Scientific Study of Horoscopes: A Laboratory Manual[1]

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Dawson College, Montreal, Quebec

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This manual describes three studies suitable for use as classroom lab exercises in social science classes dealing with the following topics: research methods, correlation, expectancy effects, personality measurement, and astrology. The appendix contains all necessary materials and forms (except for the daily newspaper horoscope forecasts needed for Study 3), optional statistical tests, and reprints of our research findings on this topic.

The lab exercises are designed to illustrate the use of the scientific method in answering questions about everyday events; they provide answers to the following questions:

Study 1

A.   What is the validity (perceived accuracy) of astrologically-based personality descriptions?

B.   Do expectancy effects influence judgments of the accuracy of astrologically-based personality descriptions?

Study 2

A.   Are there sex differences in horoscope reading habits and in belief in astrology?

B.   Is the personality dimension "locus of control" related to horoscope reading and belief in astrology?

Study 3

A.   What is the validity (perceived usefulness) of daily horoscope forecasts?

B.   Do expectancy effects influence judgments of the usefulness of daily horoscope forecasts?

METHOD

One, two, or all three studies may be done with the same students. If Study 1 is included, it should be done first and before any mention of astrology is made.

For each study, there are two options, A and B. Option A deals with question A, option B with question B. Note that option B is always the more complex and requires that option A be done first.

Before the labs are presented, you may want to ask the class:

1) How could one find out if personality descriptions based on "handwriting analysis" are accurate? (Study 1)

2) How could one find out whether males and females differ in their horoscope reading habits? **(Study 2)**

3) How could one find out if people with particular types of personality are more likely to read horoscopes than others? (Study 2)

4) How could one find out whether horoscopes are useful? (Study 3)

If you want your students to make predictions about mean ratings, correlations, etc. you will probably want to discuss some of the issues raised in the discussion sections of the studies before proceeding to the analysis of data.

Students can score their own answers and ratings. Means can easily be calculated in class by a few students with calculators. Scattergrams can be plotted on the board. If your students, like ours, are beginning students with no knowledge of statistics, you may want to stop your data analysis there and simply tell your students about statistical tests. If your students are more sophisticated, you may wish to do some statistical analyses. (The formulae for t-tests and Pearson r are included in the appendix.) For any correlational **analyses where students do not report their own data,** you can use date of birth and class section to match up results.

STUDY 1

Materials Needed

1) A copy of the "Personality Descriptions" for each student. (This is a set of 12 astrologically-based personality descriptions and a "Barnum" paragraph plus rating scales.)[1]
2) Staplers or paper clips.
3) "Personality Description" scoring key.

Procedure

Option A

If you want to answer only question A, "What is the validity (perceived accuracy) of astrologically-based personality descriptions?":
1) Hand out the "Personality Descriptions" to your students;
2) Instruct them to shuffle the pages into a random sequence and then re-staple or clip them;
3) Ask the students to read the descriptions carefully and to rate on the 10 point scales how much like themselves each is.

Option B

If you also want to answer question B, "Do expectancy effects influence judgments of the accuracy of astrologically-based personality descriptions?", proceed as above in one class. In another class:
4) Identify the personality descriptions by zodiac sign for the students. Have them write the appropriate sign above each astrologically-based description and "average college student" above the "Barnum" paragraph before they shuffle the pages and rate the descriptions.

Data Analysis

Option A

If you are only dealing with question A:
1) Identify (by zodiac sign) the personality descriptions for your students.
2) Have each student record: (a) his rating of the description for his own sign, (b) his mean rating of the other 11 descriptions, (c) his rating of the "Barnum" paragraph.
3) Calculate the class means of (a), (b), and (c) above.

Option B

If you are dealing with question B as well, do the following in addition to the above.
4) Compare the three means [(a), (b), and (c) above] of the class which rated the personality descriptions which were identified by zodiac sign and the means of the class which rated the descriptions without knowing the zodiac signs. In other words, the table below should be filled in.

Description	Mean		
	Own Sign	Average other 11	"Barnum"
Not identified before rating			
Identified before rating			

Discussion Topics and Methodological Issues

Option A

1) Ask your students why they were told to shuffle the pages of the "Personality Descriptions".
2) Ask why they were not told the origins of the personality descriptions.
3) Discuss the (presumably) high mean rating of the "Barnum" paragraph. Ask your students why they think so many people find it a good description of themselves. Give them some background on this.
4) Discuss the meaning of the difference between the class mean ratings of own sign and other 11 signs.

Option B

5) Give your students some background on expectancy effects. Ask whether they think these could be involved in people's judgments of the accuracy of astrologically-based personality descriptions.
6) Discuss the meaning of the differences between class mean ratings in the class where the descriptions were identified and the class where they were not.

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1. The personality descriptions were taken from Naylor, John, Your 1981 Astrology Guide (Globe Mini-Mags 713-724). New York: Globe Communications Corp., 1980. Specific references to zodiac signs were deleted. The "Barnum" paragraph was the paragraph described by Snyder, C.R., Shenkel, R., & Lowery, C. Acceptance of personality interpretations: The "Barnum effect" and beyond. J. Consult. & Clin. Psychol., 1977, 45, 104-114. This paragraph contains statements with a high base rate of occurrence in the population; data show that people given this description generally believe it to be a good reflection of their own personality.

STUDY 2

Materials Needed

Option A

1) A copy of the "Horoscope Reading Habits" form for each student.

Option B

The above plus
2) a copy of the Rotter Internal/External Locus of Control (I/E) Scale for each student and
3) Rotter Scale administration instructions, scoring master and norms.

Procedure

Option A

If you want to answer only question A, "Are there sex differences in horoscope reading habits and in belief in astrology?":
1) Have the students fill out the "Horoscope Reading Habits" form.

Option B

If you are also dealing with question B, "Is the personality dimension "locus of control" related to horoscope reading and belief in astrology?", do the above and
2) administer the Rotter Scale to all students. Make sure that students understand that they must always choose the statement closest to their views even when they believe neither or both.

Data Analysis

Option A

If you are only dealing with question A:
1) Calculate the average male and female scores on questions 4 and 5 of the "Horoscope Reading Habits" form.

Option B

If you are dealing with question B as well, do the following in addition to the above.
2) Explain to your students how to score their Rotter scales.
3) Have your students hand in (anonymously) a sheet with their Rotter score and their answers to questions 4 and 5 on the "Horoscope Reading Habits" form OR have them hand in their Rotters and their "Horoscope Reading Habits" forms. If you do the latter, use their birthdates to match up data for individual subjects. Plot scattergrams on the board (Rotter and Question 4, Rotter and Question 5, Question 4 and Question 5). If you wish you may calculate the correlation coefficient (formula is in the appendix).

Discussion Topics and Methodological Issues

Option A

1) Discuss possible interpretations of the sex differences found with regard to horoscope reading.

Option B

2) Give your students some background on the dimension of locus of control. Discuss its possible relationship to horoscope reading habits.
3) Discuss the meaning and significance of the scattergrams and/or correlation coefficients.

STUDY 3

Materials Needed

1) Horoscope forecasts from one or two daily newspapers published the day before the day you do the lab. One set must be taken from an out-of-town newspaper which carries a different astrologer from the one(s) in the major paper(s) in your city. (We used the Toronto Star.) The second (optional) set should come from the local paper most widely read by your students. (We used the Montreal Gazette.) The forecasts must be re-ordered in a random sequence and specific references to astrological signs deleted.

2) A copy of the "Horoscope Rating Form" for each student. (This provides instructions and the form for rating each forecast on a 10-point scale.)

Procedure

Option A

If you want to answer only question A, "What is the validity (perceived usefulness) of daily horoscope forecasts?":

1) read the randomized newspaper horoscope forecasts aloud to your students. It is recommended that each be read twice. As soon as you have finished reading one, have the students rate it (on the "Horoscope Rating Form") as to how useful the information or advice would have been to them the preceding day. (The 10 point scale of usefulness is explained on the form.)

Option B

If you are also dealing with question B, "Do expectancy effects influence judgments of the usefulness of daily horoscope forecasts?", do the above and

2) read the horoscope forecasts in the same order in another class but identify the sign for each forecast just before reading it.

