if he were to stand at a distance of half a metre! Of course, all other known radiations from the planets are also extremely weak at the earth's surface and are swamped by radiations from the earth itself, from the sun, and from man's own artefacts.

Three other difficulties for GT can also be identified. One is that it needs to explain how the various planets could have qualitatively, rather than quantitatively, different effects on geomagnetism, as they are required to in order to explain Gauquelin's findings. No explanation for this has yet been attempted. A second difficulty arises from the fact that birth labours vary considerably in duration (Kaiser and Halberg, 1962). This is problematic because, according to GT, the planetary configurations that are causally effective are ones formed some time before the birth while the configurations that need to be explained are ones formed at the time of birth. The time gap between these two is equal to the time required by the planet to influence the gm field plus the length of labour. Thus, even if all spontaneous labours begin when the relevant planets are in a certain configuration, the range and variability of labour durations would make one position of the planets at birth hardly any more probable than another. Finally, it is difficult to imagine what adaptive advantage could be gained from the evolution of the sort of selective fetal sensitivity that is postulated by GT. An organism might benefit from being born at a particular time of year or time of day, but being born when a particular planet is either rising or culminating would seem to bring no such benefit.

The other neo-astrological theory that was mentioned in the introduction to this section was developed by McGillion (1980). It will be referred to as MT for short. In contrast to GT, it suggests that the variations in personality that Gauquelin has found to be associated with birth under

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different planets are not genetically but environmentally determined. Specifically, behaviour corresponding to the different planetary types is said to be "pre-programmed" by conditions in the ambient gm or em fields in the vicinity of the neonate at the time of birth. Further, the organ by which these ambient conditions are detected, and through which the pre-programming takes place, is the pineal body.

In support of MT, McGillion (1980) has offered various pieces of analogical evidence. He points out that the pineal has been found to be sensitive to some wavelengths of visible and ultra-violet light and claims that it is also sensitive to variations in earth-strength magnetic fields, though he cites no research to support this claim. He then adds that light has the effect of inhibiting the pineal's production of melatonin and this hormone has many physiological effects including the promotion or inhibition of the production of various other hormones and transmitter substances. Thus the pineal is a suitable organ to act as the agent of wide-ranging alterations in physiology and hence behaviour. Moreover, it has been found that perinatal events can act on the pineal in such a way that developments much later in the life of the organism are affected. This is what is meant by "pre-programming". Specifically, a (medically induced) disturbance in melatonin production in rats around day six post natal has been found to have effects on the subsequent timing of puberty. It can also affect the quality of the later maternal behaviour of female rats, at least in the short term.

Although all theories that attempt to account for Gauquelin's mysterious findings should be welcomed, it is not difficult to identify a host of problems faced by MT. For example, the pineal body's sensitivity to light can hardly be relevant since neither natural photoperiods nor man's artificial lighting have any relationship with the

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diurnal positions of the planets. Secondly, even if the pineal is sensitive to gm or em fields, as McGillion claims, MT faces all the same problems as GT in explaining how the planets could affect these fields in appropriate ways. Thirdly, no perinatal pre-programming of personality traits via the pineal has yet been demonstrated; even in rats, enduring alterations in behavioural dispositions have not been observed. Finally, we might mention that MT not only fails to account for one whole set of Gauquelin's findings but actually contradicts them in theory. These are, of course, the results connected with the planetary effect in heredity.

### 4.8 Summary and conclusions.

It has been assumed in this chapter that all attempts at finding demarcating criteria, that is necessary and sufficient conditions for a belief system to be a science, have failed. As Hesse (1980) has noted, the concept "science" can at best be regarded only as a loose association of family resemblance characteristics. We have considered a number of the characteristics that have been regarded as important for a science and found that astrology shared most of them with the established sciences. It puts forward hypotheses that are testable and falsifiable; it is capable of supporting puzzle-solving; it seeks to discover a natural orderliness concealed within the bewildering confusion of phenomena and does not attempt to affect the phenomena through magical procedures; it has empirical support for some of its claims; it has a structure, consisting of core propositions, heuristics and auxiliary hypotheses, much like that of the most admired research programmes. Above all, and this is probably its strongest claim to scientific status, it has led to the discovery of novel facts, that is, discoveries which were improbable, if not altogether impossible, in the light of previous theory and knowledge.

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On the debit side, however, we have found that astrology involves a kind of theorising which, at first sight at least, appears to violate one of our cherished notions of what constitutes a science. It postulates natural connections between events which are more akin to the connections between symbols and their meanings than to those between causes and their effects. So alien is this that many of the leading researchers in the field deny that the theory could have had any role in the discovery of the novel facts. According to this view, if these facts are to be explained at all, they must be explained in terms of currently accepted forces and mechanisms or, in extremis, by new forces with similar properties to the recognised ones. Consequently a new research programme has been founded which aims, in Curry's (1981a) words, "to expand current scientific theory (of astrophysics, biochemistry, etc.) to assimilate, and ultimately eliminate, astrology as such" (page 8).

Clearly, if a theory could be devised which both explained the novel facts and was consistent with current background knowledge, this would be preferred over astrology. It would then be incumbent on researchers to devote their energies in future to testing the deductions of this theory. However, the neo-astrological theories that have been developed so far provide no such thing. They are not consistent throughout with well-established theories, though they may be in restricted parts. As one astronomer has declared; "If the Gauquelins' planetary effects are real they...lie beyond anything that science can at present understand" (Abell, 1982, p.8).

Given this situation, there seem to be two courses of action open to those who can give no credence to astrological theory. One is to explain all the evidence for astrology reductively, that is without requiring there to be any "planetary influences" at all. However, this has

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already been attempted on many occasions without success (eg. by the Committee Para, by Kurtz, Zelen and Abell - see Chapter Three above). The only reductive explanation currently being entertained is that Gauquelin illicitly selected his data. However, there is no evidence for this<note 1>. The second course is to test those parts of GT (or MT) that have some plausibility and to hold fast to the belief that, if planetary effects cannot be explained reductively, then there must be some underlying mechanism that will emerge once science has advanced sufficiently.

On the other hand, one might be persuaded to give astrology more of a hearing by the fact that it has already led to some astonishing discoveries. It is this third course which is followed in the present investigations. Of the major areas within astrology, it is "aspects"<\*> which have been most neglected and are most in need of further investigation (Eysenck and Nias, 1982). A series of studies of this area will be reported in Chapter Seven below. Although sun-signs have been extensively researched, the positions of the other planets in the zodiac signs have been somewhat neglected, especially in connection with the personalities of ordinary people. The studies reported in Chapter Nine below were designed to rectify this situation. Finally, the associations between personality types and the diurnal positions of the planets have so far been found to hold only for successful individuals but this could be due to the manner in which the associations have been investigated. Astrology supposes that they should hold for everyone. This supposition is investigated in a third series of studies, by means of personality questionnaires administered to ordinary individuals, and these studies are reported in Chapter Eight.

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### Notes.

<1> When Eysenck and Nias (1982, p.219) state that they "can find no major criticisms of their (the Gauquelins') conclusions, methods or statistics", they are in disagreement with Kurtz, Zelen and Abell who seem to suspect the Gauquelins of "cheating" (eg. Abell, 1982). Eysenck and Nias feel that it is the critics who have behaved disreputably throughout their involvement with the "Mars Effect", not the Gauquelins, and that the evidence is, on balance, very much in favour of the latter. These views are in agreement with those of Curry (1982).

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### THE DATABASE.

The studies reported in the four following chapters are all based on information gathered from one sample of subjects. Although the same information was not necessarily used in each study, it is convenient to describe some characteristics of this database in advance. Hence this chapter gives details of the subject sample, the measures taken, and some preliminary analyses and manipulations of the basic data.

#### 5.1 Questionnaires.

The Ss were required to complete the Eysenck Personality Questionnaire (EPQ: Eysenck and Eysenck, 1975) and Form A of the Sixteen Personality Factor Questionnaire (16PF: Cattell, Eber, and Tatsuoka, 1970). A third questionnaire asked for details of the date, time, place, and type of birth. Time of birth was required in hours and minutes. Ss were also asked to estimate how accurate they thought their stated time of birth was and five response options were provided as follows; (1) within 1 minute, (2) within 5 minutes, (3) within 15 minutes, (4) to the nearest hour, (5) even less accurate than (4). If no time was given at all, it was recorded as (5). Response options for "Type of birth" were (1) natural birth, (2) birth induced by medication, (3) Caesarian section, (4) unknown.

#### 5.2 Subjects.

The total sample size was 911. Of these, 562 were university students, all contacted at one college of London University. Participation in the research was voluntary and anonymity was permitted. The three questionnaires were completed under supervision at one sitting. The nature of the research was not disclosed and the birth-data questionnaire was not seen until after the personality



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inventories had been completed. Even then it was accompanied by a cover-story explaining that research was being conducted into "the distribution of births throughout the daily cycle of 24 hours, the effects that medical practices are having upon this distribution, and how the distribution varies from region to region and from time to time". This story was true but, of course, it was not the whole truth. However, it was not possible to keep the nature of the research secret from all Ss. Eighty of them knew that it was astrology that was being tested.

The remaining 349 Ss were astrologers or students of astrology. They were contacted either at one of the weekly lectures held in London by the Astrological Association or through one of the regional study groups affiliated to that body. Naturally, no attempt was made with these Ss to disguise the astrological nature of the research. However, the exact hypotheses under test were not divulged. It was merely stated that the research was designed as "an impartial and, as far as possible, objective testing of some of the most fundamental tenets of traditional astrology". Assurances were given that the author was not out to "debunk" astrology and that he had "consulted some of the most highly qualified astrologers in the country while working out the design". These Ss completed the questionnaires at home and returned them by post. Anonymity was permitted.

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**Table 5.1 Subjects' mean age in years.**

<u>Group</u>	<u>Mean</u>	<u>S.D.</u>	<u>N.</u>
Total sample	28.75	11.17	911
Astrologers	37.5	11.33	349
Students	23.25	6.83	562
Males	27.42	10.83	305
Females	29.42	11.33	606

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Table 5.1 gives the average ages of the Ss broken down by astrologers versus students and by males versus females. It shows the astrologers to be, on average, some 14 years older than the students and to be much more variable in age. It also shows that approximately twice as many females as males participated. This sex imbalance is due partly to a general predominance of females over males amongst astrologers and partly to the fact that a large proportion of the university Ss were psychology students, amongst whom females also predominate.

### 5.3 Birth-time accuracy.

Some of the studies reported in later chapters investigated the effects of the planets when placed in different sectors of the diurnal circle. Such planetary positions can only be calculated when the time and place of birth are known and, since diurnal positions change rapidly, accurate birth-times are important. Table 5.2 shows the numbers of birth-times estimated as falling in each of the five accuracy categories. As the break-down according to astrologers versus students shows, the former group has (or claims to have) more accurate times. This is as one would expect and was the major reason for using astrologers as Ss.

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**Table 5.2 Birth-time accuracy:  
frequencies in 5 categories.**

<u>Accuracy category.</u>	<u>Astrologers.</u>	<u>Students.</u>	<u>Total.</u>
(1) Within 1 minute	66	42	108
(2) Within 5 minutes	123	86	209
(3) Within 15 minutes	103	139	242
(4) To nearest hour	40	116	156
(5) Less accurate	17	179	196
Total	349	562	911

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Since birth-times are not recorded on birth-certificates in England, one has to rely on the individuals' (or their parents') memories, and these are likely to be unreliable. A rough check on accuracy can be made by examining the frequencies of times recorded on the hour, half hour, quarter hour, or to a five minute or better exactness. Table 5.3 gives such frequencies for the first three accuracy categories. It can be seen that only category 1 has a low excess of times given on the hour, the half or the quarter hour and even this distribution differs significantly from that expected for times rounded to five minutes ( $X^2=8.18$ , d.f.=3,  $p<.05$ ). Times for categories two and three are too often given on the hour or half hour and too seldom at other times, though the numbers given on the quarter hour are close to the expected numbers. This analysis suggests that the birth-times are less accurate than was claimed but of course it does not show how much less accurate.

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**Table 5.3 Birth-time accuracy:  
observed Vs expected frequencies for exactness.**

Exactness	Stated accuracy category							
	-----1-----		-----2-----		-----3-----		--Total--	
	OBS	EXP	OBS	EXP	OBS	EXP	OBS	EXP
On the hour	17	9	34	17.4	114	20.2	165	46.6
On the half hour	7	9	42	17.4	51	20.2	100	46.6
On a quarter hour	15	18	36	34.8	38	40.3	89	93.2
Other 5 minutes	69	72	97	139.3	39	161.3	205	372.7
Total	108		209		242		559	
X <sup>2</sup>	8.18		63.36		575		405	

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With df=3, critical  $X^2=7.82$  (5%, 2 tails)  
=11.34 (1%, 2 tails)  
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5.4 The daily birth-curve.

The Gauquelins (1972) found that their "planetary effect in heredity" did not apply to births that had been induced by medication or caesarian section. (Chapter Four above dealt with some possible reasons why this might be so). Consequently, for some types of astrological research, it might be important to eliminate those Ss whose births were not natural and spontaneous. It was for this reason that the birth questionnaire asked for details of the type of birth. Table 5.4 shows the distributions of answers to this question. Separate distributions are given for Ss born before and after 1950. This date is somewhat arbitrary but was chosen because the induction of births became very much more common after this date. However, the table shows that, according to the Ss, only a small proportion of the births were induced even among those born after 1950. In fact this proportion is so low (about 9% of the births for which a type of birth was specified) that there must be some doubt about the accuracy of the information. Consequently, two tests were run on these data.

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**Table 5.4 Type of birth:  
frequencies in 4 categories.**

Type of birth	Frequencies of births-		Total
	before 1950	after 1950	
(1) Natural	254	460	714
(2) Medication	13	47	60
(3) Caesarian	0	22	22
(4) Unknown	22	93	115
Total	289	622	911

---

It has been known since the middle of the last century that there is a natural periodicity in the diurnal distribution of births (Kaiser and Halberg, 1962). This distribution is characterised by a peak during the early hours of the morning and a trough in the afternoon.

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However, medical interventions are planned nowadays so that more births occur at more convenient times, especially during "office hours". As a result, distributions for induced births are roughly the inverse of the natural distribution (Gauquelin, 1971).

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**Table 5.5 Diurnal distributions of births for 3 samples.**

Time	Data of:		Charles (1953)
	--Present sample-- pre-1950	post-1950	
0000-0059	8	13	507
0100-0159	14	16	531
0200-0259	9	19	618
0300-0359	9	19	680
0400-0459	8	10	643
0500-0559	10	12	581
0600-0659	20	29	606
0700-0759	10	20	593
0800-0859	18	20	544
0900-0959	10	19	482
1000-1059	9	13	445
1100-1159	9	19	494
1200-1259	12	12	470
1300-1359	4	7	470
1400-1459	12	21	445
1500-1559	8	11	445
1600-1659	15	11	457
1700-1759	5	13	457
1800-1859	14	18	457
1900-1959	5	11	445
2000-2059	9	9	420
2100-2159	5	16	494
2200-2259	5	12	470
2300-2359	15	19	606
Total	243	369	12360

-----

If the births of Ss born after 1950 and recorded as natural births really contain an appreciable proportion of induced births, then their diurnal distribution should differ significantly from that of the pre-1950 natural births. The numbers of births during each of the 24 hours of the day for these two groups are shown in Table 5.5. Only those with birth-times recorded as accurate to the

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nearest hour or better were retained for this analysis. Legal time (ie. including daylight saving time) was used rather than Local, Solar, or any other time. It seems likely that the daily rhythm of social life would be more important than the natural rhythm of light and dark but the authorities are not clear on this point. In any case, the difference would be only one hour approximately and would apply only to the summer born in most cases. Table 5.5 also gives a comparable distribution for 12,360 spontaneous normal deliveries recorded by Charles (1953) and published by Kaiser and Halberg (1962). Chi-square analyses revealed that the distribution of the post-1950 births did not differ significantly from the pre-1950 births ( $X^2=15.3$ , d.f.=23,  $p>.1$ ) nor from Charles' sample of natural births ( $X^2=28.4$ , d.f.=23,  $p>.05$ ). Hence there is no evidence, from these analyses at least, that the post-1950 births were non-natural if the Ss recorded them as natural.

### 5.5 Standardisation of scores.

The question of how personality scores should be standardised (if at all) for astrological research is intimately bound up with the issue of what elements of an individual's existence can be predicted from the horoscope. Some astrologers speak as if every detail of an individual's life is predictable from the positions of the planets at birth, in principle if not in practice. If this were so, there would be no need to standardise scores against sex norms, for example, because sex itself could be deciphered from the horoscope. It would be better to look for the astrological indicators of sex. However, other astrologers (almost certainly the majority) regard the planets as only one source of influence (or the signs of one such source) among many. This was the view of Ptolemy who discussed this issue at greater length than is usual with astrologers, in his book "Tetrabiblos". In one passage he states that:

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"We should not object to astrologers using, as a basis for calculation, nationality, country, and rearing, or any other already existing accidental qualities."

(Quoted in Lindsay, 1971, page 347)

According to Ptolemy, the planets exert the greatest, or most important, influences on character and destiny but are by no means the only influences.

Most of the scales of the EPQ and 16PF show quite large differences according to age and sex, but not according to social class. Astrologers, however, do not claim to be able to determine either the sex of an individual or age related changes in personality from a horoscope. Hence the variance in personality scores associated with sex and age is error variance as far as astrological research is concerned. Rather than leaving it in as error, to obscure any planetary effects there might be, it is better to remove it by standardisation.

Scores on the EPQ were standardised against the age and sex norms published as Table 4 of the "Manual of the EPQ" (Eysenck and Eysenck, 1975). The 16PF scores were first standardised for sex against the norms for the British general population (Saville, 1972) and then corrected for age using the quadratic model developed for the general population of the U.S.A. (IPAT, 1970, Tables 31 and 32), no age corrections having been developed yet specifically for Britain.

Even after these corrections had been applied, appreciable correlations with age were still found for the 16PF scales F ( $r=-0.34$ ), Q1 ( $r=-0.25$ ), and N ( $r=0.2$ ).

### 5.6 Calculation of planetary positions.

The positions of the planets, ascendant<sup><\*></sup>, and midheaven<sup><\*></sup> were calculated on a Commodore Pet microcomputer using a program called "M-33" marketed by

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Matrix Software (Erlewine, 1980). This program provided the longitudes and latitudes of the planets and the longitudes of AS, MC, and SO. Times of birth were converted to Greenwich Mean Time using the table of standard times published by Mayo (1964).



THE SELECTION OF PERSONALITY SCALES

6.1 Introduction.

The personality questionnaires chosen for the present investigations of astrological theory were the Eysenck Personality Questionnaire (EPQ: Eysenck and Eysenck, 1975) and Form A of the 16 Personality Factor Questionnaire (16PF: Cattell, Eber, and Tatsuoka, 1970). Both of these inventories were chosen for a number of reasons. First, they both comprise factored scales and therefore, in theory at least, should be univocal and consequently clearly interpretable. Secondly, they have both been intensively investigated over many years and are provided with comprehensive documentation, including information specifically drawn from the British population. Thirdly, they have both been used previously to investigate astrology. This means that direct comparisons with other studies can be made and replications can be undertaken. Finally, the two of them were selected, instead of just one, because they measure traits at different levels of generality; while the EPQ measures traits of broad semantic scope, the 16PF measures more narrowly defined "primary factors". Each of these two levels of measurement has its strengths and drawbacks, in general and in the particular context of astrological research, and these will be discussed next. Afterwards it will be necessary to examine the scales contained in these inventories in more detail, both in order to determine just what they measure and because some selections amongst the scales have been found to be desirable.

6.2 Primary versus higher-order factors.

The main argument in favour of primary factors is that they provide valuable information which is lost when they are coalesced into higher-order factors (eg. Cattell et al,

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1970, pp.111-112). Cattell (1972) gives an example of such a loss of information in the following statement;

"It has been shown that research scientists differ from the general population on 16PF factors A-, F-, H+ and Q2+. That is to say, they have the markers for the second-order introversion factor on A, F and Q2 but are extraverted on H. An Eysenck E scale score would be partially self-cancelling, through failing to recognise the different direction of the H primary." (Page 181).

Now, such loss of information could in theory be particularly damaging in the investigation of astrology since astrologers usually describe astral influences in terms of narrow rather than broad traits. If there is any validity to these descriptions then higher-order constructs would be clumsy and inappropriate since traits which covary in the general population (giving rise to higher-order factors) might not covary for sections of the population categorised according to astrological criteria. To give an example, the construct "extraversion" refers to the fact that sociability, impulsiveness, and a few other traits tend to be highly correlated and all load significantly on a single factor (though this itself is a matter of controversy, as we shall see presently), and yet, for certain subsections of the population, some of these traits could conceivably be negatively correlated. It is possible that astrological parameters might serve to define such subsections (it is the contention of astrologers that they do) and there is even some evidence that this is so.

Research by Gauquelin (1980) into the personality characteristics of people born when various planets were either rising or culminating, suggests that there are different planetary types of extraversion. People born "under" the moon are extraverted in that they are gregarious and humorous, and yet they are also religious, poetic, sentimental and prone to daydreams, which are considered introverted traits. People born under Mars, on the other hand, have the extraverted traits of assertiveness and restlessness and yet are not notably

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sociable. If one were to investigate these "astrological types" with Eysenck and Eysenck's (1964) measure of extraversion, (which chiefly comprises sociability and impulsiveness items), then a "lunar" person who is sociable but not impulsive is likely to appear merely average.

Even Eysenck, who has long been a champion of the higher-order factors, concedes that primaries, if they could be measured in a satisfactory way, would make a definite contribution to prediction (eg. Eysenck, 1972). However, it is his contention that, in the field of personality measurement at least, primaries are usually either "tautological" factors or else unreliable and unreplicable (eg. Eysenck, 1977a). (A "tautological" factor is one which is obtained by merely repeating the same item several times with slightly different wordings). Along with a number of other researchers (eg. Peterson, 1965), Eysenck has maintained that only the factors with broad semantic scope (notably Extraversion and Neuroticism) are dependable.

Undoubtedly there is good evidence in support of the validity and dependability of these higher-order factors and this is the main reason for choosing Eysenck's most recent revision of his measures for them. However, evidence has also been accumulating to suggest that earlier strictures against primary factors were premature. With the advent of new computer technology it has been possible to analyse very large item pools and Browne and Howarth (1977), Cattell (1973), and Howarth (1980), amongst others, have presented evidence from such analyses showing that some factors at the primary level are indeed replicable. It is interesting to note also that Eysenck and Eysenck (1978) have recently begun to champion certain primaries. They have also argued that whether primary or higher-order factors emerge from an analysis is largely dependent upon the arbitrary choice of items to be included in the

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analysis; primaries can be made to coalesce by the inclusion of items written to lie at intermediate positions between them, and higher-order factors can be split into subfactors by the exclusion of such items.

If both primary and higher-order factors can be valid, as the research suggests, it seems advisable to employ measures at both levels of generality in a preliminary investigation of the kind undertaken here. The claim that astrological parameters serve to define subsections of the population for which traits are organised idiosyncratically can only be tested with measures of quite narrowly defined traits. On the other hand, it has been found that some of the astral influences for which good evidence has already been obtained can be described in terms of the broader constructs of Extraversion and Psychoticism (Gauquelin, Gauquelin and Eysenck, 1979, 1981). Therefore, both kinds of measure were included in the present investigations.

### 6.3 The Eysenck Personality Questionnaire.

The EPQ, like the earlier Maudsley and Eysenck Personality inventories, of which it is a development, measures the personality variables Ne (neuroticism vs emotional stability) and Ex (extraversion vs introversion) and includes a lie scale (Li) in order to detect social desirability responding. Unlike its predecessors, it also incorporates a scale to measure a relatively new variable called Psychoticism (Ps).

Evidence in favour of Ne and Ex has accumulated over more than thirty years and is derived from both psychometric and experimental testing (Eysenck, 1967, 1976). Eysenck (1970) has reviewed a large number of studies showing that these factors emerge repeatedly and unmistakably from factorial studies. In recent years Ne and Ex have been replicated in a higher-order analysis of

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Browne and Howarth's (1977) 19 primary factors (Eysenck, 1978a), in a conjoint scale factoring of the EPQ and Howarth's personality scales (Barrett and Kline, 1980a), and in a joint item factor analysis of self-reports and ratings using the Neuroticism-Extraversion-Openness Inventory (McCrae and Costa, 1983). Good convergent and discriminant validity for Ne and Ex have also been shown for appropriate scales selected from the EPQ, the MMPI, and the Comrey Personality Scales (Montag and Comrey, 1982).

As regards interpretations of Ne and Ex, there has been little controversy about the nature of neuroticism, but the same cannot be said for extraversion. The unidimensionality of Ex has been doubted by Carrigan (1960), Guilford (1975, 1977), Howarth and Browne (1972) and Howarth (1976a). On the other hand, Eysenck and Eysenck (1963, 1969) have argued that, although Ex can be split into the separate traits of sociability and impulsiveness, these traits correlate together sufficiently highly to define Ex as a unidimensional higher-order factor. So long as an impossibly strict definition of "unitary" is not adopted, this is ample evidence for the unitary nature of Ex.

However, recent investigations by Eysenck and Eysenck (1977, 1978) into the nature of impulsiveness have led to some modifications of these authors' views. They found that a measure of narrowly defined impulsiveness was only very slightly related to either sociability or extraversion but was quite highly correlated with both Ps ( $r=0.48$ ) and Ne ( $r=0.37$ ). Only when a much broader definition of impulsiveness was used could a reasonably high correlation with Ex be obtained. However, even this broad measure was found to be more highly related to Ps than to Ex. Eysenck and Eysenck concluded that "this finding suggests that both sides to the original controversy were right" (page 67).

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As far as the EPQ extraversion scale is concerned, the most important result of this controversy is that impulsiveness items have been excluded (Eysenck and Eysenck, 1977). In a recent investigation, Rocklin and Revelle (1981) found that the correlation between the EPI and the EPQ extraversion scales was almost entirely due to the sociability subscale of the former; EPQ extraversion is almost purely a measure of sociability.

The Ps scale of the EPQ is relatively new, although there have been forerunners of it in Eysenck's PI and PEN inventories. A great deal of evidence in favour of psychoticism as a dimension of personality, and of Ps as a measure of that dimension, has been summarised by Eysenck and Eysenck (1976). However, Ps has been severely criticised by Bishop (1977) and Block (1977a & b, 1978). These authors have expressed doubt that the scale really measures a predisposition to psychotic breakdown, as it is supposed to, and have pointed out that it is very poor at discriminating psychotics from normals and from criminals. Block (1977a) has also criticised the Ps scale for having a very skewed distribution. This is bad on psychometric grounds and also because it means that psychotics could earn high scores merely as a result of their characteristic fluctuations of attention (ie. through random responding). Block (1977b, 1978) has also argued that some of the evidence offered as construct validity for Ps is of doubtful value. Spirited replies to these criticisms have been published by Eysenck (1977b), Eysenck and Eysenck (1977), and Claridge and Birchall (1978). Thus the status of the Ps scale as a measure of a predisposition to psychotic breakdown remains controversial.

The claim that the psychoticism dimension underlies psychopathic disorders has also been questioned recently. In a series of studies of criminals, Hare (1982) found little evidence that the Ps scale was related to primary

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psychopathy. Ps was found to be quite highly correlated with traits associated with general criminality, such as impulsiveness and lack of socialisation, but not with those traits that mark out psychopathy itself, such as callousness, and lack of remorse and guilt. This failure of Ps to correlate with psychopathic traits has also been reported by Forbes (1980). Using a conjoint factor analysis of the scales of the EPQ, the Comrey Personality Scales, and the Foulds Personality Deviance Scales, Forbes discovered that the Ps scale did not load on the same factors as any of Fould's hostility scales, nor did it load on an empathy factor. Instead, it found its place on two factors identified as Orderliness and Conformity (with negative loadings, naturally). It is true that Bristow (1981) found the Ps scale to be quite highly correlated with the Extrapunitiveness subscale of the Personality Deviance Scale, which does indicate hostility. However, the subjects in this study were all psychiatric patients, so their results may not be applicable to normals.

While the foregoing criticisms of the Ps scale throw considerable doubt on the claim that it is a valid measure of a personality dimension underlying psychotic and psychopathic disorders, they do not invalidate it as a dimension of personality as such. Although both Loo (1979) and Helmes (1980) have both reported unsatisfactory recovery of the claimed factor structure of the EPQ, these analyses have, in turn, been severely criticised by Barrett and Kline (1980b, 1982a) for using incorrect factor analytic methodology. The latter authors have published their own independent analyses of the EPQ in which the purported factors emerged very clearly. They emerged from three separate item analyses based on samples of British adults, British students, and Thai students (Barrett and Kline, 1982a) and also from two radial parcel factor analyses of the same British adults and students (Barrett and Kline (1981)). A number of cross-cultural studies of

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factors found in the EPQ have also been undertaken. In all cases, indices of factor comparison, for samples from other countries and the original British standardisation sample, have been satisfactory and, in most cases, these indices have reached very high standards (Eysenck, 1978b).

Additional support for the Ps dimension has been obtained from Eysenck's (1978a) higher-order analysis of Browne and Howarth's (1977) 19 primary factors and from Barrett and Kline's (1980a) conjoint scale factor analysis of the EPQ and Howarth's scales. The Ps factors which emerged from these analyses may not have shown the dimension to have exactly the correlates claimed by Eysenck and Eysenck (1976), but they did reveal it as a replicable factor. To summarise the findings obtained to date, Ps appears to combine the traits of disorderliness, non-conformity, impulsiveness, amorality, and social insensitivity, but not hostility, cruelty, or lack of empathy.

### 6.4 The Sixteen Personality Factor Questionnaire.

According to Buros (1978), Cattell's 16PF is the most widely used personality factor inventory of all. None the less, the psychometric adequacy of this questionnaire has been the subject of controversy for more than 20 years. The scales of the 16PF have been criticised for their extreme heterogeneity (Levonian, 1961; Greif, 1970; Howarth, Browne and Marceau, 1972; Adcock, 1974), for not measuring factors that are unique in any meaningful sense (Becker, 1961; Eysenck, 1972), and for failing to reveal a replicable factor structure in fresh samples, or from males to females (Eysenck and Eysenck, 1969; Sells, Demaree and Will, 1970; Howarth and Browne, 1971; Adcock, Adcock and Walkey, 1974; Karsen and O'Dell, 1974).



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Naturally, these criticisms have not gone unanswered by Cattell. Many of the critical studies mentioned above were published prior to 1971 and were summarised in a paper by Eysenck (1971). (A more complete and recent summary has been published by Howarth, 1976b). Cattell replied to this with a number of powerful arguments in a paper of his own (1972) and in his subsequent book (1973). In reply to the criticism that the 16PF factor structure is not replicable, he answered that the studies on which these criticisms were based all failed to meet certain minimum methodological requirements for satisfactory factor analysis in the personality domain. In defense of his identification of his 16 primary factors, he cited the replication by parcel-factoring published by Cattell et al. (1970) and also presented the results of two new replications derived from item factor analyses, one on adults and the other on students, in which his claimed factor structure was recovered.

Cattell also used these new factorings of his items to counter Eysenck's (1971, 1972) claim that the 16PF primaries are unnecessary because almost all of their variance can be accounted for by Extraversion and Neuroticism. He showed that all nine of his own secondary factors, which include equivalents of Ex and Ne, account for only 59%, on average, of the variance of the primaries.

The extent to which the scales of the 16PF cover ground which is ignored by Eysenck's Ex and Ne has also been investigated by Saville and Blinkhorn (1976) and by Krug (1978). Saville and Blinkhorn, using a method for the extraction of arbitrary orthogonal factors targeted on particular variables, found that the Ex and Ne scales of the EPI taken together, account for only some 23% of the reliable variance of the 16PF factors. At least five more factors are required to account for the covariation among the 16PF primaries. Krug (1978) employed a different method

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for calculating the redundancy of the 16PF and the EPI against each other, but came to very similar conclusions. Using canonical correlation in conjunction with Stewart and Love's "redundancy index", he found that only 22% of the information contained in the 16PF is also contained in the EPI. However, turning the comparison about, some 70% of the EPI information was found to be already contained in the 16PF.

Finally, Cattell (1972) addressed the frequently voiced criticism that his scales are invalidated by the very low intercorrelations among the items assigned to one and the same scale. Cattell agreed that these intercorrelations are low but, far from seeing this as a fault, announced that this was actually a deliberate feature of the design of the 16PF. Statistical heterogeneity of items can be a virtue in factor scales for various reasons. Since individual items cannot be expected to represent only a single common factor, the items forming the final scale should be chosen so that, in composite, they balance out each other's unwanted common and specific factor variances. This is called using "suppressor effects" and "balancing specifics". These methods lower the internal consistency of the scales, but they actually increase "factor trueness" by reducing contamination from unwanted common factors. They also maximise "transfer reliability", that is, they increase the replicability across different ages, sexes, and cultural groupings. The homogeneity of a scale can always be increased by adding more items with similar content but this only leads to what Cattell calls "bloated specifics" and what Eysenck and Eysenck (1969) call "tautological factors". Such scales do not perform the necessary broad sampling of the given behaviour.

While there is general agreement that Cattell's factors are not at all tautological and that his arguments concerning homogeneity are entirely adequate in theory,

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there are now strong reasons to doubt that these principles were put into practice during the construction of the 16PF scales. Using data on the 16PF drawn from large samples of British adults and undergraduates, Saville and Blinkhorn (1981) were unable to discover any evidence of the "structured homogeneity" that Cattell advocates. Instead, they found that the majority of the scales had internal consistencies (alpha coefficients) that met the conventional standards of psychometric adequacy. They also found that conventional psychometric indices give good estimates of the factor and item validities. Thus, although there was no evidence for the balancing of specifics or for the use of suppressor effects, qualified support could be given to a number of the 16PF scales. The scales which seemed to be least adequate for use with individuals were B, L, M, and N. The anxiety scales, C, O, and Q4 were found to be equivalent measures of the same trait, as Eysenck (1972) had earlier discovered.

Another recent examination of the 16PF also revealed that several of its scales are psychometrically adequate, though no support could be found for the overall factor structure claimed by Cattell. Using methodology very similar to that recommended by Cattell, Barrett and Kline (1982b) performed both item and radial-parcel factor analyses of Form A of the 16PF but were unable to locate the expected 16 factors. However, when Cattell's hypothesised structure was ignored and psychometric criteria were used instead to identify valid scales, a satisfactory seven factor solution was found.

### 6.5 The selection of scales from the 16PF.

Thus, in spite of the many criticisms that have been levelled against the 16PF, it appears from recent evidence that at least some of its scales are psychometrically

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adequate. Moreover, the questionnaire as a whole contains decidedly more (reliable) information than is captured by the higher-order factors Ex and Ne. This last fact is of special importance in the investigation of astrology since it is not at all clear what features of individual differences (if any) might be influenced by astrological factors. In such a situation it is advantageous to cast one's net as wide as possible. A comprehensive questionnaire is more likely to trap isolated influences, if they are in fact isolated, than is a narrow one.

Consequently, it was decided that as many of the 16PF scales would be retained as (a) showed adequate internal consistency, (b) showed appreciable independence from the scales of the EPQ, and (c) showed evidence of factorial validity.

While the alpha coefficients published by Saville and Blinkhorn (1981) and the studies by Barrett and Kline (1982b) provide evidence for internal consistency and factorial validity respectively, the appropriate method for measuring the redundancy of Cattell's scales against Eysenck's has been the subject of controversy recently. The method used by Saville and Blinkhorn (1976) was criticised by Krug (1978) because it involved excessive adjustments for unreliability. According to Krug, the method of choice is first to predict each of the 16PF scales from the optimum linear combination of the Eysenck scales. Then the squares of the resulting multiple Rs should be subtracted from the reliabilities of the 16PF scales to show what proportions of these scales are both reliable and independent of the Eysenck scales. This method appears quite correct and the only argument that remains is what constitutes an appropriate measure of reliability. Saville and Blinkhorn employed parallel-form reliabilities but Krug objected to these on the grounds that Cattell had pursued the balanced specific principle across, as well as within,

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different forms of his test. If so, this would mean that parallel forms methods underestimate the true reliability of the test. However, in their most recent studies, Saville and Blinkhorn (1981) were unable to find any evidence that this was so. Instead, they confirmed that the alpha coefficients and the alternate form reliabilities were in good agreement, just as they should be for two tests of the same length (Nunally, 1967). Therefore, in the following calculations, Krug's (1978) method was used except that, in this case, alpha coefficients were employed as measures of reliability. Of course, this investigation also differs from previous ones in using the three scales of the EPQ instead of the two scales of the EPI.

### Method.

Subjects. A total of 911 subjects, of which 305 were male and 606 female, completed both the EPQ and Form A of the 16PF. Full details of the composition of this sample and of the administration of the questionnaires are given in Chapter Five.

Procedure. Scores on all 20 of the personality scales were standardised against the population norms, full details again being given in Chapter Five. For the sake of completeness, four second-stratum factor scores were derived from the 16PF primaries using the weights and constants published by Cattell et al. (1970, Table 10.9, pp.128-9). These higher-order factors are QI, Exvia, QII, Anxiety, QIII, Cortertia, and QIV, Independence. They were derived separately for males and females. Reliabilities for the 16PF primaries were alpha coefficients calculated for a general British adult sample by Saville and Blinkhorn (1981; Table 1). For the second-order 16PF factors, alternate-form reliabilities, for Form A with Form B, were used. These were calculated for males and females combined

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for the same British adult sample and were taken from Saville and Blinkhorn's (1976) Table 4.2

With each of the 16PF scales acting as criterion in turn, and with the Ps, Ex, and Ne scales of the EPQ as predictors, multiple regression weights were calculated by Aitken's (1937) method. For the sake of completeness, multiple regression weights were also calculated with only Ex and Ne as predictors. This allowed the contribution of Ps to the prediction of 16PF scores to be assessed.

### Results and Discussion.

#### 1. Scale intercorrelations.

The Pearson intercorrelations amongst the EPQ scales and the correlations between these scales and the 16PF primaries are shown in Table 6.1. It is interesting to compare these results with Saville and Blinkhorn's (1976) Table 5.1, which shows similar correlations. Although the latter is based on the EPI extraversion and neuroticism scales and Forms C and D of the 16PF, there are very few substantial discrepancies in the results. The only major

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**Table 6.1 Correlations between EPQ and 16PF scales.**

I---EPQ---I-----																	-----16PF-----I
Ex Ne Li A B C E F G H I L M N O Q1 Q2 Q3 Q4																	
Ps	04	16-26	-10-10	-19 30	15-40	01-02	27 08-25	16 29	00-34	19							
Ex		-22-06	29-05	20 39	62 02	72-03	13-01-28-21	11-35	-05-18								
Ne			-14-08	-15-58	-06-05	-01-33	10 23-10	01 61-06	03-26	63							
Li				03-02	19-21	-14 30	05 02-17	-09 14-16	-17 01	37-25							

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Decimal points omitted.

Where N=911, correlations greater than 0.09 are significant at the 1% level (2 tailed).

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difference in the correlations with Eysenck's Ne is that the significant relationship with factor N, reported by Saville and Blinkhorn, is non-significant in the present investigation, but this change is likely to be due to the very poor reliability of N (as shown in Table 6.3 below). Saville and Blinkhorn also reported rather higher correlations between Eysenck's Ex and factors A, G, and Q3 than have been found here and an appreciably lower correlation with factor H. These changes probably reflect the removal of impulsiveness items from the EPQ extraversion scale (Eysenck and Eysenck, 1977) since impulsiveness is likely to be an element of both G-, Expediency, and Q3-, Undisciplined self-conflict. The higher positive correlation with H, Socially bold, is to be expected because EPQ extraversion is now almost purely a measure of sociability (Rocklin and Revelle, 1981). The change in the extraversion scale may also be reflected in the increased negative correlation observed between Ex and Ne ( $r = -0.22$ ). Sociability has long been known to be inversely related to neuroticism (Eysenck and Eysenck, 1963). A similar, though rather higher, negative correlation between Ne and H is also shown in Table 6.1

The highest correlations involving EPQ psychoticism are with factors E (0.3), G (-0.4), and Q3 (-0.34). These results are in line with previous findings showing that psychoticism, as a higher-order factor, is highly loaded by other primary scales measuring dominance, lack of superego, and disorderliness (Eysenck, 1978a; Barrett and Kline, 1980a). It is rather surprising, however, that the correlation between Ps and factor I, Tough/tender-minded, is negligible, for Eysenck and Eysenck (1975) suggest "tough-minded" as an alternative appellation for the Ps scale. It appears that Ps and I have nothing in common except a name; 16PF Tough-mindedness is concerned with traits like unsentimental, hard, and practical (Cattell et al, 1970) whereas EPQ "tough-mindedness" has

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more to do with disorderliness and non-conformity (Forbes, 1980)

The correlations between the EPQ Lie scale and the other scales are of interest since the main purpose of this scale is to detect social desirability bias. The ability of the EPI Lie scale to do this has been doubted by Rump and Court (1971) and by Dunnett, Koun, and Barber (1981), amongst others. However, the corresponding scale of the EPQ is a revised version and has received support from Furnham and Henderson (1982) in the only study devoted to it so far.

In order to detect the presence of dissimulation, Eysenck and Eysenck (1975) recommend that the correlation between Li and Ne should be inspected. Table 6.1 shows that, with this sample, this correlation is -0.14. Although highly significant because of the sample size, this value is very small, as is the correlation between Li and scales C and O, the main measures of neuroticism in the 16PF. Thus, from these indices, there is little evidence for social desirability responding. Considering that the subjects in this investigation were told that their scores would only be used for research and were allowed to answer the questionnaires anonymously, this result is as expected.

However, Table 6.1 also shows that the Lie scale correlates above 0.2 (absolute value) with Ps and with the 16PF scales E, G, Q3, and Q4, and this might indicate some (slight) tendency to "fake good" on these measures. On the other hand it is possible that these correlations merely reflect the ability of the Lie scale to measure a personality variable to some degree similar, though opposite, to psychoticism. This possibility is supported by three strands of evidence. Firstly, scales E, G, and Q3 are the three scales with which Ps correlates highest. Secondly, the Lie scale has considerable internal consistency and this consistency is unaltered by special



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faking instructions or by warnings to be honest (Eysenck, Eysenck and Shaw 1974). This shows that the scale measures some stable trait though the exact nature of this trait is still unclear. Thirdly, Barrett and Kline's (1980b) study of the psychometric properties of the EPQ showed that about half of the Lie items correlate significantly with the total Ps score and, amongst British students at least, nearly half of the Ps items correlate significantly with the total Lie score.

The correlations between the EPQ and four of the 16PF second-order factors are shown in Table 6.2 . Again, there

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**Table 6.2 Correlations between EPQ scales and  
16PF second-order factors**

EPQ.	16PF factors			
	QI	QII	QIII	QIV
Ps	.1	.19	.20	.34
Ex	.71	-.26	.32	.28
Ne	-.12	.72	-.07	-.19
Li	-.09	-.24	-.10	-.21

---

Where N=911, correlations greater than 0.09 are significant at the 1% level (2 tailed).

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is very little difference between the present results with Ex and Ne and those reported by Saville and Blinkhorn (1976) in their Table 5.2 .

### 2. 16PF variance that is reliable and independent of the EPQ.

Table 6.3 shows the alpha coefficients for each of the 16PF primaries and the multiple correlations between Ps, Ex and Ne and each of the 16PF scales. The multiple Rs were squared and subtracted from the reliabilities to give the proportion of the variance that is both reliable and

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unpredictable from Eysenck's three scales. These values are shown in the third row of the table. The average proportion of unshared, reliable variance for the 16 scales is 0.29 (SD=0.1).

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**Table 6.3 Proportion of the variance in the 16PF scales that is reliable and independent of Ps, Ex, & Ne.**

	16PF scale															
	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
Alpha	37	40	53	60	68	52	77	56	44	21	27	57	39	43	48	69
R	31	18	59	48	63	40	74	11	36	15	36	62	31	35	41	64
Alpha-R <sup>2</sup>	28	37	18	38	28	36	22	55	31	19	14	19	29	31	31	28

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Decimal points omitted.

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Table 6.4 gives the equivalent results for the four second-order 16PF factors except that, in this case, alternate-form reliabilities were used. Since the second-order factors are derived from the primary scales, alpha coefficients for them cannot be calculated.

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**Table 6.4 Proportion of the variance in the second-order 16PF factors that is reliable and independent of Ps, Ex, & Ne.**

	16PF factor			
	QI	QII	QIII	QIV
Equivalent-form reliability (r)	.84	.82	.58	.67
Multiple R	.71	.73	.37	.48
r-R <sup>2</sup>	.33	.29	.44	.44

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Previous estimates of the redundancy of the 16PF against Eysenck's factors have been based on the EPI, which does not measure Ps. Equivalent estimates are presented in Tables 6.5 and 6.6 where the multiple Rs are for Ex and Ne

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only. Thus, the third rows of both tables show the proportions of the reliable variance of each factor not accounted for by Ex and Ne. The fourth rows of both tables show the proportion of the variances accounted for by Ps over and above that accounted for by Ex and Ne. These figures were obtained by subtracting the figures in the third rows of Tables 6.3 and 6.4 from the third rows of these tables. It is clear from these results that Ps adds very little to the prediction of 16PF scores; its largest contribution is to the prediction of G for which it only accounts for an extra 16% of the reliable variance. These findings are in line with Cattell and Bolton's (1969) discovery that pathological dimensions are largely outside the scope of the 16PF.

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**Table 6.5**

**1. Proportion of the variance in the 16PF scales that is reliable and independent of Ex and Ne.**

	16PF scale															
	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
Alpha	37	40	53	60	68	52	77	56	44	21	27	57	39	43	48	69
R	29	17	58	39	62	03	74	10	29	11	28	62	12	35	29	63
Alpha-R <sup>2</sup>	29	38	19	45	29	52	22	55	35	20	19	19	38	31	40	29

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**2. Proportion of the variance in the 16PF scales accounted for by Ps over and above that accounted for by Ex and Ne.**

	16PF scale															
	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
	01	01	01	08	01	16	00	00	05	01	05	00	09	00	09	01

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Decimal points omitted.

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Table 6.6

1. Proportion of the variance in the second-order 16PF factors that is reliable and independent of Ex and Ne.

	16PF factor			
	QI	QII	QIII	QIV
Equivalent-form reliability (r)	.84	.82	.58	.67
Multiple R	.71	.72	.32	.31
r-R <sup>2</sup>	.34	.30	.48	.57

2. Proportion of the variance in the second-order 16PF factors that is accounted for by Ps over and above that accounted for by Ex and Ne.

