A PSYCHOLOGICAL STUDY OF 80 FEMALE LONG DISTANCE RUNNERS USING THE MYERS-BRIGGS TYPE INDICATOR AND DEMOGRAPHIC DATA

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TABLE OF CONTENTS

LIST OF TABLES

FIGURE

CHAPTER I

INTRODUCTION

In 1972 Morgan and Costill published the paper, "Psychological Characteristics of the Marathon Runner," becoming pioneers in exploring the psychological traits of a small group of selected male marathoners. In the mid to late seventies, studies by Clitsome and Kostrubala (1979) concerning the personality types of marathoners continued investigation in this area. Each of these studies, however, were limited to male marathoners (N=9 in Morgan and Costill's work and N=83 in Clitsome and Kostrubala's). This limitation is easily explained in that one survey ("Who is the American Runner," 1980) reported that in late 1978 only 13% of all long distance runners were women, with a much smaller population having run the marathon. Thus, the women subjects were not readily available, at least not at the marathoning level.

By 1979 this situation had begun to change dramatically. A recent report (Andrews and Martin, 1980) states that while in 1975 only 433 women ran a marathon, at the end of the decade 95,000 women's distance performances from five kilometers up to the marathon had been recorded in this country alone (8,000 of these were marathons).

While these earlier studies and others that have replicated them dealt with male middle-long distance and marathon runners suggesting their psychological profiles, much of the rest of the running public has been untouched by such studies.

The present study has attempted to deal with a part of this public that was virtually unknown just a few years ago: the female long distance runner. Though much research has appeared recently about women who run, most of these have concerned themselves with elite runners and not with women of modest talent. The present study has also replicated the work of Clitsome and Kostrubala (1979) by having used the Myers-Briggs Type Indicator (MBTI), Form F, along with a demographic data sheet, but used a selected group of female long distance runners (N=80) instead of their 100 (male, N=83; female, N=17) marathoners.

Statement of the Problem

The purpose of this study was to investigate the personality type of a selected group of female long distance runners (N=80) as determined by the MBTI, Form F. The sub-problems were:

1. To determine a demographic profile of the female long distance runners in the study.

2. To compare the psychological profile of this study's subjects to those females (N=17) in other studies of Clitsome and Kostrubala (1979).

3. To determine if a predictable personality type can be established among female long distance runners.

Hypothesis of the Study

The present study was conducted on the basis of the following hypothesis: The psychological and demographic profiles of the subjects of the study will not vary significantly with those profiles of subjects in the study of Clitsome and Kostrubala (1979).

Importance of the Study

The participation of women in running can be documented as far back as 35 centuries ago. One report (Andrews and Martin, 1980) of such documentation traces back women's footraces in the Greek festivals, which have evolved into the modern day Olympics. It also points out that two of the Greek's most important female mythological figures included Hera and Atalanta, both associated with physical fleet-footedness.

When the Olympics were reestablished in the late nineteenth century, women were there running, though probably not in an official capacity. A bias had appeared among Olympic organizers denying women the opportunity of running middle-long distance events. Unfortunately, this problem still exists even in the face of extensive physiological evidence ("The Female Athlete in Long Distance Running," 1980) that women can indeed bear the physical

stress of the longer running events. In fact, the American College of Sports Medicine, in its opinion statement, declares:

> Females should not be denied the opportunity to compete in long-distance running. There exists no conclusive scientific or medical evidence that long-distance running is contra-indicated for the healthy, trained female athlete ("The Female Athlete in Long Distance Running," 1980, p. 135).

Even still, in the 1980 Olympics there were no women's distance running events longer than the 1500 meters which is known as the "metric mile" (Martin, 1979, p. 38). This occurred in the face of Norway's Grete Waitz, who, in October of 1979, won the women's division of the New York City Marathon in the time of 2 hours, 27 minutes, 33 seconds--a time that "would have beaten half the male Olympic marathon winners, and all the men in the 1970 New York Marathon" (Andrews and Martin, 1980, p. 61).