Data Analysis

Option A

1) Identify the signs of the forecasts.
2) Have the students (a) circle the rating of the forecast for their own signs and (b) calculate the mean rating for the other 11.
3) Calculate class means for (a) and (b) above.

Option B

4) Compare the two means $\lceil$(a) and (b)$\rfloor$ above of the class which rated forecasts which were identified by zodiac sign and the means of the class which made the ratings without knowing the zodiac signs. In other words, the table below should be filled in.

Description	Means			
	Newspaper A		Newspaper B	
	Own Sign	Average Other 11	Own Sign	Average Other 11
Not identified before rating				
Identified before rating				

Discussion Topics and Methodological Issues

Option A

1) Ask your students why only an out-of-town paper was used, (or why both out-of-town and local papers were used).
2) Ask why the forecasts were in random order and not identified.
3) Discuss the meaning of the following comparisons:
   (a) the difference(s) between class mean ratings of own and other 11 signs (for both newspapers, if two were used).
   (b) the differences between ratings of forecasts from the two newspapers.

Option B

   (c) the differences between ratings in the class where the signs were identified and the one where they were not.

Appendix

STUDY 1

      Personality Descriptions

      Personality Descriptions Scoring Key

STUDY 2

      Horoscope Reading Habits Form

      Rotter I/E Scale

      Rotter I/E Scale Administration Instructions and Norms

      Rotter I/E Scale Scoring Key

STUDY 3

      Horoscope Rating Form

STATISTICAL FORMULAE

REFERENCES

      Fichten, C.S. & Sunerton, B. On horoscopes, their readership and the "Barnum Effect". Presentation at the Canadian Psychological Association, Montreal, Quebec, June, 1982.

      Fichten, C.S. & Sunterton, B. Popular horoscopes and the "Barnum Effect". Journal of Psychology, 1983, 114, 123-134.

Date of birth: _____ _____ _____
Day   Month   Year

PERSONALITY DESCRIPTIONS

Please indicate how much like you each of the following personality descriptions is.

You have a great need for other people to like you and admire you. You have a tendency to be critical of yourself. You have a great deal of unused capacity which you have not turned to your advantage. While you have some personality weaknesses, you are generally able to compensate for them. Your sexual adjustment has presented problems for you. Disciplined and self-controlled outside, you tend to be worrisome and insecure inside. At times you have serious doubts as to whether you have made the right decision or done the right thing. You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations. You pride yourself as being an independent thinker and do not accept others' statements without satisfactory proof. You have found it unwise to be too frank in revealing yourself to others. At times you are extroverted, affable, and sociable, while at other times you are introverted, wary, and reserved. Some of your aspirations tend to be pretty unrealistic. Security is one of your major goals in life.

| not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | very much like me |

You are, fundamentally, a very down-to-earth person, very conscious of the realities of life. You believe in hard facts. Yours is an analytical rather than an imaginative mentality. You are orderly, conscientious, have a capacity for detail but tend to be short-sighted, unable to see the woods for the trees. There is a spartan vein in your personality which makes you self-disciplined and capable of considerable self-sacrifice in the achievement of a target or ideal. You like work for its own sake. You are too inclined to mask or hide your feelings. Built into your personality are strong links with the past. You are attracted to history and tradition, to antiques, to the "olde worlde" rather than the futuristically modern. On the one hand, you have a capacity for survival, for endurance under prolonged stress. On the other hand, you are far too much of a worrier and tend to harass yourself unnecessarily over trivialities.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

You are instinctively modernistic, think and plan in terms of the new and
futuristic, and are more concerned with changing the world for the better
than with maintaining the status quo. Originality is one of your assets.
You possess worthwhile creative talents. You loathe being tied down to
definite commitments and fiercely resist any attempts to curtail your
freedom of thought and action. You tend to do your own thing regardless
of others. You favor reform and show a strong humanitarian instinct.
Unorthodox rather than convential, you are attracted to unusual subjects
and activities. Your personality predisposes you to a Bohemian love life.
You tend to involve yourself in curious emotional entanglements. Capable of
being a very stimulating companion because of your original and offbeat
viewpoint and zany sense of humor, you have difficulty in establishing
stable relationships.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

Yours is an active temperament and it is probable you possess a natural
sense of rhythm. One of your greatest blessings is a lively sense of humor.
You not only see the funny side of things and express yourself cheerfully, but
also are able to laugh at yourself. There is a restless side to your personality.
You like to feel there is a pattern to life and to your own experiences. You are
comparatively honest and you show a sense of fair play in all dealings. You
are an idealist rather than a materialist, and instinctively generous. You want
a comfortable way of life without necessarily yearning for great wealth and
possessions. Built into your personality is a vein of intuition and foresight
which is not always evident to your associates.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

C

Yours is a responsive and emotional personality. Emotionalism- overwhelming surges of feeling- could be a weakness. You equally enjoy a good laugh and a good cry. You have a need for demonstrative affection. You are strong on imagination and intuition but weak on logic. It will be easy for you to live in a world of fantasy and difficult for you to be precise, orderly, and factual. Versatile and adaptable, you are much too inclined to involve yourself with people and events and add unnecessary complications to your life. You are capable of being your own worst enemy, of developing an addiction of one type or another.There is a need to guard against habit-forming appetites. A liking for animals and a talent for handling them could be one of your assets. An easy and sympathetic "touch", you lean toward generosity and extravagance, with an easy-come easy-go attitude.

not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | very much like me

E

You can be a good lover and a good hater. No sacrifice will be too great for those you hold dear. However, a hurt will never be forgotten or forgiven. Diplomacy is not your strongest trait. If anything, you are too blunt and outspoken at times, too inclined to callously and deliberately hurt people's ____ feelings. There is an inquisitive and penetrating side to your personality. You cannot bear to have things hidden from you and are unable to rest until mysteries are cleared up. Yet, you can be very secretive yourself, disliking even close associates having any detailed knowledge of your affairs. You have a capacity for intrigue. There is a strongly possessive side to your personality which inclines you toward unnecessary envies and jealousies but stands you in extremely good stead in handling business, money, and commercial issues. You are capable of being a hard bargainer. You have a deep-rooted need for emotional expression and more than most enjoy putting on an act, having a good laugh, a good cry, a dramatic quarrel or profuse reconciliation.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

F

You are sophisticated rather than crude, will instinctively create a harmonious atmosphere and show considerable fastidiousness in your clothes and personal appearance as well as in the decoration and arrangement of your surroundings. Favoring the happy medium, you dislike extremism and always try to maneuver a compromise. A natural diplomat, a skilled arbitrator, you set out to please, to smooth over troubled waters. Deceptive, flexible, and agreeable, you are a much more determined person than is apparent, using the speak-softly-and-carry-a-big-stick technique. You are much affected by the atmosphere in which you live and work and can quickly be made miserable by discord. Your ability to get on with others and to bring them together can be a tremendous asset to you socially. You have a talent for teamwork.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

While kindly and full of good intentions you can far too easily be remote, impersonal, distant or cold.You are motivated by an urge to do good, to be of help to humanity as a whole. It is likely you possess a touchy sense of dignity and are too easily offended. Sense of humor is not your strong point. Thrift, a dislike of waste, a tendency to use up scraps are notable characteristics. In fact, you may have a mean side to your personality. Punctual, neat, orderly, reliable and conscientious, you may yet lack imagination, initiative, and the boldness necessary to become a successful figurehead. Having an eye for detail, you are instinctively critical- and, to your companions, discouraging.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

You are good-humored, sociable, and enjoy a good laugh. Your sunny disposition enables you to win the confidence of others. Due to an inner strength and confidence you have the courage and organizational ability to tackle situations which daunt others. You intuitively know that responsibility is easier to carry than many people think. It is one of the contradictions of your personality that you can be objectively lazy and yet capable of superhuman bursts of effort when the occasion demands. Work for its own sake will have little appeal. Luxury and power have a deep-rooted fascination for you. You possess a vein of showmanship.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