	QI	QII	QIII	QIV
	.00	.01	.03	.13

The average proportion of unshared, reliable variance ( $\alpha - R^2$ ) for the 16 scales in Table 6.5 is 0.33 (SD=0.12). The corresponding average from Krug's (1978: Table 3) investigation of the same issue was 0.56 (SD=0.18). The difference between these figures chiefly reflects the differences in the measures of reliability used. The retest reliabilities employed by Krug were substantially higher than the alpha coefficients employed here but the latter are preferable on psychometric grounds.

It is also interesting to compare the results presented in Table 6.5 with Saville and Blinkhorn's (1976) Table 5.8 which shows the alternate form reliabilities of the 16PF scales after the extraction of EPI extraversion and neuroticism. Although different methods were used, the proportions of reliable and independent variance in the 16PF scales shown by the two tables are very similar.

After extracting extraversion and neuroticism by Cooley and Lohnes' method for the extraction of arbitrary orthogonal factors targeted on particular variables,

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Saville and Bliukhorn went on to extract factors B, Intelligence, I, Tough-mindedness, and Q1, Radicalism/conservatism. They then found that there was still a considerable proportion of reliable variance remaining, especially for factors G, Superego strength, A, Reserved/outgoing, and E, Dominant. Similarly in the present analysis, the 16PF factors with large proportions of variance independent of Ex and Ne are B, I, Q1, G, and E. In addition, factors Q3, L, and Q2 all have more than 30% of their variance independent of Ex and Ne, though factor A has slightly less than this figure.

Eysenck (1972) has shown that the 16PF primaries that load highest on the second-order Anxiety factor - scales C, L, O, Q3, and Q4 - correlate together almost perfectly when corrected for attenuation. This suggests that "practically all the information contained unreliably in the primaries is contained reliably in the second-order factor" (page 267). However, it does not follow that all of this information is also contained in Eysenck's Ne and, turning to Table 6.6, we find that 30% of the reliable variance of Cattell's Anxiety (QII) factor is independent of both Ne and Ex. Table 6.5 shows that it is Q3 and L that are chiefly responsible for this; 40% and 35% respectively of their reliable variances are independent.

In a similar fashion, Eysenck (1972) showed that 5 primaries which load highest on the second-order Exvia (QI) factor also correlate very highly when corrected for attenuation. However, these intercorrelations were not as high as those amongst the Anxiety primaries. In particular, E and Q2 seemed to be somewhat independent of A, F, and H. Eysenck called them "contrasting extraverted attitudes leading to either leadership or group adherence" (p. 268). A similar situation is found in the present results where 34% of the variance of Exvia is independent of Ex and Ne

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(Table 6.6). Table 6.5 shows that it is E and Q2 which contribute most to this independence.

### 3. General discussion.

The main purpose of the present analysis was to provide a basis for selecting scales from the 16PF for use, in conjunction with Eysenck's scales, in the investigation of astrological theory. The results shown in Table 6.3 are the most relevant for such selections. The first requirement set out above was that the scales should show adequate internal consistencies. The question is, what would be adequate for the present purposes? An arbitrary cut-off value of 0.4 was set. Clearly, such a low consistency would be unacceptable for use with individuals, but for research with a large subject sample, it should be adequate. This led to the rejection of scales A, M, N, and Q1. The second requirement was that the scales should show appreciable independence from Eysenck's scales, as measured by Alpha -  $R^2$ . Again, an arbitrary cut-off point was needed and, in this case, it was set at 0.3. Only 7 scales met both of these requirements. They were B, E, G, I, L, Q2, and Q3.

The third requisite stated earlier was that the scales should show some evidence of factorial validity. The present analysis was not addressed to this issue but some relevant data have been published recently by Barrett and Kline (1982b). These authors found that they could not replicate Cattell's 16 factor structure but could, nevertheless, identify individual scales possessing acceptable factor validities. It is encouraging to find that almost all of the scales which met the first two of the present requirements, also met this third requirement. Barrett and Kline found that scales B, I, and L were adequate on their own and G and E were adequate when

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combined with Q3 and H respectively. The remaining scale, Q2, was rejected but this was a borderline decision.

In conclusion, it was decided that all seven scales that have at least 30% of their reliable variance independent of Eysenck's scales would be retained. Descriptions of the traits measured by these scales, and by the three scales of the EPQ, are presented in Table 7.1 in Chapter Seven. The validity of some of these scales may be doubtful but the benefits of covering as much of the personality sphere as possible seems to outweigh the possible drawbacks.

THE ASPECTUAL CIRCLE.

7.1 Astrological conceptions.

In astrology, the influences of the planets are said to be modified by their mutual angular separations at the time of birth. Certain particular angles between planets, with permissible degrees of inexactitude, called "orbs", are regarded as especially important. These are the "aspects". They correspond to the division of the circle by small whole numbers. Aspects are frequently categorised, according to their relative strengths, as "major" and "minor". The former correspond to the division of the circle by 1, 2, 3, 4, and 6 (called "conjunction, opposition, trine, square, and sextile" respectively). Minor aspects correspond to divisions by 5 and numbers higher than 6. Aspects are also commonly categorised as "soft" and "hard" (in ancient terminology "good" and "bad"). Planets in soft aspect are said to promote desirable traits and an easy life while planets in hard aspect give rise to personal problems, hardships and vices. Of the major aspects, the trine and sextile are soft, the opposition and square are hard, and the conjunction is variable, depending on the planets involved.

Another basis for differentiating aspects is according to whether the angular separation is less or greater than the exact aspect. The former are called "applying", and the latter "separating", aspects. There appears to be no general agreement among astrologers on the significance of this distinction which is generally ignored in practice (Dean et al., 1977). However, one frequently cited piece of research, which we shall examine later, appears to show that the distinction is empirically important.

Only the geocentric separations between planets are normally considered, though a few astrologers use heliocentric measures. Also, the appropriate reference



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plane is normally taken to be the ecliptic<\*>, but there are astrologers who advocate using absolute angles (ie. the shortest distance between the bodies), or projecting onto the equator or the prime vertical. In this thesis, the terms "aspects" and "angular separation" refer to measurements made in celestial longitude unless otherwise specified. Other possible reference planes, and other bases for differentiating aspects are given in Dean et al.(1977).

### 7.2 Research on aspects.

On the strength of a thorough review of research into astrology, Mather (1979) felt that the balance of evidence was in favour of the validity of aspects. Not a great number of studies on the topic had been completed then, chiefly because the expected frequencies of aspects are difficult to calculate, due to the non-uniform geocentric motions of the planets. However, there had been three large-scale investigations and they all appeared to give firm statistical support to the concept.

One of these investigations was conducted by Nelson (1974; 1978; a complete list of Nelson's publications is given in Dean, 1983a) who studied disturbances in short-wave radio reception. The most important of such disturbances are caused by storms in the ionosphere which are caused, in turn, chiefly by solar flares. This much is widely accepted. However, Nelson claimed that predictions of short-wave radio quality could be improved above the level attainable from the monitoring of solar activity, by taking into account the heliocentric aspects between the planets and he devised a system for combining aspects between different planets (summarised in Dean et al., 1977; Playfair and Hill, 1978; Dean, 1983a). In this system, the most important aspects are multiples of 90°, which correspond to the "hard" aspects of astrology. However, recent statistical analyses by Nias (1981), Ianna and

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Margolin (1981), Meus (1982), and Dean (1983a) have all failed to support Nelson's claims. Of these, Dean's analysis is by far the most comprehensive. He studied nearly 7000 forecasts of radio quality, made by Nelson between 1966 and 1982, in a series of analyses designed to give Nelson's system every opportunity to show its worth. He had to conclude that the system was originally inspired (in the 1940s) by a statistical artefact and that it had been defended ever since by inappropriate statistics and post hoc data selection.

A second study that was reviewed favourably by Dean et al. (1977) was by Dieschbourg (unpublished, but details given in Dean et al., 1977), who investigated the associations between aspects and success in a number of careers. Specifically, he examined the numbers of aspects between 27 pairs of planets at the births of individuals eminent in ten different professions, and compared them with the aspects for a control group. Out of a total of 270 comparisons, 17 were significant at the 1% level, which gives an overall significance of approximately  $10^{-8}$ . In this study, aspects were not differentiated (eg. as soft versus hard) but the orb was varied with the type of aspect. The semisextile ( $30^\circ$ ) and quincunx ( $150^\circ$ ) were included together with the major aspects.

Positive results have also been reported by Jayne and Schaeffer (1970). In this study, the aspects between Mars and the sun, moon and seven other planets were studied for 549 eminent French sportsmen (birth-data from Gauquelin, 1955). The rationale for studying Mars aspects in particular was that Mars has traditionally been associated with athletics and has been shown, by Gauquelin, 1955), to be associated with success in sports. The frequencies of each of the five major aspects, plus the semisextile and quincunx, were examined individually and compared with expected frequencies. For aspects involving the sun,

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Mercury, Venus, and Jupiter, these expected frequencies were calculated exactly from ephemerides but for the remaining planets they were generated theoretically on the assumption of equal probability of all angular relationships. Thirteen of the 63 individual comparisons were significant at the 5% level. Combining the different types of aspects, those involving Venus and Jupiter were individually significant and, combining the results for different planet pairs, results for the sextile, square and trine were individually significant.

Unfortunately, Jayne and Schaeffer's results are not comparable with Dieschbourg's because the latter did not include sports among the professions he studied. However, sports were included together with science, acting, and writing in an investigation of aspects and career success by Shanks (1977), who also used Gauquelin's data. For these four career groups, the frequencies of aspects between 115 pairs of chart factors (including AS, MC, VX and EP) were compared with those for four, matched, randomly generated, control groups. Aspects between SO and MC were found to be significantly more common for the scientists, writers and actors than for their respective control groups, but this was the only pair of chart factors to give consistent results. However, even this result can probably be explained reductively as an artefact due to the tendency for birth-times to be recorded to the nearest hour. Le Clercq (1983) has recently pointed out the equivalence between having a SO-MC aspect and having a birth registered to a whole hour, and Gauquelin (1971) has reported that the majority of all births-times in the records are rounded to the nearest hour. It is also noteworthy that Gauquelin found that precision in minutes is scarcer in the old records than in the more recent ones. This may explain why Shanks failed to find significant SO-MC aspects for sportsmen since, of all Gauquelin's eminent subjects, these tend to be the most recently born (Startup, 1983c).

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Although Shanks found that the SO-MC pairing was the only one that gave consistently significant results across different professional groups, he did also discover over 60 other pairings which gave results significant at the .005 level with at least one of the professional groups. However, these results emerged from nearly 11,000 individual comparisons and thus represented only .0055 of the total number of tests (excluding SO-MC aspects). Therefore, they are well within the range of the expected number of significant results. Furthermore, none of these individually significant aspects replicated those found by Dieschbourg or by Jayne and Schaeffer when the same professional groups were considered, that is, scientists and sportsmen respectively. In the case of the sportsmen particularly, this itself requires explanation for the samples used in the two investigations partially overlapped.

It is likely that the discrepancies between the results of these three studies of professional groups are chiefly due to the different methods of calculating expected frequencies employed in each of them. Dieschbourg generated control groups of roughly the same sizes as his professional groups by sampling dates at random from the epochs in which his experimental subjects were born. Jayne and Schaeffer, on the other hand, used ephemerides to determine the proportion of the time that each aspect was in orb during the epoch in which the subjects in their study were born. However, neither of these methods takes into account the rate at which the subjects were born within the relevant epochs. Within any given period, the rate of birth of individuals who later become successful is likely to vary considerably for reasons which are unconnected with the movements of the planets. In particular, the rate has tended to increase linearly over time quite simply because the opportunities for participating in the professions has increased. Since the

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frequencies of aspects obtained from ephemerides are dependent on the actual years involved - the slower the planets in their orbits, the more critical the dependence - any differences between observed and expected frequencies could be due to the differences in the rate of sampling for the experimental and control samples.

The method used by Shanks, by contrast, was to match each member of his experimental groups with a control selected for the same year, and then to pick a day-of-the-year and a time-of-day for each control at random (subject only to the constraint that the distributions of these days and times matched the corresponding distributions for the entire experimental group). Of course, the choice of the year as the period for which the experimental and control subjects are matched is somewhat arbitrary, and may not be the optimum period for any of the planetary pairs, but at least this method controls for varying rates of birth over time. Thus it is to be preferred over the other two methods.

However, it is also possible that Shanks' failure to find consistent aspect effects is due to his unconventional method of defining aspects. He used a technique, called "conjunction counting", which involved generating, for each subject, all of the first 36 harmonic charts (Addey, 1976a) and then looking for conjunctions between pairs of chart factors in each of these charts. Since the orb was held constant at  $5''$  during this process, the effective orb for most of the traditional aspects was considerably smaller than is normally thought appropriate. To give an example, an orb of  $5''$  in the 6th harmonic chart means that the traditional aspect series corresponding to this harmonic (ie. conjunction, sextile, trine, opposition) are allowed orbs of only  $5^\circ/6 = 0.83^\circ$ , whereas an orb of  $5^\circ-7^\circ$  is more usual. Another possibly detrimental consequence of the conjunction-counting method is that none of the major

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aspects except the conjunction itself can be studied separately from others, that is, from their submultiple harmonics. In theory, this would be most important for the sextile (a soft aspect) which cannot be studied separately from the opposition (a hard aspect). Finally, it should be mentioned that astrologers do not normally use any aspects corresponding to harmonics higher than the 12th. To include higher harmonics may be to obscure the effects of the aspects that astrologers do regard as effective.

Despite these shortcomings, Shanks was able to report some results, significant at the 1% level, for particular harmonics when all pairs of chart factors were summed together. For the scientists, the 3rd, 6th, and 24th harmonics showed higher than expected frequencies of conjunctions. For the actors and writers, similar results were only found for the 7th and 6th harmonics respectively. The sportsmen showed no such results at the 1% significance level. However, since 36 harmonics were examined for each of the four groups (=144 tests overall), and harmonics which are multiples of each other are not perfectly independent, these results may be spurious. They are also inflated by the SO-MC aspects which are probably artefactual, as we have seen.

In addition to the career groups which featured in three of the studies reported above, groups of nonagenarians, hemophiliacs, suicides, and babies who died from respiratory distress syndrome have also been investigated in studies which included aspects among the astrological variables.

In order to test the astrological notion that the sun in some sense represents the "life force" and that its position in the horoscope indicates the length of the individual's life, Addey (1958a) examined the associations between solar aspects and longevity. To do this, he

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obtained the birth dates of 970 nonagenarians from four volumes of "Who Was Who" and calculated the frequencies of the major solar aspects to MA, JU, SA, UR, NE, and PL. However, none of these frequencies differed significantly from the expected values.

In a subsequent analysis of the same data, Addey (1958b) noticed that, amongst these solar aspects, applying aspects were far less frequent than separating ones. This led him to suggest, at first, that the applying versus separating distinction was of fundamental importance, but in a later publication (Addey, 1976a) he re-analysed this result and reinterpreted it in accordance with the theory of Harmonics that he had subsequently developed. This reanalysis, and the implications of Harmonics for the study of aspects, will be examined later in sections 7.7 and 7.8.

Lichtblau, Sansbury and Emerson (1975) investigated whether hemophiliacs could be distinguished from non-hemophiliacs on the basis of the geocentric and heliocentric aspects at their births. Stepwise multiple discriminant analysis of nearly 500 aspect pairs, for 75 hemophiliacs and 75 controls, revealed a (unspecified) number of discriminating variables. An index constructed as a weighted sum of these predictors, subsequently achieved significant ( $p < .05$ ) discrimination between fresh samples of 23 hemophiliacs and 25 controls.

Promising results using aspects (among other variables) as discriminators have also been obtained by Michelson, Wood, Wilson, Silverstein and Piland (1977a & b) in a study of the possible planetary indicators of respiratory distress syndrome (RDS) in neonates. Samples of 122 RDS babies and 145 randomly selected normal babies were gathered and a number of astrological variables were examined, eleven of which were found to discriminate between the two groups at the .001 level. Six of these were

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aspect variables. Multiple regression was also used to derive weightings for the 11 significant variables for an RDS prediction index. When the index was applied to 121 RDS and 144 normal neonates, classification was correct in 69% of cases.

However, Eysenck and Nias (1982) have identified two important reasons why little confidence should be placed in Michelson et al.'s results. First, the reports do not say how many variables were investigated in the process of finding the 11 significant ones. If it was a large number, as seems most likely from the nature of the discriminators that were identified, then it is to be expected that several would appear to be highly significant by chance alone. Secondly, it is not clear whether the RDS prediction equation was tested on fresh samples or on the same samples that were used to obtain the regression weights. If it was the latter, the test is clearly worthless. Eysenck and Nias tried to obtain clarification on these points from Michelson and his associates but without success and this must tend to diminish our confidence in these results even further.

Aspects have also been included as independent variables in an investigation of the possible indicators of suicide, undertaken by the New York Chapter of the National Council for Geocosmic Research (Press, 1978). A sample of 311 suicides, with 311 controls matched for place and year of birth, was divided into three subgroups according to the years of death of the suicides. About 100,000 astrological variables were examined but no factor that significantly discriminated the suicides from the controls in one of the subgroups was found to do so in the other two subgroups.



### 7.3 Aspects and personality.

Planets in aspect are said to promote characteristics (personality, physiological, anatomical etc.) which are a blend of the influences of the planets involved in the aspect. Criterion groups have been studied, as in the investigations reviewed above, because it is assumed that membership of such groups is facilitated by, or associated with, the possession of particular traits. However, the influences of aspects on personality have also been investigated directly in three studies employing questionnaires.

Hume and Goldstein (1977) administered the MMPI and the Leary Interpersonal Checklist to 196 students and then divided this sample into two groups; those who had an extreme score on any of the 13 personality measures employed and those who did not. For each of the measures, comparisons were then made, for a large number of astrological variables, between the distributions of the two groups. The independent variables included the major aspects along with the zodiac signs (tropical and sidereal) and the houses. Altogether 632 chi-square tests were performed but the number of these that were statistically significant did not exceed chance expectation. Results for individual variables were not reported.

It should be noted, however, that the sample in this investigation was comparatively small; the maximum size of the experimental group was only 86. Hence, for many of the individual tests there would have been fewer than seven subjects per cell of the contingency table. Also, only a very few of the 632 tests could have involved aspects since 429 of them must have been devoted to testing signs and houses. This leaves only 203 tests for aspects. If each pair of planets was tested with each of the 13 measures, a maximum of only 15 pairs could have tested (unfortunately

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the report does not give details). Moreover, no attempt was made to discover what predictions astrologers would make about the effects of aspects on the traits that were investigated. Thus, many of the analyses may have tested predictions that astrologers would not make.

The relationship between astrological variables and hostility as a personality trait has been investigated by Tiggle and Fiebert (1979). In this study, three astrological scales of hostility were developed by consulting a textbook. There was one scale each for Mars, Venus and Pluto and the score for each planet was based on three components: the house position of the planet, the number of aspects formed with other planets (weighted according to orb), and the amount of hostility associated with the aspected planet. Scores on these scales were computed from the horoscopes of 72 students and were then correlated with the students' scores on the Buss-Durkee measure of hostility. The correlation with the Mars scale ( $r=0.25$ ) was significant but those for the Venus and Pluto scales were not. This result is intriguing because Mars, of all the planets, is particularly associated with hostility in astrology. Unfortunately, it is not known whether aspects contributed significantly to the correlation because the components of the Mars scale were not analysed separately.

Two studies of the possible relationships between aspects and the traits measured by Cattell's 16PF have been conducted by Noblitt (1978). For each of 155 subjects, he obtained the ecliptic positions of the planets and, from this information, the numbers of each of the major aspects ( $6^\circ$  orbs) between the 45 possible pairs of planets. These numbers were then used, in the first study, as predictor scores in a multiple correlation with the Q4 scale of the 16PF. This was a test of the doctrine that the hard aspects lead to tension (Q4+) whereas the soft aspects promote

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relaxation (Q4-). However, the multiple R was not significant and neither were any of the individual correlations between number of aspects and Q4 scores.

In the second study an attempt was made to predict scores on each of the 16PF scales from a linear combination of 21 astrological variables. The latter consisted of the 12 sun-signs plus the nine angular separations between the sun and the planets. The sun-sign variables were scored dichotomously but unfortunately it is not clear how the aspect variables were quantified. The report appears to say that the angle between the sun and each of the planets, measured in degrees of longitude, was entered as a measure of the aspect between the bodies. However, this would seem to have nothing to do with astrology since the latter does not claim that influences increase linearly with increasing separation. Consequently the results from this study will not be reported.

### 7.4 Overview of research on aspects.

The foregoing review of research suggests that Mather's (1979) favourable estimation of the validity of aspects was premature. The recent discovery that Nelson's results with aspects and radio disturbance are spurious, is particularly damaging. Many astrologers had come to view these results as a triumphant vindication of their doctrines (Ianna and Margolin, 1981) and even the admirably critical review by Dean et al. (1977) cited it as some of the best support for astrology. The evidence for aspects provided by two earlier studies of professional groups (Dieschbourg; Jayne and Schaeffer, 1970) is also in doubt now owing to Shanks' (1977) more recent failure to find clearly significant results with similar professional groups, using an improved experimental method. Of the remaining four studies which have used the technique of counting the frequencies of aspects at the births of individuals belonging to criterion

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groups, only the study of hemophiliacs, by Lichtblau et al. (1975), was clearly successful, and this study has not been replicated.

However, this latter success, together with the ambiguity of the results with professional groups and with Tiggie and Fiebert's (1979) success in predicting hostility scores, suggest that aspects still require further research. If this is to be done, research employing measures of personality is preferable to research with criterion groups not only because the former avoids the latter's problems with the calculation of expected frequencies, but also because astrologers generally claim that the planets are only linked with various groupings of people through the mediation of personal traits. That is to say, it is only because the members of criterion groups tend to share particular traits that the planets come to be associated with those groups. The real influences are on the traits of individuals and can be detected most easily by studying these traits. Some of the research by Gauquelin, which will be examined in detail in the next chapter, gives strong support to this view, at least where the diurnal positions of the planets are concerned.

So far there have been only three direct investigations of the links between aspects and personality and each of them has rather severe limitations, as was shown above. The studies to be reported below were designed to overcome some of these limitations. They employ a considerably larger subject sample than has been used before, they investigate the majority of the 45 possible planetary pairs and they do so individually so that it is possible to determine which pairs (if any) have effects on personality, and they employ a carefully selected battery of personality measures which covers a large proportion of the personality sphere. In Study I, to which we turn next, care is also taken to

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determine what predictions astrologers are prepared to make with regard to aspects.

### 7.5 Aspect Study I

The method of this study consists of two major parts: the determination of astrological predictions and the testing of these predictions.

**7.5.1 Astrological predictions.** Predictions were obtained by canvassing the opinions of a group of individuals who are familiar with both astrology and personality testing with self-report measures. Ten such individuals were contacted, all of whom are members of a London-based group dedicated to scientific research into astrology. They were asked to complete a questionnaire with the following instructions;

"I am investigating 32 of the possible pairings of the 10 planets and I have measurements on 10 separate (though not perfectly independent) personality scales. Thus there are 320 possible results. However, astrology does not necessarily claim that aspects between each pair of planets have an effect on each of the 10 traits. Pairs of planets in aspect are said to have a powerful effect on some traits but are neutral for others. What I would like you to do, then, is to consider each of the 10 traits in turn and to indicate which of the aspects should have an effect according to astrology.

However, aspects are not all of one kind. The most common way of classifying them is as 'soft' and 'hard' (= 'good' and 'bad'). Amongst the major aspects, the sextile and trine are soft and the square and opposition are hard, while the conjunction is variable, depending on the planets involved. Now, soft and hard aspects do not necessarily affect personality in the same way, though they might do. The personality scales that I am using are all bipolar. That is, they measure dimensions of personality which have two opposite poles. With a given personality scale, then, a particular pair of planets might affect the scores in one direction when in soft aspect and in the opposite direction when in hard aspect. For example, JU and SA in hard aspect might promote neuroticism but in soft aspect they might promote stability. Alternatively, a pair of planets might affect personality in only one way whether in soft or hard aspect. For example, both the soft and hard aspects of JU and SA might promote conscientiousness not its opposite, expediency.

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Thus, when you are judging the effects of aspects, could you consider; (a) which pairs of planets have an effect on each of the 10 personality scales, and (b) whether the effects are in the same or the opposite direction for soft and hard aspects.

In the pages that follow, each of the personality dimensions will be taken one by one. For each of them there will be a brief description of the two opposite poles, which will be named and also labelled with '+' or '-'. This will be followed by an aspect grid showing the 32 planetary pairings. When you have read the description carefully, indicate your judgements on the grid in the following manner;-

(1) If the soft and hard aspects operate in opposite directions, indicate the directions with the symbols 'S' for soft, 'H' for hard, '+' for the pole marked thus, and '-' for the opposite direction. Thus, if the soft aspects operate in the positive direction, and the hard aspects operate oppositely, write S+H-. Place these symbols in the appropriate box in the grid.

(2) If the soft and hard aspects promote the same trait, write either S+H+ or S-H-.

(3) If the personality dimension is not affected by the given pair of planets, leave the relevant box blank.

(4) Since the conjunction is considered to be variable, leave it out of consideration altogether."

The ten personality dimensions that the astrologers were asked to consider are the same ten that were selected in Chapter Six above (see section 6.5). The descriptions of them that were provided are presented in Table 7.1.

The questionnaire required 32 aspects to be considered. In fact there are 45 possible pairings of the sun, moon and eight planets but the mutual aspects between SO, ME, and VE were omitted because the possible angles between these bodies are limited to  $72^{\circ}$  or less. The ten mutual aspects between the slow moving planets, from Jupiter outwards from the sun, were also omitted because their synodic periods are in excess of 12 years. With such long periods, any effects due to aspects could not be distinguished from effects due merely to the passage of years.

Five replies to this questionnaire were received. After examining the responses it was decided that all predictions

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Table 7.1 Descriptions of the opposite poles  
of each of ten personality dimensions.

SYMBOL.	DESCRIPTION.
Ps +	PSYCHOTICISM: dislikes order and routine, impulsive, has little respect for convention or social approval, attracted to odd and unusual people and pursuits, has little belief in ability to control own fate.
Ps -	NORMALITY: orderly, conventional, respectful of established ideas and majority views, perceives much of life to be under own rational control.
Ex +	EXTRAVERSION: sociable, likes parties, has many friends, needs to have people to talk to, is carefree, easy-going, optimistic, likes to "laugh and be merry".
Ex -	INTROVERSION: quiet, retiring, introspective, fond of books rather than people, reserved and distant except to intimate friends, serious, does not like excitement, reliable, prudent, pessimistic.
Ne +	NEUROTICISM: affected by feelings, easily upset, apprehensive, self-reproaching, worrying, troubled, tense, overwrought, quickly roused, hot-headed.
Ne -	STABILITY: calm, confident, serene, relaxed, tranquil, does not let emotions obscure judgements.
B +	MORE INTELLIGENT: bright, insightful, fast learning intellectually adaptable.
B -	LESS INTELLIGENT: dull, low mental capacity, intellectually slow, unable to handle abstract problems.
E +	ASSERTIVE: dominant, vigorous, forceful, bold, adventurous, inclined to be boastful and conceited, can be aggressive and pugnacious when crossed, independent.
E -	SUBMISSIVE: humble, mild, accomodating, modest, considerate, supportive, dependent.
G +	MORALISTIC: staid, dominated by sense of duty, concerned about conventional moral standards, insistenty ordered, somewhat rigid, conforming, conscientious, disciplined.
G -	EXPEDIENT: low regard for conventional moral standards though not necessarily immoral, may be fickle, frivolous, self-indulgent, undependable, but may simply be unwilling to impose own standards on others, loathe to moralise, non-conforming.

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Table 7.1 continued.

SYMBOL.	DESCRIPTION.
I +	TENDER-MINDED: sensitive, kindly, gentle, indulgent to self and others, dislike of crude people and rough occupations, aesthetic sense, perhaps fussy and fastidious.
I -	TOUGH-MINDED: realistic, no-nonsense, unsentimental hard (to the point of cynicism), practical, down-to-earth, lacking artistic feeling, rejects fancies.
L +	SUSPICIOUS: self-opinionated, dogmatic, hard to fool, jealous, irritable, easily annoyed by people putting on airs, skeptical of alleged idealistic motives, dwells upon frustrations.
L -	TRUSTING: adaptable, easy to get along with, tolerant, conciliatory, understanding, permissive, free of jealousy, accepts personal unimportance.
Q2 +	SELF-SUFFICIENT: resourceful, prefers own decisions independent, resolute.
Q2 -	GROUP DEPENDENT: a joiner and follower, dependent on social approval, likes to be one of the group, fashion-conscious.
Q3 +	CONTROLLED: exacting, socially precise, concern for etiquette, good form, and own social reputation, tries to follow a consistent and respectable path through life, somewhat compulsive.
Q3 -	UNDISCIPLINED: follows own urges, careless of protocol, unintegrated behaviour and chaotic life, uncontrolled, lax.

on which at least three of the astrologers agreed, would be tested. There were 133 of these. They are listed, together with the results, in Table 7.2 below. This table also indicates those 57 predictions on which at least four of the five astrologers agreed.

**7.5.2 Tests of Predictions.** Chapter Five above gives details of the subjects, the questionnaires, the standardisation of scores and the calculation of planetary positions. For each of the 32 pairs of planets



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individually, Ss were assigned to one of three groups on the basis of the angular separations, in celestial longitude, between the planets. The "Soft Aspect" group consisted of all Ss with a sextile or trine between the planets. The "Hard Aspect" group gathered those Ss with a square or opposition. The "Non-aspect" group comprised all the remaining Ss. An orb of  $7.5^{\circ}$  was used for all aspects. Because of the speed of the moon's longitudinal motion (about  $12^{\circ}$  per day) only those 715 Ss whose births were recorded as being accurate to at least the nearest hour (accuracy category 4 or better in Table 5.2) were used to test aspects involving the moon in this and all subsequent aspects studies. For all other aspects the entire sample of 911 was used.

The astrological predictions were each tested individually by means of analysis of variance followed by a planned comparison. The three aspect groups constituted three levels of a single factor and the comparison either contrasted the Soft with the Hard aspect groups or else combined the Soft and Hard groups and contrasted them with the Non-aspect group, depending on the prediction. A prediction of "S+H-" or "S-H+" involved the former comparison while either "S+H+" or "S-H-" involved the latter kind of comparison. The within-group mean square provided the error term for all comparisons. The analyses were carried out by the SAS computer package (Freund and Littell, 1981) using the MANOVA and CONTRAST options of the GLM procedure.

**7.5.3 Results.** The results of these analyses are shown in Table 7.2. This gives all of the 133 predictions on which at least three of the astrologers agreed and also indicates (with a superscripted "4") which of these was agreed upon by at least four of the astrologers. The predictions are indicated by first giving the planetary pair to which they apply. This is followed by the symbol of the personality

**Table 7.2. Aspect-personality relationships;  
predictions and results.**

PLANET PAIR.	PREDICTION. TRAIT.	RESULT. TREND.	RESULT. F ratio	PLANET PAIR.	PREDICTION. TRAIT.	RESULT. TREND.	RESULT. F ratio
SO-MO	Ne	S-H+		MO-MA	4Ne	S-H+	1.30
					E	S+H+	
SO-MA	4Ne	S-H+	0.72		4G	S-H-	2.63
	4E	S+H+			I	S+H-	
	I	S-H-			L	S-H+	
	4Q2	S+H+			Q2	S+H+	
SO-JU	4EX	S+H+		MO-JU	Ex	S+H+	
	4E	S+H+			Ne	S-H+	1.61
	G	S-H-	0.50		4G	S-H-	
	L	S-H+			I	S+H+	
	Q3	S-H-	1.80		Q2	S-H+	
					Q3	S+H-	
SO-SA	4Ps	S-H-		MO-SA	4EX	S-H-	1.03
	4Ex	S-H-			Ne	S-H+	
	4G	S+H+	0.75		E	S-H-	
	I	S-H-			4G	S+H+	
	4L	S-H+	2.12		I	S+H-	1.45
	4Q3	S+H+			L	S-H+	0.92
					4Q3	S+H+	0.13
SO-UR	Ps	S+H+	0.00	MO-UR	4Ps	S+H+	0.14
	4B	S+H+	0.81		G	S-H-	0.13
	4E	S+H+	1.65		I	S-H-	1.20
	G	S-H-			4L	S+H+	
	4I	S-H-			4Q2	S+H+	1.15
	4L	S+H+	0.07		4Q3	S-H-	
	4Q2	S+H+					
	Q3	S-H-		MO-NE	4Ps	S+H+	
SO-NE	Ps	S+H+			4E	S-H-	
	Ex	S-H-			4G	S-H-	
	Ne	S-H+			4I	S+H+	
	4E	S-H-			L	S-H-	
	G	S-H-	0.11		4Q2	S-H-	
	4I	S+H+	0.61	MO-PL	L	S+H+	3.02
	4L	S-H-			Q2	S+H+	
	4Q2	S-H-	0.38	ME-MA	Ne	S-H+	0.97
SO-PL	Ps	S+H+	1.40		4B	S+H+	
	4L	S-H+			I	S-H-	0.03
	4Q2	S+H+			L	S+H+	
					Q2	S+H+	
MO-VE	E	S-H-		ME-JU	Q2	S-H+	
	4G	S-H-		ME-SA	4G	S+H+	3.93*
	4I	S+H+					
	L	S-H-					
	Q2	S-H-	0.85				

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Table 7.2 continued.

PLANET PAIR.	PREDICTION. TRAIT.	RESULT. TREND.	F ratio	PLANET PAIR.	PREDICTION. TRAIT.	RESULT. TREND.	F ratio
ME-SA (contd.)	L Q3	S+H+ S+H+	2.20	VE-NE	4G 4I L Q2	S-H- S+H+ S-H- S-H-	1.63
ME-UR	<sup>4</sup> Ne <sup>4</sup> B I L Q2	S-H+ S+H+ S-H- S+H+ S+H+	2.68  0.26	MA-JU	4Ex 4E 4G L Q3	S+H+ S+H+ S-H- S-H+ S-H-	5.75*
ME-NE	I L Q2	S+H+ S-H- S-H-		MA-SA	Ps G I L 4Q2 4Q3	S-H- S+H+ S-H- S+H+ S+H+ S+H+	4.11* 0.21
ME-PL	L	S+H+	1.45	MA-UR	Ps 4Ne 4E G 4I 4L 4Q2 Q3	S+H+ S-H+ S+H+ S-H- S-H- S+H+ S+H+ S-H-	0.20 0.59
VE-MA	Ne	S-H+	0.15	MA-NE	G	S-H-	
VE-JU	<sup>4</sup> Ex <sup>4</sup> G I L Q3	S+H+ S-H- S+H+ S-H- S+H-	1.95	MA-PL	Ps E 4I	S+H+ S+H+ S-H-	
VE-SA	<sup>4</sup> Ex <sup>4</sup> E <sup>4</sup> G <sup>4</sup> L <sup>4</sup> Q3	S-H- S-H- S+H+ S-H+ S+H+	0.50  2.12				
VE-UR	Ps Ne G <sup>4</sup> Q2 <sup>4</sup> Q3	S+H+ S-H+ S-H- S+H+ S-H-					

Traits symbols are as given in Table 7.1.

Superscripted "4" = prediction made by at least 4 astrologers.

S = soft aspects; H = hard aspects; + and - indicate higher and lower scores respectively than for non-aspects.

A blank in the RESULT column indicates that the predicted trend was weaker than alternative trends.

D.f. = 2 & 712 for all aspects involving MO.

D.f. = 2 & 908 for all other aspects.

\* p < .05.

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dimension on which differences among the aspect groups are expected. The third column shows the direction of the expected differences and the last column gives the value of the F ratio for the test of these differences. Where the sums of squares for the predicted trend were found to be smaller than the residual sums of squares, the prediction is taken to be falsified and the F ratio is omitted.

Only three of the tests gave a result that was significant at the 5% level (none at the 1% level). Given that 133 tests were run, the overall result is well within chance expectation. Only 44 of the results, which is 0.33 of the total, were in the predicted direction. This is exactly the expected proportion given that a prediction could be wrong in two ways; by predicting a trend in the wrong direction and by predicting the wrong kind of trend. The results do not improve if we consider only those predictions on which at least four astrologers agreed. There were 57 of these but only one of them gave a significant result. Seventeen of the 57 (30% of the total) were in the right direction. This is also very close to the expected number.

It might be thought that better results should be obtained with the EPQ measures than with those from the 16PF since the former are probably more valid measures and two of them at least (Ex and Ne) are very familiar psychological constructs. However, none of the 29 predictions involving the EPQ variables was significant and only 11 of them (38% of the total) were in the right direction. This is only slightly higher than the expected number.

**7.5.4 Discussion.** This study provided no evidence that aspects work in the way that astrologers suppose they work. Although agreement was found among at least three of the astrologers on each of the predictions, only three of them

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led to significant results. This many significant results are to be expected among so many statistical tests even in the absence of real planetary effects.

It might be suggested that the design of the study was vitiated by the use of excessively large orbs. There is a tendency among modern astrologers to use orbs as small as  $5^{\circ}$  even for the major aspects, and even smaller ones for the sextile (Dean et al., 1977). However, it is just as common to use orbs of  $8^{\circ}$  or even  $10^{\circ}$ . The choice of exactly  $7.5^{\circ}$  for all aspects in the present study was influenced by computational convenience, but it seems to be well in line with astrological practice.

It might be that aspects have an effect but the soft-hard distinction, which the present study investigated, is not the relevant one. It is possible, for example, that the differences between the sextile and trine (the two soft aspects) are greater than the differences between these two combined and the square and opposition. A similar claim could be made for any of the numerous other distinctions between aspects that astrologers have elaborated. However, it should be noted, first, that great emphasis is normally given to the soft-hard distinction in astrological textbooks and secondly, that the present study also made allowance for what is probably the most fundamental distinction of all: aspects versus non-aspects. Indeed, 110 of the predictions that were tested (83% of the total) were that both the soft and the hard aspects would promote the same traits, that is traits that deviate from the mean in the same direction.

Some of the astrologers who were asked to complete the aspects questionnaire but failed to do so, complained that it was unrealistic because the traits that are promoted by aspects, though stable, are situationally dependent. For example, an aspect between VE and MA might consistently

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promote assertiveness (MA) but only among intimate friends (VE). If this is so, then one cannot expect to be able to detect the influences by means of personality questionnaires because the latter are designed on the assumption of considerable trans-situational consistency in behaviour. Certainly this is a telling criticism, especially in view of much recent research which suggests that individuals are not as consistent in different situations as has often been supposed (eg. Mischel and Peake, 1982). However, it is a criticism that is relevant to all research into astrology using personality questionnaires, and so will be examined in the general discussion of Chapter Ten.

One other possibility to be considered is that astrologers do not know in detail how aspects work though aspects do in fact influence personality. This suggestion might sound bizarre but there is actually some evidence for a similar position with the diurnal circle. In this case, the traditional claim that personality varies with the planets' positions has been vindicated by Gauquelin's results (eg. Gauquelin, Gauquelin, and Eysenck, 1979, 1981). However, when it comes to more precise claims about the significance of particular diurnal positions, astrology has been regularly falsified (see section 8.2 below). Thus, this possibility merits investigation. Aspect Study II, to be reported next, represents one possible approach. It employs the same distinction between soft, hard, and non-aspects, as was used in Study I, but instead of testing predictions by means of univariate contrasts between treatment groups, it merely looks for significant differences between the means of the three groups and it does so with multivariate analyses.

## 7.6 Aspect Study II.

**7.6.1 Method.** The design of this study is similar to that of Study I in many respects. Aspects between the same 32 pairs of planets were tested using the same Ss and the same ten measures of personality, and the Ss were assigned to the same three aspect groups: Soft aspects, Hard aspects, and Non-aspects. Orbs of  $7.5^\circ$  were used throughout. The only difference in the present study is that multivariate rather than univariate analysis of variance was used. That is, Manova was used to test the very general null hypothesis that the three populations from which the three aspect groups were sampled do not differ in their means on any of the ten personality measures. Separate one-way Manovas were calculated for each of the 32 planetary pairs by means of the MANOVA option of the GLM procedure in the SAS package.

**7.6.2 Results.** Several competing principles are available for effecting significance tests in multivariate analysis of variance and the MANOVA procedure of SAS provides four such test statistics: the Hotelling-Lawley Trace, Pillai's Trace, Wilk's Maximum Likelihood Criterion, and Roy's Maximum Root Criterion. None of these has been demonstrated to be universally superior or inferior but Pillai's Trace seems to be most powerful for small differences between means (Timm, 1975). Since only small differences, at best, are expected in astrological research, the F ratios that are reported in this and subsequent multivariate analyses are those derived from Pillai's criterion.

The results of the multivariate analyses are shown in Table 7.3. Out of 32 Manovas, one for each planetary pair under test, only one was significant at the 5% level. This is for MA-UR aspects, which gave an F approximation with an associated probability of 0.01. An examination of the greatest characteristic vector from this analysis reveals

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that the four dependent variables most responsible for the significant result are, in order, B, intelligence, I, tender-minded, L, suspicious, and E, assertive. Further insight into this result could be gained by using the coefficients that are the elements of the greatest characteristic vector as weights to compute a discriminant score for each subject and then to plot these scores for

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**Table 7.3. Results of multivariate analyses of aspects.**

	MO	ME	VE	MA	JU	SA	UR	NE	PL
SO	0.79	----	----	1.40	0.83	0.91	0.55	0.55	0.80
MO		1.18	0.74	0.90	0.83	1.05	0.95	1.22	1.34
ME			----	0.86	0.67	0.81	0.78	1.11	0.65
VE				0.53	0.90	0.76	1.27	0.50	1.17
MA					1.00	1.15	1.84*	1.41	1.31

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The grid represents the planetary pairs.

The figures in the grid show the F approximation associated with Pillai's Trace criterion.

D.f.= 20 & 1404 for all aspects involving MO.

D.f.= 20 & 1796 for all other aspects.

\* p=0.01

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each of the aspect groups. This would show the extent and direction of differences reflected by the significant characteristic root. However, such an exercise is hardly worthwhile since MA-UR aspects were the only ones out of 32 to give a significant result. Among so many tests it is to be expected that one will appear to be significant even in the absence of planetary effects.

As a rule it is not worthwhile to report the results of univariate results from a Manova unless the multivariate result is significant. However, in the present study the set of univariate results for the Neuroticism dimension is of particular interest since it is often assumed that hard aspects tend to promote maladjustment. Thus it is of some importance that not one of the 32 Anovas involving Ne as the dependent variable gave a significant F ratio.



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**7.6.3 Discussion.** This second study has provided no evidence that individuals with either soft or hard aspects differ from each other, or from those without aspects, in personality. Only one out of 32 Manovas provided a significant F ratio and such an overall result is within chance expectation. Moreover, there was no evidence that individuals with hard aspects differ in neuroticism from those with soft aspects between any of the pairs of planets. This last result is in agreement with Noblitt's (1978) finding that the number of hard aspects at an individual's birth does not correlate significantly with scores on the Q4 scale of the 16PF, an alternative measure of maladjustment.

Thus, this and the previous study together deal a severe blow to the traditional concept of aspects. Study I provided no evidence that astrologers know in detail how aspects work and Study II suggests that neither soft nor hard aspects have any effect on personality. However, it is still possible that personality varies in some manner with the angular separation between planets, even if it does not vary according to the traditional aspects, and there is even some evidence that this is so. The experiment from which this evidence is derived, together with an attempted replication of its results, are the subject of the next section.

### 7.7 Aspect Study III.

**7.7.1 Introduction.** It was reported, in section 7.2 above, that Addey (1958b) had discovered that separating aspects are far more frequent than applying ones at the births of nonagenarians. At the time, he suggested that this might indicate that separating aspects promote traits (allegedly) associated with longevity, such as passivity, tranquility and stability, while applying aspects promote the opposite traits: striving, activity and tension. In order to test

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this hypothesis, he studied the aspects at the births of a group of people who (allegedly) tend to have the latter traits, namely 1025 polio victims, and reported that they did indeed have more applying than separating aspects. However, this result was never evaluated statistically, the only data presented were for selected pairs of planets, and in any case, Addey soon changed his interpretation of these results.

The reason for the change in interpretation was that Addey noticed that, when the frequencies of births for a variety of criterion groups are plotted against the positions of the planets in various frameworks (including aspectual relationships), the resulting curves do not show the abrupt discontinuities demanded by traditional astrology, but continuous, wavelike fluctuations instead. These waves are usually complex, in the sense that they can be analysed into several prominent sinusoids, and they often have wavelengths and phasings that do not coincide with what would be expected according to tradition. These observations led Addey (1976a) to conclude that much of tradition was simply mistaken. However, it also led him to claim that he had discovered a new scientific starting-point for astrology which he formulated in the following terms;

"(1) Every point or factor in astrology (whether a heavenly body or a point in the mundane or ecliptic circles) is ideally related to every other point by harmonic intervals, and the symbolic effects which flow from these harmonic relationships may be measured in terms of the frequency, amplitude and phasing of the waves associated with them in any class of horoscope.

(2)...the frequency of a series represents a quality or attribute, the amplitude equals the degree to which it is present, and the phasing represents its relationship to other factors." (Addey, 1976b, p.34. Author's emphases omitted for clarity).

Of course, these principles can also be interpreted as methodological prescriptions; they suggest that research should ignore the traditional astrological categories and

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concentrate instead on discovering the most prominent harmonic waves for each criterion group. When Addey (1976a) applied these principles to the solar aspects at the births of nonagenarians, he discovered that the strongest peaks in the birth-frequency curves occurred every  $3.33^{\circ}$  of angular separation. This corresponds to a prominent 108th harmonic (in Addey's use of the term, where the fundamental is known as the 1st harmonic). This harmonic was found to be strong for four sun-planet pairs - SO-MA, SO-JU, SO-SA, and SO-UR - and in each case was phased in such a way that peaks appeared just after each of the major aspects. This explains why separating aspects originally appeared to be so important.

Addey did not evaluate these results statistically but merely plotted the frequencies of births against the sun-planet angle as a multiple of  $10^{\circ}$ . That is, he combined the 36 possible sectors of  $10^{\circ}$  angular separation for each of the four sun-planet pairs separately, and then accumulated the births falling in each of the ten degrees of these 36 sectors. The distribution of births for each sun-planet pair then showed three clear waves. Dean et al. (1977) later analysed these distributions statistically and found that each differed significantly from a rectangular distribution. When combined, the four distributions differed from chance expectation at the 0.0001 level by chi-square. Furthermore, the majority of the pairwise correlations between these curves were significant at the 5% level.