The importance of the present study did not exist in making a case for more women's marathons, nor was it in tracking the progression of the ladies in these events over the years. The importance here was to further recognize this group of women in our society and to hopefully add to the body of knowledge documenting who they are; what they do; how they train; and especially, what they are like in the area of their psychological personalities as compared to other long distance runners.

Though much research has been undertaken in the realm of sport psychology (Morgan and Pollack, 1979) and how it

relates to individual sports versus team sports in terms of the extraversion-introversion of the athletes who participate in them, new data in the area of the psychological benefits of running, especially in women, have proved quite interesting. Some of this data appeared via Shipman (Andrews and Martin, 1980) at the 1980 meeting of the International Association of Running Therapists. His data implies that women may receive even more psychological benefits from regular running than men do.

Thus, the present study dealt with women runners of varying abilities and their psychological profiles. Perhaps such a study has helped to better understand these athletes and, having found understanding, has helped set aside misconception.

Limitations of the Study

In measuring the female runner's personality type, the MBTI, Form F, was used. Many factors come to bear when trying to measure personality. Cultural forces, along with the subject's home life and countless other social variables contribute to its development. It is a formidable task to devise a workable theory to reflect the precepts upon which people deal with their environment, the way they react to situations, the terms on which they build their reasoning powers, or the differences in the values which motivate them (Myers and Briggs, 1962).

The MBTI is based on the modern Jungian theory of personality. In short, the theory suggests that "Much apparently random variation in human behavior is actually quite orderly and consistent, being caused by certain basic differences in mental functioning" (Myers and Briggs, 1962, p. 51). These variations in behavior stem from the way people prefer to develop their minds in terms of their use of perception and judgment. "Perception" was seen by Jung (Myers and Briggs, 1962, p. 51) as "the processes of becoming aware of things or people or occurrences or ideas," whereas "judgment" is described as including ". . . the processes of coming-to-conclusions about what has been perceived." These two areas act together to make up a great deal of a person's mental functioning. They also control external behavior in that perception is said to decide the way an individual sees a circumstance and his judgment constitutes how he decides to react to it (Myers and Briggs, 1962). The use of the MBTI only, without also administering one of the several other instruments available such as the Eysenck Personality Inventory or the Sixteen Personality Factor Questionnaire, was viewed as a limitation of the study. A second limitation was the subject of the study, in that for the most part they represented only the midland section of the country.

Delimitations of the Study

The delimitations of the study began with the selection

of the subjects to be used. The author attended seven road races in Oklahoma and Texas of varying distances and personally contacted female participants to present them with the research materials. Those subjects who completed and returned it to the author were included in the study (N=80).

Other delimitations of the study included the use of the MBTI only to measure the personality types of the subjects, subjects who were considered to be below "nationals class" in their running ability, and the use of a demographic questionnaire from the study of Clitsome and Kostrubala (1979), with some minor modifications by the author.

Assumptions of the Study

Three assumptions were made in this study. First, that the MBTI was easily understood by the subjects and that they answered it truthfully. Second, that the questionnaire was understood and answered accurately by the subjects. Third, that the subjects used in the study were typical of the female runners who were participating in the road races used in the study.

CHAPTER II

REVIEW OF LITERATURE

The popularity of long distance running in the United States over the last decade has been near epidemic. Estimates of up to 30 million Americans are now participating in the sport (Martin, 1979). As the popularity has grown, a market for literature has appeared to inform this population not only about the "how to's" of running but also about who the runners are themselves. Popular books on the subject abound. Many of these writings center around the psychological effects of running (Glasser, 1976; Henderson, 1976; Kostrubala, 1976; Rohé, 1974). However, scientific research is still lacking in the area of the psychological personality characteristics of these runners. Information concerning the personalities of female runners is even more scarce.