You can far too easily inhibit the development of your own personality
and abilities because you cling to your family, feeling that you are the mainstay
and that it would disintegrate without you. Ostentation, display and "swank"
are foreign to your nature. There is a tendency for you to make yourself flat
and unexciting, failing to project your personality. Yours is a highly
intuitive personality. Imaginative, you are prone to hunches and premonitions
which turn out to be correct on a surprising number of occasions. Yours is a
possessive nature, inclining you to cling to money, possessions, and relationships.
What you have you'll hold, collecting and hoarding, hanging on tenaciously to
the known and familiar, and distrusting the unknown. Sense of humor is lacking-
perhaps because you are, beneath the facade you present to the world, a very
sensitive person who is tremendously vulnerable.

| not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | very much like me |

It is important to you that you enjoy a sense of security, can
indulge in good food and drink, and have your possessions around you.
You have an inborn commercial instinct. You are capable of great
depth of affection, of lifelong devotion, and of enduring love and
loyalty. If you have a weakness it's that you cling to relationships
(and possessions) after they have served their purpose. As a sweetheart
you will be inclined to bulldoze your loved one into marriage by sheer
persistence- and by outlasting or frightening off the rest of the field.
You have the ability to "hang on" and "stay put". You show strength of
will and a stubborn determination to resist or endure. You are capable
of great patience under provocation.

not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | very much
like me | | | | | | | | | | | like me

K

You are basically interested in results and achievement, not in
thinking, feeling or theorizing. Hence, you need to keep active. Due
to your physical vitality and infectious enthusiasm you have an invigorating
and stimulating influence on companions. Your sense of humor is of the
slapstick variety and this inclines you toward horseplay and practical
jokes. You have a habit of plunging in headfirst. You tend to poke
your head into trouble. When under prolonged stress you can too easily
develop a persecution complex. Strenuous physical activity can serve as
a relaxation for you.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

Temperamentally you are a sprinter rather than a stayer. If anything, you lack persistence and powers of endurance. Your successes result from opportunism, your failures from lack of patience. You are easily bored. Yours is a quick, active, and assimilative intellect. You like knowledge for its own sake and tend to accumulate irrelevant information. Far too wasteful, you lack any sense of thrift or possession. Enjoying the novelty and stimulation of new possessions, you quickly lose interest and tend to give or throw them away. You have a latent talent as a storyteller, a capacity to cloak stark facts amazingly with wit and imagination. One of your biggest assets is your persuasiveness and ability, at times, to bend the truth. Yours is a companionable rather than a passionate nature.

not at all like me	1	2	3	4	5	6	7	8	9	10	very much like me

PERSONALITY DESCRIPTIONS

SCORING KEY

Description A - Barnum

Description B - Capricorn

Description C - Sagittarius

Description D - Aquarius

Description E - Pisces

Description F - Scorpio

Description G - Libra

Description H - Virgo

Description I - Leo

Description J - Cancer

Description K - Taurus

Description L - Aries

Description M - Gemini

HOROSCOPE READING HABITS

1. Sex: Male____   Female____

2. Date of birth: _____ _____ _____
                      Day   Month   Year

3. Birth sign: _____

4. In the past month (28 days), I read my horoscope

    never or almost | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | every day or
        never   nearly every day

5. When I read my horoscope, I generally find the advice or information
    given

    useless | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | very useful

ROTTER SCALE

Circle the answer in each pair below that you more strongly believe is true.
Sometimes you may not be sure; then choose the option which you believe is somewhat
more true than the other. Be sure to answer all questions.

I more strongly believe that:

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too
      easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take
      enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual's worth often passes unrecognized no matter
      how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced
      by accidental happenings.
6. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their
      opportunities.
7. a. No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along
      with others.
8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experience in life which determines what they're like.
9. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision
      to take a definite course of action.
10. a. In the case of the well prepared student, there is rarely, if ever, such a
       thing as an unfair test.
    b. Many times exam questions tend to be so unrelated to course work, that
       studying really is useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do
       with it.
    b. Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.
    b. This world is run by the few people in power, and there is not much the little
       guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to
       be a matter of good or bad fortune anyhow.
14. a. There are certain people who are just no good.
    b. There is some good in everybody.
15. a. In my case, getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the
       right place first.
    b. Getting people to do the right thing depends upon ability, luck has little
       or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces
       we can neither understand nor control.
    b. By taking an active part in political and social affairs the people can
       control world events.
18. a. Most people don't realize the extent to which their lives are controlled by
       accidental happenings.
    b. There really is no such thing as "luck".
19. a. One should always be willing to admit his mistakes.
    b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes you.
    b. How many friends you have depends upon how nice a person you are.
21. a. In the long run, the bad things that happen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness or all three.
22. a. With enough effort we can wipe out political corruption.
    b. It is difficult for people to have much control over the things politicians do
       in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in
       my life.

26. a. People are lonely because they don't try to be friendly.
    b. There's not much use in trying too hard to please people, if they like you,
       they like you.
27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the direction my life is
       taking.
29. a. Most of the time I can't understand why politicians behave the way they do.
    b. In the long run, the people are responsible for bad government on a national
       as well as on a local level.

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded on a separate answer sheet which is loosely inserted in the booklet. REMOVE THIS ANSWER SHEET NOW. Print your name and any other information requested by the examiner on the answer sheet, then finish reading these directions. Do not open the booklet until you are told to do so.

Please answer these items *carefully* but do not spend too much time on any one item. Be sure to find an answer for *every* choice. Find the number of the item on the answer sheet and black-in the space under the number 1 or 2 which you choose as the statement more true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the *one* you more strongly believe to be the case as far as you're concerned. Also try to respond to each item *independently* when making your choice; do not be influenced by your previous choices.

APPENDIX B

TABLE B1

DISTRIBUTION OF I-E SCALE SCORES FOR 575 MALES AND 605 FEMALE OHIO STATE ELEMENTARY PSYCHOLOGY STUDENTS

Males[a]			Females[b]		
I-E score	f	Cum. %	I-E score	f	Cum. %
			21	1	100.00
20	1	100.00	20	1	99.83
19	1	99.83	19	3	99.67
18	4	99.65	18	7	99.17
17	10	98.96	17	10	98.02
16	10	97.22	16	8	96.36
15	10	95.48	15	17	95.04
14	15	93.74	14	23	92.23
13	31	91.13	13	37	88.43
12	32	85.74	12	31	82.31
11	32	80.17	11	42	77.19
10	49	74.61	10	42	70.25
9	53	66.09	9	64	63.31
8	73	56.87	8	53	52.73
7	52	44.17	7	50	43.97
6	52	35.13	6	66	35.70
5	41	26.09	5	37	24.79
4	43	18.96	4	42	18.68
3	29	11.48	3	37	11.74
2	22	6.43	2	22	5.62
1	10	2.61	1	8	1.98
0	5	0.87	0	4	0.66

[a] $N = 575$; Mean $= 8.15$; $SD = 3.83$.
[b] $N = 605$; Mean $= 8.42$; $SD = 4.06$.

1. From Rotter, J. Generalized expectancies for internal versus external control of reinforcement. *Psychol. Monog.: Gen. & Appl.*, 1966, 80, Whole No. 609.

ROTTER SCALE

SCORING KEY

Score one point for each circled statement. The higher the score, the more external the locus of control. Items with no circled statement are fillers.

Circle the answer in each pair below that you more strongly believe is true. Sometimes you may not be sure; then choose the option which you believe is somewhat more true than the other. Be sure to answer all questions.