This is possibly the best aspects-related result of all but unfortunately it has not yet been repeated. Replication is especially important in this case since the 108th harmonic was selected after inspection of the data. Thus, in Aspect Study III, an attempt is made to replicate this finding using personality measures. It may be that this is not a reasonable thing to attempt since longevity may not

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be associated with any life-long personality traits but, perhaps, only with physiological ones. The present author is not aware of any research bearing directly upon this topic and Addey cited none. However, it is now fairly well established that there is a particular pattern of behaviour, namely Type A behaviour, that is a risk factor in coronary heart disease, a major cause of premature death (Rosenman et al., 1975; Haynes et al., 1980). Therefore, it is feasible that Type B behaviour, the opposite of Type A, might be associated with longevity.

The possibility that Addey's finding was mediated by personality is investigated by testing the 108th harmonic with the same phasing as that found for nonagenarians and with the same sun-planet pairs. Specifically, this involves contrasting the scores of all subjects for whom the sun-planet angle is the same as one of the angles for which Addey found peaks in his data, with the scores for the remaining subjects for whom the angle is the same as for Addey's troughs.

**7.7.2 Method.** The same subjects and personality measures were used as in the previous two studies. For each of the four sun-planet pairs (SO-MA, SO-JU, SO-SA, and SO-UR) separately, Ss were assigned to one of ten groups depending on the angle between the bodies expressed modulo  $10^{\circ}$ . That is, the angle was divided by 10 and the remainder was used to define the group membership of each S. There were ten such groups, one for each degree, centered on the whole degree. Thus, the range of angles defining each of these groups is as follows (expressed in modulo 10 degrees);

Group.	1	2	3	4	5	6	7	8	9	10
FROM:	0 & 9.5	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5
TO:	.5 & 10	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5

For each of the sun-planet pairs separately, Anovas were computed for each of the personality variables using the

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ten angle groups as independent levels of a single factor. These Anovas were followed by planned comparisons which contrasted the scores for groups 1, 2, 3, 5, and 8 combined with groups 4, 6, 7, 9 and 10 combined. These correspond to the groups which showed peaks and troughs respectively in Addey's (1976a) study of nonagenarians.

**7.7.3 Results.** Table 7.4 shows the results of the attempted replication of the 108th harmonic. Only one of the 40 F ratios for the planned comparisons between groups reached the 5% significance level. Such an overall result is to be expected from random fluctuations alone.

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**Table 7.4. Contrasts between peaks and troughs of the 108th harmonic for four sun-planet pairs.**

Personality dimension.	Angular separation between SO and;			
	MA	JU	SA	UR
Ps	0.29	0.04	1.91	1.95
Ex	0.07	0.00	0.38	0.00
Ne	2.07	1.86	0.07	0.00
B	0.12	3.05	0.04	1.69
E	0.71	0.73	1.32	0.74
G	0.82	0.01	0.20	0.25
I	1.38	0.44	0.19	0.02
L	2.70	0.04	0.08	1.93
Q2	3.85*	0.21	0.19	1.65
Q3	0.11	0.07	1.26	1.51

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The figures in the table are the F ratios for planned comparisons between those angle groups expected to show differences in personality in the 108th harmonic.

D.f.= 1 & 901 for all analyses.

\*  $p < .05$

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**7.7.4 Discussion.** This study has provided no evidence that personality varies according to the 108th harmonic of the aspectual circle for four of the sun-planet pairs. Thus Addey's finding with nonagenarians has not been replicated with personality measures. Of course, this failure could be due to a number of factors apart from lack of genuine

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planetary effects. It could be, for example, that survival into one's tenth decade is not associated with personality traits manifested earlier in life. A long-term prospective study would be required to establish such an association and, to the author's knowledge, this has not been done. Even the well-known association between Type A behaviour and coronary heart disease may not be particularly relevant in this context since there is now some evidence that this association concerns the tendency to complain of chest pains more than to suffer from real heart defects. Bass and Wade (1982) found that a group of patients suffering serious cardiac disease scored far lower on a measure of Type A behaviour than did another group that complained of angina but were free from actual cardiac damage.

Furthermore, it should be recalled that Addey's subjects were not only long-lived but were also eminent (they were sampled from "Who Was Who"). If the harmonic which he discovered is genuine, it might relate either to longevity, to eminence, or to the combination of the two. Hence, it might not be reasonable to expect to replicate this finding except with a comparable sample.

### 7.8 Aspect Study IV.

**7.8.1 Introduction.** Although the 108th harmonic in the charts of nonagenarians is the only harmonic of the aspectual circle that has been evaluated statistically, Addey (1976a) maintained that all integral divisions of the circle have their significance. According to his theory, different harmonics are related to different personality traits, but unfortunately he was not able to predict with any precision which harmonics would be related to which traits. He felt that such predictions would only be possible once the symbolism of the numbers by which the circle is divided is understood and such understanding could only emerge from numerous exploratory studies.

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However, he did suggest that the low-numbered harmonics indicate broad character traits while the progressively higher harmonics are related to progressively more specific traits. If true, this could provide a further reason why the attempted replication in Study III failed, for the 108th would be considered a high harmonic while the personality scales employed in the replication measure comparatively broad traits. It would also mean that it is only appropriate to investigate the low harmonics with these measures.

Addey did not attempt to investigate the low harmonics of the aspectual circle because the complex (geocentric) motions of the planets would themselves cause harmonic patterns to appear in birth frequencies and these would have nothing to do with planetary influences. In order to disentangle such effects of mere planetary motion from the possible astrological effects, reliable expected frequencies would have to be generated. However, such expectation curves are difficult to compute, as we saw in section 7.2 above. Fortunately, these problems do not arise when measures of personality are available. In this case, harmonic influences can be detected by different mean scores for subjects with different angles between the planets at birth, rather than by different frequencies of birth. If it were possible to make precise predictions about the effects of the low harmonics on personality, it would be an easy matter to test them by means of Fourier analysis applied to the means of the appropriate angular separation groups. Quite sensitive techniques exist for testing the significance of the amplitudes of particular harmonics whose existence is predicted in advance (Brooks and Carruthers, 1953). However, even in the absence of such precision, it is still possible to test the general hypothesis that personality varies as a function of the angular separation between planets.

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There are two principal methods by which this might be done when the data are in the form of personality scores. Both of them initially require that the subjects should be collected together into a number of groups defined by equal ranges of angular separations between the pairs of planets under study. Then, for the first method, the mean score of all the subjects in each group is found and Fourier analysis is applied to these means. The results of such an analysis can then be evaluated by a test, such as Shimshoni's (1971), for which tables are available for estimating the significance of the spectral peaks obtained. However, such a method has the disadvantage of being very conservative. The reason for this can be expressed informally as follows; since the test is required not only to indicate whether there are any real waves among the random fluctuations in the data, but also to identify which waves they are, it has to set a high criterion for accepting that a given amplitude, chosen post hoc, represents a signal and not just noise. The second method is to use analysis of variance to test simply whether the means of the various groups differ significantly one from another. If there are genuine waves in the data then these will increase the variance of the means above what would be expected from random fluctuations alone. This method will not reveal which harmonics are present, but it will indicate whether any at all are present. It is this latter method that is employed in the following investigation of the low-numbered harmonics of the aspectual circle.

**7.8.2 Method.** The same Ss and personality measures were used as in the previous three studies and the angles between the same 32 pairs of planets as in Studies I and II were investigated. For each of these 32 pairs separately, Ss were assigned to one of 24 groups on the basis of the angle between the planets at birth. The range of angles defining each of the groups was  $15^{\circ}$  in extent and each group was centered on a multiple of  $15^{\circ}$ , beginning at  $0^{\circ}$ .



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Thus the first group consisted of all those Ss for whom the angle between the planets was between  $0^{\circ}$  and  $7.5^{\circ}$  or between  $352.51^{\circ}$  and  $360^{\circ}$  (which is equivalent to  $0^{\circ}$ ). The second group gathered all Ss for whom the angle was between  $7.51^{\circ}$  and  $22.5^{\circ}$ . The third group comprised those Ss born when the angle was in the next  $15^{\circ}$  range, and so on up to the 24th group.

A separate Manova for each of the 32 planetary pairs was then computed using the angle groups as 24 levels of the independent variable and the ten personality measures as dependent variables. Each Manova was a test of the null hypothesis that the populations from which the angle groups were sampled do not differ in their means on any of the personality variables. All of the analyses were computed by the GLM procedure and MANOVA option of the SAS computer package (Freund and Littell, 1981). As in studies I and II, only those Ss with birth-times recorded as accurate to the nearest hour or better were included in the analyses that had the moon as one of the "planets".

**7.8.3 Results.** Table 7.5 shows the results of the multivariate analyses of the differences in means for the 24 angular separation groups. The figures in the table are the F approximations associated with Pillai's Trace criterion. Only three of these are significant at the 5% level. The probability of obtaining as many as three results significant at this level, out of a total of 32 tests, is 0.21 (by the binomial test). Hence, the overall result is not significant.

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**Table 7.5. Results of multivariate analyses of the differences in means for 24 angular separation groups.**

	MO	ME	VE	MA	JU	SA	UR	NE	PL
SO	1.10	----	----	1.22*	0.85	1.02	1.04	1.01	1.06
MO		0.94	0.94	0.98	1.12	0.95	1.06	1.14	1.09
ME			----	1.05	0.98	0.97	0.96	1.01	0.95
VE				1.08	0.98	1.06	0.91	1.09	1.01
MA					1.12	1.08	1.07	1.16*	1.16*

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The grid represents the planetary pairs.

The figures in the grid show the F approximation associated with Pillai's Trace criterion.

D.f.= 230 & 6910 for all pairs involving MO.

D.f.= 230 & 8870 for all other pairs.

\*  $p < .05$

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**7.8.4 Discussion.** This fourth study has provided no evidence that personality varies according to the harmonics of the aspectual circle. The design was such that any of the low harmonics, up to the 12th, would have been detected if present in sufficient strength (the highest harmonic detectable is the  $N/2$  th., where  $N$  is the number of data intervals).

### 7.9 Conclusion.

In this chapter, four investigations of doctrines concerning the aspectual circle have been reported and in none of them was any evidence of planetary effects found. In Study I, precise predictions of how personality varies with the aspects between particular planets were obtained from astrologers and tested against the data. Since no greater success was found than would be expected by chance alone, it was concluded that astrologers do not know in detail how aspects work. Study II was a test of the idea that aspects do in fact influence personality even though they do not do so in exactly the manner that astrologers imagine. It compared the scores of subjects with soft aspects, hard aspects and no aspects between each of 32

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pairs of planets, using multivariate analyses, but again found no evidence of planetary effects. The next two studies dispensed with the traditional concepts of aspects and instead investigated the idea that personality might vary in the manner described by the theory of Harmonics. Study II was an attempt to replicate a particular harmonic which Addey (1976a) had found to be present in the charts of nonagenarians. It was unsuccessful, but this failure could be due to a number of factors, not the least of them being the possible lack of any association between personality and longevity. The final study was a test of Addey's (1976a) idea that the low harmonics are related to variations in broad personality traits. This was tested by assigning subjects to 24 groups on the basis of the planetary angles at birth and then analysing the variance of the means of these groups using Manova. Since the number of these analyses that gave significant results did not exceed what is expected by chance alone, there was no evidence that personality varies according to any of the first 12 harmonics.

The four studies of this chapter were designed to give aspects every opportunity to reveal their validity. Since no evidence of validity was found, there must be considerable doubt that the astrological doctrines have any basis in reality. There must also be doubt that the few positive results that have been reported by previous researchers represent real effects rather than chance findings. This conclusion is not inescapable, of course, because the studies reported were not exhaustive. Astrologers have put forward a number of hypotheses about aspects which have not been tested. For example, they have suggested a number of reference planes for aspects but only the plane of the ecliptic was investigated here. Also, out of the infinite number of possible harmonics, only one higher than the 12th has been tested and that test involved only one of the possible phasings of the harmonic. However,

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the analyses that have been performed have tested all of the ideas that currently enjoy the greatest support among astrologers.

Although by far the most likely explanation for the negative results is that aspects do not have any basis in reality, three other possibilities deserve some consideration. One of them is that self-report questionnaires, such as the ones used here, do not provide appropriate measures with which to test astrology. A second is that the sample size in the present studies, though comparatively large, was too small for positive results to be expected. The rationale behind this criticism is that astrology postulates so many different planetary influences that the proportion of the variance accounted for by each must of necessity be very small. Therefore, quite enormous samples are required to detect any of them. A third possible explanation for the failures is that it is inappropriate to study planetary influences in isolation from one another because they interact and are not simply additive. However, since all of these considerations apply equally to the studies reported in the next two chapters, their discussion will be delayed until later.

THE DIURNAL CIRCLE.

8.1 Astrological conceptions.

In astrology, the influences of the planets are said to be modified by their positions in the diurnal circle at the time of birth. As the earth rotates once each day, so the sun, moon and eight planets appear to rise, culminate, set, and move again towards their rising positions. This is their diurnal motion. To define the position of a planet in this circle, a grid is required and the houses of the horoscope supply such a grid.

According to Dean et al. (1977), there is more disagreement over houses than any other area of astrology, but not all of the issues are equally contentious. In modern, Western astrology it is widely accepted that there should be 12 houses and that they should be numbered in an anticlockwise direction starting at the ascendant<\*> (eg. Hone, 1978). It is also commonly agreed that the position of a planet by house shows the sphere of life in which the planet has its strongest effect. There is a close connection between the meanings of the 12 signs of the zodiac and those of the 12 houses that correspond to them in sequence (hence the importance of the direction of the sequence of houses). As Hone (1978) explains;

"...whereas the sign-meaning will give an understanding of a MODE of action or behaviour, the house-meaning will give an understanding of the SPHERE OF LIFE to which this may be expected to relate." (page 89).

To give an example, Taurus, the second sign, is said to denote possessiveness. The corresponding house, the second, has to do with money and possessions.

Disagreements are most acute over methods of dividing the diurnal circle. Some 20 different systems have been described in the literature (Dean et al., 1977). They differ as to whether the boundaries of the houses (known as

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"cusps") should divide the ecliptic<\*> equally or unequally; whether the cusps should be equal divisions of the equator, the prime vertical<\*>, or the horizon; whether equal divisions of time or of space should be used and on a number of other points. The arguments, invariably centring on theoretical issues rather than empirical data, have been reviewed by Holden (1977).

A concept which is closely related to houses is "angularity". There are four "angles" in a horoscope: the ascendant (AS) and descendant (DS), which are defined by the intersections of the horizon with the ecliptic, and the MC (= Medium Coeli = the midheaven) and the IC (= Imum Coeli), defined by the intersections of the meridian with the ecliptic. The AS and DS correspond closely with the rising and setting points of the planets respectively, while the MC and IC are identical with the upper and lower culminations. In modern usage, planets which are close to these points are said to be angular and it is generally agreed that the influence of such planets is especially strong (Dean et al., 1977).

### 8.2 Research on planets and career.

The most comprehensive investigations of the astrological houses and angles are undoubtedly those of Michel and Francoise Gauquelin (1972, 1979a) . Their work has been discussed at several places above. They have found that the diurnal distributions of four of the planets at the births of highly successful individuals in 11 professions are consistently non-random. For eminent writers, politicians, actors, journalists, soldiers, sports champions, business executives, doctors, and scientists, at least one planet was found more often than expected in the rising and culminating positions of the diurnal circle. (For convenience, these two positions will be referred to as "key sectors". The Gauquelins' method of dividing the

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diurnal circle into sectors and of defining "rising" and "culminating" will be given in detail below). For some professions the associations found were ones involving a significant under-representation of the planet in key sectors and over-representation at other positions. This is the case, for example, for painters and musicians who seem to avoid being born when either Saturn or Mars is in a key sector. Significant results have been found for MO, MA, JU and SA but not for SO or the remaining planets. For most, but not quite all, of the associations between planet and occupation, the results are in line with astrological tradition (Dean et al., 1977).

Although these results give support to the concept of angularity, they give none to that of houses. According to tradition, planets in the first and tenth houses are most indicative of career but in the Gauquelins' research the key sectors correspond quite closely with the twelfth and ninth houses, where they are contra-indicated. Gauquelin (1955) has also tested the idea of houses directly and found no evidence in support of it. Since the houses are supposedly associated with different spheres of life, then an individual's success in a career should be reflected in a preponderance of planets in the corresponding house. For example, the fifth house is said to be concerned with creativity and the ninth house with the church. However, painters and sculptors do not have an excess of planets in the fifth nor do priests have an excess in the ninth.

### 8.3. Planets and personality.

In a later series of experiments, Gauquelin and Gauquelin (1973, 1974 a & b, 1976, 1977a) were able to show that the associations that they had found between the planets and careers are mediated by personality. To do this, they first ascertained, from published studies and by canvassing opinions, what personality traits are associated

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with membership in four of the professions (sports, science, acting, and writing). This allowed them to draw up a list of typical traits for each profession and also a list of the opposite traits (these will be referred to as the "typical profile" and "antiprofile" respectively). Then, for each of the members of these professions that had featured in the earlier studies, they consulted biographical dictionaries, and other biographical reference works, from which they extracted every word related to personality. These trait words then functioned as the units in the statistical analyses. Just as the positions of the planets at birth were associated with each individual in the career studies, so the planetary positions were associated with traits in these personality studies. For each trait in each typical profile (one for each profession) the diurnal positions of the planets for people who were described by that trait were plotted. The positions of the planets for traits which did not feature in the lists of typical traits were used to generate expected frequencies. This is known as the "character traits method". It was found that the distributions for the relevant planets showed the peaks in the key sectors that are characteristic for that profession. When the antiprofiles were used, on the other hand, the distributions for the relevant planets were the inverse of those found for the typical traits. That is, they showed troughs where the previous distributions had shown peaks and vice versa. This suggests that the real link is between the planet and the personality characteristics which are shared by the majority of the members of a profession, not with the profession per se.

Further confirmation that this is the case was obtained from a series of studies that showed that the same traits are associated with the same planets no matter in which profession the subjects were engaged. This was done by applying each of the four typical profiles to the three



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other professions apart from the one for which the given profile was drawn up, and then using the same Character Traits Method. For example, the typical profile for sportsmen was used with the other three professions combined. When the positions of Mars were plotted for each actor, writer and scientist who was described by one of the traits in the typical profile for sportsmen, the distribution showed the same characteristic peaks in the key sectors as had been obtained for sportsmen alone. This confirmation was strong enough for the Gauquelins to speak of four "planetary temperaments", initial characterisations of which were supplied by the four typical profiles.

A closely related study of personality and the planets has been reported by Gauquelin, Gauquelin, and Eysenck (1979). This was conducted in order to test Eysenck's (1975) hypotheses concerning possible relations between the influences of some of the planets and his own system of personality typology. Specifically, Eysenck had predicted that introversion would be linked with SA and extraversion with JU and MA. These predictions were derived from the evident similarities between the typical profiles for scientists, actors and sportsmen on the one hand, and the traits making up extraversion on the other. They were tested by examining the catalogue of all the traits which the Gauquelins had extracted from their subjects' biographies and classifying each trait according to its connection with extraversion, neuroticism, or psychoticism. In this way lists of traits associated with Eysenck's three major dimensions of personality were compiled and these were then used, in place of the typical profiles of each profession, in statistical analyses which were otherwise identical to those employed before. It was found that JU and MA are indeed linked with Ex+ and SA with Ex-, irrespective of the professions of the subjects investigated. Although not predicted, additional though weaker links between JU and Ps+, MA and Ps+, and SA and Ps-

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were found. This study has been repeated recently with a new sample of American subjects with essentially the same results, including the weaker associations between the three planets and Ps (Gauquelin, Gauquelin and Eysenck, 1981).

It should be noted, however, that these studies employing trait words taken from biographies have been criticised by Vergo (1982) because they allow the positions of the planets at the birth of each individual to count more than once in the frequency distributions. In fact they count once for every word used to describe the individual that is also found in the typical profile. Since many of these words are synonyms, the units entered into the statistical analyses are not all independent. Thus the assumptions of the critical ratio and chi-square tests are violated.

However, the Gauquelins have performed other analyses which are free of these criticisms and yet give similar results. In the most important of these they analysed particular trait words in isolation from all others. Instead of grouping individuals according to their membership of one profession or another, they grouped them according to whether they had been described by particular individual words. The positions of the planets for people so described were then analysed in the same manner as for the studies of profession. For each of five planets - MO, VE, MA, JU and SA - at least ten words were found which gave the characteristic peaks in the key sectors (Gauquelin 1980). These words are referred to as "positively significant isolates". Lists of them can be found in Table 8.1 below. These clusters of words form psychologically coherent groupings that are broadly in agreement with the earlier studies (Eysenck and Nias, 1982), though the present author has given a number of reasons for regarding them as better characterisations of the planetary

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temperaments than are the typical profiles (Startup, 1982a). Moreover, considerable agreement has been shown between these clusters and the descriptions of the planetary temperaments provided in both ancient and modern astrological textbooks (F. Gauquelin, 1980; Startup, 1982a; Gauquelin, 1982).

### 8.4. The importance of being eminent.

One very important feature of the Gauquelins' findings is that, in their career studies, significant associations with the positions of the planets were only obtained for the most eminent individuals in each profession. Those who are moderately successful, but not of the first rank, do not show the planetary effects (Gauquelin, 1960). For example, Kurtz, Zelen and Abell (1979a) found that a sample of athletes who were successful enough to feature in selective directories of sports personalities, did not show the Mars Effect (see section 3.4 above). It was only when Gauquelin and Gauquelin (1979b) selected from this sample the athletes of international standing that the Mars distribution showed its characteristic fluctuations.

In their explanation why this should be the case, Gauquelin and Gauquelin (1979b) first drew attention to their discovery that the link between the planets and the professions is mediated by personality. They then suggested that only the most successful members of each profession are, on average, extreme enough on the relevant traits to show a planetary effect. This idea is partly supported by the finding that, when the eminent members of a given profession are divided into those whose traits are typical of the profession and those whose traits are not, only the former show the planetary effect for that profession (Gauquelin and Gauquelin, 1976). This shows that it is only those whose personalities are similar to the typical profile for the profession that contribute to the link

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between planet and profession. If the less successful members of each profession include a larger proportion of individuals with non-typical personalities than do the eminent members, this would explain the weaker or absent planetary effects for the former. The Gauquelins have not been able to test this hypothesis with their method of extracting trait terms from biographies for the simple reason that biographies are only written for the eminent. However, their studies of "planetary heredity" (Gauquelin and Gauquelin, 1972, 1977c) show that planetary effects of a kind can be obtained with ordinary people, even if personality is not necessarily implicated here. But it is likely, given the other findings, that this effect is also mediated somehow by personality.

However, a major problem with the Gauquelins' suggested explanation for the importance of eminence, at least where sportsmen are concerned, has been identified by Eysenck and Nias (1982). They point out that previous research (reviewed by Eysenck, Nias and Cox, 1982) has shown that there is no general association between extraversion and success in sports, though sportsmen do tend to be extraverted by comparison with the general population. Indeed, it might be added that a recent investigation of athletes at three levels of excellence (representatives of the nation, the county and the region) revealed that the top-class athletes were actually less extraverted than the second-class ones (Kirkcaldy, 1982). Therefore, Eysenck and Nias argue, if Mars is associated with extraversion, and sportsmen are also more or less uniformly extraverted, as the research suggests, then the Mars Effect should apply to all sportsmen, not just the elite. Thus, the fact that it does not so apply remains unexplained.

However, this argument is less forceful than it might appear at first sight, for two reasons. First, Mars has been found to be associated with psychoticism as well as

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extraversion (Gauquelin et al., 1979, 1981). In these studies, the relationship with Ps appeared to be far weaker than that with Ex, but there are reasons for thinking that the opposite is really the case. Secondly, success in sports has been found to be related to psychoticism and to characteristics which bear a close relationship to psychoticism. Since the evidence bearing on both of these points is somewhat confused, it will be examined in some detail.

It will be recalled that, in order to examine the relationship between the planets and Eysenck's system of personality typology, Gauquelin et al. (1979, 1981) classified each of the traits in the Gauquelins' catalogues according to its connection with Ex, Ps and Ne. If the lists of traits assigned to Ex+ and Ps+ (published by Gauquelin et al., 1981) are examined, it will be found that these operationalisations of extraversion and psychoticism are neither independent nor do they correspond very closely to the alternative operationalisations of the same concepts in the Eysencks' questionnaires. These two points will be taken one at a time. First, over 20% of the traits assigned to Ps+ are also assigned to Ex+. These shared traits have mostly to do with impulsiveness, venturesomeness and sensation-seeking (eg. "daredevil, impulsive, reckless, pleasure-seeker, risk-taker"). This shows that the two personality types, as defined here, are not independent. Secondly, about 46% of the traits assigned to Ex+ are connected with impulsiveness, sensation-seeking, venturesomeness and dominance, all of which have been shown to correlate as well or better with the Ps scale of the EPQ than with the Ex scale (Eysenck and Eysenck, 1977, 1978; Eysenck and Zuckerman, 1978; Eysenck, 1978a). The remaining 54% of the traits assigned to Ex+ relate to sociability, liveliness and jocularities, which are the traits that the Ex scale of the EPQ does measure (Rocklin and Revelle, 1981; Eysenck and Eysenck, 1977). This shows that Gauquelin et

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al.'s (1979, 1981) operationalisation of extraversion is actually a mixture of extraversion and psychoticism according to the Eysencks' latest questionnaire measure of these constructs.

It appears, then, that Mars is related as much to Ps+ as to Ex+. Therefore, if it can be shown that success in sports is also related to Ps+, as seems likely on theoretical grounds (Eysenck et al., 1982), then the link between MA and eminence in sports can be explained. Unfortunately, only a very few of the many existing studies of sportsmen are (well-designed) investigations of the differences in personality between high- and average-level competitors (Dowd and Innes, 1981; Eysenck et al., 1982), and only one of the latter has employed a measure of psychoticism. However, this study, by Kirkcaldy (1982), did show that top-level male athletes score higher on Ps than those of the middle or low levels. A similar association was missing amongst the females that were studied at the same time but, since the correlation between Ps and the Lie scale was very high for this sample ( $r=-0.5$ ), a real difference may have been obscured by dissimulation.

Further evidence bearing on this issue can be obtained by examining those studies of sporting success which have employed measures that are related to psychoticism. Of particular interest here is a review paper by Williams (1978), dealing entirely with the personality of the female athlete, which concluded that the successful female is more assertive, dominant, independent and aggressive than her less successful colleagues. Also of interest is a study by Fiegenbaum (1981; reviewed by Eysenck et al., 1982) which found that high-level marathon-runners are more masculine than low-level runners or controls. Unfortunately, most of the other studies on this topic have used Cattell's 16PF, the scales of which are only slightly related to psychoticism (see Table 6.1 above). However, in their

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conclusions to their review of all this research, Eysenck et al. (1982) felt that the link between Ps and success in sports was fairly well established.

Although there is no general association between extraversion and success in sports, it is worth pointing out that extraversion may promote success in some sports while hindering it in others. This possibility has not been investigated extensively, but there is evidence that team players tend to be more extraverted and less self-sufficient than participants in individual sports (Peterson et al., 1970; Ogilvie, 1968; Dowd and Innes, 1981). This is particularly interesting in the present context because Gauquelin (1960) has found a planetary difference between the two kinds of sport. Those of his subjects who were involved in individual sports (cyclists, aviators, boxers and racing drivers) tended to avoid being born when JU was in key sectors, while his football players (the only team-sport studied) showed the opposite pattern; more of them were born with JU in key sectors than would be expected by chance. This suggests that it is JU, not MA, which is connected with extraversion, or at least with the sociability component of this dimension of personality.

Further support for this interpretation of the planetary effects comes from the Gauquelins' work on the "significant isolates". It will be recalled that these are the trait words which were found to give significant effects when tested individually. An examination of these words (see Table 8.1 below) shows that there is little in the Mars type suggesting sociability or jocularity. Instead, Mars seems to be primarily strong-willed, dominant and active. Jupiter is also associated with dominance but in this type, sociability and jocularity appear to take the place of resolution and dynamism.

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It would appear, then, that there is no compelling reason at present to doubt the Gauquelins' explanation for the importance of eminence in the planetary effects on career. These effects obtain only for the most successful individuals because success comes most easily to those who possess the traits which are associated with the planets when in key sectors. This hypothesis is plausible as far as the Mars Effect on sportsmen is concerned and there seems no reason to doubt that it also holds for the other professions that the Gauquelins have studied, though detailed examinations of each of these is beyond the scope of this thesis. There are other ways in which a part of this hypothesis can be tested, however. If the planets are associated with personality in a general way, not just with the personalities of the eminent, then planetary effects should be detectable with ordinary people. It is to the existing investigations of this idea that we turn next.

### 8.5 Planets and the personalities of ordinary people.

There have been six studies reported in recent years (and one unpublished study) that have investigated the effects of diurnal factors on ordinary people by employing personality questionnaires. Unfortunately, they have provided only rather ambiguous and conflicting results. In these studies two different basic research designs have generally been used, which will be called designs A and B for convenience. In design A, subjects with extreme personality scores are separated from the remainder of the sample and the latter are used only as controls, to provide expected frequencies. The frequencies of the planets in the diurnal positions, for the extreme subjects, are then compared with the expected frequencies using statistical tests for nominal-scale data. In design B, on the other hand, all subjects are assigned to two or more classificatory conditions (which are usually one-way, but could be higher-order, classifications) according to the



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positions of the planets at their births, and then tests suitable for ordinal- or interval-scale measurements are applied to the subjects' scores. No control group is used; one simply tests for significant differences between the means of the (two or more) groups. The relative merits of these two designs will be considered later.

Gauquelin (1981) has reported on three experiments using design A that all had negative outcomes. The first two of these are probably best ignored since the validities of the questionnaires used are unknown, but the third employed a French translation of the EPQ. Scores on the four scales of this questionnaire and the relevant birth-data were obtained for 561 subjects. Then, for tests with each of the measures separately, the sample was divided into those with and those without extreme high scores on that measure. MO, MA, JU and SA were each investigated in turn with each of the EPQ scales. The results for MA in key sectors were in the predicted direction with Ex+ and Ps+ but were reported to be non-significant. The only result to reach the 5% significance level - for MO with the lie scale - was not predicted. However, these analyses were probably too conservative since the extreme subjects were included with the controls in the calculations of expected frequencies. The results are published in sufficient detail so that expected frequencies can be recalculated from the frequencies in key sectors of the control subjects alone. When this is done, the result for MA with Ex+ reaches significance ( $z=1.93$ ;  $p=.027$  one tail) and for MA with Ps+ it is highly significant ( $z=2.41$ ;  $p=.008$  one tail). The result for MO with Li+ is also highly significant ( $z=3.0$ ;  $p=.003$  two tail). Gauquelin (personal communication) agrees that these re-analyses are correct.

Research design A, and one of Eysenck's measures of extraversion and neuroticism, have also been employed by Dean (1981). In this case the EPI was used to select

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subjects who were extreme in one direction or the other on either Ex or Ne. Thus there were four groups (E+, E-, N+ and N-) and 108 subjects were found for each. The numbers born with a planet in key sectors were compared, by chi-square, with the average frequency of all subjects with a planet in a key sector, the planets being MA, JU, SA, VE and MO. None of the analyses were significant and the results with Ex for MA, JU, and SA were all in the opposite direction to those found by Gauquelin (1981). It should be noted, however, that the method for deriving expected frequencies in this study is not to be recommended for two reasons. First, the 20 groups of subjects (4 extreme personality types X 5 planets) are not independent since being extreme on Ex does not exclude being extreme on Ne, and having one planet in key sectors does not exclude having another planet in the same positions. Secondly, the expected frequencies for different planets in key sectors cannot be taken as equivalent; the distributions of VE and MA in particular are likely to interact with the diurnal distribution of births. Expected frequencies should have been derived instead from a control sample of non-extreme subjects. However, this methodological flaw does not alter the fact that Dean's results were not in the same direction as the comparable ones from Gauquelin.

A third investigation of the diurnal circle with measures of Ex and Ne has been reported by Smithers and Cohen (1982), this time with the use of design B. The positions of SO, MO and the eight planets were calculated for 2704 subjects and then the subjects were assigned to groups according to two methods. In the first, the four cadent<\*> sectors, and in the second, the key sectors were compared with the remaining sectors. Comparisons between the means for these pairs of groups, for both Ex and Ne, were made with t tests. Significant differences were only found with MO, giving Ex- with the first method of grouping, and with SA, giving Ne- with the second method of

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grouping. Among so many tests, two apparently significant results could easily have arisen by chance.

The personalities of those born with JU rising or culminating have been compared with those born with SA in the same positions in two studies. Blaas (1983) split 200 subjects into pairs of groups depending on their scores on the 12 scales of the Freiburger Persönlichkeitsinventar and then classified them a second time according to the positions of the two planets at the time of birth. Chi-square analyses applied to the resulting contingency tables showed that both sociability and extraversion were associated with birth with JU in key sectors, shyness and introversion with SA in the same positions, as would be predicted from astrology and from the Gauquelins' earlier investigations. However, since the other 10 scales of the inventory gave non-significant results and many details of the experimental design were not reported, no great confidence can be placed in these findings.

The present author (Startup, 1979) has also investigated differences in personality of those with either JU or SA in key sectors in a very small-scale study with only 18 subjects. Despite the sample size, a significant difference ( $p < .005$  by  $t$  ratio) was found between these two groups on Bannister and Fransella's (1965) "Intensity" index, a measure of cognitive style derived from the Repertory Grid. As expected, the Jupiter subjects were found to be "loose construers" compared with the Saturn subjects. However, the study also included seven other measures and none of these gave significant  $t$  ratios. When all eight measures were included in one multivariate analysis, the resultant value of Hotelling's  $T^2$  was found to be non-significant.

Hume and Goldstein (1977) and Tiggle and Fiebert (1979) have also published studies which included the diurnal positions of the planets (using unspecified house systems)

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among other astrological variables. The former failed to find any evidence of planetary effects but unfortunately their sample size was so small that positive results could hardly be expected. The latter, on the other hand, found that the house position of Mars could be used, together with other positions of this planet, to construct an astrological scale of hostility that correlated significantly with the Buss-Durkee measure of hostility. (The designs of these studies were described in greater detail in section 7.3 above.)

### 8.6. Overview of research on the personalities of ordinary people.

No clear pattern has emerged from these investigations with questionnaires applied to ordinary people. Gauquelin (1981), it appears, has discovered associations between Mars and Ex+ and Ps+ that replicate Gauquelin et al.'s (1979, 1981) findings with eminent professionals but the link with Ex was missing from Dean's (1981) and Smithers and Cohen's (1982) results. Blaas (1983) and Startup (1979) have provided some evidence that subjects born under JU and SA differ in ways that are in agreement with the Gauquelins' earlier findings, but comparable effects were missing from the three other studies of these planets. In the absence of replication, these and all the other apparently significant results can only be taken as suggestive at present.

However, a number of possible explanations for these failures can be advanced. The most obvious one is that the samples employed in all but Smithers and Cohen's study were rather small, given that planetary effects are expected to be only very weak. In their studies of eminent people, the Gauquelins found that the frequency of planets in plus zones was only some 20-25% greater than expected for

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occupational groups and only 20-35% greater than expected for personality types (Dean, 1981).

Closely linked to the issue of sample size is the question which of the two research designs, A or B, is preferable. The main advantage of design A is that it deals with extreme personalities. This is appropriate if one's hypothesis is that links between planet and personality only hold for the extremes. However, there is little reason to believe that planetary effects on personality operate in such a categorical fashion. Dean's (1981) rationale for using only extreme subjects in his study was that he imagined that only extreme scorers are likely to show much cross-situational consistency in behaviour and thus, that the validities of his measures would be greater if he dealt with only extreme scorers. However, Bem and Allan (1974) have shown that extremity of position on trait dimensions is not related to consistency on the same dimensions. At least, this was the case for friendliness and conscientiousness, and there is no indication that extremity and variability are related for any other traits. Furthermore, Stones (1977) has shown that the comparability between direct self-ratings of extraversion and neuroticism and the E.P.I. measures of the same traits, is higher near the midpoints of the respective distributions than at the extremes. If the comparability between these two types of measure is taken as some indication of the validities of the psychometric measures, as it often is, then the conclusion must be that the psychometric measures are less valid at the extremes of their distributions than they are near the centre. Incidentally, this last finding might help to explain why Dean's (1981) results for extraversion with MA, JU and SA were inconsistent with Gauquelin's (1981) results for the same planet/trait pairs. Although both of these studies employed extreme subjects, Dean's subjects were far more extreme. It now appears that, instead of increasing the validities of his measures by selecting

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subjects from the ends of the personality dimensions, Dean may have actually achieved the opposite.

Another reason for preferring design B to design A is that the latter discards both subjects and information. Subjects are in effect discarded because the average ones are only used for calculating expected frequencies, which is something that could be accomplished in other ways. Information is discarded because scores, which give interval-scale measurements, are reduced to mere nominal data which have to be analysed with comparatively weak non-parametric tests.

Smithers and Cohen (1982) employed a very large sample, and also made use of research design B, and yet they found no unambiguous effects. However, their negative findings could be due in part to the questionnaire they used which was not a standard one. Although it was said to be similar to the Eysenck questionnaires, the Ne scale contained only 5 items and the internal consistencies of both scales were appreciably lower than those for the Eysenck scales. Moreover, their subjects were British. This is important because birth-times are not recorded officially in England and Wales (though they are in Scotland). This means that the crucial time of birth must often have been derived from parents' fallible memories. Smithers and Cohen detected a certain (unspecified) amount of rounding of birth-times to particular hours of the day but were not able to eliminate subjects with inaccurate birth-times because they had no information about the accuracy of the stated times. This was also the case in Dean's (1981) study. Furthermore, in neither of these studies was it known whether the subjects' births had been induced. This is an important consideration, it will be recalled, because Gauquelin and Gauquelin (1972) have shown that planetary effects only hold for those whose births were natural. If the proportion of inaccurate birth-times and induced births in these two

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studies were great, then significant results could not be expected. Thus, there is a need for further replications which avoid the shortcomings of the earlier studies.

The first study of the diurnal circle to be reported below was undertaken with three main purposes in mind. First, it was designed to replicate Gauquelin et al.'s (1979, 1981) findings regarding the links between MA, JU and SA and the dimensions of psychoticism and extraversion, and to do so using research design B with ordinary people as subjects and employing Eysenck and Eysenck's (1975) standard measures of these dimensions.

Secondly, it was designed to investigate the subfactors of the Eysencks' higher-order dimensions, and other relatively independent "primary" factors, by including those scales from Cattell's 16PF which were selected in Chapter Six above. The Gauquelins' research into the "significant isolates" suggests that the planetary temperaments cannot simply be equated with the Eysencks' personality types. This was discussed in part in section 8.4 above where it was argued that, though the JU and MA temperaments both show similarities with both Ex+ and Ps+, they are actually composed of different combinations of the traits that make up these higher-order factors. Another example of this phenomenon was given in section 6.2, where it was pointed out that the MO temperament shows signs of being introverted in some ways and extraverted in others. In that section of this thesis it was suggested that astrological parameters might serve to define subsections of the population for which traits are organised idiosyncratically and, if this is so, then the planetary temperaments are best investigated with measures of quite narrowly defined traits. Such an investigation is undertaken in the first study below by having a panel of judges draw up profiles for the planets in terms of the

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traits that appear to correspond most closely to the components of each planetary temperament.

No positive results have been found so far for SO, ME, UR, NE or PL. However, this does not necessarily mean that these planets have no effects. It could be, for example, that they are connected with various careers but the relevant careers have not been studied. That no heredity effects for them have been found is telling but even this does not rule out effects on personality. These planets have been investigated once with questionnaires filled out by ordinary people, with non-significant results (Smithers and Cohen, 1982), but only two measures, both of unknown validity, were used. Thus, a third objective of the following study is to investigate the possible effects of these other planets, when placed in the key sectors at birth, by means of multivariate analyses.

### 8.7 Diurnal Study I.

The method of this study consists of three major parts: the determination of astrological predictions, the testing of these predictions, and the investigation, by multivariate analyses, of the effects of the planets ME, UR, NE, PL and SO.

**8.7.1 Astrological predictions.** Predictions were obtained by canvassing the opinions of a group of individuals who are familiar both with the Gauquelins' scientific researches and with personality testing with self-report measures. Five such individuals were contacted, all of whom are members of a London-based group dedicated to scientific research into astrology. They were asked to complete a questionnaire with the following instructions;

"As you are well aware, the Gauquelins have discovered that personality varies with the positions of some of the planets in the diurnal circle. The positions that they have found to be especially important are the rising and



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culminating sectors, which are usually called "key sectors" for convenience (sectors 1, 2, 3, 9, 10, 11, 12 and 36 in a 36-sector circle). The planets which have been found to give positive results when investigated by means of trait terms taken from biographies are MO, VE, MA, JU and SA. What I am doing is testing whether these results can be replicated with questionnaire measurements of ordinary people. I have made measurements on ten separate (though not perfectly independent) trait dimensions. What is needed now is for independent judges to match up these trait dimensions with the planetary types discovered by the Gauquelins in order to predict what should be found when subjects who have the planets in key sectors are compared with subjects who have the planets elsewhere. You could help me a great deal if you are prepared to make such matching judgements. If you are willing, here is what you have to do;

In the pages that follow, you will find three tables. The first provides descriptions of the opposite poles of each of the ten personality dimensions on which I have made measurements. The second table lists all the trait words which Francoise Gauquelin found to be significantly associated with the five planets when the given planet was in a key sector at birth (called the "positively significant isolates"). These represent the planetary types as identified by the Gauquelins. Please consider only these descriptions of the planetary types and ignore the traditional astrological descriptions where the two are in disagreement. The third table is for you to record your matchings. It has the symbols of the trait dimensions along the top and the symbols for the planets down the side. Your judgements are to go within the (mostly blank) grid in the following manner;

- (1) Take each trait dimension in turn and carefully study the descriptions of the two opposite poles.
- (2) Then take each planetary type in turn and carefully study its description. (NB. Ignore the traditional ideas).
- (3) Judge whether the personalities of individuals who have the given planet in key sectors are likely to be similar to the "+" end of the trait dimension that you are considering, the "-" end of the same dimension, or neither.
- (4) If you decide that having the given planet in key sectors should lead to the traits described by the "+" end of the dimension, place a "+" in the appropriate box on the grid. Alternatively, if the description of the planetary type seems more similar to the "-" end of the trait dimension, place a "-" in the corresponding box in the grid. If the planetary description does not appear to resemble either end of the trait dimension, leave a blank in the grid and go on to consider the next planetary type.
- (5) When you have considered all five of the planetary types relative to one trait dimension, go on to the next and try to match it with each of the five planetary types again.

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You will find that some of the boxes in the grid are already filled in. These are the boxes that relate MA, JU and SA to the dimensions in Eysenck's system of personality analysis. Predictions for these planets in combination with these traits have already been made and tested and so you are not asked to provide judgements for these. That leaves 41 trait-planet combinations for you to consider."

The ten personality dimensions that the judges were asked to consider are the same ten that were selected in Chapter Six. The descriptions of them that were provided are those that are set out in Table 7.1 above. The lists of trait words associated with the five planets that the judges were asked to consider are given in Table 8.1. They were taken verbatim from Table VII in Gauquelin (1980).

Five replies to this questionnaire were received. After examining the responses, it was decided that all predictions on which at least four of the judges agreed, would be tested. There were 16 of these. They are listed, together with the results, in Table 8.2 below. This table also indicates (1) those eight predictions on which all of the judges agreed, (2) the predictions concerning the links between the planets and Ex and Ne which were derived from Gauquelin et al.'s (1979, 1981) investigations of the diurnal circle, and (3) the prediction that MO should be associated with Li+, which was derived from Gauquelin's (1981) highly significant finding with this planet-trait pair.

**8.7.2 Tests of predictions.** In order to test the judges' predictions, Ss were assigned to one of two independent groups on the basis of the diurnal positions of the relevant planets: a "key sectors" group and an "other sectors" group. For each prediction, a comparison between the means of these groups was then made by a one-tailed t test.

---

Table 8.1. The Planetary Types.  
(Positively significant isolates).

**The Moon.**

Charitable, Choleric, Comic, Dreamer, Eccentric, Facility (has), Funny, Gay, Generous, Group (in a), Humorous, Lightness, Loves freedom, Loves nature, Lyrical, Mystic, Naive, Poet, Poor, Religious, Sentimental, Susceptible to influences, Witty, Worldly, Youthful.

**Venus.**

Benevolent, Dandy, Dreamer, Erudite, Facility (has), Fame (tasted), Gracious, Great hearted, Great beauty, Influences others, Intransigent, Love (in), Scandalous, Successful, Traveller, Youthful.

**Mars.**

Active, Animates others, Ardent, Audacious, Bold, Chief, Combative, Courageous, Director, Dynamic, Efficacious, Energetic, Financially (not motivated), Great beauty, Group (in a), Hard, Heroic, Idealist, Lively, Realistic, Religious, Resolute, Self-willed, Stubborn, Tenacious, Vigorous, Vitality.

**Jupiter.**

Abundant, Admirable, Ambitious, Authority (has), Bantering, Bohemian, Brilliant, Charming, Dandy, Ease (with), Expressive, Gay, Good tempered, Harsh, Impetuous, Influences others, Ironic, Lively, Mastership, Merry, Mordant, Original, Personality, Poet, Popular, Powerful, Self-willed, Smiling, Sparkling, Successful, Sympathetic, Verve, Vitality, Warm, Witty.

**Saturn.**

Amiable, Calm, Careful, Cold, Commonsense, Conscientious, Deep, Dignified, Discreet, Distant, Esteemed, Experimenter, Family (likes), Financially (not motivated), Good, Good fellow, Hard working, Innovator, Intellectual, Meditative, Methodical, Minute, Modest, Observant, Patient, Pedagogue, Poor, Precise, Prudent, Pure, Reflective, Reserved, Research-worker, Respectful, Retires, Scrupulous, Secretive, Serene, Severe, Silent, Solemn, Solitary, Teaches, Timid, Trustworthy, Unsociable.

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The lists of traits above are taken verbatim from Table VII in Gauquelin (1980), the "Positively Significant Isolates".