The field of sport psychology is where most of the research has taken place. These studies were concerned with definable traits that could be used to channel athletes into sports they might be best suited to (Kroll, 1965). Others dealt with extraversion versus introversion and various traits associated with team sports athletes as compared to individual sports athletes (Peterson and Others, 1967).

Kroll (1965) used the Sixteen Personality Factor Questionnaire with different ability level wrestlers. He found that "Wrestlers demonstrated a significant departure from average on factor I, indicating tough-mindedness, self-reliance, and masculinity" (p. 49).

In the mid-1950s, Husman (1955) used the Rosenzweig P-F study and other instruments on cross country runners, comparing them to college wrestlers (N=8) and boxers (N=9), and a control group (N=17). The runners differed significantly ($P<.01$) from the boxers and control group, as the runners were shown to exhibit more outward aggression.

In the sixties and seventies Morgan (1980) did numerous studies, some with elite wrestlers using the Eysenck Personality Inventory (EPI). His work also used tennis players, swimmers, basketball players, cross country runners, oarsmen, and marathoners. Together with Costill, Morgan (1972) did a study on nine marathoners in which the EPI Form A, the IPAT 8-Parallel-Form Anxiety Battery (Form A), and the Depression Adjective Check List (DACL)(Form A) were administered. This study was one of the first to deal with the personality of the marathoner. The nine subjects were all male. This study concluded that their marathoner scored within the normal limits on extraversion-introversion, neuroticism-stability, and depression. However, they scored appreciably lower than the norm group for the anxiety variable.

They recommended that further research into the personality of the marathoner be undertaken before a general profile of these runners could be established.

Morgan and Pollack (1979) studied distance runners in 1977. In this detailed study, world class marathoners (N=8) and middle-long distance runners (N=11) were compared with high caliber college middle-distance runners. Each subject completed a battery of psychological inventories made up of the State-Trait Anxiety Inventory (STAI), the Somatic Perception Questionnaire (SPQ), the Depression Adjective Check List (DACL), the Profile of Mood States (POMS), the EPI, Physical Estimation and Attraction Scale (PEAS), and the Hidden Shapes Test (HST). Each runner was also interviewed to determine training habits, family history, etc.

The main thrust of the study was to determine what thought processes took place in the runner during a long distance race. Exercise tests were also employed "in an attempt to characterize the manner in which these runners processed sensory information related to physical effort ('effort sense')" (Morgan and Pollack, 1979, p. 385).

Results of the Morgan and Pollack (1979) study reported that their elite runners were much like outstanding athletes in wrestling and crew, with their "mood" superior to the general population's. Their marathoners,

interestingly, were different from Morgan and Costill's (1972) because they were no more introverted than the general population. Like the previous study, their marathoners were likewise significantly less anxious and depressed than general norms. This trait was seen as a "consequence of involvement in distance running, not an antecedent or selection factor" (Morgan and Pollack, 1979, p. 389).

Other findings were that these runners are a subculture in their consummatory behavior of alcohol, tobacco, coffee, tea, aspirin, and in the daily time spent in training; two and one-half hours on the average, which was seen as having vocational overtones. Also, it was discovered that the elite runner monitors his body's sensory input while he runs, whereas the nonelite, it was known, tends to disassociate himself from any pain that may take place during running. The elite runners, it was seen, did not encounter "the wall" or "pain zones" because they were able to adjust their running paces in such a way as to avoid these zones and were also physiologically superior to the extent that they could run closer to their maximum outputs without discomfort (Morgan and Pollack, 1979).

Some other studies in which females were used included one by Peterson and Others (1967). They used the 16 PFQ, Fom A, on a selected group from 156 women AAU

athletes and the 1964 USA Olympic team. Thirty-eight of these women competed in individual sports and were compared to 59 women who were on sports teams. The results found that "women athletes engaged in individual sports are high in such personality traits as dominance, self-sufficiency, and impulsiveness" (Peterson and Others, 1967, p. 382). The women on team sports are not as introverted but are "steady, practical, and dependable" (p. 382). They are also more sophisticated. "Socially both groups tend to be somewhat cool and aloof" (p. 382).