I more strongly believe that:

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too easy with them.
2. (a) Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   (b) There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
   (b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.
   (b) Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. (a) Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. (a) No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experience in life which determines what they're like.
9. (a) I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test.
    (b) Many times exam questions tend to be so unrelated to course work, that studying really is useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    (b) Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.
    (b) This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.
    (b) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. a. There are certain people who are just no good.
    b. There is some good in everybody.
15. a. In my case, getting what I want has little or nothing to do with luck.
    (b) Many times we might just as well decide what to do by flipping a coin.
16. (a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17. (a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
    b. By taking an active part in political and social affairs the people can control world events.
18. (a) Most people don't realize the extent to which their lives are controlled by accidental happenings.
    b. There really is no such thing as "luck".
19. a. One should always be willing to admit his mistakes.
    b. It is usually best to cover up one's mistakes.
20. (a) It is hard to know whether or not a person really likes you.
    b. How many friends you have depends upon how nice a person you are.
21. (a) In the long run, the bad things that happen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness or all th
22. a. With enough effort we can wipe out political corruption.
    (b) It is difficult for people to have much control over the things politicians do in office.
23. (a) Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.
25. (a) Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.
    (b) There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.
    (b) Sometimes I feel that I don't have enough control over the direction my life is taking.
29. (a) Most of the time I can't understand why politicians behave the way they do.
    b. In the long run, the people are responsible for bad government on a national as well as on a local level.

HOROSCOPE RATING FORM

Rate each forecast on a scale from 1-10 with 1=useless, 10=very useful.

Yesterday: Newspaper A   Yesterday: Newspaper B

Forecast   How useful **would this**   Forecast   How useful **would this**
  #   advice/information **have been**   #   advice/information **have been**
             for you yesterday?   for you yesterday?

1 _____   1 _____

2 _____   2 _____

3 _____   3 _____

4 _____   4 _____

5 _____   5 _____

6 _____   6 _____

7 _____   7 _____

8 _____   8 _____

9 _____   9 _____

10 _____   10 _____

11 _____   11 _____

12 _____   12 _____

Yesterday: Newspaper A   Yesterday: Newspaper B

Forecast   How useful **would this**   Forecast   How useful **would this**
  #   advice/information **have been**   #   advice/information **have been**
             for you yesterday?   for you yesterday?

Statistical Formulae

Paired t-test

$$t = \frac{\overline{X} - \overline{Y}}{\sqrt{\dfrac{\sum D^2 - \dfrac{(\sum D)^2}{N}}{N\,(N-1)}}}$$

$D = X-Y$

N = number of pairs of scores

$(df = N-1)$

Independent t-test

$$t = \frac{\overline{X} - \overline{Y}}{\sqrt{\left[\dfrac{1}{N_1} + \dfrac{1}{N_2}\right]\left[\dfrac{\sum X^2 - N_1\overline{X}^2 + \sum Y^2 - N_2\overline{Y}^2}{N_1 + N_2 - 2}\right]}}$$

$(df = N_1 + N_2 - 2)$

Pearson r

$$r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\left[N\sum X^2 - (\sum X)^2\right]\left[N\sum Y^2 - (\sum Y)^2\right]}}$$

$(df = N-2)$

On Horoscopes, Their Readership and the "Barnum Effect"*

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Abstract

In a series of studies on 366 college students, questions related to 1) individual differences associated with horoscope reading habits, 2) the reliability and validity of daily and monthly horoscope forecasts and of astrologically based personality descriptions and 3) the role of expectancy in judgments of horoscope forecast usefulness and of astrologically based personality description accuracy were investigated. Results indicate that females are more likely to read their horoscopes and that although locus of control is unrealted to horoscope reading habits, Neuroticism on the EPI is closely related. Daily and monthly forecasts were found to be unreliable and invalid. Astrologically based personality descriptions were found to have some reliability. Expectancy effects were found to affect judgments of horoscope usefulness and of astrologically based personality description accuracy. It was also found that astrologically based personality descriptions may have some validity ; these results are explained by familiarity effects and by the "Barnum effect."

Introduction

Ninety per cent of daily newspapers carry horoscopes and thirty to sixty per cent of the population admit to some belief in astrology. Given their pervasiveness, surprisingly little is known about horoscopes.

In the present investigation, the following questions were explored:

1. What personality factors and individual differences are associated with horoscope reading habits?

2. How reliable are daily and monthly horoscope forecasts and astrologically based personality descriptions?

3. How valid are daily and monthly horoscope forecasts and astrologically based personality descriptions?

4. What is the role of expectancy in judgments of horoscope forecast usefulness and of astrologically based personality description accuracy?

5. Why do even "nonbelievers" often feel that the personality description for their own zodiac sign is surprisingly accurate?

ects: 366 college students

edure:

Personality factors associated with horoscope reading

Two hundred and two subjects completed the Eysenck Personality Inventory or the Rotter Internal-External Locus of Control Scale and answered questions concerning their grades and horoscope reading habits.

Validity of daily and monthly horoscope forecasts and expectancy effects

The previous day's forecasts for all twelve zodiac signs, taken from two high circulation daily newspapers, were rated on a ten point scale of personal usefulness by one hundred and ninety-two subjects. Subjects rated both sets of forecasts. Some subjects rated forecasts identified by the appropriate zodiac sign; others rated the same forecasts without knowing the appropriate zodiac signs.

The same procedure was followed for monthly forecasts. One hundred and fifty subjects rated the previous month's forecasts for all twelve zodiac signs. Forecasts were taken from two high circulation women's magazines. All subjects rated both forecasts without knowing the appropriate zodiac sign.

Reliability of daily and monthly forecasts

To assess the reliability of daily forecasts, nine frequent horoscope readers (at least three times per week) spent a minimum of thirty minutes attempting to match the daily forecasts, which were not identified by zodiac signs, from the two newspapers mentioned above.

The same procedure was followed for monthly forecasts by five other high frequency horoscope readers.

Validity of astrologically based personality descriptions and expectancy effects

Two hundred and three subjects rated thirteen one paragraph personality descriptions on a ten point scale ranging from "not at all like me" to "very much like me." Twelve paragraphs were astrologically based personality descriptions taken from two different "purse size" horoscope booklets (references to ruling planets and predictions for the future were deleted). Ninety-eight subjects rated the descriptions from one of the purse size booklets; an additional one hundred and five subjects rated those from the other set. The thirteenth personality description was the "Barnum" paragraph described by Snyder (Journal of Consulting and Clincial Psychology, 1977, 45, 101 - 114); it contains vague statements with a high base rate of occurrence in the population and is usually perceived as highly accurate when attributed to credible sources. Some subjects read all descriptions identified by the appropriate zodiac sign (the "Barnum" paragraph was described as a description of the average college student), while others read the thirteen descriptions without knowing the appropriate zodiac signs.

Reliability of astrologically based personality descriptions

To assess the reliability of astrologically based personality descriptions, seventeen subjects who believed that astrologically based personality descriptions are valid and who had spent a minimum of two hours on the task attempted to match the twelve personality descriptions, which were not identified by zodiac signs, from the two "purse size" booklets.

Results

Table 1: Question 1

QUESTION: What personality factors and individual differences are associated with horoscope reading habits?

Reading Habits

		Females	Males	Major Finding	t test p
ow many times per week do you read your horoscope?	$\bar{x}$	1.3	0.9	Females> Males	< .05
	(n)	(167)	(176)		
ow personally useful has the information or advice given een? (1 = useless, 10 = very useful)	$\bar{x}$	3.9	2.3	Females > Males	< .001
	(n)	(160)	(163)		
f you have read a personality description of your sign, ow much like you was this? (1 = not at all like me,) = very much like me)	$\bar{x}$	5.3	4.9	Females> Males	< .05
	(n)	(69)	(47)		
		Yes	No		
ave you ever read the personality description of your iign?	%	64%	36%		
	(n)	(162)	(91)		

Personality Factors and Individual Differences: Correlations

PEARSON r VALUES	Frequency of Reading/Week		Daily Forecast Usefulness		Personality Description Accuracy	
	(n)	r	(n)	r	(n)	r
How personally useful are your daily horoscopes?	(202)	+.391***				
Rotter Internal/External Locus of Control Scale	(181)	+.004	(172)	+.003	(129)	+.147
Eysenck Personality Inventory: Neuroticism	(21)	+.671***	(19)	+.577**	(16)	+.394
Grade in Psychology course	(78)	-.107	(78)	-.096	(78)	-.071

* p < .05
** p < .01
*** p < .001

ANSWER: Subjects read their daily forecasts, on the average, once per week; females read their forecast more often and found these to be more personally useful than did males. Those who read their daily forecasts found these to be more useful than those who did not.

More than half of the sample have read a personality description of their own sign. Subjects found these to be moderately accurate; females found these to be more accurate than did males.