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The positions of the planets in the diurnal circle were calculated according to Gauquelin and Gauquelin's (1957) method. This involves, in the first place, finding the two times when the planet itself, not its ecliptic longitude (as in astrological house systems), crossed the horizon on the day of birth. If the planet was above the horizon at the time of birth, then that fraction of the time between rising and setting that has elapsed since the planet rose, gives the planet's relative position in the diurnal arc. Similarly, with a planet below the horizon, the fraction of the time between setting and rising that has elapsed since the planet set, gives the relative position in the nocturnal arc. The two arcs are divided into equal numbers of sectors and the sectors within each arc are equal in size. Any even number of sectors may be arbitrarily chosen. Thus, the sector position of a planet, for an arbitrary 12 sector division of the circle, can be found as follows;

(a) for a planet above the horizon:

$$\text{Sector} = \text{INT} ((\text{LST} - \text{RT}) / (\text{ST} - \text{RT}) * 6) + 1$$

(b) for a planet below the horizon:

$$\text{Sector} = \text{INT} ((\text{LST} - \text{ST}) / (\text{RT} - \text{ST}) * 6) + 7$$

Where LST = Local sidereal time of birth.

RT = Rising time.

ST = Setting time.

INT = take the integral part of the expression within brackets.

If either the numerator or the denominator in either of these equations is negative, 24 (hours) must be added.

The positions of the planets were initially calculated and stored as celestial longitudes and latitudes, as specified in section 6.6 above. From this information, together with the longitude of the MC and the geographical latitude of birth, sector positions can be found by trigonometry. The listing of a FORTRAN program, called "DIURNL", which accomplishes this, can be found in Appendix II.

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A program similar to "DIURNL" was used to find the positions of the sun, moon and eight planets in a 36-sector circle, with the sector numbering beginning at the rising position and following the diurnal motion (ie. the opposite direction to the numbering of the astrological houses). Ss were then assigned to the "key sectors" or "other sectors" group depending on the position of the planet under study. Ss with the planet in sectors 1, 2, 3, 9, 10, 11, 12 or 36 formed one group and the remaining Ss formed the other group. The sectors listed for the former group correspond to Gauquelin's (1981) preferred definition of "key sectors", the rising and culminating positions where the planets appear to exert their strongest influences. Since eight out of the 36 sectors comprise the key sectors, approximately 0.22 of the sample is expected to fall into this group, though the proportion is bound to vary slightly with different planets owing to astronomical and demographic factors (Gauquelin and Gauquelin, 1957).

Since diurnal positions change rapidly (about 10 every four minutes), only those Ss with birth times accurate to within 15 minutes or better (categories 1, 2 or 3 in Table 6.2) were employed in this study. Also, since Gauquelin and Gauquelin (1972) have shown that planetary effects disappear for those whose births were induced by medication or caesarian section, only those Ss whose births were recorded as having been natural were retained. There were 468 Ss who met both of these conditions.

**8.7.3. Multivariate analyses of SO, ME, UR, NE, and PL in the diurnal circle.** The judges were not required to make predictions about the effects of SO, ME, UR, NE or PL in the diurnal circle because the Gauquelins have not obtained convincing results with these planets. The judges could have been asked to base their predictions on astrological tradition instead but it was felt that this would be too confusing since they were specifically requested to ignore

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tradition, and to concentrate on the Gauquelins' findings, with the other planets. Consequently, the effects of these planets were investigated in a multivariate manner.

As in the first part of this study, Ss were assigned to either the "key sectors", or the "other sectors", group on the basis of the diurnal positions of the planets. The two groups were defined in the same manner as before and the same Ss were employed. In this case, however, all ten of the personality measures were entered into the analysis simultaneously. These multivariate tests were computed by means of the SAS computer package, using the MANOVA option of the GLM procedure (Freund and Littell, 1981).

**8.7.4. Results.** The predictions of which traits would be associated with the planets when the latter are placed in key sectors at birth, and the results of the tests of these predictions, are shown in Table 8.2. At least four of the judges agreed on 16 predictions and seven others, derived from previous studies with positive findings, were also added. However, only one of the tests of these 23 predictions gave a t ratio that was significant at the 5% level. This was for the association between MA in key sectors and Ps. The probability associated with two of the other results was less than 0.1. These were for MA with Ex+ and SA with Ex-. Out of the 23 tests, 13 were in the predicted direction while 10 were in the opposite direction. The probability associated with this result is 0.34 by the binomial test.

Overall, the results of this study are not significant since one result at the 5% level, or three at the 10% level, are within chance expectation. However, all three results that were significant at the 10% level have been found at least twice in previous studies and so they merit some further examination. Consequently, the way in which personality varies with the diurnal position of the planet

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Table 8.2. Traits associated with planets in key sectors:  
Predictions and results.

PERSONALITY DIMENSION.		PLANETS.				
		MO	VE	MA	JU	SA
Ps.	Prediction.			<++>	<++>	<-->
	t ratio.			1.79**	0.50	0.29
Ex.		+		<++>	<++>	<-->
		-1.82		1.34*	0.58	-1.48*
Ne						
B						
E		-		++	++	
		-1.07		0.38	0.18	
G		-			--	+
		-0.93			0.90	0.99
I		++	+	--		
		-2.32	-0.27	-0.07		
L		--				
		0.21				
Q2				+		
				-0.25		
Q3		-		-	--	++
		-0.27		-0.06	1.13	-0.28
Li		<++>				
		-1.40				

For each personality dimension, the upper rows in the table show the predictions and the lower rows show the t ratios for tests of these predictions.

+ or - Predictions agreed by at least 4 judges.

++ or -- " " " " " 5 "

<++> or <--> " derived from previous findings.

\* p<0.1. \*\* p<0.05.

Figure 8.1.

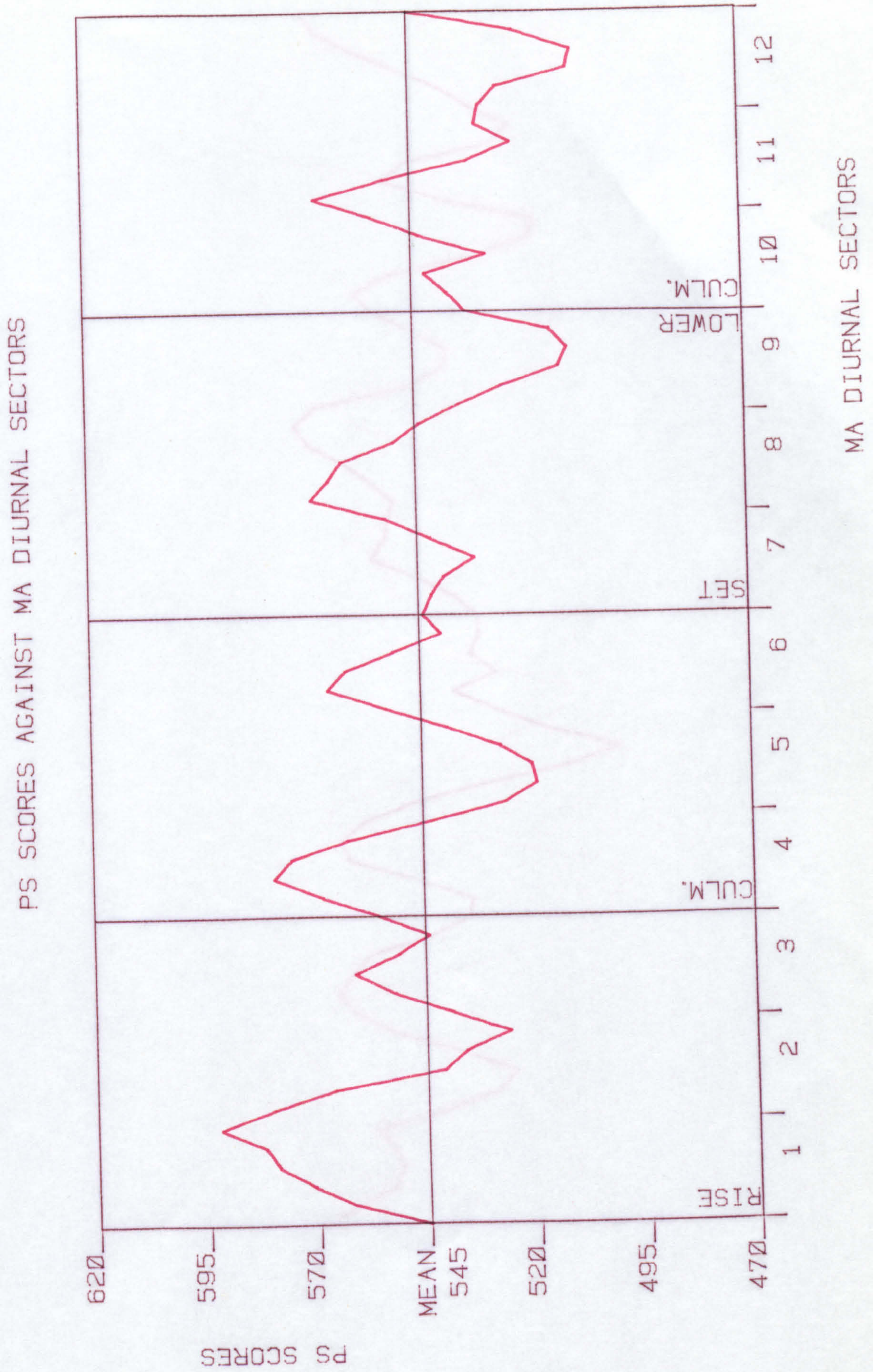




Figure 8.2.

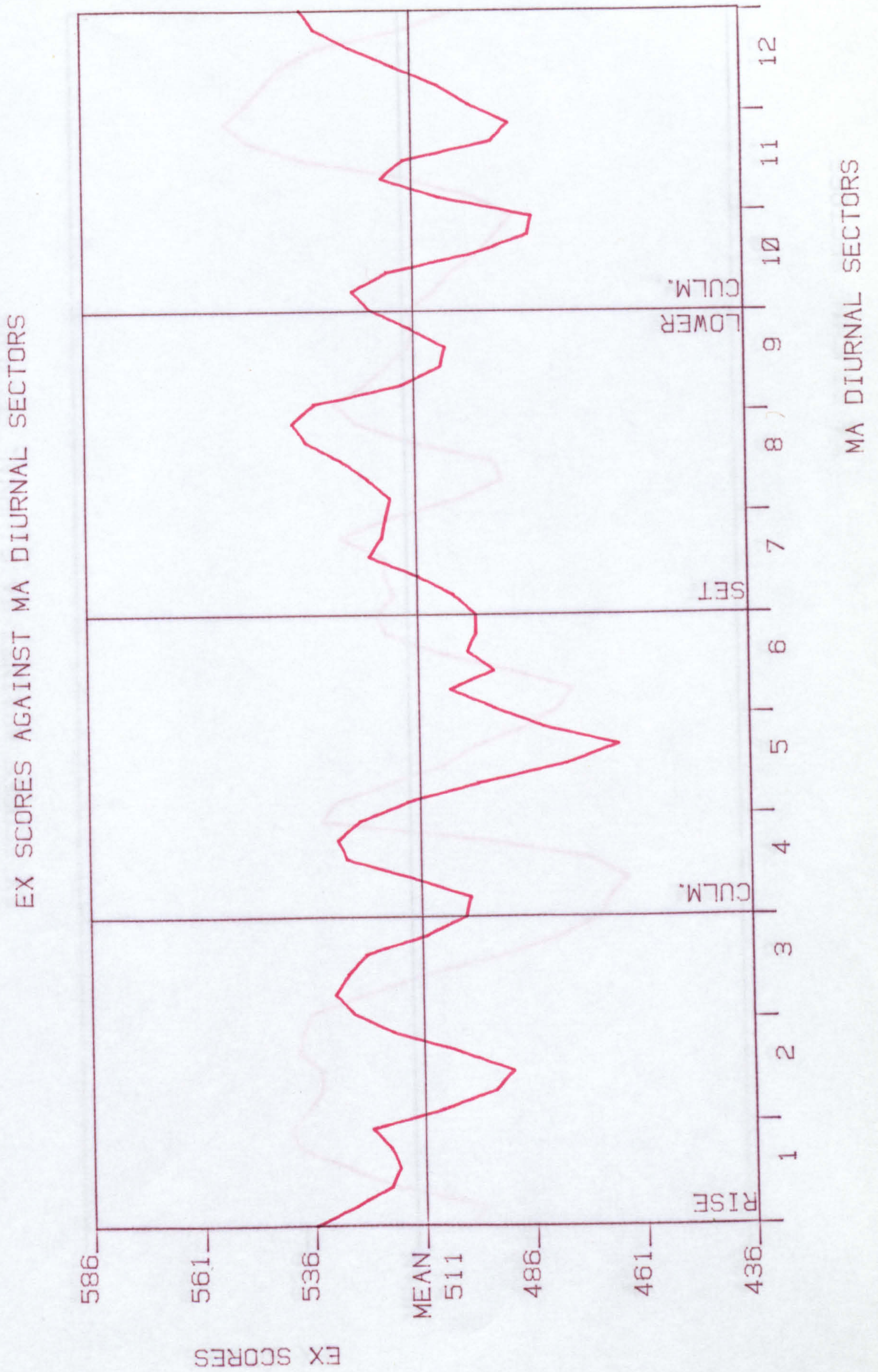
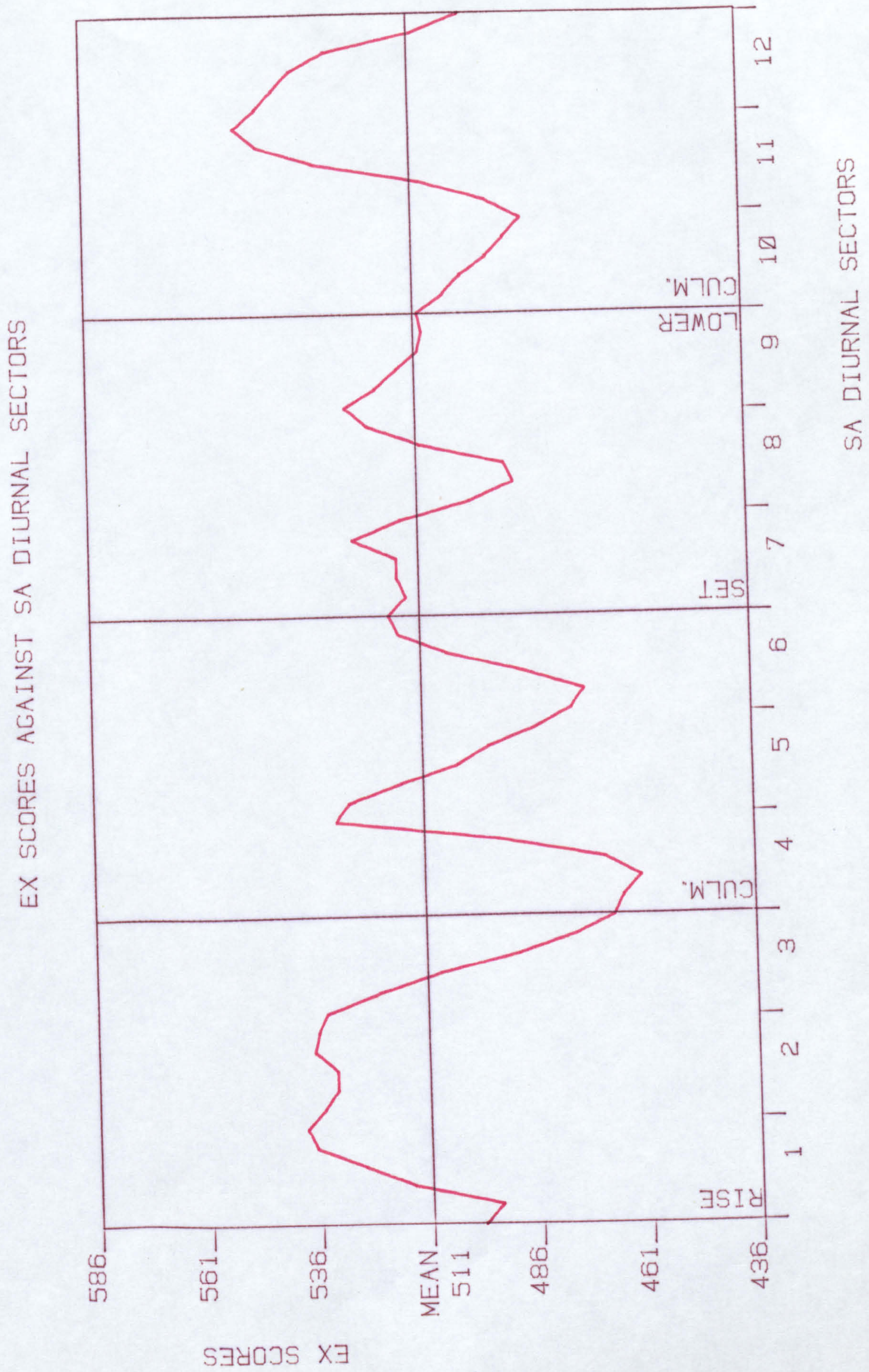


Figure 8.3.



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has been plotted for these three trait-planet pairs and presented in Figures 8.1, 8.2 and 8.3. These graphs require some explanation. On each of them, 64 points have been plotted. The reason for this apparently arbitrary number is that the graphs were drawn automatically by a plotter that was driven by a computer program written primarily to perform Fast Fourier Transform using the Cooley and Tukey algorithm (as implemented on the CED Alpha computer). This algorithm operates on  $2^n$  data points, where  $n$  is a positive integer. Consequently, the diurnal positions of the planets were first calculated for a circle of 21600 sectors and then the program calculated the largest  $2^n$  number of equal sectors that the data would fit into while ensuring that at least one subject was located in each sector. For these data, that largest number turned out to be 64. Thereafter, the mean of all the scores for all Ss falling in each sector was found and finally, a 5-point triangular moving average was computed as follows; if A, B, C, D and E are the means for five consecutive sectors and Na, Nb, Nc, Nd and Ne are the corresponding sample sizes, then the moving average for the third of these sectors, S3, was computed as;-

$$S3 = (A + 2B + 3C + 2D + E) / (Na + 2Nb + 3Nc + 2Nd + Ne)$$

The point of all these manipulations is to show the general shapes of the functions linking personality to the positions of the planets (ie. by smoothing out higher frequency variations). Because of the smoothing, the scores on the ordinate are not very meaningful. These rather arbitrary numbers were obtained because, after the raw scores had been standardised against the norms (see section 5.5 above), they were multiplied by 100, to make decimal points unnecessary, and had 500 added to them to eliminate negative values. Thus the mean score of each personality dimension is close to 500 and the standard deviations are close to 100.

Table 8.3. Results of multivariate comparisons:  
Key sectors versus other sectors for ten planets.

	PLANET.									
	SO	MO	ME	VE	MA	JU	SA	UR	NE	PL
T2 =	1.84*	1.53	1.43	0.51	0.62	0.64	0.83	0.57	1.09	1.00

The figures in the table are the values for Hotelling's T2.  
D.f. = 10 & 457 throughout.

\* p=0.052.

The results of the multivariate comparisons of scores for key sectors versus other sectors are presented in Table 8.3. Although these analyses are performed chiefly to investigate the possible effects of the planets for which predictions were not available, the planets which feature in the first part of this study are included for the sake of completeness. Where there are only two treatment groups in a Manova, as there are here, all of the test criteria are equivalent to Hotelling's T2 (Jones, 1966). Of the ten values of T2 shown in the table, only one comes close to being significant. This is the result for SO, whose associated probability is 0.052. This is not sufficient to give the analysis overall significance.

**8.7.5 Discussion.** Only one of the results in the first part of this study was clearly significant. This showed that subjects who have MA in a key sector tend to score higher on Ps than those who have MA elsewhere. On its own this does not give the study overall significance. However, this association has been found on every occasion that it has been investigated, which is now four times. It was first found in Gauquelin et al.'s (1979) study of more than 7,000 eminent Europeans and this study was then replicated with an independent sample of some 1,500 eminent Americans. A second replication employing a sample of 561 ordinary

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people measured by the Ps scale of the EPQ was reported by Gauquelin (1981) as having a non-significant result but this has since been re-analysed (by the present author) and found to be significant after all (see section 3.5). Since the present replication is the third, it deserves serious attention.

The smoothed curve of Figure 8.1 shows the general shape of the variations in Ps scores when plotted against the diurnal positions of MA. Prominent peaks occur in sectors 1 and 4 of the 12 sector circle as was expected. Three other clear peaks and troughs can also be observed. This is somewhat different from a comparable plot for MA and Ps published by Gauquelin et al. (1981) in which only the key sectors gave clear peaks. However, the numbers and locations of subsidiary peaks for planetary effects tend to vary from one investigation to another when different research methods are used. Addey (1974, 1975) has noted these variations and suggested that they may be both systematic and meaningful. His ideas on this topic will be examined in some detail below.

None of the other results attained the conventional 5% level of significance but two that were predicted were marginally significant at less than 0.1. These were for MA in key sectors associated with Ex+ and SA in key sectors associated with Ex-. Both of these associations have been found twice before with eminent professionals (Gauquelin et al., 1979, 1981) and the one involving MA has also been obtained with ordinary people (Gauquelin, 1981, after the present author's re-analysis). However, it should be noted that both Dean (1981) and Smithers and Cohen (1982) failed to find either of these two associations using different measures of Ex.

Figures 8.2 and 8.3 show, in general outline, how Ex scores varied with the diurnal positions of MA and SA for

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this sample of subjects. The shape of the curve for MA does not show a very strong resemblance to the comparable curves published by Gauquelin et al. (1979, 1981). In particular, the peak in Ex scores just before the culminating point and the trough which coincides with culmination are unexpected, and the several fluctuations in the second half of the graph correspond to no previous result. The curve for SA, on the other hand, is more similar to previous findings. The expected troughs in key sectors overlap with the rising and culminating points. Only three other clear waves are found and, remarkably enough, these are in much the same phase as those of Figure 8.1. Indeed, the correlation between the 64 moving averages for these two curves, if the corresponding sectors are paired, is  $-0.34$ , which is significant at less than 0.01. This correlation was not predicted and may well be coincidental, but it is remarkable enough for attention to be drawn to it.

Among the present results there are also several notable failures to replicate. In their two studies, Gauquelin et al. (1979, 1981) found JU to be associated with Ex+ and Ps+ and SA to be associated with Ps-, but none of these findings were repeated here or in Gauquelin's (1981) previous investigation with the EPQ. Furthermore, the highly significant link between MO and Li+, discovered by Gauquelin (1981), is actually reversed (though not significantly so) in the present results.

The multivariate analyses for ME, UR, NE, PL all failed to reach significance. This is, perhaps, just what one should expect since the Gauquelins have never obtained positive results with these planets. The result for SO, however, was very close to being significant and it will be well to bear this in mind when the diurnal positions of the sun are examined in further detail below. Multivariate analyses for MO, VE, MA, JU and SA were also included since it was possible that these planets might have had effects

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which differed from those anticipated by the judges. However, no evidence for such effects was found.

In general, the findings of this study are very disappointing. The one clearly significant, and two marginally significant, results do not inspire great confidence when set against the numerous non-significant results and when considered in the light of the inherent implausibility of any planetary influences on personality. However, there are a number of ways in which these failures could be explained apart from the lack of planetary influences. Firstly, it will be recalled that the planetary effects discovered by the Gauquelins are quite weak even with eminent professionals and that these effects can be obscured by inaccurate birth-times. Furthermore, planetary effects do not hold for individuals whose births were medically induced. Now, it was shown, in section 5.3 above, that the birth-times in this study are almost certainly not as accurate as the subjects stated and in section 5.4 reasons were also given for thinking that many of the subjects who claimed that their births were natural must really have had their births induced. Both of these factors would tend to obscure planetary effects as would also any errors of measurement in the personality scales. This latter factor is likely to be particularly important for the seven scales from the 16PF that were included in the analyses, for the mean alpha coefficient for these scales is only 0.49 (see Table 6.5). This means that over half of the variance (on average) of these measures is error variance. When all of these sources of error are combined, it might be that a sample size of 468 is simply not large enough to detect weak planetary effects.

However, there is another possible explanation for the poor results that deserves attention. The present study tested the effects of the planets when placed in key sectors, that is, just after the rise and just after the

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culmination of the planet. These are the positions that have most reliably given significant results in the Gauquelins' research. However, there are other positions of the planets which have also given results with considerable regularity. Of special note are the sectors just after the setting and lower culmination. Either peaks or troughs in the frequency distributions were frequently observed in these two positions in the Gauquelins' studies of career (Gauquelin, 1960) and in their studies of personality (Gauquelin, 1976a). When Gauquelin (1960) combined the distributions for all of the planet/career pairs that reliably gave significant results, these subsidiary peaks were quite prominent both for the French subjects and for the subjects from other countries independently, and the correlation between the two curves was a highly significant 0.83. This led Gauquelin to speak of four cycles of planetary influence of six hours each.

However, such composite curves tend to blur important distinctions since the frequency distributions for some of the individual planet/career pairs reliably show wave-forms that are clearly not four-fold. Of special note are the distributions of Mars at the births of sportsmen, which usually give a three-fold wave, with a single peak halfway between setting and lower culmination in addition to the usual peaks in key sectors. Such three-fold waves were not only present in the total sample of 1485 sportsmen but were also found among four of the five subsamples: footballers, boxers, pilots and "other sports" (Gauquelin, 1960). Moreover, the same pattern was replicated in an independent study of the Mars Effect by the Belgian Committee Para (Gauquelin, 1976b). Thus the three-fold wave in the Mars Effect on sportsmen cannot be regarded as the result of random fluctuations.

Furthermore, it should be noted that planetary effects do not always manifest as peaks even in the key sectors.



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For some planet/career and all planet/antiprofile combinations, the peaks appeared between the angles and it was troughs that were found in the key sectors. The Gauquelins generally interpret this as showing that individuals with particular genetic endowments tend to avoid being born when certain planets are in key sectors. However, it is equally true to the data to say that they seek to be born at other times. The only justification for expressing it the first way is that results have most regularly been associated with the key sectors, but this should not be used to disguise the fact that peaks have also been reliably observed in other positions.

All of this suggests that personality does not vary in a discrete way with the positions of the planets, being extreme when the planets are in key sectors but being unaffected at other times. Instead, it appears that personality may vary continuously as a function of the planets' diurnal positions, with the shape of the function changing, perhaps, according to the particular planet/trait combination. This view has been strongly championed by Addey (1979a, 1981b). If it is correct, then it would mean that, for some of these combinations, the key sectors may have no special importance. This would be the case, for example, if the function linking planetary position with character trait is close to the mean at these points. In fact there is already some direct evidence that this is so and the best of it has been provided by the Gauquelins themselves. This evidence will be reviewed in the introduction to Diurnal Study II which follows and which was designed as a further investigation of these ideas.

### 8.8 Diurnal Study II.

**8.8.1. Introduction.** The best evidence that personality varies continuously as a function of the planets' diurnal positions comes from data published by Gauquelin and

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Gauquelin (1973, 1974a & b, 1977a). It is derived from the same studies that showed that certain personality types tend to be born when particular planets are in key sectors (see section 8.3 above). These studies used the character traits method. That is, typical profiles and antiprofiles were first drawn up for each of four professions and then the positions of the planets at the births of individuals described by the traits in these profiles were compared with the positions of the same planets at the births of individuals not so described. The most clear-cut results from these studies were the ones that came from pairing each profile with the planet to which it belonged. The sense of "belonged" here is that each profile was drawn up for a particular profession and membership of each profession had previously been found to be associated with one particular planet. (Writers, sportsmen, actors and scientists were chosen in preference to any of the other professions presumably because each was linked with only one planet). These results were clear-cut because they consistently gave either peaks (for typical profiles) or troughs (for antiprofiles) in the key sectors (though they did not always give four-fold waves). However, the Gauquelins did not only pair each profile with the planet to which it belonged but also paired it with the three other planets. When the Character Traits Method was used on all of these planet/profile pairs, with VE thrown in for good measure, all of the 40 resulting frequency distributions differed significantly from their corresponding expected frequencies.

The Gauquelins have published the observed and expected frequencies, in both 12 and 18 sectors, for each of these distributions but have reported the associated chi-squares for only a few of them. Therefore, since these results are central to the present discussion, the opportunity will be taken to report these statistics in full. Table 8.4 shows the chi-squares for the distributions of the five planets

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for the four typical profiles and the four antiprofiles. It will be convenient here if the pairings of the profiles with the planets to which they belong are called "proper pairings" and the remainder are called "cross-pairings".

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**Table 8.4. Chi-square for the distributions of 5 planets for 4 typical profiles and 4 anti-profiles.**

<u>TYPICAL PROFILES.</u>	MO	VE	MA	JU	SA
Writers	299 <u>285</u>	151 176	88 129	81 135	31** 41**
Sportsmen	31** 50**	42** 62**	157 <u>168</u>	33** 41**	63 71
Actors	159 289	124 297	337 408	<u>891</u> <u>922</u>	466 423
Scientists	49 87	54 81	40** 125	42 78	<u>118</u> <u>158</u>
<u>ANTI-PROFILES.</u>					
Writers	<u>351</u> <u>332</u>	186 228	106 173	100 197	35** 81
Sportsmen	42** 94	62 102	<u>163</u> <u>135</u>	20* 32*	33** 36**
Actors	197 341	171 292	316 348	<u>726</u> <u>804</u>	568 566
Scientists	102 137	36** 40**	82 125	52 87	<u>38**</u> <u>109</u>

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 For each profile, the upper row of figures gives chi-square for 12 sectors, the lower row gives chi-square for 18 sectors.

The underlined values are the ones obtained by pairing the profiles with the planets to which they "belong".

\*  $p < 0.05$ . \*\*  $p < 0.01$ . For the remaining values,  $p < 10^{-6}$ .

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It can be seen that, though the chi-squares for the proper pairings (underlined in the table) tend to be larger than those for the cross-pairings, this is not quite uniformly the case (viz the results for the anti-profile of the scientists). Moreover, all of the results are significant, the majority being highly so. Nevertheless, the Gauquelins have had very little to say about the

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cross-pairings. The main reason for this reticence seems to be that the distributions for the cross-pairings rarely show clear peaks or troughs in the key sectors, nor do they betray any other obvious patterns. Peaks and troughs appear in different sectors apparently at random, are not regularly spaced, and vary to some degree in number. It is no wonder the Gauquelins (1974a) have called them "anarchical".

Another reason why the Gauquelins have virtually ignored these results may be that one of the assumptions of chi-square is violated in the character traits method. In this method, the positions of the planets at the births of each subject count once in the frequency distributions for every word used to describe the subject that is also found in the given profile. Since many of these words are synonyms, the units entered in to the statistical analysis are not all independent as they are required to be. Thus, the probabilities associated with the resultant extreme values of chi-square cannot be taken as accurate estimates of the probabilities that the related null hypotheses are true. In short, none of the chi-square tests based on the character traits method can be trusted.

Of course, this flaw in the method, which was pointed out by Vergo (1982), applies equally to the proper pairings as to the cross-pairings. With the former, however, independent support for the results has been obtained from a number of sources, some of which were mentioned in section 8.3 above. Of particular importance in the present context is the finding that, when the method was applied to different professions independently, the proper pairings gave very similar distributions, with peaks always being found in the key sectors (Gauquelin and Gauquelin, 1976). For example, when the distribution for JU at the births of subjects described by the actor's typical profile was plotted (1) for actors and (2) for sportsmen, scientists

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and writers combined, the two resultant curves showed a highly significant correlation of 0.78.

No similar independent support for the results of the cross-pairings has been offered so far. However, data on which similar tests could be made have been published by Gauquelin and Gauquelin (1973, 1974a & b, 1977a). These are the same data from which the chi-square values in Table 8.4 were derived. It will be recalled that, for each planet in the cross-pairings, results were obtained for both the typical- and the anti-profile of each of the four professions. Since these pairs of profiles are composed of mutual antonyms, the distributions of the planets for each pair ought to be the inverse of each other. This can be tested simply by calculating the correlation for each typical- versus anti-profile pair. The distributions for the two members of each pair are, of course, independent because the words making up the two kinds of profile are exact opposites of each other.

Such analyses have not been reported before but since they are central to the present discussion, they are reported here. Table 8.5 shows the correlations between the distributions for the typical profiles and anti-profiles for each cross-pairing. In each case, the distributions that were entered into the analysis were for an 18 sector division of the circle and were derived by subtracting the expected from the observed frequency for each sector, as given in the Gauquelins' publications (op. cit.). It can be seen that every one of the 16 coefficients is negative and is significant at the 0.01 level. This suggests that the fluctuations observed in the distributions for cross-pairings are not merely random but represent, at least to a first approximation, the ways in which certain bundles of character traits vary with the diurnal positions of the planets.

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Table 8.5. Correlations between the distributions of five planets for four typical- and four anti-profiles.

PROFILES.	PLANETS				
	MO	VE	MA	JU	SA
Writers		-.80	-.80	-.81	-.67
Sportsmen	-.71	-.81		-.64	-.71
Actors	-.83	-.85	-.82		-.89
Scientists	-.86	-.61	-.76	-.74	

---

D.f. = 16 throughout.  
 All coefficients are significant at <0.01.

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In this analysis, the correlations between the distributions for all the other cross-pairings were also calculated. There are 32 cross-pairings altogether, so the matrix contained 496 non-repeated coefficients, of which the 16 in the table were expected to give negative values. No predictions were possible for the remaining 480 correlations but it is of interest to know if they contain any patterns nevertheless. In fact only 15 of them gave significant correlations (two-tailed tests), which is well within chance expectation. Thus this analysis did not reveal any general patterns for the cross-pairings.

In conclusion, the results provide evidence that personality varies continuously with the diurnal positions of five of the planets but reveal no pattern to the variations except among the proper pairings. This is an awkward state of affairs because, without any pattern, one hardly knows how to begin to construct an explanation for what appear to be the facts. When placed in key sectors, the planets are linked with certain temperaments (ie. the profiles, and their opposites, of four professional groups). These temperaments are complex in that they are composed of various traits and yet they do not correspond exactly to any recognised higher-order factors, such as those identified by Eysenck. When placed elsewhere, the

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planets are still linked to the same temperaments but in complex ways, the underlying patterns of which are obscure. The only suggestion that can be offered at present is that these relationships are complex because the temperaments that have been examined are complex. If measures of simpler traits or "purer" factors were employed instead, it could be that simpler patterns linking planet to personality would be found.

This possibility has been investigated by Addey who, it was mentioned in the previous section above, considered it to be a mistake to suppose that planetary effects only apply to the key sectors. He held that the effects are always in force wherever the planet is placed and he suggested that the functions linking personality to planetary position take the form of harmonic waves. He began to investigate these ideas systematically using individual trait words taken from the Gauquelins' data but unfortunately he died before being able to complete the project. The five interim reports on his work that he published (Addey, 1979a & b, 1981a & b, 1982) provide very promising results but alas, rigorous statistical analyses were omitted. Since the descriptions of his methods of analysis and evaluation are somewhat complex and are scattered throughout his publications, a summary and critical appraisal of them is provided in Appendix III. Hopefully, someone will undertake to complete his analyses in the near future.

The analysis of the Gauquelins' data that was presented above suggested that personality varies continuously with the positions of the planets. If this is true not only of the particular personality types that the Gauquelins have studied, but of personality in general, then it should be possible to repeat the general finding with ordinary people measured by questionnaires. This is the aim of Diurnal Study II which follows. Since this study uses measures of

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less complex traits than those employed by the Gauquelins, it is also hoped that simpler, more coherent, results will be obtained. However, there is at present no firm basis for predicting any particular patterns in the results and any search for a simplifying reduction will have to be conducted a posteriori. Hence, the central aim of the study is merely to investigate whether individuals who were born with the planets in different positions throughout the circle differ in personality more than is expected by chance. Since no precise predictions about the results are possible, a multivariate approach is used.

**8.8.2. Method.** The same 468 Ss and the same ten personality scales as in Diurnal Study I were used. However, in this case the positions of the planets were calculated for a 12-sector circle and, for each of the planets separately, Ss were assigned to one of 12 groups depending on the position of the given planet. The choice of exactly 12 sectors is to some extent arbitrary but was guided partly by the fact that the Gauquelins have frequently used this number and partly by the need to keep the sample size per sector reasonably large. With 12 sectors, the average number of Ss per group is 39.

Differences in the mean scores of the 12 groups were examined for the ten personality scales simultaneously by means of a one-way Manova. As before, these tests were carried out by the SAS computer package, using the MANOVA option (Freund and Littell, 1981).

**8.8.3. Results.** The results of the ten Manovas are shown in Table 8.6. As in the aspect studies reported above, Pillai's Trace criterion was used to provide F approximations. It can be seen from the table that only one of these F ratios is significant. This is the result for SO. However, the probability associated with it is only 0.005 and the binomial test shows that the probability of



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**Table 8.6. Results of multivariate comparisons of the means of 12 sector-groups for 10 planets.**

	PLANET.									
	SO	MO	ME	VE	MA	JU	SA	UR	NE	PL
F =	1.39*	1.00	0.99	1.05	0.93	0.81	0.91	0.92	0.89	0.94

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The figures in the table are F approximations associated with Pillai's Trace criterion.

D.f. = 110 & 4560 throughout.

\* p=0.005.

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obtaining one result out of ten significant at this level is less than 0.05. Thus this result has overall significance.

An examination of the univariate results for SO reveals that the personality scales Ex, Ne, G and Q3 all gave significant F ratios (5% level). Graphs showing the general shape of the variations in these personality traits with the positions of SO are presented in Figures 8.4-8.7. These graphs were drawn by the same method as those presented in section 8.7.4 above. The most salient feature of the graphs for both G and Q3 is the prominent peak in sector 1, the rising position. The graph for Ex also shows a peak in this position but, in this case, a trough coinciding with the setting point is more prominent. None of these features appear in the graph for Ne. However, this is perhaps the most striking of the four relationships on account of its large and gradual fluctuations. There are two clear peaks, which are half of the circle apart, and two troughs, which are also half of the circle apart.

**8.8.4. Discussion.** The only significant result in this study was the one for the sun. This was quite unexpected because no associations between personality and the diurnal positions of the sun have been reported before. The

Figure 8.4.

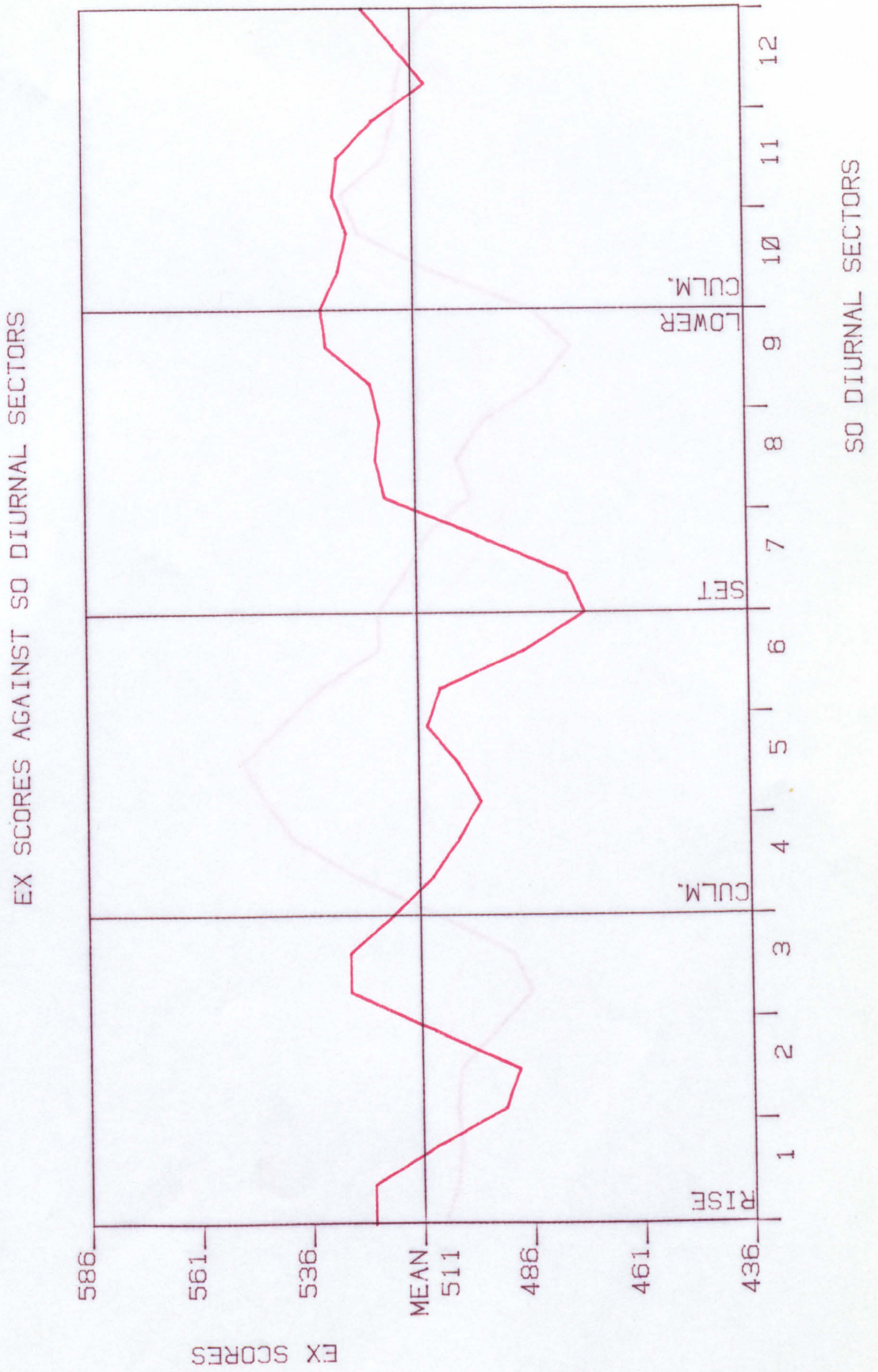


Figure 8.5.



Figure 8.6.

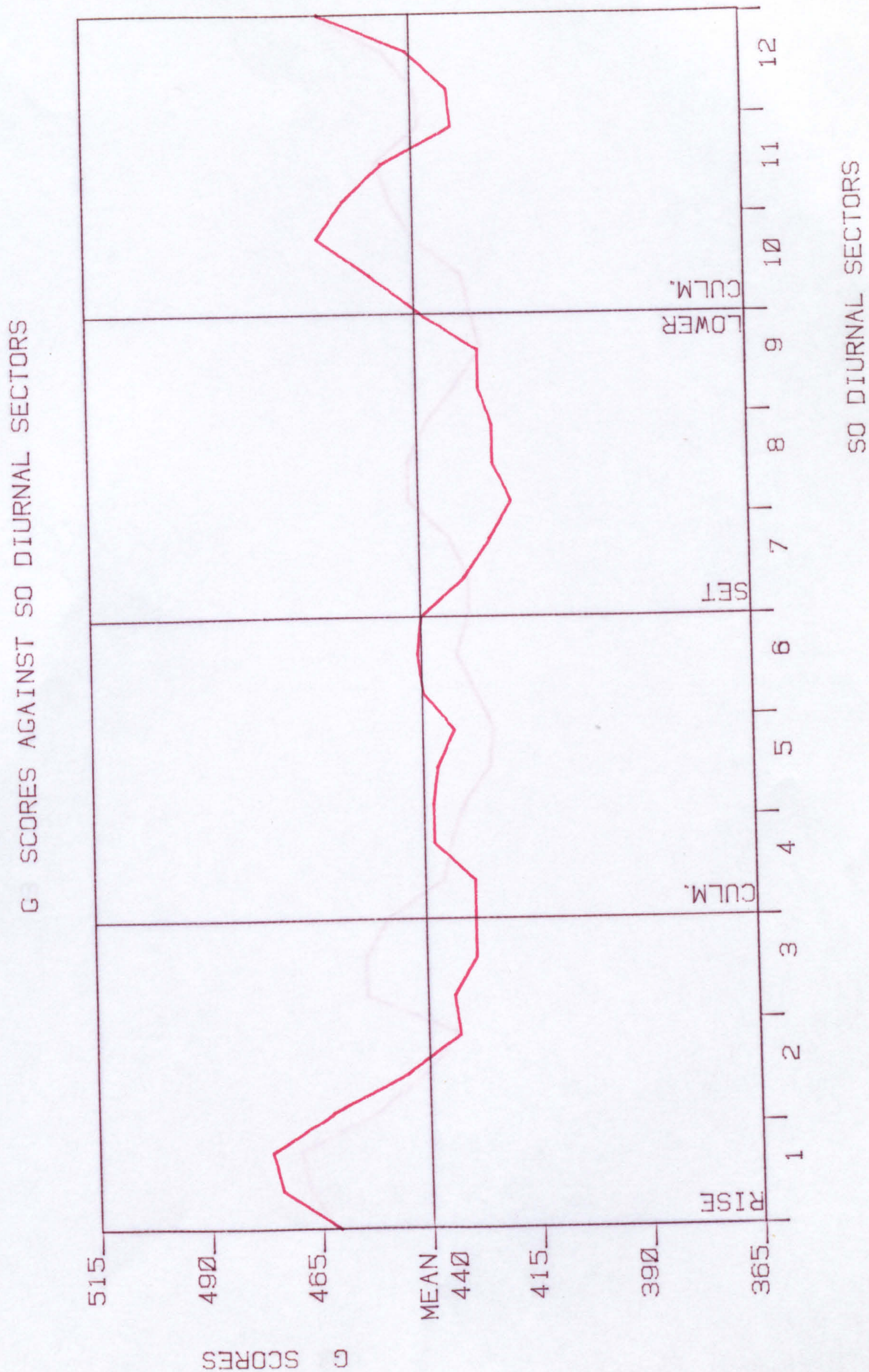
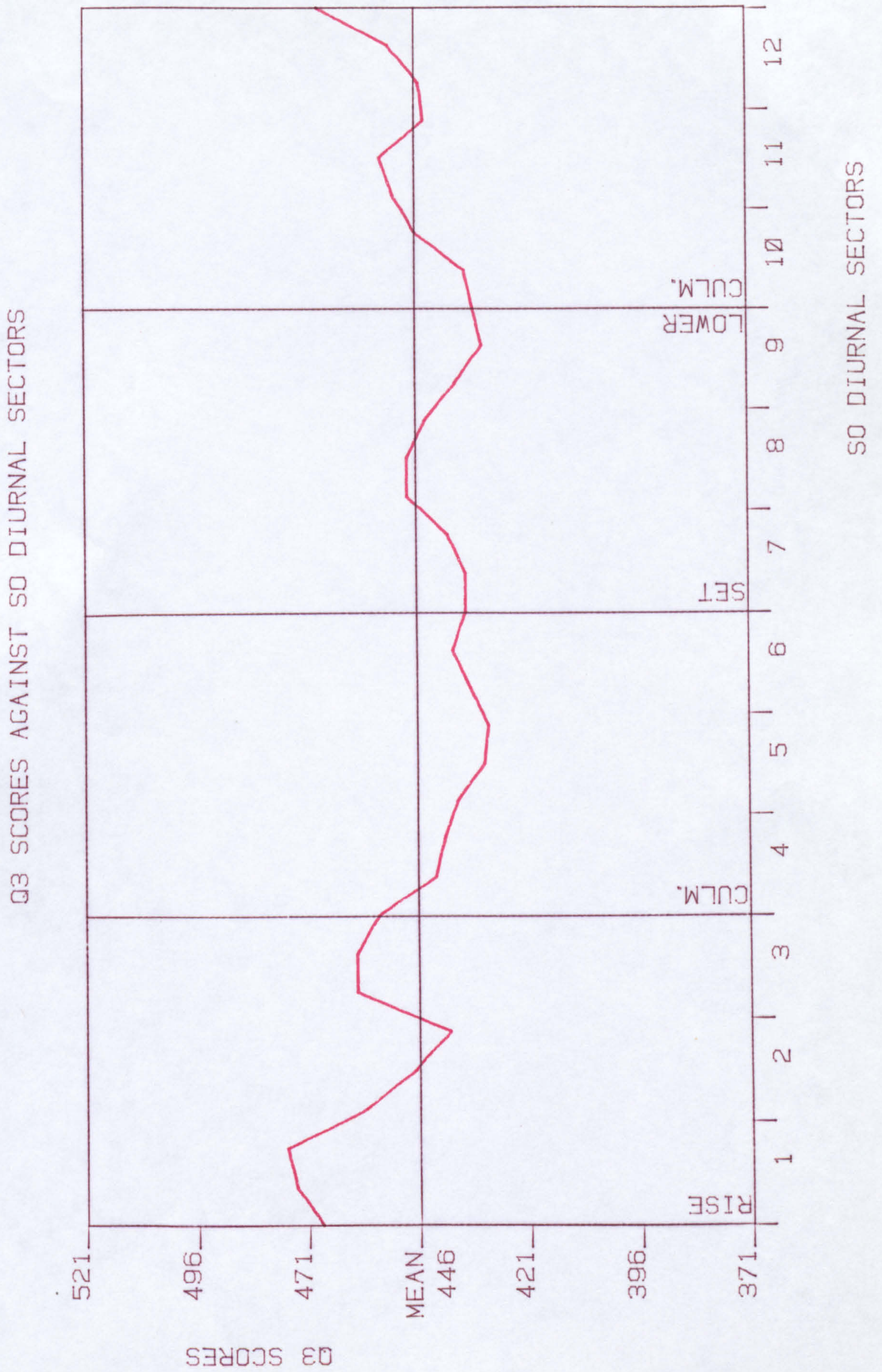


Figure 8.7.