Neal (1963) used the EPPS in 1963 and concluded that women athletes were significantly higher in the areas of nurturance, achievement, and autonomy as compared to a nonathlete control group. Kane (1972) studied women in track and swimming during 1966 and saw that they were very much alike. Using the 16 PFQ, he viewed them as high on sociability and low in the areas of emotional maturity and confidence while being extraverted and anxious.

Similar studies conducted with the 16 PFQ were done by Mushier (1970) on women lacrosse players who scored high on ability, toughmindedness, and creativity, but were low on sociability. Malmurphy (1968) found women in team sports high in anxiety and group dependence and low on leadership and extraversion when compared to those in individual sports and in a control group. Ogilvie (1968) compared men and women swimmers and concluded that the females were low on dominance, toughmindedness, and

general anxiety. Williams and Others (1970) compared female fencers to norms and to achievement levels and saw that the subjects were high on dominance, and self-sufficiency but low on sociability as compared to the norms.

Such studies led Kane (1972) to suggest in a report to the National Research Conference, Women and Sport, at Pennsylvania State University that:

> 1. Women athletes may be seen in general as 'extraverted and somewhat anxious' and high on dominance with many deviations.
>
> 2. Some good support for the concept of specific 'sports types' does exist.
>
> 3. There may be cultural differences between British female athletes and those of the U.S.
>
> 4. In studies where males and females were compared, the females were lower on dominance and confidence, but higher on traits such as anxiety and impulsiveness.
>
> 5. The same types of 'personality supports for achievement' are similar to both male and female athletes; however, the presence of too much anxiety amongst the females could indicate a need for special preparation for the female to enter the competitive role that she may be unaccustomed to (p. 27).

One study by Booth (1958), using the Minnesota Multiphasic Personality Inventory (MMPI) on a variety of athletes and nonathletes, indicated that varsity athletes were significantly lower in anxiety than nonathletes. Another finding was that varsity individual sports athletes had a significantly high depressive trait than those on the team sports.

The first large scale study on the personality type of lond distance runners, in this case marathoners, without the inclusion of psychopathology, was done by Clitsome and Kostrubala (1979) in 1976. This also was the first time that these personality traits were described using Form F of the MBTI, the instrument employed in the present study. In their study, Clitsome and Kostrubala contacted 125 marathoners over the age of 18 whose names were obtained from lists of those who had completed marathons in Southern California, were registered in marathon clinics in San Diego and Honolulu, or who were members of the San Diego Track Club. Test materials consisting of the MBTI and a Demographic Questionnaire were mailed to these 125 marathoners during the first two months of 1976. The subjects of the study were the 100 marathoners (83 males, 17 females) who had returned the materials within three months. The demographic questionnaire had questions in the areas of training habits, age, occupation, income, and educational levels attained. They also answered the MBTI which described them "in terms of Extraversion versus Introversion, Sensing versus Intuition, Thinking versus Feeling, and Judging versus Perception" (pp. 1010-1020).

Some of the results of this study revealed that using chi-square comparisons on the frequencies of the MBTI preferences between males and females, no significant differences could be found between Extraversion-Introversion,

Sensing-Intuition, Thinking-Feeling, and Judging-Perception. Closer scrutiny found an approximate one to one (1:1) ratio in Extraversion-Introversion, as well as for Sensing-Intuition. This was interesting because it was known that general populations experience ratios of three to one (3:1) for these areas. This meant that their marathoner was twice as introverted as compared to norms (2:1). This held true for the sensing preference.

Combining frequency distributions for the MBTI's, 16 types saw the males as having a maximum number of 16 ISTJ types and a minimum of one for INTP types. The females had a high of three ESTJ types and zero for the INFJ, ISFP, and ESTP types. Once more, no significance was found as for frequency of a specific type using the chi-square on these subjects.