Neither scores on the Rotter Internal/External Locus of Control Scale nor grades in psychology were related to horoscope reading habits. Scores on the Neuroticism Scale of the Eysenck Personality Inventory, on the other hand, were found to be significantly positively correlated with reading frequency and forecast usefulness ratings, but not with ratings of personality description accuracy.

Table 2: Question 2

QUESTION: How reliable are daily and monthly horoscope forecasts and astrologically based personality descriptions?

	(n)	Average Number of Descriptions or Forecasts (out of 12) Correctly Matched	p of These Results Being Obtained by Chance
Daily forecasts	9	0.67	n.s.
Monthly forecasts	.5	1.80	n.s.
Personality descriptions	17	4.12	<.05

ANSWER: Daily and monthly horoscope forecasts cannot be reliably matched. Personality descriptions, on the other hand, were correctly matched at better than chance levels; this suggests some degree of reliability.

QUESTION: How valid are daily and monthly horoscope forecasts and astrologically based personality descriptions?

All Forecasts and Descriptions Were Rated Without Knowing the Appropriate Zodiac Sign

	(n)	Average Ratings of One's Own Sign	Average Ratings of the Other 11 Signs	Average Ratings of "Barnum" Paragraph	t or F test p	Main Finding
Daily Forecasts (1 = useless, 7 = very useful)						
Montreal Newspaper	(161)	3.14	2.59		<.05	Own > Other 11
Toronto Newspaper	(125)	2.62	2.38		n.s.	Own = Other 11
Monthly Forecasts (1 = useless, 7 = very useful)						
Magazine A	(148)	2.56	2.14		n.s.	Own = Other 11
Magazine B	(150)	2.97	2.89		n.s.	Own = Other 11
Personality Description (1 = not at all like me, 7 = very much like me)						
"Purse Book" A	(98)	4.59	4.10	5.64	<.001	"Barnum" > Own = Other 11
"Purse Book" B	(83)	5.99	5.07	6.06	<.01	"Barnum" = Own > Other 11

ANSWER: (Bear in mind that all subjects made their ratings without knowing the appropriate zodiac sign.) Subjects rated their own daily forecast (for yesterday) from the Montreal newspaper as somewhat more personally useful than the other 11 forecasts (subjects live in Montreal and read the Montreal forecasts). These findings were not replicated when using forecasts from a Toronto newspaper.

When rating monthly forecasts (for last month), subjects found that their own forecast was not more personally useful than the forecasts for the other 11 signs; this was true for two different magazines.

Subjects' ratings of personality descriptions showed that they rated the "Barnum" paragraph description to be the most like their own personality; this was true for two different samples, using two different sets of astrologically based personality descriptions. However, using one of the sets of astrologically based descriptions, subjects' own sign's personality description was seen to be as accurate as the "Barnum" paragraph (and both of these were rated as more accurate than the personality descriptions of the other 11 zodiac signs), while, when the second set of descriptions was used, subjects' own sign's descriptions were perceived to be no more accurate than the personality descriptions of the other 11 zodiac signs.

QUESTION: What is the role of expectancy in judgments of horoscope forecast usefulness and of astrologically based personality description accuracy?

Role of Expectancy in Daily Forecast Usefulness Ratings

ly Forecasts (= useless, 10 = very useful)	(n)	Average Ratings of One's Own Sign	Average Ratings of the Other 11 Signs	t or F test p	Main Finding
treal Newspaper					
.dentified by zodiac sign	(31)	3.68	2.09	<.01	Own > Other11
ot identified by zodiac sign	(161)	3.14	2.59	<.05	Own > Other11
Main Finding: Interaction	(192)	Own/Other 11 x Identified/Not Identified		<.10	Own sign's forecast, when identified by zodiac sign, is rated relatively more accurate than when not identified by zodiac sign, while average ratings of the other 11 signs are rated relatively less accurate if identified by zodiac sign than if not identified.
ronto Newspaper					
Identified by zodiac sign	(31)	4.81	2.19	<.001	Own > Other11
Not identified by zodiac sign	(125)	2.62	2.38	n.s.	Own = Other11
Main Finding: Interaction	(156)	Own/Other 11 x Identified/Not Identified		<.001	(as in interaction above)

Role of Expectancy in Judgments of Personality Description Accuracy

rsonality Descriptions Purse Book" 8) (= not at all like me,) = very much like me)	(n)	Average Ratings of One's Own Sign	Average Ratings of the Other 11 Signs	Average Ratings of "Barnum" Paragraph	t or F test p	Main Finding
dentified by zodiac sign	(22)	6.73	4.27	6.18	<.01	"Barnum" = Own > Other 11
ot identified by sign	(83)	5.99	5.07	6.06	<.01	"Barnum" = Own > Other 11
ain Finding: Interaction	(105)	Own/Other 11 x Identified/Not Identified			<.10	(as in interactions above)

ANSWER: Subjects who made ratings knowing which forecasts or descriptions applied to their own zodiac sign rated these as more personally useful or accurate, respectively, than they rated the other 11 signs. There was a tendency for subjects who knew which forecasts or descriptions applied to their own zodiac sign to rate these as relatively more personally useful or accurate and to rate other 11 signs as less personally useful or accurate than did subjects who did not know which forecast or description applied to their own sign. These results suggest that expectancy, in the form of knowledge of zodiac sign, plays a role in judgments of horoscope forecast usefulness and of astrologically based personality description accuracy.

QUESTION: Why do even "nonbelievers" often feel that the personality description for their own zodiac sign is surprisingly accurate?

Average Number of Personality Descriptions in "Purse Books" A and B Correctly Matched

(n)	Average Number of Descriptions Out of 12 Correctly Matched	p of These Results Being Obtained by Chance
(17)	4.12	<.05

Role of Expectancy in Judgments of Personality Description Accuracy

	(n)	Average Ratings of One's Own Sign	Average Ratings of the Other 11 Signs	Average Ratings of "Barnum" Paragraph	F test p	Main Finding
Personality Descriptions ("Purse Book" B descriptions identified by zodiac sign) (1 = not at all like me, 10 = very much like me)	(22)	6.73	4.27	5.18	<.01	"Barnum" = Own > Other 11

Average Accuracy Ratings of One's Own Sign's Personality Description by Those Who Have or Have Not Ever Read a Description of Their Own Sign

	Ratings by Those Who Have At Some Time, Read a Description of Their Own Sign		Ratings by Those Who Have Never Read a Description of Their Own Sign		t test p	Main Finding
	(n)	x̄	(n)	x̄		
Personality Descriptions ("Purse Books" A and B descriptions rated without knowing the appropriate zodiac sign) (1 = not at all like me, 10 = very much like me)	(117)	6.38	(54)	5.26	<.05	Have read description > Have not read description

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ANSWER: Astrologically based personality descriptions appear to be reasonably reliable (i.e., subjects can correctly match them at better than chance levels). Subjects' ratings of the "Barnum" paragraph, which contains vague statements with a high

base rate occurrence in the population, indicate that such vague statements are seen as fairly characteristic of oneself; indeed, even when subjects know which personality description is of their own zodiac sign, their ratings of such descriptions are only marginally, and not significantly, higher than their ratings of the "Barnum" paragraph. Furthermore, those subjects who have, at some time in the past, read a description of their own sign's personality description rated their own sign's personality description in the present study as more accurate than did subjects who have never read such a description.

These findings suggest that even "nonbelievers" may feel that the personality description of their own sign is remarkably accurate a) because they may recognize elements of the description and confuse familiarity with accuracy, and b) because such descriptions contain many vague statements with a high base rate of occurrence in the population which, under appropriate circumstances, are seen as good descriptions of oneself.

Discussion

What personality factors and individual differences are associated with horoscope reading habits?

   a) Females read their horoscope forecasts more often than males and found these, as well as astrologically
      based personality descriptions, to be more personally useful and accurate than did males.

   b) Of the personality and individual differences variables investigated, only the Neuroticism scale of the
      Eysenck Personality Inventory was found to be related to horoscope reading habits.