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Gauquelins have found no profession that is linked with the sun, no heredity effect involving the sun and no relationship between the astrologers' postulated solar temperament and the traits of individuals born with the sun in key sectors (Gauquelin, 1980). Moreover, Gauquelin, Lampe and Paruta (1975) found that the planetary effects for MO, MA, JU and SA are all independent of the solar birth-hour.

However, none of these negative findings is directly at variance with the present positive results and there are, in fact, two studies showing the influence of the sun on biochemical reactions which reveal certain parallels with some of these results. In one of them, Takata (1951) studied variations in the flocculation index of blood, which is a measure of the amount of albumen, an organic colloid, in human blood serum. In a long-term study, Takata discovered that this index is responsive to variations in solar output and also varies on a daily basis. It shows a sudden increase which begins about 15 minutes before sunrise and reaches a peak some 45 minutes later. Also of note is Rothen's (1976) discovery that certain immunological reactions in vitro vary according to a diurnal cycle. The rate of these reactions decreases at sunrise and increases again at sunset.

The parallel between these discoveries and the results of the present study is that, in all of them, significant changes occur around the time of sunrise, beginning just before and reaching a peak a short while after, the rise of the sun. In the present study this is the case with three of the personality dimensions: Ex, G and Q3. Admittedly, the similarity is only one involving a pattern of variations linked to the movement of the sun and it does seem unlikely that, even if a child's blood or immune system is affected by the sun at the time of birth, this would have permanent effects on its personality. However,

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it is important to consider the mechanism by which the sun affects biochemical processes. It seems probable that these effects are mediated by Extra Long Frequency (ELF) waves in the atmosphere. Playfair and Hill (1979) report that recent experiments have shown that the ability of the blood to coagulate quickly is affected by magnetic fields in the ELF range. Schumann (1957) has shown that ELF waves are set up between the earth's surface and the ionosphere where they resonate at frequencies which coincide with many of the important frequencies of the human brain and body (1-100 Hz). Because they have extremely long wavelengths, these waves are very penetrating and difficult to shield. Finally, Konig and Anker-muller (1960) have discovered that naturally occurring ELF waves vary locally with a 24-hour period, increasing at sunrise and decreasing at sunset. All of this suggests that ELF radiation forms just the sort of mechanism that might have far-reaching, and even long-lasting, effects on living organisms. Whether they could permanently affect the new-born child so as to influence personality in later life may seem unlikely but the possibility should be considered. Obviously, the unexpected results of the present study need to be replicated before any effort is spent on discovering their cause, but if they are replicated, it is encouraging to know that clues to a possible cause exist already.

The fourth of the significant univariate results for the sun, that for the neuroticism dimension (Figure 8.5), did not show any sudden rise or fall at sunrise. Instead, it gave a remarkably even two-fold wave with a major peak in mid-afternoon and a major trough just before midnight. To the author's knowledge, this pattern does not correspond to the variations in any geophysical effects. However, it may be of some significance that a recent study of the health of infants born at different times of day showed that births between 2 and 4 p.m. have the greatest prevalence of low (poor) Apgar scores and more often present serious

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problems upon departure from the delivery room (Breart and Rumeau-Rouquette, 1979). Thus birth in mid-afternoon appears to be associated with tendencies towards both poor neonatal health and slightly elevated neuroticism scores. If it could also be shown that Apgar scores correlate with neuroticism, then the case for a connection between these two findings would be quite strong.

Unfortunately, the relationship between Apgar ratings and adult personality does not appear to have been investigated and the existing studies of the correlates of Apgar scores in children are inconclusive. Associations with I.Q. in pre-school children have been reported by Serunian and Broman (1975) and Edwards (1968) but were not found by Shipe et al. (1968) or by Broman et al. (1975) when race, sex and socioeconomic status were controlled. Only one study of personality correlates appears to have been conducted so far. This was by Shipe et al. (1968) who found no evidence of personality differences among three-year olds when high and low Apgar scorers were compared. However, only 24 matched pairs of subjects were used in this study and personality was rated by the parents, so the results are hardly conclusive.

The multivariate comparisons for all of the nine other planets were non-significant. This is not surprising where ME, UR, NE and PL are concerned, for significant effects for these planets have never been found previously. However, in view of the Gauquelins' findings and the new analyses reported in the introduction to this study, the results for MO, VE, MA, JU and SA are disappointing indeed. In section 8.7.5 above, a number of factors were identified which would have the effect of obscuring planetary influences: inaccurate birth-times, the presence of subjects whose births were induced, and errors of measurement in the personality scales. It was pointed out then that, with all of these sources of error, a sample



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size of 468 may simply not be large enough to detect weak planetary effects. This issue will be addressed in detail in Chapter Ten where estimates will be made of the sizes of the effects that are expected in astrological investigations and where statistical power analysis will be used to determine what size of effect could be detected, with a reasonable probability of success, given samples of varying sizes.

### 8.9 Summary and Conclusions.

The purpose of the two studies reported in this chapter was to investigate whether the personalities of ordinary people vary with the diurnal positions of the planets. Such associations were expected not only on the basis of astrological theory, but also because the Gauquelins have found such associations with eminent people. The most clear-cut of the latter findings are ones showing that individuals with certain traits tend to be born just after particular planets have either risen or culminated.

There appears to be no reason why these associations should be restricted to the eminent and indeed, one plausible theory advanced to explain earlier discoveries actually requires that the links between the planets and personality should apply generally. It has been found that the most successful members of a number of different professions tend to be born when certain planets are in key sectors, but the same does not apply to the average members of the same professions. The Gauquelins have suggested that the reason for this is that success in these professions tends to be contingent on the possession of particular traits and only the most successful individuals are, on average, extreme on these traits. However, some doubt has been cast on this idea by Eysenck and Nias's (1982) identification of an anomaly with respect to sportsmen. Mars in key sectors has been found to be associated with

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eminence in sports and also appears to be linked with extraversion. According to the Gauquelins' explanation for the importance of eminence, this suggests that success in sports is partly contingent on the possession of extraverted traits. However, research in the psychology of sports fails to corroborate this suggestion; the most successful sportsmen are no more extraverted than their less successful colleagues.

However, this anomaly turned out to be less serious than it seemed at first sight. On closer examination it was found that Mars is associated at least as strongly with psychoticism as it is with extraversion and that success in sports is also associated with psychoticism and traits related to this personality factor. Thus, there appears to be little reason to doubt that the Mars Effect with sportsmen is mediated by personality in the manner suggested by the Gauquelins; Mars in key sectors promotes psychoticism and psychoticism, in turn, promotes sporting success. Mars also promotes extraversion but this happens to be irrelevant to the connection between Mars and sports because extraversion itself is irrelevant to sporting success. It seems probable that the other connections between the planets and careers that have been discovered are also mediated by personality in parallel ways though detailed examinations of each of these were not attempted.

Despite the coherence of the Gauquelins' discoveries with eminent people, and the plausibility of the idea that the links between the planets and personality should apply generally, the results of experiments with ordinary people have been disappointing. Associations between Mars and Ps+ and Ex+ that replicate earlier findings with eminent professionals have been found in one study but the link with Ex+ was missing from two other studies. Again, evidence that people born under JU and SA differ in predicted ways has been provided by two small-scale studies

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but comparable effects were missing from three other studies of these planets. A few other significant results with ordinary people have also been reported but no trust can be placed in them until they have been replicated.

Against this background, two further investigations of ordinary people were undertaken. In the first of these, predictions of the ways in which personality should differ between those born with the planets in key sectors and those born with the planets elsewhere were obtained from previous experiments and from judges, and were tested against the data. Only one of these tests gave a clearly significant result, while two others were marginally significant. Since 23 predictions were tested in all, these results could have arisen by chance. However, the three significant results had all been obtained on at least two previous occasions and so they are likely to represent more than chance variations. Graphical representations revealed that the shapes of the functions linking personality to the position of the planet throughout the diurnal circle, were very similar to previous findings by the Gauquelins, for two of these three planet/trait pairs.

A number of explanations why so few of the results of this first study were significant were offered. It was noted that planetary effects have always been found to be very small in previous investigations and that inaccurate birth-data, the presence of subjects whose births were medically induced, and errors of measurement in the personality scales, would all combine to make it difficult to obtain significant results. However, in the second study reported in this chapter, a different possible explanation for the poor results was investigated. It was suggested that personality may vary continuously as a function of the planets' diurnal positions throughout the circle and that, for some of the planet/trait combinations at least, the key

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sectors, which were examined in the first study, may have no special importance.

This suggestion was offered on the strength of a number of results that have already been published, by the Gauquelins and by Addey, and also on the basis of new analyses of data provided by the Gauquelins. The best of the latter analyses were ones that showed that the distributions of each of five of the planets at the births of eminent individuals described by the traits contained in the typical profiles of four professions, were the inverse of (were negatively correlated with) the distributions of the same planets at the births of individuals described by the antiprofiles for the same professions. This was found to be the case even when the planets were paired with the professional profiles to which they did not belong. This shows that the fluctuations observed in the distributions for these "cross-pairings" are not merely random but represent the ways in which certain bundles of traits vary with the positions of the planets throughout the circle.

The aim of Diurnal Study II, then, was to investigate whether the personalities of ordinary people also vary with the positions of the planets throughout the circle. For each of the ten planets separately, subjects were assigned to one of 12 equally spaced sectors depending on the position of the given planet at birth and then the differences in the mean scores for the 12 groups were examined for ten personality scales simultaneously by means of a one-way Manova.

Only one of these multivariate analyses gave a significant result. This was the analysis for the sun which was significant even when set against the nine other non-significant results. An examination of the univariate results for the sun revealed that four of the ten personality scales provided significant F ratios. These

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were the scales for extraversion, neuroticism, conscientiousness and self-control. Graphs of these results were presented and compared with the manner in which a number of other biological and geophysical variables have been found to fluctuate on a daily basis. Several intriguing parallels between these findings were identified, suggesting possible mechanisms by which the sun might affect the personalities of the newborn, but it was concluded that the new result should be shown to be reliable before any effort is spent in attempting to explain it.

THE ECLIPTIC CIRCLE

9.1 Astrological conceptions.

In astrology, the influences of the planets are said to be modified according to their positions in the ecliptic circle at the time of birth. As seen from the earth, the sun appears to move through the fixed stars along a path called the ecliptic, completing one cycle in a year. The moon and planets also appear to move relative to the stars, with various periods, and their paths all lie close to the ecliptic. The band of the sky within which they move is called the zodiac.

As is well known, there are 12 signs of the zodiac and they begin with a sign called Aries. According to astrologers, the influences of the planets in the ecliptic circle are modified primarily by the sign in which they are placed at birth. What is not quite so widely recognised is that there is a fundamental disagreement among astrologers about where the beginning of Aries should be located. In the West, the great majority of astrologers use what is called the "tropical" zodiac, which begins where the ecliptic intersects with the equator at the northern vernal equinox. In India, and among a minority of Western astrologers, on the other hand, the beginning of the zodiac is located at a fixed point among the stars. This is called the "sidereal" zodiac. Because of a phenomenon called the precession of the equinoxes, the two zodiacs constantly, though very gradually, diverge. At present they are nearly one sign, or  $30^{\circ}$ , apart so that sidereal AR coincides with tropical PI, sidereal TA coincides with tropical AR and so on. However, there is also a certain amount of disagreement among proponents of the sidereal zodiac as to where exactly the first point of AR should be located. Dean et al. (1977) give details. In both kinds of zodiac the signs follow the same sequence, are all of the same size ( $30^{\circ}$  of longitude

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each) and signs bearing the same names in the two zodiacs are attributed virtually identical influences. In this chapter, whenever the signs are mentioned, it is the tropical zodiac that is implied unless it is stated otherwise.

Traditionally, the 12 signs are classified in three major ways. One such classification is according to the four "triplicities" or "elements": fire, earth, air and water. The three signs which belong to each element are said to have characteristics in common. For example, the three fire signs, AR, LE and SG are all supposed to promote ardour and enthusiasm. A second classification, which is crossed with the elements, is by the three "quadruplicities" or "qualities": cardinal, fixed and mutable. Again, the four signs which belong to the same quality are said to share characteristics. For example, the four cardinal signs, AR, CN, LI and CP, are all said to be active and enterprising. Finally, signs are classified according to their "polarity" as either positive or negative, with the former supposedly being extraverted and the latter introverted. In the terminology of the analysis of variance, the elements are nested within the polarities. These three forms of classification, in the orders given above, all begin with AR and follow the sequence of the signs. Thus the signs can be represented with respect to the three classes as in the following table.

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**Table 9.1. Signs of the zodiac  
classified by polarity, element and quality.**

		POLARITY.			
		POSITIVE		NEGATIVE	
		ELEMENT.			
		FIRE	AIR	WATER	EARTH
QUALITY.	CARDINAL	AR	LI	CN	CP
	FIXED	LE	AQ	SC	TA
	MUTABLE	SG	GE	PI	VI

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Other bases for classifying the signs into groups and for subdividing them into parts have also been proposed by astrologers in different places and at different times but none of them is in wide use in the West. Details can be found in Dean et al. (1977) and in Hone (1978).

### 9.2. Zodiac-signs and group membership.

**9.2.1. Sun-signs.** Astrologers claim that people born with the sun in different signs of the zodiac tend to differ in personality and consequently are attracted to, and tend to excel in, different occupations. On the face of it, this seems to be the easiest of all astrological doctrines to investigate because one only needs to know an individual's date of birth to determine his sun-sign, and biographical directories listing the eminent members of various professions are readily available. Moreover, the ecliptic motion of the sun is comparatively simple and so, if the sign distribution for a given profession is to be compared with that of the general population, the expected frequencies for each sign would appear to be easy to calculate. Thus it is not surprising to find that a large number of studies of sun-sign and occupation, collectively sampling over half a million births, have already been carried out. Unfortunately, on closer examination, things do not turn out to be so straightforward.

Dean et al. (1977) undertook a meta-analysis of 60 major sun-sign studies for which data had been published and found that none of them made proper allowance for the fact that the distribution of births in the general population is not uniform. They reviewed the existing literature and found that the seasonal distribution of births varies considerably from country to country, from place to place within large countries, from year to year, and from one kind of person to another. When the 60 sun-sign distributions were compared with the various control groups



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that had been used by the original researchers, it was found that about half of them gave significant chi-square values. However, Dean et al. were able to show that such control groups could be a standard deviation of 10% or more in error and that it was impossible to tell what the error might be for any particular study. Thus a significant difference between the distributions for a professional group and a control group is not convincing evidence for sun-signs.

Faced with this situation, evidence for sun-signs could still be gained if it could be shown that independent samples from a given profession have similar distributions. Dean et al. managed to locate 11 such pairs of distributions which were indubitably independent. They calculated the correlations between the corrected sign totals for each of these pairs but found that none of the resulting coefficients was significant. Gauquelin (1978) has also compared the results of his sun-sign studies of nine professions (Gauquelin, 1955), which employed French data, with Van Deusen's (1976) American data for the same professions and found that there was no more than chance agreement between the appropriate pairs of distributions. Cooper and Smithers (1975), on the other hand, found that the distributions of births in sun-signs for both British and American army officers have very similar shapes with peaks in the signs corresponding to the summer and mid-autumn. However, they corrected the American distribution using the general population birth-pattern for Britain, when the American birth-pattern differs appreciably from the British by showing a pronounced autumn peak (Eysenck and Nias, 1982). Thus the replicability of the British pattern is uncertain.

Of course, even if some sign-distributions were shown to be both significantly different from the general population and reproducible in independent samples, this still would

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not support traditional astrology unless it could also be shown that the occupations in question are associated with the signs predicted by astrology. Van Deusen (1976) claims to have discovered such associations in his huge investigation of a large number of different occupations, but there is considerable doubt that astrology did actually predict the results that he obtained. Gauquelin (1978) has accused him of "...a veritable distortion of the astrological tradition for which even astrologers might reproach him" (page 123). Eysenck and Nias (1982) have put his claims to the test by supplying a group of ten psychology graduates with a standard personality description of each sun-sign and asking them to say which personality type would be likely to succeed in each of ten of the occupations studied by Van Deusen. The test did not lend itself to exact statistical evaluation, but it seems quite clear that the agreement with Van Deusen's results was no better than chance. Dean et al. (1977) have also compared some of the available data with previous astrological predictions and failed to find any clear agreement.

On the basis of their meta-analysis of the existing studies of sun-sign and group membership, Dean et al. (1977) concluded, "...none of this vast work has produced convincing evidence for the validity of signs" (p.88). Since that time there have been two further important studies on the topic. Shaffer, Nurco and Bonito (1977) attempted to replicate Newmeyer and Anderson's (1973) finding that heroin addicts tend to be born more often when the sun is in AQ, and less often when it is in SC, than the general population. They were not successful and so suggested that the original result was likely to be spurious because the normative data employed was not adjusted for race, sex or geographic area. The other major recent study is by Tyson (1980) who looked for associations between sun-sign and the chosen course of study at

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university of over ten thousand South African students. Twenty-three types of course were studied but only one of them gave a significant result and this was not clearly in agreement with astrology. Thus there appears to be no reason to revise Dean et al.'s conclusion.

**9.2.2. The moon, the planets and the angles.** Astrologers claim that people differ in their group memberships not only according to their sun-signs but also according to the zodiac sign occupied at birth by the moon, the planets and the angles<sup>\*</sup>. However, only a few studies have been devoted to investigating these other factors, for reasons which vary according to the nature of the factor. The zodiacal motions of the outer planets are very slow and those of the inner planets are very irregular over time. In both cases, the expected frequencies needed for statistical tests of association, between group membership and planetary sign position, are difficult to establish either from a theoretical basis or from a control group. Dean et al. (1977) give details. The astronomical corrections needed for research with the moon and the angles are far easier to calculate. However even these factors have been rather neglected because they move through the zodiac so rapidly that their positions at birth can only be ascertained with the required accuracy when birth-times are available. A few studies involving the planets have been reported but their outcomes are all inconclusive owing to the uncertainties surrounding the expected frequencies that they employed (Dean et al., 1977). Four studies involving either the moon, or the angles, or both have been published and it is to these that we turn next.

Newmeyer and Anderson (1973) tested an astrologically derived prediction that individuals born with the moon in PI or SC would be especially prone to heroin addiction. They collected two samples of addicts, of 278 and 1107

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subjects respectively, and tested the distributions of their moon signs against an expected rectangular distribution. The distribution for the smaller sample was not significant as a whole but the sign PI, though not SC, was individually significant. The overall distribution for the larger sample, on the other hand, was significantly different from what was expected ( $p < .02$ ), but in this case neither PI nor SC was individually significant. Both GE and VI occurred more frequently, and CP occurred less frequently, than chance in both samples. However, the correlation between the 12 sign totals for the two samples was not significant ( $r = .08$ ). Thus it is doubtful that there is a genuine association between moon-sign and addiction.

An opportunity to look further into this matter is afforded by another study of drug addiction by Martinek (1983) who has presented moon-sign totals for a sample of 812 addicts. In this case, the distribution for the moon does not differ significantly from a random distribution and the correlations between the 12 sign totals for this sample compared with Newmeyer and Anderson's smaller and larger samples are  $-.07$  and  $.08$  respectively. Both fall far short of significance.

In his study, Martinek also presented data on the distributions of AS and MC in the zodiac signs for 116 drug addicts for whom birth-times were available. However, when these distributions were corrected for astronomical factors, they were found not to differ significantly from what was expected (F. Gauquelin, 1983; Startup, 1983c). Hence, the evidence for any zodiacal effect on drug addiction is extremely tenuous.

The possibility that having red hair is associated with having one of the angles of the horoscope in particular signs has been investigated by Addey (1968) with a sample

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of 100. The ascendant, midheaven, east point<\*>, and vertex<\*> were all studied but none of their distributions differed from chance.

By far the largest and most systematic study of the moon and the MC in the zodiac has been conducted by Gauquelin and Gauquelin (1978) using data on nearly sixteen thousand Europeans. These subjects had all achieved eminence in one or another of ten professions. However, no clear associations were found between professional membership and zodiac sign occupancy by MO or MC (nor by SO). Ascending signs have also been examined for over five thousand celebrities in eight professions by Reverchon (1962) and for 813 famous writers by LeClerq (1975). Both of these authors used data published by the Gauquelins and both failed to obtain any significant results. Thus, it seems very unlikely that these astrological factors have the influences claimed for them by astrologers.

### 9.3. Harmonics of the ecliptic circle.

In the previous section it has been implied that a successful zodiac-sign study requires three properties: statistical significance, repeatability and agreement with tradition. Addey (1970), however, has identified another desideratum. If the positions of the planets for any given group are plotted for each degree of the ecliptic then, according to tradition, the resulting distribution should show abrupt discontinuities at the boundaries of at least some of the signs. Addey plotted such distributions for a number of different groups but found that whatever abrupt changes in slope were in evidence did not often coincide with sign boundaries. Instead, the distributions revealed wavelike fluctuations which appeared to be unrelated to zodiacal divisions.

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While Addey regarded this as clear evidence against the validity of traditional astrology, he nevertheless maintained that the waves he observed in the data were not random fluctuations but actually revealed "astrological" influences in line with his theory of Harmonics (see section 3.5 above). In support of this theory, he offered five different kinds of evidence for the reality of harmonics in the ecliptic circle. This evidence has been examined carefully by Dean et al. (1977) and the following account follows their meta-analysis closely. Addey did not attempt to analyse distributions for the moon or the planets in this fashion, but concentrated solely on the position of the sun.

A central idea of Harmonics is that the distribution of births (with respect to the positions of any heavenly body) for any particular group of subjects, such as doctors or victims of poliomyelitis, is characterised by a unique set of dominant harmonics (Addey, 1971). Unfortunately, Addey never attempted to replicate the results from one harmonic analysis of the ecliptic circle with an independent sample drawn from the same group. Dean et al., however, managed to locate six pairs of independent sun distributions, for doctors, clergymen and polio victims, which they analysed in two ways. They calculated correlations between the 360 degree totals and also between the amplitudes of the first 60 harmonics, for each pair of distributions, but found that all of the resulting coefficients were non-significant.

A second claim that Addey (1976a) made was that, for any sample of subjects that share some salient characteristic, the harmonic numbers of the strongest waves in the sun distribution tend to be related as multiples. For example, large amplitudes for a sample of nonagenarians were obtained for harmonic numbers 9, 18, 153 and 171, which are all multiples of nine. However, when Dean et al. calculated

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the probabilities of obtaining given numbers of multiples, they found that even Addey's best example of this phenomenon was not significantly improbable.

Thirdly, Addey (1971) suggested that the phase angles for harmonics that are separated by a constant interval between their harmonic numbers, tend to bunch together. For example, he noted that, for a group of 7302 doctors, the phase angles for the first 20 harmonics that are separated by nine harmonics, starting with the seventh (i.e. 7th, 16th, 25th, 34th...), are almost all located in one half of the circle instead of being evenly distributed throughout the circle. However, as Dean et al. noted, the only data that he presented in support of this hypothesis were selected, so no conclusions can be reached.

With respect to phase angles, Addey (1976a) also suggested that the peaks, troughs or nodes of the strongest harmonics from each distribution tend to cluster around the beginning of the tropical zodiac, thus giving support to the tropical, as opposed to the sidereal, framework. However, when Dean et al. systematically examined the 60 most prominent harmonics from 15 of the available sun distributions, they could find no significant evidence for this kind of clustering, nor for any other kind.

Finally, Addey (1974b, 1976a) has reported that several harmonics, for particular solar distributions, are significant by correlation analysis. This technique involves averaging together, in two groups, all those segments of a solar distribution which correspond to the wavelength of the harmonic of interest. For example, to examine the 6th harmonic, all six segments of  $60^\circ$  in length are averaged as two groups of three segments each. Once the pairs of averaged segments have been formed in this way, the significance of the harmonic in question, and its multiples, can be tested by correlation because all

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harmonics with other wavelengths will be cancelled out. However, a systematic survey by Dean et al., of the first 60 harmonics of all 17 of the available solar distributions, showed that the number of individually significant positive correlations did not differ significantly from the number of individually significant negative correlations or from the number of apparently significant positive correlations obtained with random data generated by computer. Thus, there was no satisfactory evidence in favour of harmonics from this analysis.

Thus, in conclusion, there is no evidence for the existence of harmonics of the ecliptic circle. Addey has identified five different kinds of phenomenon that appear to support his theory of Harmonics when reference is made to selected cases. However, when these phenomena are sought in systematic surveys of the available data sets, they are found to be present no more often than expected by chance.

### 9.4. Zodiac sign and personality.

In the two previous sections we have examined the evidence for the claim that membership of various groups is associated with the natal positions of the planets in the ecliptic circle. Some of the groups that have been studied are defined by physical characteristics (eg. red hair) but the majority have been occupational groups. The rationale for studying the latter is that choice of occupation, and especially conspicuous success in an occupation, is assumed to be partly determined by personality, and personality, according to astrology, is (at least partly) determined by the positions of the planets. Since psychological research supports the first of these assumptions (eg. Cattell et al., 1970; Eysenck et al., 1982; Gauquelin & Gauquelin, 1973, 1974a & b, 1977a), then the failure that we have noted to find associations between occupation and the ecliptic positions of the planets suggests that the latter have no



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influence on personality. However, there have been several studies that have addressed this issue directly by assessing personality and these will be reviewed in the present section, beginning with those that have investigated only the sun and then proceeding to those that have included the planets and other factors.

Silverman (1971) consulted four textbooks to discover what values are supposed to be held most dear by the various sun-signs and then tested these predictions, by means of the Rokeach Value Survey, on a sample of 954 psychology graduates. He found, contrary to astrological expectations, that Librans and Aquarians did not tend to rank the value "equality" especially highly, Sagittarians did not differ from others in the importance they attached to honesty, Pisceans and Aquarians did not regard being helpful as more important than did other signs, nor did those born with the sun in TA or CN consider family security to be particularly valuable, and finally, subjects with the sun in VI, GE and CP did not differ from others in the importance they attached to being intellectual. In short, no differences were found among the sun-signs in the values that were espoused.

Pellegrini (1973) chose 12 males and 12 females for each of the sun-signs from a larger pool of undergraduates who had been required to complete the California Psychological Inventory (CPI). Significant differences between sun-signs were found by means of analysis of variance, on four of the 18 scales of the inventory. Closer examination revealed that the differences on three of the scales were almost certainly spurious, but a powerful effect on the measure of Femininity still remained. Standen (1975) later pointed out that, when the six signs which scored significantly highly on this scale are arranged in their order in the zodiac, they comprise the consecutive signs whose corresponding dates run from late July to late January. However,

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attempted replications of this finding by Illingworth and Syme (1977) and Tyson (1977) failed to find any associations between the signs and any of the scales of the CPI, and Mayes and Klugh (1978) also failed to replicate Pellegrini's findings with the Flexibility and Femininity scales. Since Pellegrini obtained no differences between males and females on any of the scales, including Femininity, when such differences are a regular feature of this inventory, it now seems to be generally agreed that the original result must have been produced by some "undetected gross error in the data", as Standen (1975, p.260) suggested.

Jourard (1978) has conducted an exploratory study of sun-signs by testing 240 students with his own standard self-disclosure questionnaire. This instrument requires respondents to indicate how much information on each of 40 topics they have disclosed to both of their parents and to their closest friends of the same and of the opposite sex. It yields scores for each target-person as well as an overall score. When these scores were entered into a two-way Anova, the main effect for signs was found to be non-significant but the sign by target-person interaction was highly significant. Inspection of the data revealed that the only consistent pattern in the results was that Capricorns disclosed significantly less than members of the other signs to three of the four target-persons. However, since there was no main effect for signs, Jourard was inclined to regard this result as being due to chance variation.

The study of sun-sign and personality that has attracted the most attention is undoubtedly that by Mayo, White and Eysenck (1978). They administered the Eysenck Personality Inventory (EPI) to 2324 adults in order to test two astrological predictions: that the positive signs would score higher on Ex than the negative signs and that the

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Water signs would score higher on Ne than the remaining signs (see section 9.1 for "positive", "negative" and "Water" signs). Both of these predictions were supported by the data, with the former reaching a very high level of significance. When mean personality scores were plotted against sun-sign it was found that Ex scores showed a saw-tooth pattern with all of the means for positive signs being above the grand mean and all the negative signs being below. A similar plot for Ne scores revealed that the three Water signs were the only ones, apart from AR, whose means were greater than the average for all subjects.

This study has now been repeated at least ten times. Since non-significant results have been reported for six of these replications, some doubt has been raised as to whether the effects might be artefactual after all (eg. Jackson and Fiebert, 1980). In order to resolve this question, a further replication will be undertaken below and then a meta-analysis of the majority of the existing studies on this topic will be reported later in section 9.7. To anticipate the main outcome of this meta-analysis, it can be said that the effect of zodiacal polarity on extraversion is reproducible under a variety of conditions and that several of the failures to replicate can be accounted for by inadequate sample sizes. The effect of Water signs on neuroticism, on the other hand, is elusive. Details will be given below.

Of course, to establish that having the sun in a positive sign is reliably associated with greater than average extraversion (which will be called the "polarity effect" for convenience), does not necessarily mean that the sun itself affects personality according to its position in the zodiac. Since the alleged influences of the signs are so well known nowadays, and since the majority of people in Western countries know what their own sign is (Gauquelin, 1973), it is possible that the opinions of at

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least some people about their own personalities have been affected by what astrology asserts. That is to say, some small proportion of the population might alter their self-images as a result of their exposure to astrology and attribute to themselves some of the traits which astrology claims they ought to possess. It has been calculated that the polarity effect is so weak that it could be brought about by one person in ten changing his response to three questions or one person in 3.3, on average, changing his response to one question in the direction predicted by astrology (Dean, 1983c). And in fact, there is a variety of evidence suggesting that this is the correct explanation for the effect.

Firstly, there is evidence that people do indeed alter their responses to questionnaire items to conform to astrological information. Delaney and Woodyard (1974) have shown that this can happen even when the information is bogus. In their experiment, 55 students were asked to read descriptions of the characteristics of their own signs and were then required to complete a questionnaire designed to measure the traits Dominance and Change. Unknown to the subjects, the sign descriptions had been specially prepared so that they emphasised either high or low levels of these two traits. When the scores on the questionnaire were analysed it was found that the mean scores on the two scales differed significantly in the direction in which the astrological material had been slanted, thus showing conformity with astrological ideas.

A second demonstration of the power of astrological information to affect individuals' self-images has been undertaken by Eysenck and Nias (1982). In this study, 122 adults were first presented with 12 lists, consisting of six traits each, which were in fact standard descriptions of the characteristics of the signs, though this was not revealed at first. The subjects' task was to select the

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three descriptions which best matched their own personalities. Following this, they were told that the descriptions were really portraits of the sun-signs arranged in random order and they were then given three chances to identify the description that corresponded to their own signs. This second task allowed the experimenters to identify which subjects probably had some knowledge about sun-signs and which had none. In fact, they classified Ss as "knowledgeable" if they correctly identified their own sign on the first guess and "ignorant" if all three guesses were incorrect. Those who guessed correctly only on the second or third attempt were treated as borderline cases. Finally, the numbers of Ss in each of these three "knowledge" groups who had chosen the traits for their own sun-signs as good descriptions of their own personalities at first, were compared. It was found that both the "ignorant" and the "borderline" groups showed no tendency to select the traits belonging to their own signs whereas the "knowledgeable" group showed a marked tendency to assess themselves in accordance with astrology.

The two previous experiments show that individuals' self-images can be affected by knowledge of astrology and strongly suggest that the polarity effect can be explained by such self-attribution. However, Mayo et al. (1978) considered this possibility before they published their findings and failed to find any evidence in support of it. Each of their subjects had been asked, "how much do you know about interpreting an astrological chart?" but when the sample was divided into those who replied "nothing" and those who claimed to know "a little" or "a lot", there was found to be no difference in the polarity effect between the knowledgeable and the apparently naive groups. However, it has been pointed out by Eysenck and Nias (1982) that the means of assessing knowledge here was not appropriate since one may well disclaim any knowledge about interpreting a chart and yet be quite familiar with one's own sun-sign.

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Indeed, since almost all the subjects in this study were interested in astrology, it is likely that the great majority of them had at least a rudimentary knowledge about sun-signs. In fact, in a later study, Eysenck and Nias almost reversed the prediction that had been tested in the original study. They argued that people who know a good deal about astrology are aware that the sun-sign is only one of the many factors that are taken into account when assessing character and, as a result, they should not be unduly influenced by their familiarity with their own sun-signs. Consequently, such people should not show the polarity effect to the same extent as those who know only a little about astrology. This prediction was tested in an exact replication of Mayo et al.'s study and Eysenck and Nias report that the results were as expected; the polarity effect was only significant for Ss who claimed only a little knowledge or no knowledge at all about astrology.

A similar experiment to this last one has also been conducted by Pawlik and Buse (1979) using a German translation of the EPI, together with a questionnaire designed to measure amount of belief in astrology. On the basis of their responses to the latter, the 799 subjects were divided into equal groups of "non-believers", "believers" and "strong believers" and then the polarity effect was tested for each of these groups separately. It was found, as expected, that the non-believers did not show the effect while the two groups of believers did. Moreover, the effect for the "believers" was stronger than for the "strong believers" in a way which parallels the finding that very knowledgeable subjects do not show the effect whereas slightly knowledgeable subjects do.

It should be recognised, however, that all of this evidence showing an association between the polarity effect and knowledge about, or belief in, astrology does not rule

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out the possibility that the sun really does effect personality since, as Eysenck and Nias (1982) put it,

"It is conceivable that astrology is true only for a few people who, on finding that their lives followed the astrologically predicted pattern, became believers." (page 57).

However, Eysenck and Nias have conducted another experiment which seems to preclude even this possibility; they attempted to replicate the polarity effect with a sample of 1160 schoolchildren. The rationale for this is that children have far less knowledge about astrology than adults and so, if sun-sign effects could be found with them, they would be unlikely to be due to self-attribution. However, no such effects were found either for the positive signs with Ex+ or for the Water signs with Ne+.

Despite all the evidence reviewed above, Smithers (1981, 1982) has expressed two lingering doubts that the sun-sign effects discovered by Mayo et al. can be completely accounted for as the results of self-attribution. At first Smithers suspected that there might be a true seasonal component to the polarity effect because a gradual trend in the mean Ex scores seemed to be present in the results of several independent studies. TA frequently gave the lowest mean and SG the highest and these two signs are just over six months apart. In order to check this possibility, Smithers (1981) repeated the study in Australia, where the seasons are reversed, with a sample of subjects who were all born in the Southern Hemisphere. Since the results showed the usual polarity effect, not a reversed one, and SG still scored highest on Ex while TA scored second lowest, Smithers concluded that no seasonal effect was present. However, there was one surprising result in the data which led Smithers to express his second doubt. Among the questions asked of the 1494 subjects was one requesting a list of all major illnesses suffered. The 70 illnesses that were mentioned in response to this question were categorised according to the nature of the disease and one

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of these categories included all complaints of a neurotic kind. When the frequency of these neurotic complaints was plotted against the sun's ecliptic position, it was found that a three-fold wave was formed with peaks very closely corresponding to the three Water signs. Smithers found it difficult to believe that people would take astrology so seriously as to perceive and report themselves erroneously as suffering major neurotic illnesses.

Certainly this last result is surprising but it seems that we have little choice but to accept that people are prepared even to report more illnesses if that is what astrology says should be the case. The main reason for reaching this conclusion is that there is evidence that the Water signs are no more frequent than is expected among those who are really suffering from major neuroses. Pearson and Crookes (1979) tested this with a sample of 920 psychiatric outpatients all diagnosed as neurotic or personality disorders.

Finally, if the sun-sign effects discovered by Mayo et al. were due to real differences in personality rather than differences in self-attribution, we would expect these differences to be apparent when personality is rated by others rather than by the self. However, Gauquelin (1981b) has found this not to be the case in a large-scale study of over 2000 European celebrities. This study employed a modified form of the "character traits method" which the Gauquelins had previously used to investigate the diurnal circle (see section 3.3 above). That is, to characterise each of the subjects for whom they had previously collected birth-data, they consulted biographical dictionaries from which they extracted every word related to personality. This provided descriptions which are, in most respects, equivalent to rating data. Then, in order to discover what traits are alleged to be associated with having a major horoscopic factor in each of



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the signs of the zodiac, Gauquelin consulted the textbooks written by eight widely regarded astrologers and extracted all the keywords used to describe each sign. This provided 96 sets of keywords (12 signs for each of 8 astrologers). Then, taking each of these sets of keywords separately, the position of the sun in the zodiac was plotted for every individual in the catalogue who had been described by each word in the given set of keywords. The positions of the sun for traits which did not feature among the keywords were used to generate expected frequencies. It was found that, of the 96 sets of keywords, only 40 gave greater than expected frequencies in the appropriate sun-signs while 56 of them gave less than expected frequencies. Thus, there was no evidence that the subjects' personalities corresponded to what astrologers would expect from their sun-signs. Of course, this finding not only fails to support the reality of the polarity effect but equally fails to support all other astrological ideas about sun-sign and personality.

It is quite possible, however, that the moon and planets might affect personality according to their positions in the zodiac even though the sun, apparently, does not. This, after all, has been found to be the case in the diurnal circle (see chapter 8). Gauquelin (1981b), however, did not confine his study to sun-signs but also examined the possible effects of the moon-sign and the ascending sign. That is, for each of the 96 sets of astrologers' keywords, he also plotted the positions of MO and AS in the zodiac and compared the resulting distributions with expected frequencies. The results were no better than for the sun; subjects who had MO or AS in a given sign were no more likely to be described by the keywords thought appropriate for that sign than by any other keywords. Furthermore, when Gauquelin repeated the whole experiment using the sidereal instead of the tropical zodiac, the results for SO, MO and AS were equally poor.

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Apart from this last experiment, there have been four studies of the (tropical) zodiac which have investigated other factors in addition to the sun. In one of these Silverman and Whitmer (1974) first rated each of the signs on eight personality traits on the basis of descriptions found in several astrological books. This task was then repeated by a professional astrologer. Good inter-rater reliabilities were found for the traits aggressive, ambitious, creative, extraverted and intuitive. Next, each of 130 students rated themselves on these five traits and, for 86 of the subjects, similar ratings were also obtained from close friends. Finally, for each of the five traits, correlations were calculated between the two sets of ratings (self and friends) and the weights assigned to their sun-signs, moon-signs and ascending signs. Only one out of the 30 resulting coefficients was significant, which is not sufficient for overall significance. When the sun, moon and ascendant signs were combined by taking the average of their ratings for each trait, the results were no better.

A study investigating all of the planets (plus AS and MC) at once, using a weighting system, has been reported by Metzner, Holcombe and Holcombe (1980). The signs as such were not studied but the main categories into which they fall: the two polarities, the four elements and the three qualities (see section 9.1). The planets were weighted by giving three points to the polarity, element or quality in which SO, MO and AS were found, two points for the type of sign occupied by ME, VE, MA and MC, and one point for each of the remaining planets. In this way, eight planetary scores were computed for each of the 156 subjects; scores for positive signs, for earth, fire, air and water signs, and for cardinal, fixed and mutable signs. The astrological hypothesis that signs of different polarity are associated with different degrees of extraversion was then tested by correlating the polarity scores with scores from two

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measures of extraversion: the EPI and the Gray-Wheelwrights Type Survey (GWTS). Both of these correlations were significant for the 60 males in the study but not for the 96 females.

The second hypothesis to be tested was that each of the four elements is associated with one of Jung's four "functions" according to the following pairs: air-thinking, water-feeling, fire-intuition, earth-sensation. However, when scores on the GWTS, which provides measures of these four functions, were correlated with scores on the four elements, only one of the predictions was supported. This was the association between earth and sensation, which was significant for females but not for males. Metzner et al. actually reported correlations for all of the elements with all of the functions, among which they obtained five significant results altogether. However, since the indexes for the elements are not independent of one another, and neither are the scores for thinking versus feeling or sensation versus intuition in the GWTS, the overall significance of these results is hard to assess. In this part of the study, the Ne scale from the EPI was also correlated with scores on the four elements but none of these coefficients was significant. Perhaps the best way to appraise the combined results, for the four elements with the five personality measures, is to look for replications between the males and females, since the results are given separately for each. It is then found that only nine of the twenty pairs of correlations are in the same direction, which is slightly below the number expected by chance. Thus, the evidence for differences between the four elements was very poor indeed.

A third experiment by Metzner et al. was designed as a test of the idea that each of the three qualities is related to one of the three personality types based on Sheldon's somatotype system. The predicted pairs are

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somatotonia with cardinal signs, viscerotonia with fixed signs and cerebrotonia with mutable signs. These hypotheses were tested by correlating scores on Cortes and Gatti's measure of the three personality types with the appropriate astrological indices but none of the predicted coefficients was significant for either sex. The Ex and Ne scales of the EPI and the Ex scale of the GWTS were also correlated with the indices for the three qualities but none of these coefficients was significant either.

Thus, among the 22 predictions that Metzner et al. tested, only two produced significant results in the expected direction. These showed a relative preponderance of planets in positive signs and in earth signs to be correlated with extraversion and the sensation function respectively. However, both of these results were obtained for only one of the sexes. Hence, no reliance can be placed on them.

The association between one of the elements and one of the four functions of Jung's system has also been tested by Whisenant (1978) in two small pilot studies. In this case, however, a perusal of the astrological literature led the author to predict that a preponderance of planets in Water signs would be linked with intuition rather than feeling, as Metzner et al. expected. In order to test this, the planets were weighted according to a slightly different system in which the element occupied by SO and MO received two points, and the elements occupied by the remaining planets, plus AS and MC, were given a score of one each. The Myers-Briggs Type Indicator was used to assess the subjects' standing on the sensing-intuition dimension. The correlation between the Water index and the intuition scores was calculated for two samples, of 12 and 14 subjects each. The coefficients obtained were .82 and .67 respectively, which are both significant at the 1% level.

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It is noteworthy that Metzner et al. also obtained a significant, though unanticipated, correlation between intuition and Water-sign preponderance ( $r = .23$ ) for the females in their sample, though the males provided an equally large correlation in the opposite direction. It ought also to be noted, however, that self-attribution effects cannot be ruled out in either of these studies since the sun features quite heavily in both of the weighting systems used. Moreover, several of the subjects in Whisenant's small samples were friends of the experimenter and five of them "had more than a layman's knowledge of astrology" and thus probably knew their own horoscopes well. Hence the results of this study need to be repeated with naive subjects, and with a weighting system which excludes the sun, before any confidence can be placed in them.

Finally, the moon and the planets ME, VE and MA, in addition to the sun, have been investigated by Russell and Wagstaff (1983) using the Ex and Ne scales of the EPI. This was a test of the same hypotheses as those investigated by Mayo et al. except that, in this case, the 350 subjects were classified not only according to the element of the sun-sign, but also according to how many of the other planets mentioned above were in the same element as the sun. The rationale for this design, as with the two previous studies, is that astrology predicts that the more planets individuals have in one of the elements, the more they should tend to have the traits attributed to that element. Thus each subject was placed in one of the 20 cells of a four (elements) by five (number of additional planets) matrix and the means for these cells were compared in two-way analyses of variance. Neither of the main effects nor the interaction was significant for either Ex or Ne, thus giving no support to either of the hypotheses.

9.5. Overview.

We have seen, in the foregoing review of the literature, that there is no convincing evidence that the sun affects personality, or physical characteristics, according to its position in the ecliptic circle. Although many studies have been reported which appear to show significant associations between sun-signs and membership of various groups, on closer examination these have been found to lack clear statistical significance, repeatability in independent samples, and agreement with astrological tradition. The case for solar harmonics in the ecliptic circle has also been found to lack acceptable statistical support. Furthermore, when traditional claims concerning the influences of the sun on personality were tested directly with rating data, no evidence in support of those claims was found. Since the number of studies that have been conducted is now quite large, the predictions that have been tested are varied, and the data that have been sampled are voluminous, and yet the evidence is so poor, it is probably time for all to agree that enough is enough; the sun-sign idea is simply not valid. (Of course, this conclusion does not encompass possible season-of-birth effects, which are beyond the scope of the present review).