How reliable are daily and monthly horoscope forecasts and astrologically based personality descriptions?

   a) Daily and monthly horoscope forecasts could not be matched reliably.

   b) Astrologically based personality descriptions, on the other hand, were correctly matched at better than
      chance levels; this suggests some degree of reliability.

How valid are daily and monthly horoscope forecasts and astrologically based personality descriptions?

   a) Daily and monthly horoscope forecasts do not appear to be valid.

   b) When personality descriptions were not identified by the appropriate zodiac sign, subjects rated their
      own sign's description to be a better description of themselves than they rated the other 11 signs (when
      one set of descriptions was used), and to be no better than the other 11 signs (when another set of descrip-
      tions was used).

      Although not conclusive, these results suggest that astrologically based personality descriptions may have
      some validity (see QUESTION 5).

ION 4: What is the role of expectancy in judgments of horoscope forecast usefulness and of astrologically based personality description accuracy?

a) Knowing that a particular daily forecast or personaltiy description was for one's own sign caused subjects to rate these as more personally useful or accurate than the other 11 signs' forecasts and descriptions.

These results suggest that expectancy, in the form of knowledge of zodiac sign, plays a role in people's judgments of forecast usefulness and of astrologically based personality description accuracy.

b) However, even when personality descriptions were identified by the appropriate zodiac signs, one's own description was rated to be no more accurate than the "Barnum" paragraph.

This finding suggests that astrologically based personality descriptions are seen to be valid partly because they contain vague statements with a high base rate of occurrence in the population.

TION 5: Why do even "nonbelievers" often feel that the personality description for their own sign is surprisingly accurate?

a) The data indicate that 1) astrologically based personality descriptions have some reliability, 2) knowing that a particular description applies to one's own sign increases its perceived validity, 3) the "Barnum" description is seen to be as accurate as one's own zodiac sign's personality description, even when these are identified by the appropriate sign, and 4) people who have read a personality description of their own zodiac sign at some time in the past rate their own sign's description to be more accurate than people who have never read a personality description of their own sign, even when descriptions are not identified by zodiac sign.

These results suggest that even "nonbelievers" may feel that the personality description of their own sign is remarkably accurate because they may recognize elements of the description and confuse familiarity with accuracy and because such descriptions contain many vague statements with a high base rate of occurrence in the population, which, under appropriate circumstances, are seen as good descriptions of oneself.

Conclusions

1. Females read their horoscopes more often than males, and females feel that forecasts and personality descriptions are more accurate. Locus of Control and grades are unrelated to horoscope reading habits, while Neuroticism on the Eysenck Personality Inventory is strongly related.

2. Daily and monthly horoscope forecasts lack reliability; astrologically based personality descriptions are somewhat reliable.

3. Daily and monthly horoscope forecasts lack validity; astrologically based personality descriptions may have some validity, but explanations other than astrological may explain the results.

4. Knowing that one is reading the forecast or the personality description of one's own sign increases personal usefulness and accuracy ratings.

5. "Nonbelievers" may feel that the personality description for their own zodiac sign is surprisingly accurate because they may recognize elements of the description and confuse familiarity with accuracy and because astrologically based personality descriptions contain vague statements with a high base rate of occurrence in the population which, under appropriate circumstances, are seen as good descriptions of oneself.

POPULAR HOROSCOPES AND THE "BARNUM EFFECT"*[1]

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SUMMARY

The following were investigated in a series of studies on 366 college students: (*a*) individual differences associated with horoscope reading habits, (*b*) the reliability and validity of daily and monthly horoscope forecasts and astrologically based personality descriptions, and (*c*) the effects of knowing the zodiac sign on the perception of the usefulness of horoscope forecasts and on the accuracy of astrologically based personality descriptions. Results indicate that females were more likely to read their horoscopes. Although locus of control was unrelated to horoscope reading habits, Neuroticism on the EPI was closely related. Daily and monthly forecasts were shown to be unreliable and invalid. Astrologically based forecasts descriptions were found to have some reliability. Knowledge of personality zodiac sign was found to affect ratings of horoscope usefulness and accuracy of astrologically based personality descriptions. Such personality descriptions, even when not identified by zodiac sign, were shown to have some validity, at least in the eyes of readers. These results are explained by familiarity effects and by the "Barnum effect."

A. INTRODUCTION

In the United States an estimated 90% of daily newspapers carry horoscopes (13), and 30% to 60% of the population admit to some belief in astrology (5). Given their pervasiveness, surprisingly little is known about horoscopes or about horoscope readers.

A number of studies have investigated the relationship between horoscope reading habits and personality. The most frequently explored variable has been locus of control. The findings of these studies have been

contradictory. Scheidt (14) found that external locus of control was related to positive attitudes toward paranormal phenomena; however, Sosis, Strickland, and Haley (21) found no relationship between locus of control and interest in astrology. McGarry and Newberry (10), in an attempt to reconcile the conflicting results, have merely added to the confusion. They found that while high involvement with paranormal practices was related to internal locus of control, low involvement was not related to external locus of control.

Locus of control has also been studied in relation to acceptance of vague, general personality descriptions as accurate characterizations of oneself. The results in this area have been contradictory as well. Snyder and Larson (19) found that external locus of control was related to the acceptance of such descriptions, yet Snyder (17) was unable to replicate these results.

Snyder and his colleagues have carried out extensive studies of the acceptance of vague, general personality descriptions which contain statements with a high base rate of occurrence in the population. The acceptance of such descriptions has been called the "Barnum effect" by Meehl (11) after P.T. Barnum, whose circuses' success was thought to be based on the notion that there should be a "little something for everybody" (20). Snyder has reported on the acceptance of "Barnum" personality descriptions ostensibly based on psychological tests and interviews (17, 19) as well as on signs of the zodiac (18). In their review of the literature, Snyder *et al.* (20) expressed doubts about the usefulness of investigating personality characteristics independent of situational factors that elicit acceptance. The studies they reviewed indicate that a number of situational variables appear to be highly relevant. Factors which have been shown to affect acceptance of Barnum descriptions include: (*a*) the generality of statements, (*b*) the high base rate of occurrence in the population of certain characteristics, (*c*) the degree to which descriptions are ostensibly individualized for the person, and (*d*) the favorability of descriptions.

But can personality variables and the Barnum effect completely explain why people read daily and monthly horoscope forecasts and why they feel that the personality description of their own sign is surprisingly accurate? Can it be alternatively true that forecasts are read because they provide information that is possibly personally useful and because astrologically based personality descriptions are possibly accurate? Kelly's (8) review of the literature showed that there are many different theoretical views proposed by astrologers and that there is little evidence to support or, indeed, to dispute, astrological claims. Few studies have assessed either the per-

sonal usefulness of forecasts or the accuracy of astrologically based personality descriptions (i.e., their validity). It is also not known whether different astrologers, when compiling forecasts or personality descriptions for a particular sign, make similar predictions (i.e., reliability). Almost nothing is known about the most frequently read astrological information: daily and monthly forecasts and brief personality descriptions appearing in newspapers and magazines.

In the present investigation, the following questions were explored. What personality factors and individual differences are associated with horoscope reading and with belief in astrology? How reliable and valid are daily and monthly horoscope forecasts and astrologically based personality descriptions? What is the role of knowing the zodiac sign in judgments of horoscope forecast usefulness and of personality description accuracy? Why do even "nonbelievers" often feel that the personality description for their own zodiac sign is surprisingly accurate?

B. METHOD

Three hundred and sixty-six college students (M age 17.5; range 16-22) enrolled in Introductory Psychology courses from 1980 to 1981 served as Ss.

Individual differences associated with horoscope reading were assessed by having some Ss complete the Eysenck (4) Personality Inventory (EPI) and others complete the Rotter (12) Internal-External Locus of Control (I/E) Scale; all answered questions concerning their grades and horoscope reading habits.