Although the sun almost certainly does not affect personality according to its position in the zodiac, one discovery to emerge from all this research is that astrology itself does affect personality, or at least it affects some individuals' perceptions of their own personalities. A variety of evidence was reviewed above which, taken together, strongly suggests that exposure to astrology can lead a small proportion of the population to attribute to themselves the traits which astrology claims they ought to possess. This has been found to be the case with extraversion, at least, and perhaps with neuroticism also. It would be interesting to know if similar effects

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obtain with other personality dimensions. Since the traits ascribed to the signs of the zodiac are not limited to those measured by the EPI, there seems to be no reason why self-attribution effects should not be found on a variety of dimensions. It is true that several different self-report measures have already been used in sun-sign studies (eg. the CPI) without finding evidence of self-attribution, but the sample sizes employed have been rather too small to detect the sort of effect sizes that are expected. Therefore, in the study that is reported below, all ten of the personality scales selected in Chapter Six above are used in a multivariate analysis in which the means for the sun-signs, grouped in various ways, are compared.

While the evidence suggesting that sun-signs are invalid is very strong now, the same cannot be said for the moon, planets and angles. Admittedly, the existing studies (especially those of the Gauquelins) of the effects of moon sign, AS sign and MC sign on group membership and personality suggest that these two factors are invalid. However, the investigations have not yet been extensive enough for this verdict to be brought in with complete confidence. The effects of the planets in the zodiac have been studied even less. Because the motions of the planets are either very slow or else very irregular, it is difficult to conduct decisive tests of association between planetary position and group membership. Fortunately, the irregularities of the planets' motions are far less of a problem when questionnaires are used to assess personality because, in this case, it is not necessary to calculate expected frequencies within groups. However, none of the existing studies of personality have investigated the planets individually; they have all used weighting systems to form composite measures. Although these systems have been suggested by astrologers, and are therefore part of the doctrine that one wishes to test, it seems inadvisable

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to use them for two reasons. First, when an a priori weighting system is used to quantify astrological variables, one is not only testing whether the planets have any effects but also the particular weights that have been applied. Secondly, it could be that some planets have effects while others do not, as seems to be the case in the diurnal circle, and yet a weighting system throws them all in together. For example, the sun is invariably included with a large weighting even though the research suggests that it is ineffective. Thus, it is preferable to establish which, if any, of the planets affect personality and then to determine their appropriate weights a posteriori.

This is the method which is adopted in the study that is reported next. It is not possible to include the planets UR, NE and PL because their sidereal periods, all in excess of 84 years, are greater than the range of birth-dates covered by the sample. It is not possible to include SA either but for a different reason. Saturn's ecliptic motion is so slow that it spends nearly two and a half years in each sign, on average. This is important because the sample employed in this study is composed of two distinct groups with quite different mean ages. The groups are students and astrologers whose mean ages are 23.3 years (s.d. 6.8) and 37.5 years (s.d. 11.3) respectively. The comparatively small standard deviation for the students' ages means that the great majority of students have SA in the same four signs. Since astrologers and students are ipso facto likely to differ in personality, differences between signs are likely to be found for reasons which are quite unconnected with planetary influences. The same problem also arises with JU but it is not so acute with this planet since it spends only about one year in each sign.

Since the categories into which the signs fall are widely accepted as being important in astrology, a factorial design is used. The elements are nested within



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the polarities and these two factors are then crossed with the qualities, as in Table 9.1. Each of the 12 signs is thus located in one of the 12 cells of the matrix and the second-order interaction term provides a test of the differences among all of the signs.

### 9.6. Ecliptic Study I.

**9.6.1. Method.** Chapter Five above gives details of the subjects, the questionnaires and the calculation of planetary positions used in this study. Only those Ss whose births were recorded as being accurate to the nearest hour or better (N = 715) were retained for analyses involving MO because of the comparatively rapid ecliptic motion of this body. The ecliptic motions of AS and MC are even more rapid, so birth times accurate to within 15 minutes (N=559) were required for these factors. All 911 Ss were retained for the sun and the planets ME, VE, MA and JU.

For each of the eight astrological factors individually, Ss were assigned to one of the two Polarity groups, one of the four Element groups, and one of the three Quality groups on the basis of the sign occupied by the factor at birth. This is, therefore, a three-factor, partially hierarchical design in which the factor Element is nested within the factor Polarity and these two are crossed with the factor Quality. All three effects are fixed and so the error mean square is used as the denominator for all F ratios. All ten of the personality scales selected in chapter six above were entered simultaneously into multivariate analyses of variance. These analyses were carried out by the SAS computer package (Freund and Littell, 1981) and, since the design was unbalanced, the GLM procedure was used.

**9.6.2. Results.** The results of the Manovas are presented in Table 9.2. F approximations associated with Pillai's Trace

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criterion are shown for all eight astrological factors and for three main, and two interaction, effects. It can be seen that only one out of the 40 ratios is significant ( $p=.008$ ). This is for MO with the factor Quality, suggesting that individuals born with the moon in signs belonging to the three Qualities differ in personality. An inspection of the results of the univariate Anovas based on Type III sums of squares (as recommended by Freund and Littell, 1981) reveals that individually significant results for this effect were provided by the scales Ne, neuroticism, E, dominance, G, conscientious, and L, suspicious. The means for the three Qualities for these four scales, expressed as T-scores, are shown in Table 9.3.

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**Table 9.2. Results of multivariate comparisons for three sign categories and eight astrological factors.**

<u>Effect.</u>	<u>Astrological factor</u>							
	SO	MO	ME	VE	MA	JU	AS	MC
Polarity	1.35	0.43	0.81	0.53	1.16	1.01	0.87	0.87
Element(Polarity)	1.08	1.25	0.93	0.85	1.13	0.53	1.13	1.06
Quality	0.62	1.93*	1.37	0.83	0.67	0.85	1.23	1.12
Plrty*Qlty	1.23	1.34	1.04	0.73	0.75	1.52	0.84	1.37
Elmnt(Plrty)*Qlty	0.81	1.00	0.99	0.95	1.16	1.37	0.86	1.21

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The figures shown are F approximations associated with Pillai's Trace criterion.

\*  $p=.008$

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It is important to note, however, that since a separate test of the null hypothesis (of no difference among the groups on any of the dependent variables) is conducted for each of the components of the among-group variation, the experimentwise Type I error rate is compounded. In effect, this means that the probability associated with one F ratio in the table must be judged not only against the fact that

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eight separate Manovas were calculated but also against the fact that five effects were analysed for each Manova. The probability of obtaining one F ratio significant at  $p=.008$ , out of 40 independent results, is greater than .27 by the binomial test. Hence, this apparently significant result is probably due to chance variation.

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**Table 9.3. Means for MO in the three Qualities for four personality scales.**

<u>QUALITY.</u>	<u>Ne.</u>	<u>E.</u>	<u>G.</u>	<u>L.</u>
Cardinal	53.2	57.4	45.0	50.4
Fixed	50.2	60.3	42.1	52.6
Mutable	51.4	58.8	44.2	52.3
F ratio	5.17	4.36	4.63	3.17
p.	.006	.01	.01	.04

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F ratios are based on Type III sums of squares.  
D.f. = 2 & 703 throughout.

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Although none of the multivariate results for SO were significant, the univariate results are still of interest in the search for self-attribution effects. In fact only two of these were significant; the positive signs had a significantly higher mean for Ex than the negative signs ( $F=8.45$ ;  $d.f.=2$  &  $899$ ;  $p=.004$ ) and there was a significant effect of Element on E, dominance ( $F=3.29$ ;  $d.f.=2$  &  $899$ ;  $p=.04$ ). Inspection of the means for this second result shows that Fire and Water signs both scored higher than Air and Earth signs.

**9.6.3. Discussion.** This study provided no evidence that individuals differ in personality according to the ecliptic positions of the angles, the planets or the moon. Although one of the results for the latter body proved to be highly significant on its own, this could easily have arisen by chance among 40 significance tests. Since this paucity of

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effects for MO, AS and MC is in line with previous negative outcomes with these factors and since the present tests, and several of the previous ones (eg. Gauquelin and Gauquelin, 1978; Gauquelin, 1981b), have had large enough samples to make them quite powerful, it now seems highly unlikely that MO, AS or MC have the effects which are claimed for them. Only very tenuous evidence for the effects of the planets in the zodiac has been found previously (eg. Whisenant, 1978; Metzner et al., 1980). Thus, the negative results with the planets in the present study make it very unlikely that these bodies have the effects claimed for them either.

The usual polarity effect with the sun in the zodiac was found for Ex but no other convincing evidence for self-attribution was obtained for any of the other nine personality scales according to Polarity, Element or Quality. One significant result was found that suggested that signs belonging to different elements differ in degree of dominance, but this can be discounted since the multivariate analysis in which this result was embedded was non-significant. Such an absence of results is actually rather surprising since the traits that are ascribed to the signs of the zodiac are not limited to those comprising extraversion. Silverman and Whitmer (1974) found that it was possible to rate the signs differentially on the traits ambitious, creative and intuitive as well as extraverted and aggressive and to obtain good inter-rater reliabilities (between psychologist and astrologer) on these ratings. Therefore, if astrological doctrines can influence some individuals when replying to extraversion items, it is not at all clear why they should not equally influence replies to items on other scales. This is not to doubt the validity of the polarity effect with Ex, however. The meta-analysis which follows next shows that the polarity effect is genuinely reproducible. However, it also shows that the Water sign effect with neuroticism is elusive, so it will

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be necessary to return later to the question why astrology seems to affect self-attribution reliably on only one scale.

### 9.7. Sun-sign studies of Ex and Ne: a meta-analysis.

**9.7.1. Introduction.** Two years after Mayo et al. (1978) first provided evidence for the polarity effect, Jackson and Fiebert (1980) declared, "It is unclear if sun-sign effects, at least in terms of introversion-extraversion, are elusive or illusory". Two years later again, Kelly and Saklofske (1982) echoed this doubt. By now, however, there have been sufficient replications of the original study for it to be possible to conduct a meta-analysis to decide whether or not the effect is reproducible and, if so, under what conditions.

Table 9.4 lists the 14 studies which are used in the meta-analysis. This table also shows what kinds of Ss, and which questionnaires, were employed in each study. The last column, headed "Naive?", shows whether the Ss were aware that astrology was being tested at the time they answered the questionnaires. Studies 9 and 11-14 require a few extra comments. The questionnaire used in Study 9 comprised two scales, one for Ex and one for Ne, which were modelled on the EPI. However, the Ne scale included only five items and the internal consistencies of both scales were considerably lower than those of the EPI. Study 11 is the one which was reported in the previous section above in which all 911 of the Ss on the database were tested. For Study 12, only those Ss who were experimentally naive were selected. These were all university students. The remaining Ss were included in Study 13. Eighty per cent of these were students of astrology. Two different questionnaires were employed in Study 14. The I-X Test, an adaptation of Marston's Personality Rating Scale, is a measure of extraversion. The Payne Feradcom Test is said to be a

Table 9.4. Studies of sun-sign and personality.

STUDY No.	AUTHORS.	SUBJECTS.	TEST.	NAIVE?
1.	Mayo, White, & Eysenck (1978)	British adults applying for astrological predictions.	E.P.I. form ?	No.
2.	Smithers & Cooper (1978).	Introductory science and technology students.	E.P.I. form ?	Yes.
3.	Veno & Pamment (1979)	1st-year undergrads., born in southern hemisphere.	E.P.I. form ?	?
4.	Jackson. (1979)	Adults born in New Zealand. Responded to newspaper advertisement.	E.P.I. form A	No.
5.	Pearson & Crookes (1979)	Psychiatric outpatients. Neurotics and personality disorders.	E.P.I. form A	Yes.
6.	Jackson & Fiebert (1980)	Psychology undergrads.	E.P.I. form ?	Yes?
7.	Saklofske et al. (1982)	1st-year undergrads. Born in southern hemisphere.	E.P.Q.	?
8.	Mohan et al. (1982)	Indian children, aged 12-14 years.	Junior E.P.I.	No.
9.	Smithers & Cohen (1982)	British adults, contacted via a T.V. programme.	Non-standard test.	No.
10.	Jackson. unpublished.	Introductory undergrads living in N.Z.	E.P.I. form ?	No.
11.	Present study.	Undergrads & astrologers.	E.P.Q.	Mixed
12.	Present study.	Undergraduates only.	E.P.Q.	Yes.
13.	Present study.	Astrologers only.	E.P.Q.	No.
14.	Forlano & Ehrlich (1941)	Male college students, New York City.	(1) I-X test. (2) Payne Feradcom.	Yes.

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measure of feelings of inferiority, but an inspection of its items suggests that it can be regarded as a measure of introversion, albeit of a rather anxious kind. Forlano and Ehrlich (1941) did not investigate astrology but season-of-birth, for which purpose they published the 12 monthly mean scores of 7897 male college students. These data are not in a suitable form to enter into the first part of the present analysis but they will be used in correlation analyses later.

**9.7.2. Effect size, significance and power.** Table 9.5 shows some important statistics for the polarity effect with Ex for 13 of the studies listed in Table 9.4. The column headed "d" gives sample values of Cohen's d, the scale-free measure of effect size that Cohen (1977) recommends for the comparison of two means. It is the difference between the two sample means divided by the pooled within sample estimate of the population standard deviation. The last column of the table shows whether sex differences were controlled either by entering sex as a separate factor in an Anova of factorial design, or by standardising scores against sex norms.

It can be seen that seven out of the 13 results are non-significant. However, when the probabilities associated with the first 11 studies (Studies 12 & 13 are not independent of Study 11) are combined by the method of adding weighted Zs (Mosteller and Bush, 1954), using the studies' degrees of freedom as weights, the overall probability that the results are due to chance is found to be less than  $10^{-5}$ . The Stouffer method of adding Zs also permits the calculation of what has come to be called the "fail-safe N" (following Cooper, 1979). When reviewing studies there is often a nagging doubt that a number of studies might not have been uncovered because they provided non-significant results and so were not thought worth publishing. (Rosenthal, 1979, refers to this as the "file

drawer problem"). However, in this case, calculations show that some 71 non-significant studies of the polarity effect would be needed to raise the meta-analysis probability above the 5% significance level. It seems extremely unlikely that as many studies as this are lying around unpublished in researchers' files for want of a significant result.

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**Table 9.5. Sun-sign and extraversion: a meta-analysis.**

Study number	N***	Power.	t or F.	d.f.	p.	d.	Control for sex?
1.	1162		F=20.83	1 & 2300	<.0001	.19	Yes.
2.	295	.71	t=1.96	589	=.025	.16	No.
3.	342	.79	t=1.50*	685	>.05	.11*	Yes.
4.	169	.52	t=1.42*	336	>.05	.16*	No.
5.	460	.88	t=0.57*	918	>.05	.02*	No.
6.	87	.33	t=0.68	172	>.05	.10	No.
7.	120	.42	t=-.65	239	>.05	-.08	Yes.
8.	595	.94	t=-.74	1188	>.05	-.04	No.
9.	1740	--**	F=28.73	1 & 3380	<.001	.18	Yes.
10.	256	.67	t=1.66*	510	=.05	.15*	No.
11.	454	.88	t=2.71	908	<.005	.18	Yes.
12.	241	.65	t=2.67	480	<.005	.21	Yes.
13.	213	.61	t=1.13	426	>.05	.11	Yes.

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\* t and d estimated using the s.d. for the standardisation sample.

\*\* power cannot be estimated because a non-standard personality questionnaire, of unknown comparative validity, was used.

\*\*\* N here refers to the size of each group in the comparison or, where sample sizes were unequal, it is the harmonic mean of the two sample sizes.

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Though the average effect size is certainly very small (mean  $d=.13$ ;  $s.d.=.08$ ), the foregoing statistics give ample evidence that it is not illusory. This being so, it is



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possible to explain several of the failures to replicate in terms of inadequate sample sizes. The table shows that the power of the tests in Studies 4, 6 and 7 was .52 or lower. These power values are based on an estimate of the population effect size derived from the F ratio obtained by Mayo et al. for the polarity effect, using the equations provided by Hays (1973). The power of each of the subsequent replications to obtain a result significant at the one-tailed, .05 significance level, given the sample size, and given the estimated population effect size, was then calculated by the equations provided by Cohen (1977). Actually, these power values are probably overestimates for all of the studies in which sex differences were not controlled since the variance due to sex was removed in the Mayo et al. study by having sex as a factor independent of sun-sign polarity. Thus, there was something less than a fifty-fifty chance of obtaining a significant result in three of the studies listed in Table 9.4.

The failures of Studies 8 and 13 to find significant differences between the positive and the negative signs can be accounted for within Eysenck and Nias's (1982) explanation for the polarity effect. In fact, these two studies provide replications of two of the findings that were used in support of the explanation in terms of self-attribution. The Ss in Study 8 were children and, it will be recalled from section 9.4 above, children are not expected to show the polarity effect because few of them are familiar with astrology. Actually, if this study were to show the effect, it would be expected to be reversed since the Ss were Indian and the sidereal zodiac, which is out of step with the tropical zodiac by nearly one whole sign, is in widespread use in India. In fact, a slightly reversed effect was obtained but it was not significant. The Ss employed in Study 13 were students of astrology. It was pointed out earlier that such people are not expected to show a marked polarity effect because they are aware

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that the sun-sign is only one of the many factors taken into account when assessing character from the horoscope.

It might also be possible to account for the non-significant results of Study 5 in terms of the type of Ss employed. In this case the Ss were psychiatric outpatients. Now, the most plausible explanation for the polarity effect is that it is caused by a small proportion of people altering their self-images as a result of their exposure to astrology. If this explanation is correct then the question arises why astrology should have such an influence. One possible answer to this is that astrology is one of the very few apparently objective sources of information about personality that is accessible to most people. Personal self-images are, presumably, built up from various types of feedback that are received throughout life and, for some people, astrology is one of these sources of feedback. However, psychiatric patients tend to receive very large amounts of feedback about their personalities from authoritative figures during the course of their illnesses and this feedback generally owes nothing to astrology. It would not be surprising, therefore, if this feedback were enough to efface any previous influences from astrology itself.

If six of the non-significant results reported in Table 9.5 can be accounted for in terms of either inadequate sample sizes or the type of Ss employed, there is still one non-significant result - that of Study 3 - which cannot be explained in either of these ways. However, even with a power as great as .79, such as this study has, there is still a probability of .21 of making a Type II error. Thus, it is probably best to regard this failure to replicate as being due to sampling error.

It will be recalled that, in Study 14, Forlano and Ehrlich (1941) investigated possible season-of-birth

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effects on two personality dimensions by calculating mean scores for each of the 12 months of birth. The data that they published are not suitable for direct tests of the polarity effect. However, there is a slight saw-tooth pattern in their monthly means and the agreement between this pattern and similar patterns obtained in sun-sign studies can be investigated via correlation analyses. That is, the means for the 12 months investigated by Forlano and Ehrlich can be correlated with the means for the 12 sun-signs that correspond most closely to the respective months. The appropriate data for such analyses is available, or else has been obtained from the authors, for eight of the sun-sign studies. The results are presented in Table 9.6.

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**Table 9.6. Correlations between 12 group means for independent studies of the polarity effect.**

<u>QUESTIONNAIRE.</u>	STUDY NUMBER								
	1	2	3	4	5	9	10	11	
I-X Test	.61*	.61*	.18	.58*	.30	-.22	.12	-.12	
Payne Feradcom	-.63*	-.50*	-.52*	-.46	-.05	-.45	-.20	-.39	

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\*  $p < .05$  (one-tail).

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Since the Payne Feradcom test measures (anxious) introversion, it is expected to correlate negatively, if at all, with the other studies. In fact, all eight of the coefficients involving this test are negative and three of them are significant. Three of the coefficients involving the I-X Test are also significant. These results suggest that astrology had already begun to influence individuals' self-images over 40 years ago. Moreover, since Forlano and Ehrlich's subjects presumably never imagined that the data they provided would be used to investigate astrology, these results are unlikely to owe anything to the demand

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characteristics of the experiment. Thus they suggest that astrology was already at that time having a permanent influence upon some individuals. Of course, we know that astrology had become very popular by the 1940s (Bok and Mayall, 1941; see Chapter One above), but it is still surprising to find that it was so influential among college students at that time.

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**Table 9.7. Sun-sign and neuroticism: a meta-analysis.**

Study number.	N***	Power.	t or F.	d.f.	p.	d.
1.	886		F=4.49	2 & 2300	.011	.11
2.	255	.34	t= .99*	685	>.05	.09*
7.	90	.18	t=-.34	239	>.05	-.05
8.	415	.47	t= .79	1189	>.05	.05
9.	1328	--	F=1.46	3 & 3380	>.05	.02
11.**	419	.48	t= .76	908	>.05	.05
12.**	220	.31	t=-.28	480	>.05	-.03
13.**	199	.29	t=1.44	426	>.05	.15

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\* t and d estimated using the s.d. for the standardisation sample.

\*\* Tested Water signs plus AR versus the remaining signs.

\*\*\* N here is the harmonic mean of the sample sizes for the two groups in the comparison.

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Not all of the replications of Mayo et al's (1978) study of sun-signs have included tests of the Water sign effect with neuroticism. Relevant statistics are available for only eight of the studies and these are presented in Table 9.7. In this table, "d" is the same measure of effect size as in Table 9.5. As in that table also, the power values are based on an estimate of the population effect size derived from the Mayo et al. study. In Studies 1, 2, 7, 8 and 9, the tests for differences between groups compared the mean for the three Water signs with the mean for the remaining signs. In Studies 11, 12 and 13, on the other

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hand, the sign Aries was included with the Water signs because the original study by Mayo et al. showed that the mean Ne score for this sign was second only to the mean for PI. Smithers (1981) also has found that Aries subjects tend to score highly on rating-scale measures of anxiety. Furthermore, astrological textbooks tend to portray AR as having neurotic traits, albeit of an extraverted kind (Smithers, 1981).

It can be seen from Table 9.7 that the original study is the only one out of the eight considered here to have obtained a significant result. However, it can also be seen that the power of the test in six of the other studies was less than .5. Thus, these replication failures might be entirely due to inadequate sample sizes. Study 9 employed an even larger sample than did Mayo et al. but in this case a non-standard test consisting of only five items was used. Hence its relative power cannot be assessed.

However, the Water sign effect has been replicated in one other study, by Smithers (1981), though the data from this study were not suitable for inclusion in Table 9.7. Smithers used four self-rating scales to assess neuroticism and, when the responses to these scales were combined and plotted against the sun-signs of 1108 women born in the Southern Hemisphere, peaks were found for each of the Water signs and for the sign Aries. As we have seen earlier, Smithers (1981) found that those Ss who were born with the sun in Water signs also reported having suffered more neurotic illnesses than did other Ss (see section 9.4 above).

These results suggest that the Water sign effect is reproducible though it requires very large samples to be detected. Why it should be even weaker than the polarity effect is unclear, especially when one considers that the relation between the Water signs and emotion is much better

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known than that between the polarities and extraversion (Mayo et al., 1978). One possible explanation is that neuroticism traits, being socially undesirable, are not so readily incorporated into the self-image as are traits associated with the extraversion dimension, which are more neutral. However, there are no data to support this speculation at present.

**9.7.3. Conclusions.** From the foregoing analysis it appears that the polarity effect is readily obtainable, given adequate sample sizes, with normal adults from "Western" countries (so far it has been obtained in Britain, Australia, New Zealand, Germany and the U.S.A.). This conclusion seems to apply even to people who probably take very little interest in astrology, such as science and engineering students (Smithers and Cooper, 1978), and who are unlikely to believe in astrology with any great conviction. If an adequate sample size is defined as one that gives a test a probability of .8 of obtaining a result that is significant at the 5% level (as recommended by Cohen, 1977), and if the original study by Mayo et al. is regarded as suitable to provide an estimate of the population effect size, then calculations show that at least 350 subjects are required for each of the groups in the comparison. The effect seems to have been obtainable ever since astrology acquired general popular appeal, that is for the last 40 years, and it cannot be explained as being due to the demand characteristics of the testing situation.

Not enough research has yet been devoted to the Water sign effect to say under what conditions it can be detected. It appears to be very much weaker than the polarity effect - possibly only one seventeenth of the strength - and so requires even larger samples for its detection, but it is likely that it can be found with much the same subjects.

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So far, a few groups have been identified amongst which the polarity effect is either absent or very much reduced. These include subjects who know nothing about astrology, such as children, and those who know a great deal, such as students of astrology. Psychiatric patients have also been found not to display the effect and it has been suggested that this may be because whatever influence astrology might have had on such people has been effaced by psychotherapeutic treatment.

GENERAL DISCUSSION.

10.1 Review.

Chapter One of this thesis briefly surveyed the revival of astrology in the Twentieth Century. Having been moribund in the Western world for two centuries, astrology began to show new signs of life in Europe about 100 years ago. At first it was very much a minority interest pursued by Theosophists and a few intellectuals but after 1930 it rapidly acquired an immense popular following as a result of "Lucky Stars" columns appearing in newspapers and magazines. So successful has this revival been that, at present, about 45% of the population professes some degree of belief in astrology. Moreover, most developed countries have at least one major society devoted to the serious study of astrology and the abundance of practising astrologers is now about the same as that of psychologists.

As would be expected, psychologists were not slow to respond to this astonishing upsurge of interest in astrology. Since most of the astrology that is presented for mass consumption is patently absurd, it is not surprising that a good deal of psychological research has been designed to explain belief in astrology in terms of the psychological characteristics of the believers. This research was reviewed in Chapter Two. It was argued there that most of the early work was vitiated by inadequate taxonomy and measurement but that recent studies which have concentrated on astrology itself, rather than general "superstitiousness", have made some progress. In particular, there is now a reliable body of evidence that belief in astrology helps people to cope with anxiety and social deprivation. At least this appears to be the case for the majority of believers, though there is also evidence that the interest of a small proportion of believers stems from a constructive attempt to found an alternative culture based on a new value consensus. This



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latter kind of belief does not appear to be associated with personal maladjustment.

Of course, the motivations of those who believe in astrology have no direct bearing on the validity of astrology itself. However, the research which was reviewed in Chapters Seven, Eight, and Nine, and the new studies that were reported therein, strongly suggest that astrology as it is traditionally practised is invalid. Reliable evidence has been obtained for only one traditional horoscopic interpretation - that the positive and negative sun-signs are associated with extraversion and introversion respectively - but this effect has been found to be due, almost certainly, to the beliefs and knowledge of the subjects who took part in the research. Therefore, if the perceived accuracy of horoscopes is illusory, it is a matter of some interest to discover what factors give rise to the illusion of accuracy. The factor to which most attention has so far been paid is the "Barnum Effect". However, when the existing research on this effect was reviewed in the second part of Chapter Two, it was found that it contributed little to the explanation of the perceived accuracy of any of the three major kinds of horoscope: Lucky Stars columns, astrological textbooks, and professional birth-chart interpretations.

Scientists and philosophers have responded to the current enthusiasm for astrology not only by investigating the basis for belief in it, but also by questioning its scientific status. Several important approaches to this question were examined in Chapter Four. It was argued there that two of these approaches are untenable because they are contradicted by the history of research into astrology, which was reviewed in Chapter Three. Contrary to what Popper and Kuhn claim, astrology does advance hypotheses that are falsifiable and it is capable of supporting a puzzle-solving tradition. It was noted, however, that

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astrology has traditionally involved a kind of theorising which is alien to science and therefore might be excluded as a branch of science on these grounds. Nevertheless, it has also been shown that, in most other respects, it has a structure much like that of the most respected Scientific Research Programmes and furthermore, it has already led to the discovery of novel facts. This is probably its strongest claim to scientific status. The support for this last claim was reviewed in Chapter Three where it was argued that the evidence produced by the Gauquelins for some astrological ideas is already as good as that for almost any area of research in the social sciences. Although there has been one apparent failure to replicate one of the Gauquelins' planetary effects, close scrutiny of the conduct of this replication suggests that insufficient safeguards were implemented, against bias on the part of the team of independent investigators, for any firm conclusions to be drawn from the replication.

Although the present author believes that astrology has received sufficient support that its underlying (acausal) theory should be examined with great care, several of the leading researchers in this field take a different view. They hold that any real planetary effects must be mediated by causal mechanisms and they have attempted to elaborate mechanistic theories to explain the effects that have been discovered. However, when two such theories were examined in Chapter Four, it was found that neither of them is consistent throughout with other well-established scientific theories. It was concluded, therefore, that further research is required into the nature of planetary effects before the question of scientific status can be settled.

Astrology claims that personality varies with the birth positions of the planets within three main frameworks: the aspectual circle of the angular separations between pairs

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of planets, the diurnal circle of the houses, and the ecliptic circle of the zodiac signs. Hypotheses about these frameworks were tested, by means of personality measurements of ordinary people, and the results of these tests were reported in Chapters Seven, Eight, and Nine. Each of these chapters began with a review of the previous investigations of these frameworks and the whole series of studies was preceded by one chapter giving details of the database that was used for the new investigations, and another chapter in which the rationale was given for selecting ten particular personality scales.

Astrological doctrines concerning aspects have not been extensively investigated and the previous research on this topic has produced equivocal results. Therefore, a series of four studies was designed in order to explore these doctrines thoroughly. In the first, a group of astrologers was asked to specify how personality varies with specific angular separations - called "aspects" - between 32 pairs of planets and these predictions were tested against the data. In the second, a comparison of the traditionally categorised "soft" and "hard" aspects was made using multivariate methods, while the fourth study ignored the traditional categorisation into aspects and non-aspects and simply looked for any effect of angular separation. The third study was an attempted replication of a previous finding showing support for the 108th harmonic of the aspectual circle. No evidence of the validity of astrological ideas was found in any of these studies.

Evidence that personality varies with the positions of some of the planets in the diurnal framework has already been obtained but most of it is confined to eminent individuals. Therefore, a second series of two studies was designed to test for similar effects with ordinary people. The first of these studies tested 23 predictions, derived from previous research, concerning the personality

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correlates of planets placed in the Gauquelins' "key sectors" at birth. In general, the results were very poor. Only three of these predictions were supported and the results for two of these were only marginally significant. However, all three effects had been found on at least two previous occasions. The second study investigated whether personality varies in any manner according to the positions of the planets in 12 diurnal sectors. The rationale for this was drawn from a new analysis, which was presented in Chapter Eight, of some data published by the Gauquelins. This analysis shows that personality varies continuously with the diurnal positions of the planets. With personality questionnaires, however, significant results were only obtained for the sun. These suggest that personality varies on at least four dimensions according to the time of day of birth.

A third group of studies was devoted to two topics related to the signs of the zodiac. Firstly, the doctrine that personality varies with the signs occupied by the planets was tested. The only reliable result was one showing that people born with the sun in a "positive" sign tend to score higher on extraversion than those with the sun in a "negative" sign. This effect has been obtained several times previously but there have also been several failures to replicate it. Therefore a meta-analysis of most of the existing studies of this effect was undertaken. It was found that the effect can be reliably obtained under certain ordinary conditions though no influences from the sun need be invoked to explain it. It appears to be due to individuals altering their responses to questionnaire items in conformity with astrological expectations.

### 10.2 General discussion of the experimental results.

The results of the studies reported in this thesis provided very little support for the tenets of astrology.

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No evidence was found for the validity of aspects or zodiac signs and the findings for the diurnal circle were much weaker and more limited than was expected on the basis of the Gauquelins' results with eminent people. However, in the discussions featured in the three previous chapters, a number of possible criticisms of the experimental designs, and of the personality measures, were briefly mentioned. These criticisms will be considered next before any final conclusions are drawn.

**10.2.1. Situational dependency.** It was noted, in section 7.5 above, that some astrologers consider it to be inappropriate to investigate astrology with ordinary personality questionnaires because the traits promoted by astrological factors are situationally dependent. For example, an aspect between MA and VE might promote assertiveness, which is of the nature of MA, but only among intimate friends, who are signified by VE. Questionnaires, however, are constructed on the assumption of general cross-situational consistency in behaviour and do not allow for situational discriminativeness.

While there is no evidence that astrology is actually able to predict interactions between personality and situation, there is certainly ample evidence for the discriminativeness of behaviour. For example, it is a persistent finding that scores from personality questionnaires usually account for less than 10% of the variance in criterion measures of behaviour in particular situations (Mischel, 1968). Furthermore, when behaviours relevant to particular traits, such as conscientiousness, are measured in a variety of different situations, the mean correlation between them tends to be very low, even when the behaviours are reliably measured by aggregating over multiple occasions (Mischel and Peake, 1982). However, it is also a consistent finding that the great majority of correlations between behaviour measures from different

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situations, though small, are positive and the behaviour measures themselves, when aggregated across situations, tend to have considerable internal reliabilities (Epstein, 1983). This shows that one can predict reasonably well the average behaviour in one sample of situations from the average in a different sample of situations. Moreover, the literature contains many examples of strong relationships between observers' ratings of personality and experimentally measured behaviour. Since the observers tend to witness behaviour in quite different situations from those prevailing at the time psychologists make their measurements, these findings provide further evidence of cross-situational consistency (Funder, 1983).

Thus, although there is evidence for substantial discriminativeness in the patterning of individuals' behaviour from situation to situation, there is also good evidence for substantial coherence and continuity within the lives of individuals. Which of these two, variability or consistency in behaviour, appears to be dominant largely depends on the type of analysis carried out. For astrology, the relevant level of analysis would seem to be one that concentrates upon the broad trends in individuals' lives rather than the discriminations that individuals make hour by hour and day by day. At the former level there appears to be considerable consistency and therefore it is unlikely that astrological results could be improved by taking situations into account. However, psychological research into the interactions between personality and situation is still in its infancy and a variety of ways of classifying situations usefully for personality studies are still being investigated (Lord, 1982; Cantor, Mischel and Schwartz, 1982). Therefore, it is not impossible that astrological results could be improved by some future interactional approach.

**10.2.2. Astrological effects: multiplicative or additive?**

Another frequently voiced criticism of research into astrology focuses on the fact that the typical study takes astrological factors in isolation from one another. This is inappropriate, it is argued, because astrological effects are multiplicative rather than additive. That is, a variety of different factors may indicate the same personality traits and when several of these are present at an individual's birth, the effect of them in combination is greater than the sum of the effects in isolation. For example, having SO in a positive sign of the zodiac, having JU close to one of the angles, and having a major aspect between JU and MA all (allegedly) indicate extraversion. Now each of these on its own may account for, say, 1% of the variance in extraversion scores, but when all three factors are present they might account for 6% or more of the variance.

Again, this possibility cannot be ruled out. However, it ought to be noted, first, that this conjecture is at odds with the postulated situational discriminativeness that was discussed in the previous section above. If astrological factors indicate behavioural dispositions in particular types of situation, then it is difficult to see how they could combine in any but an additive way. Secondly, a number of studies of astrology have employed designs which would permit multiplicative effects to be observed but these have not been conspicuously more successful than other studies. It is true that Tiggie and Fiebert (1979) and Whisenant (1978) obtained significant results when they combined planetary indicators by means of weighting systems, but these are unrepeated results in which little confidence can be placed. Noblitt (1978), Metzner et al. (1980) and Russell and Wagstaff (1983) have also used designs in which different indicators of the same traits were combined, but the results of these studies were not significantly different from chance. Thirdly, the

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Gauquelins' studies, which have yielded by far the most reliable results, have all concentrated on planets taken in isolation. Of course, it might be possible to improve on these results if one knew which factors to combine and in what ways. However, factorial designs generally require much larger samples than one-way designs and are usually not worth undertaking unless theoretical considerations clearly indicate them.

**10.2.3. The longitudinal stability of personality.** In contrast to the cross-situational consistency of behaviour, the temporal stability of personality is uncontroversial (Mischel, 1968; Mischel and Peake, 1982). However, if there are any associations between personality and the positions of the planets at birth, these are, presumably, ones that involve only those features of personality that are stable over the life-time (or at least over the 50 or so years of normal adult life). If so, personality questionnaires are valid measures of the personality variables with which astrology deals only to the extent that they measure life-long characteristics. Naturally, it would be no easy matter to estimate this degree of validity for any particular personality scale, but one can at least place an upper bound to these validities by measuring the relevant reliabilities of the scales. In this case, the relevant reliabilities are the re-test correlations after several decades of adult life.

Unfortunately, there have been very few studies of the stability of personality over periods greater than ten years. However, in a very recent publication, Conley (1984) has argued that the re-test correlation (C) to be expected after any number of years can be estimated quite accurately from Converse and Markus's (1979) formula;

$$C = Rs^n$$

where R is the internal consistency or period-free reliability of the measuring instrument, s is the



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coefficient of annual stability, and  $n$  is the interval (in years) for which the re-test coefficient is required. Since  $R$  is known for most standard tests,  $s$  is the only variable in this formula for which a value must be calculated.

Conley's approach to the estimation of the annual stability is to obtain the results of all the existing studies of the longitudinal stability of extraversion, neuroticism, and psychoticism and to plot the uncorrected re-test correlations against the interval between successive testings. He then seeks the value of  $s$  which gives the curve with the best fit to the resulting data points. It emerges that a value of  $s = .98$  gives a satisfactory fit for almost all the data in the personality field (though intelligence and self-opinion, which were also tested, require higher and lower values of  $s$  respectively).

The expected re-test correlations for the ten scales that were employed in this thesis can easily be calculated using Conley's finding. For these purposes, the best measures of internal consistency are probably the alpha coefficients calculated for random samples of the British population. For the EPQ, these have been presented by Barrett and Kline (1982a) and for the 16PF, they have been published by Saville and Blinkhorn (1981). Since structural transformations in psychological characteristics take place in childhood (and perhaps in old age as well), it is best to estimate re-test coefficients for no more than the 50 years of normal adulthood. When this value is entered for  $n$  in Converse and Markus's formula, and when alpha coefficients are entered for  $R$ , it is found that the average re-test coefficient expected for the three scales of the EPQ is .30 and the average for the seven selected scales of the 16PF is only .18.

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If this analysis is correct, even the best available measures of personality have quite limited validities as measures of the variables with which astrology is concerned. This means that the effect sizes expected in the studies reported in this thesis are very small. The implications of this conclusion for the power of the tests that were conducted will be considered next.

**10.2.4. Power analyses.** No evidence was found, in the studies reported in this thesis, for the validity of aspects or zodiac signs and the findings for the diurnal circle were only suggestive. However, before conclusions can be drawn from these negative results, it is necessary to estimate the probabilities that significant results would be obtained with the sample sizes that were employed. In order to do this, some estimate must be made of the effect sizes (ESs) that are expected. The analysis in the previous section above only allows an upper limit to be placed upon these; it does not specify what they should be. Usually such estimates are drawn from previous, comparable research. This cannot be done directly for aspects and signs, of course, because no previous research has provided reliable, positive results. It can be done for the diurnal circle, however, because in this case there are the Gauquelins' results to draw upon.

Since the present studies were concerned with associations between personality and planetary positions, estimated ESs should ideally be derived from previous studies which have investigated personality. However, this is not advisable with those of the Gauquelins' studies which have employed the Character Traits Method because of the violations of statistical assumptions that this method involves (as noted in section 8.3 above). Nevertheless, some idea of the size of planetary effects can be gained from the Gauquelins' studies of career. Since these studies have employed very large samples, they provide good

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estimates of population ESs, and since it has been shown that professional eminence is linked with personality, it is reasonable to use them as indirect measures of the effects expected with personality.

Rather than examine all of the Gauquelins' career studies, the Mars Effect of sportsmen will be considered alone since it has been studied in most detail and is, in any case, typical of the other effects. Gauquelin (1976b) has published the observed and expected frequencies for MA in key sectors for 1553 champions. From these data, the value of  $w$ , the index of ES that Cohen (1977) recommends for use with goodness-of-fit tests, is found to be .114. This index is actually equivalent to the sample value of  $\phi$ , the fourfold point correlation coefficient. Since the latter is a bona fide product moment coefficient, it may be squared to estimate the proportion of the variance (PV) accounted for by group membership. Thus, in the case under consideration,  $PV = .013$ . Such a conversion has the advantage of assisting comparisons with studies using different designs. In the present analysis it can be used as an estimate of the kind of ES expected in the univariate studies reported above.

Most of the studies reported in this thesis employed multivariate analyses. Unfortunately, it is difficult to conduct power analyses for such tests because the expected ES varies with the dimensionality of the effect. In the case of a one-dimensional departure from the null hypothesis, the power of the criteria for Manova decreases as the number of dependent variables increases, but the opposite occurs when the dimensionality of the departure from the null hypothesis is close to the numbers of D.V.s (Bock, 1975). Since the expected dimensionality of the effects in astrological studies is unclear, power analyses of the multivariate tests will not be attempted.

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Nevertheless, two of the major studies reported above relied on univariate tests of predicted effects and these are amenable to power analysis. These are Aspect Study I (section 7.5 above) and Diurnal Study I (section 8.7). The power of the tests to obtain a result significant at the .05 level in these studies is shown in Table 10.1 for three population ESs. In this table,  $f$  is the index of ES that Cohen (1977) recommends for use with the analysis of variance. It is the standard deviation of the standardised means. In Diurnal Study I, the means of only two groups were compared. For such comparisons the normal index is  $d$ , the standardised difference between means. However, the relationship between  $f$  and  $d$  is simply  $f = d/2$ , since the standard deviation of two values is half their difference. For each value of  $f$  there is also a corresponding proportion of the variance (PV) accounted for by population membership. These values are related to  $f$  by a simple function and are equivalent to  $\eta^2$ , which is itself a generalisation of the point-biserial  $r^2$ . The associated power values, which depend upon the sample sizes, were derived from the tables published by Cohen (1977).

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**Table 10.1. Power analyses of Aspect Study I  
and Diurnal Study I.**

STUDY.	EXPECTED EFFECT	$f$ .	P.V.	Power
Aspect Study I.	Predicted differences	.05	.002	.25
	between three	.10	.010	.78
	aspect groups.	.15	.022	.99
Diurnal Study I	Predicted differences	.05	.002	.23
	between key sectors	.10	.010	.56
	and other sectors.	.15	.022	.85

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It can be seen from the table that the probability of obtaining a significant result was quite low in both of the studies if the population PV is as small as .002. If the population PV were as great as .01, however, there is a reasonable chance that significant results would have been

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obtained in Aspect Study I, though the probability of significant results in Diurnal Study I would be little better than fifty-fifty. A high probability of significant results in the latter study would only occur if the PV were at least .02, or about twice as great an ES as that found in the Gauquelins' career studies.

Of course, it is always strictly invalid to conclude, when results are non-significant, that the null hypothesis is true, and it is functionally invalid also unless the power of the test is high even for a tiny ES. From the analysis above, however, we can be reasonably confident that aspects must account for less than 1% of the variance in personality scores if they account for any of it at all. Since less than 30% of the variance of personality scores could be associated with differences in life-long personality (section 10.2.3), one might suggest that aspects are unlikely to account for more than .002 of the overall variance. In this case a sample of more than 3000 subjects would be required to ensure a reasonable probability (i.e. a power of about .8) of obtaining significant results. Since the evidence in favour of aspects from previous studies is extremely tenuous, even though very large samples were used in some of these, it is the present author's opinion that the effort required to gather such a huge sample can hardly be justified.

The situation with the diurnal circle is quite different, however. In this case, the power of the tests was only sufficient for the conclusion that planets in key sectors probably account for less than 2% of the variance in personality scores. In order to reach the same degree of confidence that PV is less than 1%, a sample of about 1000 subjects (instead of the 468 available in the present study) is required.

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**10.2.5. Recommendations.** The previous section showed that the power of the tests in Aspect Study I was high enough to detect quite weak effects and yet this study provided no support for traditional doctrines about aspects. The three other studies of aspects reported in Chapter Seven likewise failed to support any of the ideas about this framework that are most popular among astrologers at present. Of course, it is not possible to conclude that personality does not vary in any way with the angular separations between planets but since the evidence from previous studies is only very weak and equivocal, further research on aspects cannot be recommended.

The power of the tests of zodiac effects in Ecliptic Study I was not estimated in the previous section. However, there is no reason to believe that the power was not sufficient to detect quite small effects. Considering the quantity and variety of previous studies of the ecliptic circle, and the paucity of the evidence that has resulted from them, it is probably time to call a halt to all further investigation of this area of astrology also.

Of the three major astrological frameworks that have been studied, only the diurnal circle has received any support from the research reported in this thesis. This support is quite meagre but the calculations reported above show that the tests used to investigate this framework had only low power to detect effects of the size that are expected. Considering this, and considering the reliability of previous findings for the diurnal circle, further research seems to be well justified. In the remainder of this chapter some steps that might be taken to increase the chances of obtaining better results in future will be considered.

The most direct way to increase the power of any test is, of course, to increase the sample size. Apart from this

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obvious step, any measures that would serve to increase the effect size are also clearly recommended. Ensuring that the subjects' birth-times are accurate and that their births were natural, are two such measures. Misinformation about these two factors needlessly reduces the strength of any (possible) associations between the planets and personality. It might also be possible to increase effect sizes by using moderator variables or by using different kinds of measuring instruments. These possibilities will be discussed next.

Five variables have been proposed in recent years which, it is claimed, moderate either the predictability of behaviour from ratings, or the congruence between self- and observer-ratings, or both (Penner and Wymer, 1983). Of these, Bem and Allen's (1974) self-ratings on consistency in behaviour is the technique that is probably the most relevant to astrological research. Although there is some doubt that these ratings enhance the correlations between behavioural measures from particular situations (Mischel and Peake, 1982), there is good evidence that inter-rater agreement is higher for those subjects who rate themselves as consistent compared with those who rate themselves as inconsistent (Bem and Allen, 1974; Mischel and Peake, 1982). Furthermore, it has been found that self-rated consistent subjects are more temporally stable on behaviours which are considered to be prototypical of certain traits (friendliness and conscientiousness have been studied so far) than are self-rated variable subjects (Mischel and Peake, 1982).

It is this last finding that makes Bem and Allen's technique particularly relevant to astrology. It was noted earlier that only those features that are stable throughout the lifetime are likely to be associated with the birth positions of the planets. It was also shown that even the best available questionnaires are probably quite limited in

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their ability to measure these features of personality. This last finding leads to the recommendation that only questionnaires with appreciable internal consistencies (alpha coefficient at least .75) should be employed in astrological research. It also suggests that any technique which allows temporally stable subjects to be selected could be of benefit.

At this point it is worth reconsidering the reasons why the Gauquelins obtained good results only with the most eminent members of each profession. So far the tendency has been to assume that this occurs because eminence in most professions is associated with extremity of position on various trait dimensions. However, it could be that temporal stability is at least as important as extremity, if these two are separable. For example, a scientist who is very studious during one part of his life but quite neglectful of his studies during another part is unlikely to be as successful as another scientist who is moderately studious throughout his life.

In fact there is evidence that extremity and consistency are separable to some degree. Rushton, Jackson and Paunonen (1981) have found that self-ratings of extremity correlate significantly with self-ratings of consistency on 10 out of 16 personality dimensions, but the relationships between the two types of variable are quite weak in most cases. Furthermore, when separate frequency distributions were calculated for subjects' scores on their most consistent traits and on their least consistent traits, it was found that high consistency can occur at all points along the trait score continuum whereas inconsistency is confined to the centre of the continuum. In other words, subjects who rate themselves as inconsistent on a trait do not tend to rate themselves as extreme on that trait, but those who rate themselves as consistent are as likely to be average as they are to be extreme.



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Given this finding, it might be thought that the best policy for astrological research would be to select only those subjects who score extremely since they are likely to be temporally stable as well as extreme. However, there are two considerations that weigh against this. Firstly, there is some evidence that the validity of questionnaire measures is somewhat reduced for extreme scorers (Stones, 1977). Secondly, if subjects who score at the centre of continua are discarded, it is not possible to use parametric tests on the scores of the remaining subjects because such tests assume continuity in the scale of measurement. It is only valid to use non-parametric tests which are weaker and which do not include counterparts to many of the most useful parametric tests. Thus, it is probably preferable to select subjects for consistency over time rather than extremity at any particular time.

A second recommendation is that different kinds of measuring instruments from trait-based questionnaires should be tried. This idea stems from the observation that the planetary temperaments that have been identified by the Gauquelins (eg. F. Gauquelin, 1980) do not all sort well into the equivalence classes that are assumed in the construction of questionnaires. The Moon temperament is a good example because it appears to combine some features of both extraversion and introversion (which was discussed in section 6.2 above). The nomothetic approach to personality, which guides the construction of questionnaires, assumes that a common set of trait dimensions can be used to characterise all people and that individual differences are to be identified with different locations on these dimensions. Undoubtedly this approach is valid and useful for many purposes but it may not be the ideal approach for astrology since astrological variables appear to define types of people among whom traits are configured in distinctive ways. In short, astrology seems to require a type, rather than a trait, approach to personality.

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An approximation to a typological approach was adopted in the research that was reported in this thesis by using scales which measure "primary" traits and by having judges predict which configurations of these traits should be associated with birth under various astrological conditions. This approach was not successful but, as we have seen, this might be due to the very limited reliability of the 16PF scales that were employed. It might be, also, that even "primary" scales make too many assumptions about which behaviours are equivalent manifestations of universal traits. An alternative approach would be to abandon all assumptions about equivalent behaviours and to deal with individual questionnaire items instead. Since planetary positions are well defined and objectively ascertainable, they can easily be used as criteria against which the relevance of particular items may be judged. Initially, items could be targetted upon the traits that have already been shown to be associated with the planets. They could then be selected on the basis of their empirical associations with planetary positions and finally tested on cross-validation samples. Of course, this is just a version of criterion keying but in this case, in contrast to most other applications of this technique, the only doubts about the reliability and objectivity of the criterion would be those imposed by the inaccuracy of the birth-data.

**10.2.6. Conclusions.** Both the previous and the present research into zodiac signs and aspects have failed to find any clear evidence for the validity of these doctrines despite using quite powerful tests to investigate them. Therefore, it is suggested that further research into the validity of the astrological theory of personality should ignore these frameworks and concentrate on the diurnal circle instead. During 30 years of research, the Gauquelins have provided a large body of reliable findings showing that individual differences in personality are associated

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with particular diurnal birth positions of some of the planets. The new analysis of some of the Gauquelins' data that was reported in section 8.8 above, and Addey's harmonic analyses of the Gauquelins' trait-word data, also suggest that personality varies continuously with the diurnal positions of the planets. So far, these positive results have been mostly confined to eminent persons. Efforts to find similar effects among ordinary people have provided only meagre evidence as yet. However, there appear to be no reasons why better evidence should not be forthcoming in the future if sufficiently large samples of subjects with accurately timed births are tested with appropriate instruments.

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## Appendix I

### Glossary of Terms.

**Angles.** In modern terminology, the angles of a horoscope are the Ascendant (q.v.), the Descendant, the Midheaven (or Medium Coeli), and the Imum Coeli. The first two are located at the intersections of the horizon with the ecliptic, in the east and the west respectively. The second pair are located at the intersections of the meridian with the ecliptic, at the upper and lower culminations respectively. The vertex (q.v.) might also be considered to be an angle.

**Angular, Angularity.** There are four angular houses (q.v.) in the horoscope: the first, the fourth, the seventh, and the tenth. These are the four houses which follow the angles (q.v.) in an anticlockwise direction. Traditionally, a planet was said to be angular if it was found in one of these houses at birth. However, the modern practice is to call a planet angular if it is within eight degrees or so of one of the angles, no matter which side of the angle it is found. Thus, in modern usage, a planet can be angular even if placed in a cadent (q.v.) house. Angular planets are said to be especially influential.

**Ascendant:** one of the angles (q.v.) of the horoscope. It is the eastern intersection of the horizon and the ecliptic (q.v.). The sign of the zodiac in which the ascendant is placed at birth is known as the Ascending, or Rising, Sign, and is treated as especially important in horoscopic interpretations.

**Aspects.** An aspect is an angular separation between a pair of horoscopic factors. Particular angles, with permissible degrees of inexactitude (called "orbs") are considered to be especially influential. The most important aspects, with their corresponding angles, are the conjunction (0°), the sextile (60°), the square (90°), the trine (120°), and the

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opposition (180°). Further details are given in section 7.1 in the main body of the thesis.

**Cadent.** The four houses (q.v.) which precede the four angles (q.v.) in an anticlockwise direction, are known as the cadent houses.

**Descendant.** See under **Angles**.

**Diurnal circle, Diurnal position.** Because of the Earth's diurnal rotation, the planets appear to circle the Earth each day with a period of about 24 hours. Thus, at any particular point in time, each planet can be said to have a position in the diurnal circle. The mundane houses (q.v.), of which there are many systems, are used to define these positions in astrology (see section 3.1). The Gauquelins have also devised their own diurnal framework (see section 3.7.2).

**East Point:** the eastern intersection of the horizon and the Prime Vertical (q.v.). It is treated as an angle (q.v.) by some astrologers.

**Ecliptic, Ecliptic circle.** The ecliptic is the apparent path of the sun against the background of the fixed stars. It is inclined at an angle of about 23.5° to the equator and is the centre of the band of the sky known as the zodiac. Since all of the planets, as well as the sun, move relative to the stars, they all have varying positions in the ecliptic circle. Such positions are usually defined in terms of celestial latitude (and longitude) or in terms of a location within one of the signs of the zodiac.

**Houses.** See **Mundane Houses**.

**Hypothetical planets.** Some astrologers claim to have detected, by astrological or psychic means, planets that

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have never been observed in ordinary ways. There are at least 25 such "planets" for which ephemerides have been calculated. See Dean et al. (1977) for details.

**Imum Coeli.** See under **Angles**.

**Judicial astrology:** this refers to all those techniques whereby a judgement is made from a horoscope erected for the time of birth. It is contrasted with **Natural astrology** which attempts to account for non-personal occurrences (eg. earthquakes, floods) on the basis of the current positions of the planets.

**Midheaven.** See under **Angles**.

**Mundane chart:** a horoscope erected for the inauguration of an institution or a political entity, such as a nation.

**Mundane houses.** The 12 divisions of the diurnal circle (q.v.) which feature in most horoscopes are known as the (mundane) houses. Many systems have been devised for making these divisions. More details are given in section 8.1 above.

**Nodes:** the intersections of the planets' orbital planes with some other plane, usually the ecliptic (q.v.).

**Natural Astrology.** See under **Judicial Astrology**.

**Planets.** Although it is often said to be incorrect to include the sun and moon among the planets, it is often convenient to do so in astrology. Moreover, the Oxford English Dictionary still preserves this usage, which is derived directly from Ancient Greek.

**Prime Vertical.** The vertical, great circle which passes through the East Point (q.v.), the West Point, the Zenith,

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and the Nadir. The western intersection of the Prime Vertical with the horizon is known as the Vertex, and is, treated as an angle (q.v.) by some astrologers.

**Sidereal period:** the period (usually average period) between two consecutive conjunctions of a particular heavenly body with a given fixed star. For the sun, this period is the sidereal year.

**Sidereal Zodiac:** any zodiac of equal-sized signs whose beginning is defined as some point among the fixed stars.

**Synastry:** the comparison of one individual's horoscope with that of another individual, usually for the purpose of judging compatibility.

**Tropical Zodiac.** The zodiac for which the first point of Aries coincides with the intersection of the ecliptic and the equator at the vernal equinox of the Northern Hemisphere.

**Vertex.** See under Prime Vertical.



## Appendix II.

LISTING OF PROGRAM "DIURNL".

This FORTRAN program computes the diurnal position of a planet - according to Gauquelin's method - from the longitude and latitude of the planet plus the longitude of the MC and the geographical latitude of birth. Input is in minutes rather than degrees and output is in terms of a 21600 sector circle.

```

      REAL MC
      E=23.45229*!P/180.
      WRITE(1,51)
      READ(1,52)I,J,K,L
C
C Convert to radians
C
      MC=FLOAT(I)/10800.*!P
      GL=FLOAT(J)/10800.*!P
      ZL=FLOAT(K)/10800.*!P
      CL=FLOAT(L)/10800.*!P
C
C Calculate right ascension of MC
C avoiding tan90° and tan270° (=infinity).
C
      IF(MC-(!P/2.))2,1,2
1      MC=MC+.0001
2      IF(MC-(!P*1.5))3,1,3
3      RAMC=ATAN(TAN(MC)*COS(E))
      IF(MC-(!P/2.))7,1,4
4      IF(MC-(!P*1.5))5,1,6
5      RAMC=RAMC+!P
      GOTO 7
6      RAMC=RAMC+!P*2.
C
C Calculate right ascension and declination of planet,
C avoiding division by cos90° or cos270° (=zero).
C
7      IF(ZL-(!P/2.))9,8,9
8      ZL=ZL+.0001
9      IF(ZL-(!P*1.5))10,8,10
10     A=COS(E)*SIN(ZL)-SIN(E)*TAN(CL)
      B=COS(ZL)
      RA=ATAN(A/B)
      IF(B)11,8,12
11     RA=RA+!P
      GOTO 14
12     IF(A)13,14,14
13     RA=RA+!P*2.
14     A=COS(E)*SIN(CL)+SIN(E)*COS(CL)*SIN(ZL)
      D=ATAN(A/SQRT(1.-A*A))

```

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```

C
C Calculate rising and setting times
C avoiding geolat or decl = zero.
C
      IF(GL)16,15,16
15    GL=GL+.0001
16    IF(D)18,17,18
17    D=D+.0001
18    A=-TAN(GL)*TAN(D)
      A=!P/2.-ATAN(A/SQRT(1.-A*A))
      RT=ADJUST(RA-A)
      ST=ADJUST(RA+A)
C
C RT and ST in radians, not hours.
C Calculate diurnal positions.
C
      DURA=ADJUST(ST-RT)
      DURB=ADJUST(RT-ST)
      DSR=ADJUST(RAMC-RT)
      DSS=ADJUST(RAMC-ST)
      IF(DSR-DSS)19,19,20
19    DP=ADJUST((DSR/DURA)*!P)
      GOTO 21
20    DP=ADJUST((DSS/DURB)*!P+!P)
C
C Convert from radians to 21600 sectors
C
21    IDP=DP*10800./!P+.5
      WRITE(1,53)IDP
51    FORMAT('Input MC, GL, ZL, and CL in minutes
+(of longitude or latitude) - 4I5 format')
52    FORMAT(4I5)
53    FORMAT('Diurnal position = ',I5)
      STOP
      END