Validity of daily and monthly horoscope forecasts was evaluated by having some Ss rate the previous day's forecasts for all 12 zodiac signs and having others rate the previous month's forecasts. Daily forecasts were taken from two high circulation daily newspapers.[2] Ratings were made on a 10-point scale of personal usefulness ("How personally useful would this forecast have been for you if you had read it yesterday?") by 192 Ss. Ss rated both sets of forecasts. Some Ss rated daily forecasts identified by the appropriate zodiac sign; others rated the same forecasts without knowing the signs. The same procedure was followed for monthly forecasts. One hundred and fifty Ss rated the previous month's forecasts for all 12 zodiac

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[2] Forecasts were from the *Gazette* (Montreal, astrologer Sydney Omarr) and from the *Toronto Globe and Mail* (astrologer Jeane Dixon). Forecasts from different cities were used in order to control for the possibility that Ss, all of whom resided in Montreal, were familiar with the Montreal forecasts.

signs. Monthly forecasts were taken from two high circulation "women's" magazines.[3] All Ss rated both monthly forecasts without knowing the zodiac signs.

Reliability of daily forecasts was assessed by having nine frequent horoscope readers (at least three times per week) spend a minimum of 30 minutes attempting to match the daily forecasts, which were not identified by zodiac sign, from the two newspapers mentioned above. The same procedure was followed for monthly forecasts by five other frequent horoscope readers.

Validity of astrologically based personality descriptions was evaluated by 203 Ss who rated 13 one-paragraph personality descriptions on a 10-point scale ranging from "not at all like me" to "very much like me." Twelve paragraphs were astrologically based personality descriptions taken from two different "purse size" horoscope booklets[4] (references to ruling planets and predictions for the future were deleted). Ninety-eight Ss rated the descriptions from one of the purse-size booklets; an additional 105 Ss rated those from the other set. The 13th personality description was the Barnum paragraph described by Snyder et al. (20); it contains vague statements with a high base rate of occurrence in the population and is usually perceived as highly accurate when attributed to credible sources. Some Ss read all descriptions identified by the appropriate zodiac sign (the Barnum paragraph was presented as a description of the average college student), while others read the description without knowing the appropriate zodiac signs.

To assess the reliability of astrologically based personality descriptions, 17 Ss who believed that astrologically based personality descriptions were valid and who had spent a minimum of two hours on the task attempted to match the 12 personality descriptions, which were not identified by zodiac signs, from the two purse books.

C. RESULTS

1. *Personality and Individual Differences*

Ss read their daily forecast, on the average, 1.09 times per week. Sixty-four percent had read a personality description of their own sign; they found these to be moderately accurate (M = 5.44 on a 10-point scale, with

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[3] Forecasts from *Vogue* (astrologer Marie Elise Crummere) and from *Glamor* (astrologer not named) were used.

[4] Descriptions from *Globe Mini Mags* (1981, astrologer John Naylor) and from Dell Purse Books (1981, astrologer Sally Joyce) were used.

10 being "very accurate"). Females read their daily forecasts more frequently, $t(341) = 2.19$, $p < .05$, indicated that forecast information was more personally useful, $t(321) = 4.52$, $p < .001$, and that the personality description of their own sign was more accurate, $t(114) = 2.03$, $p < .05$, than did males.

Neither scores on the Rotter I/E Scale nor grades in psychology were related to horoscope reading habits. Scores on the Neuroticism Scale of the EPI, on the other hand, were found to be significantly positively correlated with reading frequency, Pearson $r(19) = .671$, $p < .001$, and forecast usefulness ratings, $r(17) = .577$, $p < .01$, but not with ratings of the accuracy of personality descriptions. Reading frequency was found to be positively related to judgments of forecast usefulness, $r(200) = .391$, $p < .001$.

2. Reliability of Forecasts and Personality Descriptions

Daily and monthly forecasts were correctly matched only at chance levels. However, an average of 4.12 of the 12 personality descriptions were matched correctly by the 17 Ss; the probability of such results being due to chance is less than 5% (1).

3. Validity of Forecasts and Personality Descriptions

Results, presented in Table 1, show that when Ss made ratings without knowing zodiac signs, it was found that they rated their own daily forecast

TABLE 1
PERCEIVED VALIDITY OF DAILY FORECASTS AND PERSONALITY DESCRIPTIONS

Source	Own sign	Other 11 signs	"Barnum"
	Daily forecasts		
Montreal newspaper			
Identified by sign	3.68	2.09	
Not identified	3.14	2.59	
Toronto Newspaper			
Identified by sign	4.81	2.19	
Not identified	2.62	2.38	
	Personality descriptions		
Purse Book A			
Not identified	4.59	4.10	5.64
Purse Book B			
Identified by sign	6.73	4.27	6.18
Not identified	5.99	5.07	6.06

Note: The higher the mean score, the greater the perceived usefulness or accuracy; maximum score = 10.

(for yesterday) from the Montreal newspaper as somewhat more personally useful than the forecasts for the other 11 signs, $F(1, 160) = 4.68$, $p < .05$. However, these results were not replicated when forecasts from a Toronto newspaper, where possible familiarity with forecasts was eliminated, were rated. Thus, it appears that daily forecasts were not valid.

No differences were found between 150 Ss' ratings of the personal usefulness of their own and others' monthly forecasts; this was true for forecasts taken from both magazines used. These results suggest that monthly forecasts were not valid.

As shown in Table 1, when no information on zodiac sign was provided, Ss' ratings of personality descriptions showed that they judged the Barnum paragraph description to be the most like their own personality; this was true for two different samples and two different sets of astrologically based personality descriptions: $F(2, 194) = 14.81$, $p < .001$; $F(2, 164) = 6.11$, $p < .01$. However, when one of the two sets of astrologically based descriptions was used (Purse Book B) and when zodiac sign was not known, Tukey hsd tests showed that Ss judged the personality description for their own sign to be as accurate as the Barnum paragraph (and both of these were rated as more accurate than the personality descriptions of the other 11 zodiac signs): $Q = 4.108$, $k(164) = 3$, $p < .05$; $Q = 4.434$, $k(164) = 3$, $p < .01$, respectively. When the second set (Purse Book A) of personality descriptions was used, Ss rated their own sign as no more accurate than the other 11 signs.

4. Role of Knowledge of Zodiac Sign and Previous Experience

Means in Table 1 show that Ss who made ratings knowing which daily forecasts applied to their own zodiac sign rated these as more personally useful than the forecasts and descriptions for the other 11 signs; this was true for both the Montreal, $F(1, 30) = 9.61$, $p < .01$, and the Toronto, $F(1, 30) = 18.41$, $p < .001$, newspapers. When the scores of Ss who made ratings knowing the zodiac signs were compared, in the same analysis, to those made by Ss who did not know the signs, results indicate that Ss who knew which forecast and description applied to their own zodiac sign rated these as relatively more personally useful and rated the other 11 signs as less personally useful than did Ss who did not know which forecast applied to their own sign: $F(1, 190) = 2.82$, $p < .10$ for the Montreal and $F(1, 154) = 15.26$, $p < .001$ for the Toronto newspaper.

When Purse Book B personality descriptions were identified by zodiac sign results on perceived accuracy show a significant main effect, $F(2,$

42) $= 9.23$, $p < .001$. As shown by the means in Table 1, Ss judged the personality description for their own sign to be as accurate as the Barnum paragraph and judged both of these to be more accurate than the personality descriptions of the other 11 zodiac signs: $Q = 5.786$, $k(42) = 3$, $p < .01$; $Q = 4.434$, $k(42) = 3$, $p < .01$, respectively. Furthermore, Ss who knew which description applied to their own zodiac sign tended to rate these as relatively more accurate and tended to rate the other 11 signs as relatively less accurate than did Ss who did not know which description applied to their own sign, $F(2, 206) = 2.56$, $p < .10$.

Ss who had, at some time in the past, read a description of their own sign's personality rated their own sign's description, when this was not identified by sign, as more accurate ($M = 6.38$) than did Ss who had never read ($M = 5.26$) such a description, $t(169) = 2.48$, $p < .05$.

D. DISCUSSION

Sex differences. The findings in the present study that females were more likely to read and to believe in horoscope forecasts and in astrologically based personality descriptions is consistent with the data of Sosis *et al.* (21), who found similar sex differences in college students. Sosis *et al.* offered three possible explanations for their findings. The greater concern with astrology by females may be an attempt to adopt a passive stance in order to escape from recent pressures to achieve in academics and careers, a means by which females, who often feel relatively powerless, can exert more control over their lives, and "a sex-typed superstitious pastime" (p. 70). None of these explanations is supported by evidence. For example, Bastedo (2) cites Gallup Poll results which show that believers in astrology tend to be less educated and tend to occupy low status jobs, a finding which is not consistent with the first explanation. The present study's finding of no relationship between locus of control and horoscope reading habits argues strongly against Sosis *et al.*'s second point. Sosis *et al.*'s third possibility is not really an explanation at all. Another possible explanation is at least supported by informal research: females may believe in astrology simply because horoscopes are usually found in the "women's" sections of daily newspapers and in "women's" magazines. The search for stimulus materials for the monthly forecasts used in this study necessitated a perusal of many "neutral" (e.g., *Time*, *Newsweek*), "women's" (e.g., *Vogue*, *Glamor*) and "men's" (e.g., *Playboy*, *Penthouse*) magazines. Only the "women's" magazines carried horoscopes. It is difficult to determine which came first, women's interest in astrology or publishing policy. Nevertheless,

women are more likely to be exposed to astrology; this, of course, can stimulate greater interest.

Personality and individual difference variables. Neuroticism scores on the EPI were found to be positively related both to reading frequency and to belief in horoscopes. These results are of considerable interest as the EPI has been used in a number of controversial studies of astrology (see 8 for a review). Various investigators (9, 16) have found support for the astrological prediction that people born under the so called water signs (Cancer, Scorpio, Pisces) exhibit greater Neuroticism than those born under other signs. Others (7, 23) have not been able to replicate these results. The present findings suggest that since a concern with astrology is related to Neuroticism, future studies of astrological predictions using the EPI should control for the horoscope reading habits of Ss in each zodiac sign.

Locus of control and grades were not found to be related to horoscope reading frequency or to belief in astrology. The absence of a relationship between either grades or locus of control and belief in astrology is consistent with the data of both Sosis *et al.* (21) and McGarry and Newberry (10). In college students, belief in the paranormal is, therefore, probably not due to lack of intelligence. Nor is belief in astrology simply an attempt to exert control over one's life.

Reliability of forecasts and personality descriptions. The results indicate that daily and monthly horoscope forecasts have little reliability; i.e., forecasts for each sign made by one astrologer were found to be unrelated to forecasts made by another. There are at least three possible reasons for this: different astrologers may focus on different aspects of daily life, vague wording of forecasts may preclude accurate pairing, and astrologers using different theoretical formulations may make different, sometimes even conflicting predictions. In the present investigation, an attempt was made to eliminate the first reason by using stimulus materials from publications with similar readership. Thus, forecasters would have been expected to have focused on similar life situations.

Astrologically based personality descriptions, on the other hand, were found to have some reliability. Ss were able to match personality descriptions formulated by different astrologers at better than chance levels. Bastedo (2), who subjected large numbers of astrologically based personality descriptions to content analysis, also found considerable agreement among astrologers concerning traits which characterize each sign.

Perceived validity of forecasts and personality descriptions. Daily and monthly horoscope forecasts were not perceived to be valid by the Ss in

this study. When zodiac sign was not known, Ss' ratings of the personal usefulness of forecasts indicated that the forecast for their own sign was no more personally useful than the forecasts for the other 11 signs. However, when zodiac sign was known, Ss rated the forecast for their own sign as more personally useful than the forecasts for the other signs. These results suggest that one of the reasons for belief in astrology is knowledge of zodiac sign. When sign is known, as it is in all horoscopes, people may be motivated to ignore predictions that do not fit and to focus on predictions which do. It is easier to recall, "When my horoscope said beware of accidents, I broke my leg," than it is to recall, "When my horoscope said beware of accidents, I did not have an accident." "Illusory correlations" between two variables that are present are much more easily made than between one variable which is present and another which is absent (3, 22).

The present study was concerned with the perceived validity rather than the construct validity of astrologically based personality descriptions. Thus, positive findings should not be interpreted as support for astrological principles. When the perceived validity of personality descriptions was assessed, it was found that the Barnum paragraph was judged by Ss as the most accurate description of themselves. This was true both when zodiac sign was known and the Barnum paragraph was identified as a description of the average college student and when zodiac sign was not known. In addition, when zodiac sign was known, Ss rated the description of their own sign to be more accurate than the description of the other 11 signs. An unexpected finding was that when zodiac sign was not known and Purse Book B descriptions were used, Ss rated their own sign's description to be more accurate than the descriptions of the other 11 signs. However, these results were not replicated when Purse Book A descriptions were used.

A number of possible explanations of the present findings on the perceived validity of astrologically based personality descriptions can be made. However, explanations based on the effect of knowing the sign, on the role of situational variables, and on the Barnum effect cannot explain all of the findings.

Zodiac sign and situational variables (e.g., generality of statements, characteristics with a high base rate of occurrence in the population, descriptions ostensibly individualized for the person, favorable wording) have been shown to influence acceptance of astrologically based personality descriptions (15, 18). However, neither knowledge of sign nor situational factors can explain the superiority of the Barnum paragraph or the finding that when zodiac sign was not known and Purse Book B was used, Ss

rated their own sign's description as more accurate than the descriptions of the other signs. Thus, knowledge of sign and situational factors can explain some, but not all of the present results. Indeed, Hampson, Gilmour, and Harris (6), in a series of three studies, have shown that people do not accept personality descriptions simply because of demand characteristics or because of social desirability or because they cannot distinguish true from false information about themselves.

In addition, despite the presence of the Barnum effect, it is difficult to account for the finding that even when zodiac sign was not known Ss rated their own sign's description as more accurate than the descriptions of the other 11 signs.

In order to explain this unexpected finding, a supplementary analysis of the data was carried out. The ratings of Ss who had, at some time in the past, read a description of their "own sign" personality were compared to those of Ss who had not. It was found that Ss who had read such a description rated their own sign's description to be more accurate than did Ss who had never read a description of their own sign. These results suggest that familiarity may explain the finding that one's own sign's description was rated as more accurate than the other 11, even when zodiac sign was not known. Two possible mechanisms underlying the effect of familiarity on acceptance of personality descriptions can be proposed. Having read that, "As a Virgo, you are an honest person," one's self assessment may come to include the trait "honest." A personality description which stresses honesty may therefore be accepted as an accurate characteristic of oneself. Alternately, having some previous information about one's supposed character traits (e.g., "I'm a Virgo. Virgos are honest.") may give one the opportunity to notice, and subsequently to recall, instances of behavioral confirmation (e.g., "I returned the bus ticket to the man who dropped it. This was really honest of me.") Thus, familiarity may operate, in this instance, through having repeatedly noticed oneself behaving in an honest fashion.

Once the effects of familiarity with one's astrologically based personality description are recognized, it is possible to account for all of the findings related to the acceptance of astrologically based personality descriptions. The data indicate that 1. astrologically based personality descriptions have some reliability, 2. knowing that a particular description applies to one's own sign increases its perceived validity, 3. the Barnum description is seen to be as accurate as one's own zodiac sign's personality description even when descriptions are identified by the appropriate sign, and 4. people who

have read a personality description of their own zodiac sign at some time in the past rate their own sign's description to be more accurate than do people who have never read a personality description of their own sign, even when descriptions are not identified by zodiac sign. These results suggest that acceptance of astrologically based personality descriptions are due to 1. the reliability of such descriptions, 2. knowing that the description is for one's own zodiac sign, 3. the Barnum effect, and 4. familiarity. Even "nonbelievers" may feel that the personality description of their own sign is remarkably accurate because they may recognize elements of the description and confuse familiarity with accuracy.

Many "believers" and even some "nonbelievers" feel that astrologically based personality descriptions provide accurate characterizations of people. Explanations for the perceived validity of such descriptions can be offered without resorting to astrological tenets. But what have yet to be investigated are the consequences of such beliefs; whether one's reading of, e.g., "As a Virgo, you are gregarious and outgoing," would affect one's self-assessment or behavior and perhaps create a self-fulfilling prophecy.

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