      FUNCTION TAN(X)
      TAN=SIN(X)/COS(X)
      RETURN
      END

      FUNCTION ADJUST(X)
      B=!P*2.
      X=X+B
1     IF(X-B)3,2,2
2     X=X-B
      GOTO 1
3     ADJUST=X
      RETURN
      END

```

## Appendix II.

### NOTES.

!P = pi. For computers without this constant, it can be generated by:  $PI=4*ATAN(1.)$  .  
E = obliquity of the ecliptic.  
MC = longitude of the MC.  
RAMC = right ascension of MC.  
GL = geographical latitude of birth.  
ZL = longitude )  
CL = latitude )  
RA = right ascension ) of planet  
D = declination ) expressed in radians.  
RT = rising 'time' )  
ST = setting 'time' )  
DURA = duration above horizon )  
DURB = duration below horizon ) expressed  
DSR = duration since rise ) in radians.  
DSS = duration since setting )  
DP = diurnal position.

The mean obliquity of the ecliptic in 1900 was  $23.4523^\circ$  and will be  $23.4393^\circ$  in the year 2000. The actual value can vary from the mean by as much as  $\pm .003^\circ$ . The value given in the program is the mean value for 1950.

GL can be derived if the longitude of the Ascendant (AS) as well as RAMC is known, as follows;  
 $GL=ATAN(-1*(COS(RAMC)/TAN(AS)+COS(E)*SIN(RAMC))/SIN(E))$   
and no quadrant problem arises. However, this method is unreliable because at 6 and 18 hours sidereal time the equation becomes ill-conditioned. At these times 00 Libra and 00 Aries respectively are rising at all latitudes, hence knowing AS cannot reveal GL. Close to these times, a small error in AS gives a large error in GL.

## Appendix III.

### THE HARMONICS OF THE DIURNAL CIRCLE:

An appraisal of Addey's methods of analysis and evaluation.

#### 1. Introduction.

In chapter 8 (section 8.8.1) it was mentioned that a promising investigation of the ways in which personality varies with the diurnal positions of the planets had been undertaken by Addey. The results of this investigation that have been published were not described in detail above since the methods on which they are based are somewhat complex and the results themselves have not been evaluated statistically and are therefore uncertain. The articles that Addey published (1979, 1980, 1981a & b, 1982) were interim reports on a large-scale, systematic investigation based on data provided by the Gauquelins (1973, 1974a & b, 1977). Unfortunately Addey died (in March 1982) before he was able to complete this investigation and write up his findings in book form, as he planned. Apparently, he completed most of his analyses and was beginning to write just before his death, so his project could be completed by others. Addey was not trained in science or applied statistics and he wrote mainly for astrologers. Consequently, he did not always set out his methods of analysis and evaluation with the clarity normally required by scientists. Thus, it is the purpose of this appendix to elucidate these methods. This will be done in two parts: the first part describes the data with which Addey worked and the methods used to analyse it and the second part critically appraises the ways in which Addey evaluated his results. The results themselves will not be given in detail as the only ones available at present are already presented in the five articles cited above and should be sufficiently clear once the method is understood. The account of Addey's methods given below is based on these five articles, supplemented by personal communications from Addey in February and March 1982. The

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account is prefaced by a brief description of the theory of Harmonics as Addey applied it to the diurnal circle.

#### 2. The Theory of Harmonics.

Addey's starting point for his work on the harmonics of the diurnal circle was the Gauquelins' discovery that (eminent) people with different personality traits tend to be born when certain planets have just risen or have just passed their upper culmination (the "key sectors"). Addey, however, considered it to be a mistake to suppose that personality varies in a discrete way, being extreme when the planets are in key sectors but being unaffected at other times (as the Gauquelins have tended to claim). Instead, he suggested that personality varies continuously as a function of the planets' positions and that the functions linking personality to planetary position take the form of harmonic waves. To take a hypothetical example, the function linking the trait of assertiveness with the position of Mars might form a fifth harmonic (a five-fold sinusoid wave) in the sense that the number of assertive individuals who are born throughout the diurnal cycle of Mars fluctuates smoothly with a wavelength one fifth of that of the whole circle.

Addey suggested that different harmonics would be produced when the births of individuals with different traits are plotted against the positions of the various planets, but he was unable to predict which exact harmonics would be produced by any particular trait/planet combination. Instead, he hoped to be able to induce the principles on which such predictions could be made from a close examination of the results of harmonic analyses of the Gauquelins' data. It is to the methods used in these harmonic analyses that we turn next.

### 3. The Method of Analysis.

**3.1 Trait-word data.** The analysis utilised only those trait-words which had been applied most commonly to the writers, sportsmen, actors, and scientists investigated by the Gauquelins. It appears the criterion was that, to qualify for the analysis, the words must have been used at least 100 times by the biographers, when describing the celebrities, though Addey was not quite clear on this point. This made 199 words available for the analysis.

**3.2. Diurnal Positions of the Planets.** Only four of the planets - MO, MA, JU and SA - were considered. Their positions in the diurnal circle were calculated by the same method as is employed by the Gauquelins (see section 3.7.2 above and Appendix II), except that Addey did not restrict himself to 12, 18 or 36 sectors, as the Gauquelins have, but used whatever number was convenient for a particular analysis. For example, when examining the seventh harmonic, he used 70 sectors.

**3.3. Observed Frequency Distributions.** Taking each of the four occupational groups separately, the frequency distribution for each of the 199 trait-words for each of the four planets was then calculated. That is, the number of individuals described by a given trait-word was plotted against the planet's sector positions. The position of the planet at the birth of each individual described by the given word was only counted once in the frequency distribution no matter how often the individual was described by that word in the biographical material that was consulted. Addey called this the "single count method".

**3.4. Expected Frequency Distributions.** For each of the four professions separately, a correction was then applied to each of the distributions described above. This correction involved subtracting from each observed distribution, the

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corresponding expected distribution. The latter was calculated as follows. For each sector of the circle a computation was made of the total number of trait-words, of all descriptions, that had been applied to the individuals who were born when the given planet was in that sector, counting each word only once for each individual no matter how often it had been applied in the consulted biographies (i.e. "single count method"). This provided the set of what the Gauquelins (1974) have called "reference distributions" of trait-words for each planet.

Next, for each of the 199 selected words, the number of times a given word was applied to all the members of a given profession was obtained, still using the single count method. This might be called the "target-word frequency".

Thirdly, the proportion of all trait-words represented by each target-word frequency was calculated. That is, for each target-word, it was found what fraction of the entire word frequency was represented by the target-word frequency. This can be referred to as the "target-word proportion".

Finally, the expected frequency for each sector was provided by multiplying the appropriate reference distribution by the relevant target-word proportion. That is, the expected frequency for a given trait word in a given sector (for a particular planet and occupational group) is equal to the total number of words applied to people who were born when the planet was in that sector multiplied by the target-word proportion corresponding to the trait-word in question.

#### **EXAMPLE:**

Suppose one wants to calculate the expected frequency for a particular sector for MA at the birth of sportsmen described by the term "self-willed". First one

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counts how many times this term was applied to the entire collection of sportsmen, counting the term just once for each sportsman no matter how many times it was applied to each. This might yield a count of, say, 556. However, the total number of traits, of all descriptions, attributed to the entire sample of sportsmen was 6184. Thus "self-willed" is a sample of this entire collection representing only  $556/6184 = .0899$  of the total. This is the target-word proportion. Then, to find the expected frequency for this word for any given sector, one must multiply the total number of words belonging to that sector by .0899. Suppose that the sportsmen who were born when MA was in sector 14 were described by 62 words all told. In that case, the expected frequency for "self-willed" for sector 14 is  $.0899 \times 62 = 5.5738$ .

The final score for each sector (for each word, planet and occupational group separately) was obtained by subtracting the expected from the observed frequency for that sector. Clearly, this means that some sectors had positive, and others negative, scores.

The distributions were calculated for each professional group separately, as described above, in order to control for the fact that each of the professions has been found to be associated with an excess frequency in key sectors of one of the four planets. For example, SA tends to be in key sectors more often than expected at the births of scientists. Scientists also tend to be described by particular trait-words more often than do members of the three other professions. If the distribution of SA for these words were examined for all four professions together, then there would automatically appear to be peaks in the key sectors. When the distributions are studied for scientists separately, however, it is possible to determine, for any particular trait-word, whether SA tends to be present in each sector either more or less often than



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expected for the scientists as a group. In theory, each group should show the same result for a particular word. When group membership is controlled, one can test whether a given trait is consistently indicated by a given planetary position regardless of group membership.

**3.5. Harmonic Analysis.** Once the expected frequency distributions had been subtracted from the observed distributions for each profession separately, the four resultant sets of distributions were added together for the sake of harmonic analyses. For these analyses, the data were grouped into 100 sectors and then amplitudes and phases for the first 20 harmonics were computed.

**3.6.** The analysis then proceeded through the selection of single harmonics of one planet at a time for further scrutiny. It was very rare for any of the amplitudes from the harmonic analysis to be individually significant by Shimshoni's (1971) test. Consequently, alternative criteria for selecting harmonics had to be developed. A trait-word was taken to characterise the  $n$ th harmonic of a given planet if the amplitude of the  $n$ th harmonic for that trait/planet pairing was at least 25% greater than the mean amplitude of the 20 harmonics in the given analysis. For example, the word "energetic" would be taken to characterise the 4th harmonic of MA if the amplitude of the 4th harmonic of the distribution of MA for this word was at least 25% greater than the mean of the first 20 harmonics from this analysis.

**3.7.** Having discovered all the words that characterise the  $n$ th harmonic of a given planet, according to the method in step 3.6, the analysis then proceeded by selecting one phase at a time of this harmonic for further scrutiny. By convention, only 4 out of a large number of possible phases were considered and these phases were at (notional)  $90^\circ$  intervals, with the first phase having a peak at (notional)

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$0^{\circ}$  - except in the case of the 4th harmonic of MA where the position of the peak of the first phase was  $45^{\circ}$  (though the reasons for this departure were not clearly stated). The four arbitrarily chosen phases might be called the "ideal phases".

Another feature of this method that has not yet been made clear is what qualified a word for inclusion in one of these four ideal phases. Given that phases vary continuously between  $0^{\circ}$  and  $359^{\circ}$ , and yet a word must qualify for one of four discrete ideal phases, some criterion may have been used to decide when the phase of a given word was too discrepant from any of the four ideal phases to qualify for inclusion in any of them. Alternatively, since the four ideal phases could be said to cover the intervals,  $315^{\circ}-44^{\circ}$ ,  $45^{\circ}-134^{\circ}$ ,  $135^{\circ}-224^{\circ}$ ,  $225^{\circ}-314^{\circ}$ , a word could qualify for one or the other of these if its own phase fell within any of these limits. In one of his personal communications, Addey wrote that the phases of the words tended quite often to cluster together in four groups of their own accord, but he did not give details of this phenomenon.

3.8. At this stage the analysis was mostly complete and lists of traits associated with the peaks of each of four phases, for each of 20 harmonics, for each of the four planets, were available. For clarity of graphical presentation, the distributions for all of the words found to characterise a given phase of a given harmonic (of a given planet) were added together and all of the  $n$  segments of the  $n$ th harmonic were also added together to give a composite distribution.

#### 4. Methods of Evaluation.

It is not clear exactly how many of the possible planetary harmonics Addey studied in detail. With 20

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harmonics for each of four planets, 80 analyses are possible, and with four phasings for each of these, the full project would have entailed 320 separate results. In fact, Addey published results for only five harmonics in detail (including the four phases of each). These were the fourth harmonic of SA (Addey, 1979), the fourth of MA (Addey, 1979, 1980, 1981b), the third of MA (Addey, 1981b), and the first and second of MA (Addey, 1981a). He also published limited details of the sixth and fifteenth of MA (Addey, 1980).

Addey evaluated these results in a number of different ways. In this section, seven such methods will be first described, together with an example of each, and then appraised. Of course, it hardly needs to be said, the fact that harmonic waves emerged from these analyses is, on its own, no argument in favour of Addey's theory, no matter how large the amplitudes of the waves. The method of analysis guarantees this result. Words were selected to characterise the four phases of the various harmonics simply because they showed strong amplitudes in the given harmonic and because they had the required phasing. If they had been selected only after passing an appropriate significance test, the situation would be different.

**Method 1.** Synonyms and closely related words appear in each list for each phase of each harmonic of each planet, as expected.

**Example:** Phase 1 of the fourth harmonic of MA contains "energetic, vigorous, active". It also contains "audacious, courageous, combative".

**Appraisal:** This looks very good at first sight. However, we are given no indication how often such results might be expected by chance nor are we told how to evaluate the relationship between words appearing together when those words are not actually synonyms. Moreover, the results are not always as clear as in the example above. Thus, in phase

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2 of the second harmonic of MA, we find "clear" and "dreamer". But dreamers are usually considered to be vague and confused.

**Method 2:** Antonyms and words which are broadly opposite in meaning appear in pairs of lists for phases which are (notional) 180° apart, as expected.

**Example:** With the first harmonic of MA, MA above versus MA below the horizon show the following pairs of opposites (synonyms belonging to the same phase are bracketed together); Rough Vs (charming, gracious, with ease): (Solitary, shy) Vs. (gay, popular, natural, good fellow): Secretive Vs. abundant.

**Appraisal:** Again, we are not told how often such a result is to be expected by chance. Moreover, words appearing in opposed phases sometimes look more like synonyms than antonyms. For example, with the first harmonic of MA again, we find; (powerful, vigorous, dynamic) Vs. verve. With the second harmonic of MA, phase 1 Vs. phase 3, we find; (Straight, frank, true) Vs. (lucid, sincere, simple).

**Method 3:** The four phases of the nth harmonic together contain words which are consonant with the character of the nth harmonic, these characteristics having been predicted beforehand on the basis of previous investigations and of theoretical considerations concerning the (symbolic) meanings of numbers.

**Example:** The fourth harmonic had previously been thought to be concerned with "self-realisation" (Addey, 1979), whereas the third is concerned with "the ideal or formal cause of a thing" (Addey, 1981b). This prediction has been confirmed, Addey claimed, with the finding that the fourth harmonic of each planet does indeed show a process of self-realisation, the process for each planet being characteristic of that planet. By contrast, the third harmonic "shows the most ideal expression of a planetary position" (Addey, 1981b). Further confirmation is derived from the finding that

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"there is nothing in the third harmonic (of MA) which corresponds in any way to the choleric temperament shown in phase 1 of the fourth (of MA)" (Addey, 1981b).

**Appraisal:** This form of evaluation is too ad hoc to carry any weight at all. If definite characteristics had been clearly predicted beforehand, and the predictions had been confirmed by these results, then we might have some grounds for confidence in the theorising. As things stand, this line of reasoning has far more the character of interpretation after the fact than experimental corroboration. One is reminded of Meehl et al.'s (1971) warnings about "...the malignant influence of human ingenuity to concoct ad hoc concepts, tailor-made to fit a finite set of facts."

**Method 4:** The four phases of each harmonic, when taken in order, show graduated progressions which are psychologically meaningful.

**Example:** "In the fourth (harmonic) of Saturn we see the process of self-realisation through taking responsibility and 'making one's mark' in the world...In the case of Saturn's fourth it is...the story of the great dictator who nearly always starts life under some kind of deprivation or sense of inferiority..." (Addey, 1979).

**Appraisal:** This form of evaluation seems even more ad hoc than evaluation type 3 and the same comments apply here but with greater force.

**Method 5:** Confirming instances of the evaluations outlined in methods 3 and 4 above are found in the planetary positions and corresponding lives of famous people.

**Example:** People born with MA positioned just before the border of one of the odd-numbered houses of traditional astrology tend to see life in tragic terms, thus confirming the idea that the sixth harmonic of MA is concerned with "the pessimistic/optimistic contrast in character" (Addey,

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1980). For example, there is Jean Paul Sartre, Albert Camus, Maupassant and Malarme.

**Appraisal:** The usual strictures against seeking confirming instances after the fact apply here. In this case there is the additional danger of introducing circularity into the argument. For example, four of the celebrities who are used to illustrate the MA/6th harmonic tendency to see life in tragic terms are French writers and thus are probably featured in the Gauquelins' collection of writers from which Addey derived his results. However, it may be that such cases were only introduced for illustrative purposes with no intention of providing support for the results.

**Method 6: Split-half replicability:** When the planetary distributions for the trait-words which characterise a given phase of a given harmonic of a planet are divided into two independent groups (roughly halves), according to the occupations of the subjects, the distributions for the two halves show the same waves with much the same phasings.

**Example:** The distribution for MA for the words "sad, reserved, solitary, melancholy, worried, poor" shows a sixth harmonic phased at approximately  $0^{\circ}$  and it shows the same wave, with the same phasing for actors, scientists and sportsmen combined (word count = 310) as it does for writers alone (word count = 311) (Addey, 1980).

**Appraisal:** This is by far the best kind of evidence of all favouring Addey's basic thesis. Similar split-half comparisons have also been presented graphically for two phasings of the first harmonic of MA (Addey, 1981a) and one phasing each of the fourth (Addey, 1979) and the fifteenth (Addey, 1980) harmonics of MA. Unfortunately, Addey never published the results of statistical analyses of such comparisons. Such evaluation is very easy; one only needs to calculate the correlation between the two independent halves and then discover what probability is associated with the coefficient. It is possible to estimate what these coefficients are for the results that have been presented

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by reading off the scores for each sector from the graphs that have been published. The table below shows these estimates.

PLANET.	HARMONIC.	GROUPS COMPARED.	SPLIT-HALF CORRELATION		
			r.	df.	p.
MA	6th	Actors Vs. sportsmen + scientists + writers.	.99	4	<.01
MA	1st phase 2	Sportsmen + scientists Vs. actors + writers.	.92	7	<.01
MA	1st phase 4	Actors Vs. sportsmen + scientists + writers.	.43	7	NS
MA	4th	Sportsmen + writers Vs. + scientists + actors.	.82	7	<.01
MA	15th	Actors Vs. sportsmen + scientists + writers.	.99	8	<.01

It can be seen that four of these five coefficients are highly significant, though the fact that the figures were estimated from graphs must diminish our confidence in them. Another factor that detracts from these results is that they may have been selected. Though Addey (1979) states, "...I have been able to show the result of breaking down the results at each phase into different groups...and to show that the results are consistent right across the board", he never published a table giving these results. Considering that such a table is crucial to the evaluation of all this work, this is a curious omission.

**Method 7:** Tests of specific predictions derived from the analysis of the Gauquelin data with new samples of subjects and alternative methods of measurement.

**Example:** Only one such test has been attempted so far. Addey (1981b) devised a single question that was designed to measure a personality dimension similar to tough-mindedness. This was intended as a test of the finding that those born with MA above the horizon are cool, reserved and critical compared with those born with MA below the horizon, who were found to be trusting, responsive and soft-hearted. This self-report item was

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answered by 127 subjects. Once those with MA in houses 5, 6, 7, and 12 had been discarded, because for them MA was not clearly above or below the horizon, 84 subjects remained (personal communication). Their results can be summarised in the following contingency table;

		TYPE OF ANSWER GIVEN.		TOTAL.
		Soft	Hard	
MA IN RELATION	Above	13	23	36
TO HORIZON.	Below	27	21	48
TOTAL.		40	44	84

The value of chi-square for this table is 2.59, which is not significant, although the result is in the predicted direction.

In a later, post hoc analysis (personal communication), Addey excluded those Ss whose reply to the question had shown no strong feelings either way. In this case there are 69 in the analysis and the results are as follows;

		TYPE OF ANSWER.		TOTAL.
		Soft	Hard	
MA IN RELATION	Above.	13	21	34
TO HORIZON.	Below.	27	8	35
TOTAL.		40	29	69

The value of chi-square associated with this table is 9.18, which is highly significant, though the result is rather dubious owing to the post hoc exclusions. Nevertheless, considering that the self-report measure consisted of only one question, and therefore would be expected to be subject to considerable error of measurement, and considering that the sample was relatively small, the experiment can perhaps be taken as "promising", even very promising.

### 5. Conclusions.

Given the theory of harmonics, Addey's method of analysing the way in which traits vary with the diurnal positions of the planets appears to be satisfactory, though the method he used to derive the four "ideal phases" for each harmonic



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requires elucidation. Problems with this work arise when the results of the initial analyses are evaluated, that is, when one tries to establish whether the harmonic waves that Addey identified are likely to have arisen by chance. The fact that harmonic waves emerged from the analyses is, on its own, no evidence in favour of Addey's theory because words were selected to characterise the various harmonics after examination of the data. In this review, we have also seen that three of the seven methods of evaluation used by Addey carry no weight because they are ad hoc interpretations rather than rigorous appraisals (methods 3, 4 and 5). It may be that it is doing Addey an injustice to suggest that he intended these as anything but tentative interpretations. However, he devoted much space to them, so it is well to be clear about their status .

The remaining four methods of evaluation are all promising though none of them has so far been developed sufficiently to allow objective assessments. According to the theory, synonyms should be found amongst the words that characterise particular harmonics and antonyms should be found characterising the opposite phases of the various harmonics. It should not be difficult to test these expectations systematically and the data presented so far suggest that they may well be corroborated, though no statistical tests have been reported.

Probably the most straightforward kind of test that could be conducted on these data would be to calculate what has been called the "split-half replicability" of the harmonics. Estimates of the replicability of five harmonics were reported above and it was found that four of them gave remarkably high correlations which were highly significant. Since the data on which these tests were based appear to have been selected, one cannot have great confidence in the results. However, if the number of possible sets of data from which these sets were selected is not great, these

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results on their own could amount to positive confirmation since they are so unlikely on the basis of chance variation.

Finally, Addey's findings could also be tested quite easily by means of self-report questionnaires administered to fresh samples of subjects. On the only occasion when this has been attempted so far, surprisingly promising results were obtained, especially considering that the measure that was employed consisted of only one question.

Some remarkably strong evidence was presented in chapter eight (section 8.8.1) above showing that personality varies continuously with the diurnal positions of five of the planets. It was noted there, however, that there was no obvious pattern to the variations that were detected and it was suggested that this might be because the personality characteristics that were investigated were complex "bundles" of traits (ie. collections of traits characterising the typical personalities of four occupational groups). With his theory of Harmonics, and with the analytical method that he has developed, Addey provided one possible means of discovering underlying patterns in these variations. Most unfortunately, he died before he was able to complete his investigations. However, the results that he presented are promising and deserve to be followed up.

THE VALIDITY OF ASTROLOGICAL THEORY  
AS APPLIED TO PERSONALITY,  
WITH SPECIAL REFERENCE TO THE ANGULAR SEPARATION  
BETWEEN PLANETS.

by

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Thesis submitted for the degree of Doctor of Philosophy.

Goldsmiths' College, London University.

March 1984.

## THE ACCURACY OF ASTROLOGERS' KEYWORDS

### Part II The Origin of the Planetary types

by

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#### ABSTRACT

After outlining briefly a control study for the analysis presented in Part I, this article discusses four theories of the possible origins of the planetary types. The first three theories are often upheld by astrologers, by their critics, or by both, but all of them, it is argued, are unsatisfactory as they stand. The fourth theory, which is new in some respects, is based partly on widely accepted historical data and partly upon speculations derived from scientific methodology. It is claimed that this theory makes it possible to construe the astrological enterprise, from its beginnings to the present, as far more rational than is usually supposed by astrologers and their critics alike.

KEYWORDS: *Astrology, planetary traits, Babylonians, history of science, philosophy of science*

#### INTRODUCTION

Part I of this article<sup>1</sup> presented a re-analysis of some recently published data from a study of astrologers' keywords for the planets. The study was by *Françoise Gauquelin*<sup>2</sup> who, it was argued, seriously underestimated the significance of some of her results. It was shown that chi-squared analyses - the agreement between 14 astrologers and the *Gauquelins'* independently derived lists of typical traits for four of the planets - yield extremely significant results for all of the astrologers, both ancient and modern. The aim of the present paper is to discuss this remarkable result, to attempt to explain how astrologers come to possess this knowledge, or at least to outline some possible approaches to such an explanation.

Before beginning this discussion, however, I would like to report briefly on a study I have run recently to supply control data for the analysis in Part I. In that analysis, expected frequencies were calculated on a theoretical basis. This was, perhaps, somewhat risky since the calculations did not take account of the fact

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#### INTRODUCTION

Part I of this article<sup>18</sup> presented a re-analysis of some recently published data from a study of astrologers' keywords for the planets. The study was by *Françoise Gauquelin*<sup>8</sup> who, it was argued, seriously underestimated the significance of some of her results. It was shown that chi-squared analyses - the agreement between 14 astrologers and the *Gauquelins'* independently derived lists of typical traits for four of the planets - yield extremely significant results for all of the astrologers, both ancient and modern. The aim of the present paper is to discuss this remarkable result, to attempt to explain how astrologers come to possess this knowledge, or at least to outline some possible approaches to such an explanation.

Before beginning this discussion, however, I would like to report briefly on a study I have run recently to supply control data for the analysis in Part I. In that analysis, expected frequencies were calculated on a theoretical basis. This was, perhaps, somewhat risky since the calculations did not take account of the fact

that, due to implicit or explicit psychological knowledge, we know that certain traits go together. Even somebody who doubted that astrologers had any knowledge about the planets at all would assume that astrologers associated batches of psychologically linked traits, rather than individual traits, with the planets, even though the associations between traits and planets might be random.

In the control study, then, portions of the *Gauquelins'* eight lists of typical traits for the planets (lists for MO, MA, JU, & SA, and their opposites, but excluding VE), in scrambled order, were given to 16 subjects who were asked to arrange the trait words into eight groupings of their own such that at least some of the groupings formed psychologically coherent portraits. The subjects were given no clues that the exercise had any connection with astrology. Once the subjects had formed these groups to their satisfaction, the groups were paired with the planets in an arbitrary fashion and the numbers of 'hits' and 'misses' were calculated as in the study in Part I. It was found that the proportion of the total number of matches that were hits was .216. In Part I, the theoretically calculated proportion was .212. These two proportions do not differ significantly and thus increase our confidence in the results in Part I<sup>+</sup>.

#### DISCUSSION

In what follows I will outline three theories that are frequently used to explain how astrologers came by their descriptions of the planets' influences. They have not always been used to account for astrologers' knowledge of the influences, of course, because it is often assumed that astrologers have no such knowledge - they only have descriptions of what they imagine the influences to be. The position adopted here, by contrast, is that the *Gauquelins* have provided good evidence that at least some of the planets do indeed exert an influence on human personality, and *Françoise Gauquelin's* study<sup>8</sup>, together with the re-analysis provided by the present paper, give strong support to the idea that astrologers have been quite accurate in their descriptions of those influences. It may be that these views are mistaken - after all *Michel Gauquelin's* personality studies, in contrast to his career studies, have received little by way of replication so far. Yet the fact that his personality studies are in such good agreement with astrological opinion is a remarkable finding which, it seems, is most easily explained by assuming that both stem from a real knowledge of real planetary influences. This view may eventually turn out to be faulty but it appears to be the most reasonable interpretation of the evidence at present.

The three theories of the origin of the planetary typology that I intend to discuss are all, in my opinion, unsatisfactory as they stand. I shall outline each in turn and point out their inadequacies. Afterwards I shall offer a theory which

makes sense of many of the 'facts' at our disposal and which allows us to construe the astrological enterprise, from its beginnings to the present day, as far more rational than is usually supposed - by astrologers and their critics alike.

In the following discussion of the first three theories, I shall use *Françoise Gauquelin's* descriptions of those theories as they appear on page 22 of her book<sup>8</sup>.

(1) "...the present astrological knowledge is only a deformed remainder of an elaborate science revealed to the first astrologers by higher intelligences from elsewhere."

By some accounts these 'higher intelligences from elsewhere' were non-human intelligent beings, presumably from space. By other accounts they were gods or angels or, depending on your moral outlook, demons. The trouble with this theory is that, if they are taken to be intelligent aliens, then we have not accounted for the origin of the typology at all because we have not explained how these aliens got their knowledge. And in any case it is not clear how this theory could be independently tested. This is also the problem with the theory if the intelligent beings are taken to be spiritual; in the absence of any independent test, not only of the ability of spiritual beings to teach astrology, but also of their very existence, we are left with only a circular explanation.

A similar theory to the above suggests that the ancient astrologers acquired their knowledge paranormally. I call this explanation similar not only because it appeals to the marvellous and mysterious, but also because it appears to be circular. In order to avoid circularity in an explanation, the explicans (the statement of the explaining laws and conditions) must draw support from reasons that are other than, and independent of, the explicandum (the thing to be explained). Perhaps one might wish to argue that ESP has been independently investigated in many ways, yet I am not convinced by this. Which particular psi ability is to be invoked? Surely telepathy is no good since, prior to the establishment of the typology, there was no one's mind to read. Clairvoyance is equally dubious since it is difficult to imagine what state of affairs could have been paranormally perceived which was not available to ordinary perception. That leaves precognition, which is possible, I suppose, but which would presumably require that the ancient astrologers somehow saw the results of modern investigations which were themselves, in turn, inspired, albeit indirectly, by the 'insights' of the ancients. For myself I would prefer to find a less mind-boggling explanation, if possible, and only invoke ESP if all else fails.

(2) "The origin of the planetary symbolism seems related to the aspect (= 'appearance?') of the planets when we observe them in the sky...The apparent movements of the planets are also responsible for many keywords traditionally attached to each celestial body."

The idea here seems to be that the originator(s) of the planetary typology started out with the simple theory that the planets influence human personality

and then, to discover what these influences are, they took note of the gross appearances of the planets and interpreted these appearances analogically in terms of personality characteristics. *Françoise Gauquelin* gives a typical explanation of how the ancients were supposed to have thought: "...the large and brilliant Jupiter suggests power, the red Mars suggests fire and war, the light blue Venus suggests tenderness, the ashy yellowish Saturn suggests remoteness and old age, etc."

This explanation is a great favourite amongst those who think that the whole of astrology can be dismissed as a typical product of the muddled, superstitious, irrational human mind prior to its illumination by science a mere 400 or so years ago. It may be that many astrologers have tried to give a rationale for their beliefs through this analogical mode of reasoning but it does not follow that this is how the Babylonians proceeded initially. The analogies may have been put forward as a defence of the typology, even by the Babylonians themselves, but it is implausible that the analogies alone were the source of it. Each of the planets has many characteristics visible to the naked eye, so how were the Babylonians to know which were the relevant ones? The Moon is not only changeable in shape and brightness but it also moves through the zodiac very rapidly and yet speed is not attributed to the Moon but to Mercury. Venus (and other planets to some extent) varies a good deal in visible brightness and yet is not thought to be changeable in character. The Sun, and also the Moon, are glaringly different from the planets in appearance and yet the temperaments attributed to all these bodies are of much the same order. Jupiter is comparatively large and bright and brightness may perhaps suggest power but Venus appears even larger and brighter. And as for the Sun...

This theory is unsatisfactory enough even if one supposes that the astrologers' descriptions do not correspond with the facts. It still requires us to believe that the learned men of Babylonia proceeded in a completely unsystematic, inconsistent manner. It suggests that the planets were judged by a hotch-potch of different types of characteristic, the Moon was judged by its phases, Mars by its colour, Jupiter by its brightness or size, Saturn by its apparent speed and so on. The theory becomes simply absurd as soon as we have evidence that the astrological descriptions are accurate. We are then asked to believe that this chaotic process of judging by appearances alone is actually a route to knowledge.

(3) "(The planetary symbolism)...was slowly elaborated through constant observations of the possible effects of the cosmic surroundings upon mankind."

I think this theory is also unsatisfactory but I wish to make it quite clear that it is only unsatisfactory when the word 'observation' is interpreted in a particular way, or within a certain philosophical context. Observation also plays an important part in the theory that I will put forward later but it plays a different part to that which it has here. As I understand her, *Françoise*

*Gauquelin* believes that astrology, and any other science for that matter, could have been built up from observations. Our knowledge consists either of accumulated perceptions or else of assimilated, sorted, and classified perceptions. Either way our knowledge of the external world fits itself together like a self-assembling jigsaw puzzle. *Michel Gauquelin* also seems to be drawing on this view when he says: "It is even possible that among all the false intuitions based on doubtful analogies, the Chaldean priests could have observed certain facts about the mode of influence of the planets."<sup>9</sup> I may be misrepresenting the *Gauquelins* but these two quotations from them suggest that they adhere to strict empiricism, or what *Popper*<sup>15</sup> has called "the bucket theory of the mind". According to this theory our minds resemble a bucket in which perceptions and knowledge accumulate. The perceptions gain entry to the mind and once there undergo some automatic process - perhaps they are classified systematically, perhaps an induction process takes place - the end result of which is knowledge of a universal law of Nature. We have observations and they look after themselves. (In some versions of this theory we are even encouraged to interfere as little as possible with the process of knowledge accumulation because interference always introduces error).

*Popper* regards this 'bucket theory' as completely unsatisfactory and I am convinced by his arguments. While outlining his alternative, which he dubs 'the searchlight theory', he points out that, "...observation is a process in which we play an intensely active part. An observation is a perception, but one which is planned and prepared. We do not have an observation but we make an observation. An observation is always preceded by a particular interest, a question, or a problem - in short, by something theoretical... This is why observations are always selective, and why they presuppose something like a principle of selection." Add to these comments *Popper's* negative solution to the 'Problem of Induction' (see, for example, *Popper*<sup>16</sup>) and it can be seen that astrology could never have been built up from observations. Observations must have played much the same part as they do in all science, that is, as tests of hypotheses in the course of the critical examination of those hypotheses. It was, almost certainly, never possible to stage clear and decisive tests of astrological hypotheses until very recently, but that is another matter and will be discussed later. The important point here is that it is inconceivable that the Chaldean priests simply stood on their ziggurats and had observations which, in the fullness of time, arranged themselves automatically into astrological knowledge. Observations must have been made because of the intuitions based on analogies, not in spite of them, as *Michel Gauquelin* seems to suggest.

(4) Having dismissed three theories of the origin of the planetary typology, I now come to the fourth, which I shall preface with a few remarks. The kernel of this theory is not new, it was put forward by historians of religion in the early part of this century and may have been suggested many times before and since.

However, I have never seen it treated in the context of scientific discovery. Historians, basing their opinions on historical and archeological records, have outlined the way in which the typology probably arose, but they have generally regarded this typology as make-believe. For example, *Franz Cumont* called astrology, "...that desperate error on which the intellectual powers of countless generations were spent".<sup>3</sup> Yet we now have some evidence that gives strong support to some of the astrological hypotheses or, to put this another way, the activities of the founders of astrology seem to have led to real knowledge about the way the world is organised. If this is so, then it is about time that those activities were reappraised. The theory that follows depends largely on facts which are already well-known and widely accepted. What is new about it is, I believe, that the facts are presented in such a way that the activities of the ancient astrologers appear very similar to those that take place in any scientific research programme.† In other words, I shall be giving a rational reconstruction of the development of one part of what I regard as a scientific research programme. This means interpreting the facts in terms of philosophy of science and, where there are gaps in the historical record, it means speculating about what may have taken place in the past, the speculations being guided by the philosophy

I can imagine that some people might look askance at the idea of interpreting historical facts in terms of scientific methodology, or anything else for that matter. It is often assumed that history is just a question of presenting facts systematically and any attempt at interpretation is likely to introduce distortion. This view is similar to the 'strict empiricist's' view of science discussed above and suffers from similar misconceptions. The historian must choose the problems he deals with from an indefinitely large number of possible problems. Willy-nilly he also interprets the facts he presents, the interpretations normally being conditioned to a large degree by theoretical considerations which led to the choice of problem in the first place. Since this process is only as good as the interpretive system which is brought to bear on history, it is important to be explicit on this point‡. In the presentation that follows, astrology will be taken as a 'scientific research programme'.

†The term 'scientific research programme' comes from *Imre Lakatos* and makes reference to his "Methodology of Scientific Research Programmes" (see *Lakatos*, 1970<sup>12</sup>), one of the leading contemporary philosophies of science. Astrology has already been analysed in terms of this methodology by *Curry*<sup>4,5</sup> and *Startup*<sup>17</sup>.

‡I would like to draw attention to two recent discussions of the interaction between history of science and philosophy of science, one is by *Lakatos*<sup>13</sup>, the other by *Worrall*<sup>19</sup>.

### Babylonian Theory

Bearing these prefatory remarks in mind, the fourth theory of the origin of the planetary typology can be introduced in the words of *Franz Cumont*, the historian of religion, who wrote in 1912: "By a logical and fully justified development of primitive belief, which attributed to the Sun and Moon a powerful effect upon the earth, a preponderating influence over the determination of destiny has also been assigned to the five planets...They were therefore identified with the principal figures of the Assyrio-Babylonian pantheon...Thus...divinities assumed a double character, the one traditional and based on ancient beliefs, the other adventitious and inspired by learned theories."<sup>3</sup>

This is a theory about the Babylonians' theorising and clearly suggests that the original astrologers began in the same manner as scientists normally do - they started out with a bold conjecture. I intend to argue that they also proceeded in the normal manner, that is, by trying to put their conjecture to the test. But first, a few comments about this initial idea.

It seems almost incredible but not one of the three popular theories discussed above makes anything of the fact that the planets are named after the gods, that they were so named right from the Babylonian beginnings and, in a sense, have always been named after the same gods. According to *Cumont* again: "...the names of the planets which we employ to-day, are an English translation of a Latin translation of a Greek translation of a Babylonian nomenclature."<sup>3</sup> Presumably we can take 'translation' here to mean that each successive culture did its best to find a member of its own pantheon which corresponded in character to the respective god of the earlier culture. Although this is widely accepted by students of astrology, theories two and three above (and possibly number one also) seem to suggest that the influences of the planets were discovered prior to their receiving names, as if the matching between god and planet was based on similarities between the gods' attributes and the characteristics of the planets which had been independently derived. But the process took place the other way round. The Babylonian gods 'existed' long before their names were also given to the planets. The Babylonians theorised that the planets were the gods, or symbolised the gods, and therefore had the same influence over the terrestrial affairs that the gods in their pantheon were supposed to have. Thus, to discover what influences each of the planets had, all they had to do was to find the correct pairing of god and planet.

This theory about the Babylonians' theorising not only makes the typology an intriguing and very bold conjecture, some of whose fundamentally important social, ethical, and political implications have been discussed by *Cumont*<sup>3</sup>, it also gives observation a more credible role to play. In this account, observation was used to check the appropriateness of the god-planet pairings that were



proposed and, where the initial pairings proved unsatisfactory, it may have promoted a new round of conjectures and observations. Moreover, this theory even leaves some room for judging by appearances. For example, if you have a belligerent god of war in your pantheon and you observe a red planet in the sky, perhaps these two belong together. Perhaps the Babylonians' theory did include the idea that the planets' appearances should correspond somehow with the gods' characters. It is even possible that the reason why the Gauquelins have been unable to corroborate the astrologers' ideas about the Sun and Mercury is that, with these two bodies, the method failed - the gods matched with these two were wrong all along! Yet it seems unlikely that this judging by appearances represents the whole story. Surely the Babylonians would have tried to check up on their scheme by making empirical observations in the light of the rest of their astrological theory. They may have even revised their ideas about the nature of their gods as a result of such empirical checks. However, in view of the weakness of the planetary influences, when taken singly, it is not clear how such checks could have been made. Unfortunately it is at this stage that the historical record lets us down. I do not know of any evidence bearing upon this crucial stage of the development of astrology and must resort to speculation myself.

### Astrological Observations

It is possible that, in the distant past, either astrological influences were stronger than they are now or else people were more susceptible to them. Perhaps these two amount to the same thing. Obviously this conjecture is ad hoc, we have no reason to expect it to be true apart from it being difficult to imagine how any astrological influences could have been observed in the past, even in the light of a theory, if they were as weak then as they seem to be now. Taken singly, planetary influences are so weak now that clear evidence for them has only been gained with the help of statistics, well-kept public records, accurate time-pieces, very large samples, and an experimental method. If the influences had been very much stronger in the past, so strong in fact that every individual had a character corresponding to his rising or culminating planet, observations would have been easy to make. However, we have no independent evidence that this was so. The theory seemed worth mentioning only as a possibility and as a reminder that it is the very weakness of the influences that make it so difficult to account for astrologers' accuracy.

The great problem in observing planetary influences is that each horoscopic factor gives off only a weak signal which is embedded in noise. The great advantage of statistics in astrological work is that when used properly they allow us to filter out the noise and thus leave the signal exposed. But is there any other way of filtering out the noise? I want to suggest now that there might be

another way and that this is connected with the way in which astrological communities typically operate. They are composed of people who make a particular study of a restricted domain and these people not only study their topic with great application but also feed back the results of their thoughts and observations to the group which discusses their ideas at length<sup>†</sup>. New ideas are produced in profusion: the members of the group take the ideas and test them against their own experience: most of the ideas are ditched sooner or later without anyone being able to say exactly when they were discarded nor why, but some of them are preserved: the body of opinion evolves ever so gradually and it is rarely certain who was responsible for the changes, nor is it ever clear what the present state of the art is: at any one time the doctrine comprises a mixture of time-honoured tradition plus the latest ideas that are being toyed with by the current practitioners: nothing is settled, nothing clear, all is in a state of flux, all is 'intuitive'.

While many sceptics might agree that this is how astrologers have generally behaved, they are unlikely to allow that this could be a route to genuine knowledge. However, this sort of process has been regarded as a possible source of knowledge by some modern epistemologists. For example, *Walter Buckley*, has said: "From the view of science as simply a recording and logical organisation of external data we are coming to recognize it as a fully morphogenic process, in which the socio-cultural aspect may act, not only as a distorting process, but also as a purifying, noise-filtering device by gradually filtering out the idiosyncratic, the purely subjective, and the empirically false, and leaving a residue of the relatively verified and true."<sup>1</sup>

Perhaps this notion of a 'societal noise filter' can be made clearer by giving an example from a non-astrological field, in this case from folk medicine. Attempts to use substances derived from one organism to inhibit or kill others began at least 2,500 years ago when the Chinese became aware of the curative properties of the mouldy curd of soya beans and used this substance to treat boils, carbuncles, and similar infections<sup>2</sup>. Similarly, extracts of lichens have been used from early times in folk medicine as a dressing for wounds and in treating tuberculosis<sup>2</sup>. It was not known why these extracts were helpful and the phenomenon of antibiosis was not recognised. Moreover, if the true curative properties of these substances are regarded as 'signal', then the signal given off must have been greatly obscured by noise, that is, the 'noise' created by

<sup>†</sup> *Morris Jastrow*<sup>1</sup> another historian of religion, had this to say about the early astrologers: "An astral theory of the universe is not an outcome of popular thought, but the result of a long process of speculative reasoning carried on in restricted learned circles. Even astrology, which the theory presupposes as a foundation, is not a product of primitive popular fancies but is, rather, an advanced scientific hypothesis."

many unsuccessful applications of these medicines. Many a wound must have become septic, many a case of tuberculosis must have proved fatal, despite the use of a medicine that had some real efficacy. Yet that efficacy was still detected somehow, without the aid of controlled experimental analysis. Possibly it was detected by the 'societal noise filter'.

When the three planets discovered in modern times are considered, it seems very probable that the main method used to discover their influences has been described above. Astrologers, and their critics also, often write as if these characteristics were derived from the attributes of their eponymous gods but this seems unlikely except, perhaps, with Pluto<sup>†</sup>. Uranus, in Greek mythology, was a rather vague, ill-defined sky-god, consort of Gaea; he was chiefly famed for having been emasculated by Cronus, one of his sons.<sup>10</sup> There is little in this that could lead to the striking characteristics attributed to Uranus the planet. He was often depicted as a bewildered old man<sup>10</sup> - not at all like the original, inventive, and strong-willed planet. Neptune was a rather slight deity, with ill-defined duties, in early Rome<sup>14</sup>. When he was later identified with Poseidon, he grew in stature and became lord of the maritime empire. Being associated with the sea may be appropriate for a planet that is nebulous and dreamy, but it should not be overlooked that Poseidon was of a surly, impetuous, and quarrelsome nature, much given to causing earthquakes when in a rage<sup>14</sup>. And in any case, isn't the sky just as nebulous and dreamy as the sea?

Rather than the characteristics of these modern planets being derived from the attributes of the gods, the gods were probably used only to give a starting point for discussions and for the trial and error process. But whichever way it happened, there should be enough documentation of the relevant facts to make speculation unnecessary. Hopefully, someone will write this history soon. This could provide a most important test of the theory of astrological observations outlined here. However, it would be really telling if some strong evidence could be found that the astrological descriptions of these planets are factual. As things stand, *Françoise Gauquelin*<sup>8</sup> has revealed only very slight evidence that these planets have influences resembling those attributed to them by astrologers.

One major potential weakness of this theory of the 'societal noise filter' is that it does not explain why the postulated method of observation worked in some cases but not in others. It may have been more or less successful with four or five of the 'ancient' celestial bodies, but *Françoise Gauquelin's* study<sup>8</sup> showed almost no signs of success with Mercury. Even more damaging is the total

† A popular modern astrological doctrine maintains that newly discovered planets are inevitably given appropriate names, even though the names are bestowed by astronomers nowadays. This is usually taken as one more example of synchronicity.

absence of any clearly detectable (astrological) influence from the Sun, in either the diurnal or the ecliptic circles<sup>6</sup>. It is hardly good enough to claim that a certain method provides good observational data at times if one cannot also explain its failure at other times. It is true that folk medicine has also frequently failed (if its aim is taken to be the discovery of efficacious treatments), as in its faith in leeches, lancets, and blood-letting, but this counts as no excuse; these 'errors' are also in need of explanation. It is possible that this method is helpful only when there is a signal to detect, and even then it only works slowly and unsurely, but it is poor at indicating the total absence of a signal. That is, if theory leads one to expect a signal where in fact there is none, this method of observation could not easily indicate this fact. However, even if this were the case, it is not easy to arrive at clear predictions (or rather, postdictions) as to what should be found in the historical record. If astrologers were looking for indications of influences where none existed, on the one hand you might expect that their opinions about those influences would waver a good deal, because there would be no signal to anchor their speculations, but on the other hand you might predict less wavering, because more reliance would be placed on the word of authority. The fluidity of astrological speculations must often have been crystallised by the ex cathedra pronouncements of the 'big names'.

#### CONCLUSION

In this general discussion I have briefly outlined four theories of the origin of the planetary typology and have dismissed the first three as unsatisfactory. Some people may say that my discussion of them has been all too brief and my dismissals too facile. I then proceeded to offer a theory which, to my mind, is far more adequate. This was in two parts. The first part, which is supported by some historical data, suggests that the beginnings of the typology originated in a conjecture for which the Babylonians are renowned, the conjecture, that is, that there is a pattern to the will of the gods which may be discovered by a study of the gods' manifestations, or symbols, in the sky. Throughout this discussion 'gods' has, of course, remained an undefined term - but one has to call a halt somewhere. The second part of this theory concerns the methods that could have been used to put the original conjecture to the test. This part is far more speculative. It takes its cue from the idea that astrology, beneath or alongside all its mystical, philosophical, and theological accretions, has the character of a scientific research programme. One consequence of this idea is that, if we look carefully enough, we will find evidence that astrologers tried to test their conjectures against the empirical data, and they would not have been put off by the impossibility of making clear-cut tests. Now this may seem very far-fetched. It will be objected that this portrays the Babylonians as far more rational and systematic than we know them to have been. One of my answers to this is

that the Babylonians' activities have never before been analysed in the light of the Methodology of Scientific Research Programmes, but only in the light of other (inferior) methodologies. As John Worrall wrote: "...a historian's perceptiveness may be improved by making explicit use of methodology. A methodology may supply the historian with a heuristic - not only with a set of problems, but also with a stock of conjectural solutions of them."<sup>19</sup>

I do not pretend that this discussion is in any way complete. An adequate treatment of the whole topic would require a far more extensive knowledge of the history of astrology than I can lay claim to and would demand far more space for its presentation than is available in a journal. The aim of this discussion is primarily to stimulate thought, to highlight problematical areas, and to suggest what types of further research are likely to be profitable. I shall be happy if it achieves nothing save to re-emphasise the importance of the critical evaluation (and re-evaluation) of theories.

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ASTROLOGERS' KEYWORDS FOR THE PLANETS:  
A NEW QUANTIFICATION OF THEIR ACCURACY

by

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### ABSTRACT

Previous attempts to quantify the agreement between astrologers' keywords for the planets and the Gauquelins' independently-derived lists of planetary traits have been marred by the use of less than ideal data. A fresh analysis, with new data and a different method, is presented here. The results show quite high, non-random agreement, especially for MA, SA, and MO, though arguments are also presented for regarding the measurements as only rough estimates. Improvement in astrologers' accuracy over time was anticipated but the evidence supporting it was slight.

KEYWORDS: *Astrology, planetary traits, Moon, Mars, Jupiter, Saturn, astrologers' keywords, personality description*

### INTRODUCTION

In 1980, Françoise Gauquelin<sup>7</sup> published a monograph that reported the results of several studies of the accuracy of astrologers' keywords for the planets. In the most important of these studies the 'character-traits method'<sup>12-15</sup> was used to test the keywords published by 10 renowned astrologers, and a planetary effect was found for most of the astrologers with MO, VE, MA, and SA. That is, the same method was used as had previously been employed by the Gauquelins in their investigations of the planetary temperaments<sup>12-15</sup> except that the keywords took the place of the lists of 'typical traits'. Significantly high frequencies, in the usual rising and culminating sectors of the diurnal circle, were found quite consistently for the four planets mentioned, but not with the others.

Although this was a good test of the accuracy of the keywords, in that it compared the astrologers' opinions directly with empirical data, Gauquelin<sup>7</sup> had reservations about it. She recognised that it was particularly susceptible to Type I and Type II statistical errors and that it tended to discriminate against those astrologers who used only a few keywords, especially if they were also unusual words. It gave undue weight to those words that occur frequently in the Gauquelins' trait catalogues and under-emphasised those that occur only rarely. Consequently, she devised a second test that would eliminate the inequalities of the first by giving equal weight to all keywords.

In Gauquelin's second test, the keywords were compared with the lists of 'typical' and 'opposed' traits for MO, MA, JU, and SA that had previously been compiled.<sup>12-15</sup> Agreements and disagreements between the astrologers and the Gauquelins — on the assignment of traits to planets — were plotted in a matrix and a measure of the degree of agreement was calculated. This measure, called 'proportion of coherencies', was the ratio of the number of agreements to the number of agreements and disagreements combined. It was computed for each astrologer separately, using his keywords for all 4 planets, and for each planet separately, using keywords from all the astrologers. It did not permit inferential tests, to see if

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the amount of agreement observed was greater than would be expected by chance, but it did provide a descriptive measure that could be used to compare the astrologers one with another and to estimate their comparative success with different planets.

However, 'proportions of coherencies' has been criticised by Startup<sup>19</sup> because it does not take adequate account of the agreement that is to be expected by chance alone. In its place Startup used a coefficient of agreement for nominal scales called Cohen's kappa<sup>2,19</sup> and also tested the significance of the agreement between the Gauquelins' and the astrologers' lists of traits by means of Chi-squared. Recently, this re-analysis has in turn been questioned by Gauquelin<sup>8,9</sup> on various grounds. Although she has raised no objections to the use of kappa itself, she has vigorously maintained that the expected value of 'proportions of coherencies' is 50%. She has not given any convincing justification for this figure and unfortunately it now emerges that the problems with the original study involve not only the expected frequencies but also the observed frequencies. The latter are misleading because Gauquelin did not deal adequately with the fact that the lists of typical traits are not mutually exclusive. She now reveals<sup>9</sup> that if a keyword appeared in one of the lists of typical or opposed traits, she did not proceed to check if it also appeared in another list, even though a high proportion of words feature in two or more lists. Thus the figures she gave for the number of words falling in each list are dependent upon the order in which the lists were checked. Gauquelin now specifies that the order was MO, MA, JU, SA, which, since it is an arbitrary order, means that the scores are also arbitrary to some extent.

Another reason for questioning Gauquelin's original study (and Startup's re-analysis<sup>19</sup> of the same data) arises from her use of the lists of 'typical' and 'opposed' traits as criteria against which to judge the validity of the keywords. It is important to note that these are lists of traits typical (or the opposite) of 4 professional groups rather than of the planets themselves. They were derived from descriptions of the typical writer, sports champion, actor, or scientist supplied by psychologists, educated laymen, and experts in the four fields. We have no assurance that each trait in these lists is typical of the planet to which it is assigned and there is good reason to be doubtful about quite a number of them, even insofar as they are supposed to typify the professional groups. For example, we find that 'headstrong, fervour, dreamer, and maniac' are said to typify the scientist<sup>13</sup> while the character *opposite* to that of the scientist includes 'alert, member of commissions, convincing, critical, not discouraged, eminent, original, and lecturer'! No doubt many of these anomalous entries came about because of the need to stick to an objective and inevitably inflexible method. Nevertheless, the lists are clearly not ideal for the present purposes.

Fortunately the Gauquelins have provided better criteria against which to judge the keywords. These are the lists of 'significant isolates'<sup>7</sup> which were derived by testing the distributions of the planets directly, using the 'character-traits method', for each word that is recorded at least 50 times in the traits catalogues. All such words that showed a significant planetary effect qualified for inclusion amongst the 'isolates'. Thus there is a good evidence that these words are genuinely associated with their respective planets. The main disadvantage with these lists is that they are comparatively short and few of the keywords match these trait-words exactly. However, the lists can be expanded with the help of a dictionary of synonyms without introducing any words with a different basic meaning.

If the 'significant isolates' are to be used as a criterion, however, it is important to recognise that the 'negative isolates' (analogous to the 'opposed' traits lists) contain many words that also appear in the lists of 'positive isolates'. The proportions of the negative isolates that appear somewhere or other in the lists of positive isolates are: MO .63; VE .52; MA .5; JU .7; SA .87; Total .67. This is, presumably, a natural effect, not an artefact. Nevertheless, the statistical tests that are needed for a proper analysis of the data require that the categories used are mutually exclusive. This means that many of the keywords would have to be dropped from the analysis if the negative isolates were used since the majority of them

would qualify for more than one category. Even if only the positive isolates are used, this problem does not disappear. The proportions of positive isolates that also feature on other lists of positive isolates are: MO .32; VE .31; MA .26; JU .23; SA .04; Total .20. Thus to keep the categories mutually exclusive, not only must the negative isolates be excluded, but all keywords that qualify for more than one planetary category must also be discarded.

The main aim of the present study was to measure the agreement between 10 astrologers' keywords for the planets and the Gauquelins' independently-derived lists of trait-words associated with the same planets. Because of the imperfections of previous studies, detailed above, this was done with fresh data and a modified method. A second aim was to test whether the agreement observed was likely to have arisen by chance, and a third objective was to look for evidence of improvement in the astrologers' accuracy over time. Gauquelin<sup>7</sup> felt that she had found such evidence in her original study but since the accuracy of her measurements is now in doubt, so must her evidence be. Startup<sup>8</sup> has outlined a theory of the origins of the planetary typology which entails, among other things, that improvement over time is likely though not inevitable. The present investigation provided an opportunity to discover what was in fact the case.

#### METHOD

The astrologers' keywords, minus the repetitions amongst any single astrologer's words for a given planet, were taken from the appendix to Francoise Gauquelin's booklet<sup>7</sup> and the Gauquelins's trait-words were taken from Table 7 of the same work – the 'positively significant isolates', hereafter referred to as 'the isolates'. Only 4 of the 5 planets which appear there were considered because this author was under the impression that the list for VE was only tentative although he has since learned that this is not so.<sup>10</sup> Also only 10 of the original 14 astrologers could be studied because the keywords for the other 4 have not been published.

Keywords for two of the astrologers – Ptolemy and Barbault – were recorded in French and so had to be translated before they could be compared with the isolates, which are in English. A small dictionary [P Forbes & M Ledesert (eds). *Harrop's New Pocket French and English Dictionary*. Harrop's, London, 1964] was purposely used so that only a limited number of the most common translations would be generated. This done, all the keywords were compared with the isolates and exact matches were recorded without further ado. Whenever an exact match could not be found, *Roget's Thesaurus*<sup>4</sup> was consulted for synonyms in the following strict manner. The thesaurus is organised into heads and sub-heads with synonyms and closely-related words gathered under the sub-heads. If a sub-head could be found that contained a keyword and an isolate, the keyword was counted as belonging to the same planet as the isolate. Sometimes two or more isolates from different planetary lists were found under the same sub-head along with a keyword. In that case the keyword scored in two or more planetary categories. If no such match could be found at all, the keyword was dropped from the analysis as having an unknown relationship with the planets. A record of all these matches, and the sub-heads under which they occur, has been kept and is available for inspection.

With the procedure given above, some keywords qualified for inclusion in two or more planetary categories. All such words were discarded from the analysis. This was necessary because Cohen's kappa,<sup>2,18</sup> the test chosen for the measurement of agreement, requires all the categories to be mutually exclusive. This step is also justified theoretically, however, since a word that describes the influence of more than one planet cannot be typical of any planet.

The total number of keywords used by the astrologers, not counting repetitions amongst a single astrologer's words for any one planet, was 1239. Of these only 563, or 45%, were retained for the analysis of agreement. Of the eliminated words, 517 (42% of the total) were discarded because they could not be matched with the isolates, even with the help of Roget, and 159 (13% of the total) were discarded because they qualified for more than one planet.

A secondary aim of this investigation was to test whether the degree of agreement between the astrologers' keywords and the Gauquelins' lists was greater than would be expected by chance. Ideally this would be done by testing the significance of kappa, the coefficient of agreement. An approximation to the standard error of kappa has been provided by Cohen<sup>2</sup> but unfortunately this approximation is only adequate when the sample size is large (ie.  $N \geq 100$ , according to Cohen). Since none of the astrologers has this many words to describe individual planets and only one astrologer has over 100 words to describe all 4 planets combined (after discarding words), an alternative test had to be devised. This test involved applying chi-squared in the following manner.

Those of the astrologers' keywords that could be matched with the isolates were classified as either 'hits' or 'misses', depending on whether they belonged to a target or a non-target list respectively. Then, all words that qualified as both a hit and a miss were dropped from the analysis but a word that was a miss twice or thrice over was retained. This procedure differs slightly from the one adopted to calculate kappa. For kappa, four planetary categories were used and each word had to qualify for only one category. For chi-squared, on the other hand, only two categories – hit and miss – were used. This collapsing of categories was necessary because one of the requirements of chi-squared is that the expected frequencies should equal at least 5 when there is only one degree of freedom. This requirement meant that the planets could not be treated separately but instead each astrologer's hits and misses for the four planets were added together. Of the 722 keywords for which a match with isolates was found, 140 (11% of the original total) had to be discarded because they qualified as both a hit and a miss. Expected frequencies for the chi-squared test were derived by the method given in detail by Startup.<sup>19</sup> That is, the probability, under the null hypothesis, that a keyword would fall into a given list of isolates was taken to be equal to the proportion of the total number of isolates found in that list. Thus the expected proportion of hits would be approximately .25 for the four planets combined. Observed and expected numbers of hits and misses were computed for each planet separately and then the numbers for all four planets were added together to give total numbers of hits and misses.

#### RESULTS

Table 1 presents the coefficients of agreement (kappa) between the Gauquelins and the 10 astrologers on the assignment of traits to the planets. Agreement is measured for each planet individually and for each astrologer's collection of keywords taken together. It will be seen that all of the coefficients are positive, indicating that agreement is always better than chance, and range between .12 and 1.0. As with previous analyses, agreement tends to be lowest for JU followed by MO but in this analysis MA fares better than SA.

It is important to note that two of the textbooks from which the keywords in the present study were extracted were published after the first appearance of the Gauquelins' lists of typical traits. One of these was by Weingarten, who purposely incorporated the Gauquelins' findings in his book,<sup>3</sup> and who has obtained the highest overall kappa here. The other was by Mann who does not appear to have been equally influenced. Overall kappa for his keywords was the third poorest.

The rank order correlation (rho) between the chronological order of publication of the 10 textbooks and the magnitude of overall kappa is .19, which is not significant. If the two authors who had access to the Gauquelins' results are excluded, this correlation climbs to .26, but is still not significant. A case can be made for also discarding Hall and Grell from this correlation since their publications are compilations of the ideas of others and so are difficult to place in a chronological order. In this case the correlation climbs further to .49. However, with only 6 subjects, this is far from significant.

Table I. Agreement between keywords and isolates.

TEXTBOOK	DATE	Kappa (k)				OVERALL	N <sup>a</sup>	χ <sup>2</sup>	N <sup>b</sup>
		MO	MA	JU	SA				
Claudius Ptolemy	(2nd C. A.D.)	.36	.76	.47	.41	.44	47	33.2	49
Charles Carter	(1925)	.55	.71	.37	.44	.52	61	53.4	61
Margaret Hone	(1951)	.72	.82	.61	.92	.79	34	65.9	61
Andre Barbault	(1955)	.72	.81	.72	.71	.74	74	101.8	76
Manly P. Hall	(1958)	.50	.71	.27	.48	.50	115	74.6	121
Jeff Mayo-	(1964)	.73	.67	.55	.73	.69	46	50.2	50
Dal Lee	(1968)	.71	1.00	.61	.64	.73	27	35.9	28
Paul Grell	(1970)	.70	.76	.51	.72	.68	77	88.7	81
Henry Weingarten	(1977)	.85	.94	.45	.86	.82	41	74.0	41
Tad Mann	(1978)	.36	.87	.12	.38	.45	41	22.4*	41
Average		.62	.81	.47	.63	.64		59.9	

Agreement is measured by kappa for each planet individually and for each astrologer's keywords taken together. Chi-squared is given for the hits and misses for all four planets combined. Df=1 throughout.

\*Significant at 10<sup>-5</sup>. All other values of χ<sup>2</sup> are significant at less than 10<sup>-8</sup>.

N<sup>a</sup>= Number of words used in the calculation of k.

N<sup>b</sup>= Number of words used in the calculation of χ<sup>2</sup>.

The only evidence here that astrologers have improved over time is that all of the modern astrologers have a better overall result (kappa) than Ptolemy. This result is statistically highly significant. If there had been no real improvement since Ptolemy, we would expect that some of the modern astrologers would have better results than Ptolemy and some would have worse, with an equal chance of being better or worse. With this as a null hypothesis, the probability (sign test) associated with nine results being better is .002. If Weingarten and Mann are discarded for the same reason as above, then p=.008.

Table I also gives the values of chi-squared associated with the hits and misses scored by each astrologer. With one degree of freedom, all results except Mann's are significant at better than 10<sup>-8</sup>. Mann's result is significant at 10<sup>-5</sup>. This is evidence that the agreement measured by overall kappa is not due to chance with any of the astrologers.

## DISCUSSION

The results of this study provide evidence of considerable accuracy on the part of the astrologers, with MA, SA, and MO, and, to a lesser extent, with JU. However, there are reasons to suspect that the method employed here has been somewhat biased in favour of the astrologers. For one thing, nearly half of the keywords were discarded because no match for them could be found amongst the isolates. This seemed the fairest procedure since a failure to find a match cannot be taken, at this stage, as evidence of inaccuracy. Yet it may be, as Gauquelin<sup>8</sup> suggested, that many of these words are 'far-fetched' in the sense that they really do not describe any of the planetary temperaments. Only further research can settle this.

More pertinently, perhaps, some keywords that failed to find a match may have described the temperament opposite to that of the target planet. Not may would have been discarded for this reason, since the 'negative' temperaments are mostly made up of traits that feature somewhere or other in the positive temperaments, but there may have been some that were.

A third reason for caution with the present results is that one of the assumptions of the statistical tests has been somewhat violated. Both kappa and chi-squared require that the units used in their calculation are independent. Since the units in this case are trait-words, and such words are linked semantically, they cannot always be independent in the statistical sense. A letter<sup>21</sup> appearing in the present issue of this journal deals with this point at some length but, as the replies to it show, the problem has not been completely neglected up to now. For example, the author<sup>20</sup> has already run a control study to check whether the known links between trait-words would invalidate the theoretically-based expected frequencies in a study such as the present one. He found that they do not. Nevertheless, there is no doubt that the dependencies between trait-words will tend artificially to inflate the values of chi-squared and thus increase the dangers of Type I errors. Consequently, the significance levels presented above cannot be taken at face value. However, this does not mean that the results cannot be trusted at all.

In defence of the astrologers' accuracy, two points may be adduced. First, in the absence of genuine accuracy, significantly bad results are as likely as significantly good ones; chi-squared is inflated quite impartially by the violation of independence, either in one direction or in the other. Yet the results are all in the predicted direction for each astrologer and for each planet. Secondly, if dependence between words inflates kappa (the coefficient of agreement) artificially, then those astrologers who use more words should have higher kappas. However, the rank-order correlation between magnitude of kappa and the number of words used in the calculation of kappa is -.39, which is in the wrong direction. Thus we still have evidence for the astrologers' accuracy even if we cannot have confidence in the precise figures presented.

Even if all the factors mentioned above have favoured the astrologers, there is at least one factor that could have worked against them; there is no guarantee that the 'significant isolates' with which the keywords were compared, are all placed correctly under their respective planets. The derivation of these isolates does not involve the violation of the independence assumption discussed above, because these words were tested individually, yet some of them may still have attained significance by chance simply because so many words (253 x 10 planets) were tested. Gauquelin<sup>7</sup> has written about this problem and identified particular words that are probably badly placed.

Improvement in the astrologers' accuracy over time was anticipated but the evidence in support of it was slight. All of the modern astrologers had better overall accuracy than Ptolemy, the one ancient astrologer included here, and this in itself is highly significant. However, the interpretation of this result is not straightforward because Ptolemy's terminology is very different from modern terminology and is difficult to translate.<sup>7</sup> The correlation between publication date and degree of accuracy, although in the right direction, was non-significant. This result is also difficult to interpret, though. The majority of the publications span only 50 years and this may be too short a time for measurable improvements in an astrology based on traditional methods. Perhaps the full span of 2,500 years is needed. Alternatively, knowledge of the planets' influences may not have progressed at all, though there is certainly no evidence for deterioration.

The aim of this study has been to measure the accuracy of astrologers' descriptions of the planetary influences. The best way to do this at present seems to be to measure the agreement with the Gauquelins' 'isolates' but this measurement is only a rough estimate of the accuracy, not only for the statistical reasons discussed above, but also because of the notorious imprecision of ordinary language. Michel Gauquelin<sup>11</sup> has briefly discussed this problem and pointed out that there are different kinds of shyness, of tenacity, of organisational ability,

and so on. The meaning of most words and phrases can also be grossly or subtly modified by their contexts. Astrologers supply lists of keywords chiefly as mnemonic devices, not as precise summaries of their understanding. They usually also provide, and prefer, descriptions of the temperaments in ordinary language. 2 (A lengthy discussion of personality description in ordinary language, and how to analyse it psychologically, has been published by Bromley.<sup>1</sup>) In view of this, it may be worthwhile for the author to record some of his impressions concerning the keywords, impressions that are not easily quantified.

The results for JU were the worst of the 4 planets – on average and for 8 of the 10 astrologers individually. Francoise Gauquelin<sup>7</sup> investigated JU in detail and found that the 'ill-aspected', or negative, keywords for this planet give much better results than the positive and negative keywords combined. Inspection of the present data suggests that this happens because JU has traditionally been viewed, on the positive side, as philosophical, scrupulous, calm, methodical, and sincere, all of which are traits of SA, and as religious, which belongs to MO and MA according to the lists of isolates. One wonders whether this misperception is due to the doctrine of benefic and malefic planets. This ancient tendency to divide the planets sharply into good and bad has been breaking down recently, no doubt, but appears to have left many traces still. MA and SA, the two malefics of tradition, tend to be perceived too negatively. SA is often described as narrow-minded, mean, depressive, and suspicious while MA is seen as tyrannical, hateful, sadistic, and destructive, none of which traits feature among the isolates or their synonyms.

On the other hand, it is possible that these negative keywords for MA and SA are really more accurate than they seem. Gauquelin et al<sup>16</sup> may have failed to find an association between any of the planets and Neuroticism, but it does not follow that astrologers are wrong in describing neurotic traits; the astrologers' intentions must be taken into account. With their negative keywords they try to describe the failings associated with each planet when that planet is strong in the chart of a generally maladjusted person. SA has been shown to be introverted<sup>16,17</sup> and the negative traits attributed to this planet are typical of the unstable introvert, the dysthymic type of neurotic.<sup>2</sup> Similarly, MA was found to be extraverted,<sup>16,17</sup> and the negative keywords for this planet are similar to the traits of the unstable extravert, the individual with conduct problems.<sup>2</sup> In addition, MA has been found to be associated with Psychoticism,<sup>16,17</sup> of which the traits mentioned above would also be a manifestation.<sup>4</sup>

Finally, it is the author's impression that astrologers over the ages have failed to perceive an entire facet of the lunar personality. The positive isolates for MO include 'funny, gay, witty, humorous, and youthful'. The only feature of this characteristic levity that astrologers have regularly captured is the inconstancy, but they have not associated this with humour. This cannot be counted as inaccuracy, of course, but only as a failure to perceive. One wonders how there can be such a failure in the midst of so much success.

#### CONCLUSION

The re-analysis of astrologers keywords for the planets presented here provides evidence of considerable accuracy with four of the planets. Reasons have been given for doubting the precision of the measurements of accuracy and of statistical significance, but there is little reason to doubt that astrologers have achieved a high degree of accuracy that cannot be accounted for by chance. Moreover, the measurements presented here are based on a sounder method than those of Gauquelin<sup>7</sup> and of Startup<sup>9</sup> and therefore supersede them. Evidence that accuracy has improved over time was only slight but the conditions for testing this were not the optimum. The theory of the origins of the planetary typology advanced by Startup,<sup>20</sup> is unaffected by this failure. Although the theory suggests that improvements must have been made at some time, it does not require them to be continual or even permanent; there is no human endeavour in which progress is inevitable.

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## Belief in astrology: a symptom of maladjustment?

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**Summary**—Previous research has demonstrated that people with a greater belief in astrology show more signs of maladjustment than people who have less belief or none at all. However, those who have the greatest commitment, the astrologers themselves, have been neglected. In the present study 66 students of astrology completed the EPQ and the 16PF. In general, their mean scores did not show any consistent signs of neuroticism and their 16PF group profile was significantly different from those of various neurotic groups but very similar to that of a comparison group of psychology students. The only sign of maladjustment was in their high P scores but even these were not significantly higher than those of the psychology students.

### INTRODUCTION

In 1940, Gordon Allport drafted a statement condemning astrology (Bok and Mayall, 1941; Bok, 1975) which, among other things, stated that

"the principal reason why people turn to astrology and to kindred superstitions is that they lack in their own lives the resources necessary to solve serious personal problems confronting them."

This suggests that belief in astrology is symptomatic of maladjustment, or at least of an inadequate personality. Hardly any worthwhile research into this topic had been done at that time (Plug, 1976) but recently there have been two studies that tend to support Allport's assertion. In one, Wuthnow (1976) found that the deprived and socially marginal were more interested in their horoscopes and more likely to believe in astrology than were the more privileged. Since people who reported experiencing certain personal problems were also likely to believe in astrology, Wuthnow felt justified in regarding this belief as a coping mechanism. In the other study, Plug (1975) used a questionnaire to measure degree of belief in astrology and found this to be positively correlated with a measure of suggestibility ( $r = 0.1$ ,  $P < 0.04$ ) and with the Neuroticism scale of the Eysenck Personality Inventory ( $r = 0.37$ ,  $P < 10^{-6}$ ). Tyson (1982) has also studied a group of people who were presumably committed to astrology and found that they showed signs of stress relating to social relationships. However, his subjects were currently consulting an astrologer and so are likely to have been experiencing particular difficulties at the time. Their commitment to astrology and their difficulties might both have been only ephemeral. While it is interesting to know what leads a person to consult an astrologer, if we want to know whether an abiding commitment to astrology is a symptom of chronic maladjustment, surely we must study the astrologers themselves. As Tyson (1982) pointed out, both Wuthnow's subjects (a random sample from the San Francisco area of the U.S.A.) and Plug's (South African psychology students) are unlikely to have had a deep commitment to astrology.

Gauquelin (1972), who has extensively studied astrology itself, once wrote that astrologers are "mentally sick", but the only detailed study so far came to quite different conclusions. Moore (1960) canvassed subscribers to a serious astrology journal and, although she used no psychological tests, felt that her survey was sufficiently probing to conclude that there was little evidence of neuroticism amongst her subjects. Instead, they seemed to be "well above average as far as intelligence, education and general background go". This suggests that those who devote themselves to a serious study of astrology might have quite different characteristics from those who believe in it but do not apply themselves to it in earnest. The former might be said to have a counter-cultural involvement while the latter only look to it for guidance and solace. Wuthnow (1976) found some evidence that a counter-cultural orientation is associated with belief in astrology, as is marginality, though the association of the latter was far stronger with his sample, and the two associations were independent of each other.

The present study looked for evidence for two different kinds of involvement in astrology. Serious students of astrology were asked to fill in two standard personality questionnaires. If belief in astrology is regularly symptomatic of maladjustment, then the positive correlation between belief and neuroticism (Plug, 1975) should extend into the higher range of belief and commitment shown by astrologers themselves. On the other hand, if there are two patterns of belief, astrologers might be similar not to neurotics but to other groups of intellectuals. In particular, since astrology is chiefly concerned with human personality and motivation, often involves counselling and demands a willingness to grapple with some mathematical technicalities, its students might well be similar to psychology students.

### PROCEDURE

Students of both astrology and psychology acted as *Ss*. Thirty-three male and 33 female astrologers were picked at random from a far larger number that had completed questionnaires in the course of an unrelated study. They had been contacted either at one of the weekly lectures held in London by the Astrological Association or through one of the regional study groups affiliated to that body. Sixty-six psychology students, half of them male and half female, completed the same questionnaires. They were also picked at random from a larger number that had been tested routinely during their first

Table 1. Group means and SDs for male and female astrologers on the 16PF (stens) and the EPQ ( $z$ -scores), with  $t$ -ratios for comparisons with the British general population means

Scale	16PF Questionnaire				Female (df = 1144)			
	Mean	SD	$t$	Signif.	Mean	SD	$t$	Signif.
A	4.5	2.2	-2.8	<0.01	4.0	2.2	-4.2	<0.001
B	7.6	2.4	5.9	<0.001	8.5	1.3	8.6	<0.001
C	5.2	2.5	-0.8	NS	5.6	1.8	0.3	NS
E	7.6	1.9	6.1	<0.001	7.2	2.2	4.7	<0.001
F	5.6	1.8	0.4	NS	6.5	1.7	2.7	<0.01
G	5.0	1.7	-1.4	NS	3.9	1.6	-4.5	<0.001
H	5.5	2.4	-0.04	NS	5.6	2.1	0.1	NS
I	6.9	1.9	3.9	<0.001	6.6	2.0	3.2	<0.01
L	5.5	2.6	-0.04	NS	5.6	2.0	0.1	NS
M	8.0	1.7	7.0	<0.001	7.9	1.5	6.8	<0.001
N	3.8	1.9	-4.7	<0.001	3.6	1.9	-5.4	<0.001
O	4.9	2.1	-1.7	NS	5.2	1.9	-0.9	NS
Q1	5.7	1.7	0.6	NS	5.7	2.1	0.6	NS
Q2	6.7	1.7	3.4	<0.001	6.5	2.0	2.9	<0.01
Q3	4.9	2.3	-1.7	NS	4.3	2.0	-3.4	<0.001
Q4	5.3	2.5	-0.6	NS	5.9	2.4	1.1	NS

Scale	EPQ				Female (df = 3293)			
	Mean	SD	$t$	Signif.	Mean	SD	$t$	Signif.
P	0.41	0.96	2.3	<0.05	0.66	1.21	3.8	<0.001
E	-0.38	1.16	-2.2	<0.05	0.09	0.98	0.5	NS
N	0.09	1.13	0.5	NS	0.32	0.97	1.8	NS
L	-0.3	0.75	-1.7	NS	-0.49	0.8	-2.8	<0.01

2-Tailed tests throughout.

week after enrolment at a college of London University. All 132 Ss completed the Eysenck Personality questionnaire (EPQ) (Eysenck and Eysenck, 1975) and Form A of the 16PF (Cattell, Eber and Tatsuoka, 1970). Scores on the EPQ were standardized against the sex and age norms published as Table 4 of the *Manual of the EPQ* (Eysenck and Eysenck, 1975) and the 16PF scores were first standardized for sex against the norms for the British general population (Saville, 1972) and then corrected for age using the quadratic model developed for the general population of the U.S.A. (IPAT, 1970, Tables 31 and 32), no age corrections having been developed yet specifically for Britain.

#### RESULTS

Group means for the male and female astrologers separately are presented in Table 1. Means for the EPQ scales are in  $z$ -score form while those for the 16PF are in stens. The table also gives the values for the  $t$ -ratio obtained from comparisons with the British standardization means. These show very little evidence of neuroticism. With respect to the 16PF, all the scales which load strongly on the higher-order Anxiety factor, scales C, L, O, Q3 and Q4, show non-significant differences from the standardization means, with only one exception. That exception is with factor Q3 with females only. Similarly with the EPQ, the astrologers' means on the Neuroticism scale show only non-significant differences from the general population. Lie scores are low. The only serious sign of maladjustment is to be found in the high scores on P. However, these scores were found to be not significantly higher than those of the comparison group of psychology students ( $t = 0.97$  and  $0.39$  for females and males, respectively,  $df = 64$ ,  $P > 0.2$ ). The P scores of the female, but not the male, psychology students were themselves significantly higher than the norms ( $t = 2.2$ ,  $df = 3293$ ,  $P < 0.05$  for females,  $t = 1.8$ ,  $df = 2343$ ,  $p > 0.05$  for males).

The 16PF scales on which the astrologers differ most markedly from the norm are: B, intelligence; E, assertive; I, tenderminded; N, forthright; and especially M, imaginative. The males are rather more introverted than the females on the EPQ and on those scales of the 16PF that are related to extraversion.

Similarity between the 16PF profiles of the astrologers and the psychology students was measured by means of the pattern-similarity coefficient,  $r_p$  (Cattell, Coulter and Tsujioka, 1966). Comparisons were also made with the profiles for two occupational and four clinical groups published by Cattell *et al.* (1970). Table 2 gives these results and shows

Table 2. Pattern-similarity coefficients for comparisons between 16PF profiles for astrologers and four occupational and four clinical groups

Comparison groups	Astrologers	
	Female	Male
Occupational		
Astrologers (m)	0.76***	1.0
Psychology students (f)	0.72***	0.55***
Psychology students (m)	0.57***	0.71***
Psychologists (m)	0.04	0.03
R. C. Priests	0.01	0.01
Clinical		
General neurotics (m & f)	-0.41***	-0.36***
Anxiety reaction (m & f)	-0.43***	-0.4***
Inadequate personality (m & f)	-0.33**	-0.22
General psychotic (m & f)	-0.41***	-0.29*

\* $P < 0.05$ ; \*\* $P < 0.02$ ; \*\*\* $P < 0.01$ .

highly-significant positive coefficients for the astrologers and psychology students and, for the most part, highly-significant negative coefficients for the groups of neurotics and psychotics. Similarity coefficients for academic psychologists and Roman Catholic priests were non-significant.

#### DISCUSSION

The results of this study have revealed that people who not only believe in astrology but also study the subject seriously, in general show little sign of maladjustment. They do not differ consistently from the general population on those traits which are associated with neuroticism, and their profiles differ significantly from those of neurotics but are very similar to those of psychology students. Students of astrology are not noticeably similar to professional psychologists but it is possible that professional astrologers might show more resemblance. Similarity with Roman Catholic priests was also tested since it has been suggested that astrologers aspire to a priestly role, and a large proportion of them do consider that astrology embodies spiritual values (Moore, 1960). However, no such similarity was found. It is still possible that astrologers may be abnormal in a psychotic rather than a neurotic direction, as Gauquelin (1972) suggested, for the 16PF is not designed to discriminate on this dimension (Cattell *et al.*, 1970). Yet their scores on the EPQ P scale, while high, were not significantly higher than those of the psychology students. Their high scores may merely reflect their unconventional intellectual tastes and their willingness to take an unorthodox stand, both of which are correlates of the P scale (Eysenck and Eysenck, 1976).

Instead of neuroticism, the astrologers' 16PF profiles show a combination of assertiveness (E) and forthrightness (N), which might again be a reflection of their willingness to advocate an unorthodox discipline, together with the tendermindedness (I) and imaginativeness (M) which are found in a number of helping professions, such as social workers and employment counselors, and amongst musicians and imaginative writers (Cattell *et al.*, 1970). Scores on B, intelligence, are also high but this can come as little surprise considering that astrology itself, when studied in detail, is complex and technical. However, no great emphasis should be placed on interpretations of individual 16PF-scale scores since there is considerable doubt about the meanings and validities of these scales (see, for example, reviews by Eysenck, 1971, and by Howarth, 1976).

In a questionnaire for popular use, Eysenck and Wilson (1975) included an item asking: "Do you read horoscopes with the hope of obtaining some guidance in your life?" A positive endorsement earns the respondent one point on the (lack of) autonomy subscale of a neuroticism test. Since Plug (1975) has found a positive correlation between belief in astrology and neuroticism and Tyson (1982) has found that people who consult astrologers are high on externality of (political but not self) control, there is no reason why this item should not be valid. However, the findings of the present research do suggest that such items are prejudicial to the genuine astrologer. While the majority who profess a belief in astrology may be poorly adjusted and socially deprived, those who carry their belief into dedicated study do not have these characteristics.

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