Demographic results showed a mean age of 33.46 years for males and 30.53 years for the females. Using $\overline{Z}$ tests ($\overline{Z}$=3.24), this age difference was significant at the $p<0.01$ level. The males averaged having run 5.78 marathons to the females' 2.94 ($\overline{Z}$=1.98), which was significant at the $P<0.05$ level. The males had also been running significantly longer ($\overline{Z}$=1.87 at $P<0.05$ level), an average 5.87 years to 3.76 years for the females. There were no significant differences between personality types versus the number of miles trained or for the training mileage per week of the males and females. In the area of educational

level it was seen that 93% of the males and 82% of the female marathoners had attained at least one year of college. This was significant at the time compared to national norms, where 42% of males and 30% of females had one year of college or more.

Gontang and Others (1979) did a similar study soon afterward, once again using the MBTI and Demographic Questionnaire, this time on sub-3-hour marathoners. While the previous study included females (N=17) this study dropped its females (N=2) because of the obvious validity problems encountered with such a limited sample.

Results from this study of the better marathoners (in most marathon races, times under three hours generally are in the top 10% of all finishers, for males) revealed a maximum frequency of 13 for the ISTJ types and zero frequency for the ISTP types and ESTP types. This means that there were two times as many introverts in this group of marathoners as in the previous slower group who were just as likely to be extroverted as introverted.

Other areas where the two groups were compared demographically were in age, number of marathons, number of years training, and also the number of miles of training per week. In all of these characteristics there was a significant difference, except for the one area of age. For example, the sub-3-hour runners had been running on an average of 8.88 years, had run 11.14 marathons, and was training a mean of 76.14 miles per week. In

educational levels the fast group had twice as many who had done graduate work, with 96% having had at least a college level education or higher. The sub-3-hour group also had 20% more males in high white collar occupations.

Therefore, the studies on marathoners using the MBTI and the Demographic Questionnaire summarized that

> marathoners are distinctly different from the general, nonmarathoning population, and that these differences are accentuated in this particular sub-3-hour marathon population (Gontang and Others, p. 1027).

Morgan (1980) reviewed the work done on trait psychology and the controversy that has plagued it over the last 25 years. He concluded that for a real technology to be established in this area,

> replication must become a way of life; complex multivariate analyses should continue, but we must also become tolerant of the 'single-subject' study of behavior; methodological rigor must become routine; our work must be guided by theory, but we must not lock ourselves into static or premature theory; and finally, the questions we ask must govern the methodology we adopt--we must not permit our methodology to structure the questions we ask (p. 73).

CHAPTER III

RESEARCH PROCEDURES

The purpose of this study was to administer the Myers-Briggs Type Indicator (MBTI), along with a Demographic Questionnaire, to a selected group of female long distance runners (N=80) to determine their personality types as well as other general traits. These findings were then compared with the female marathoners (N=17) in an earlier study done by Clitsome and Kostrubala (1979).

Myers-Briggs Type Indicator

To determine the personality types of the female subjects in the study, the MBTI was the psychological test used. At the conclusion of their study, Clitsome and Kostrubala (1979) made the following comments about the MBTI and its use:

> It is extremely interesting to note that a psychologic measurement such as the MBTI, with all the difficulties inherent to its development and refinement, so accurately reflects the common observations about marathoners. The MBTI is a specific derivative of C. G. Jung's theory of personality type and was developed as such to test his theory for consistent validity and use. This may indicate that the most useful and accurate theoretic framework for further investigation in this area is Jungian (p. 1027).

The development of the MBTI first took place in the years between 1942 to 1944 when the original items were written being based on type theory and observation of subjects whose types were known. This work produced Forms A and B of the MBTI.

In a second undertaking from 1956 to 1958, work was done to strengthen weak areas of the indicator, with many of the weakest items being dropped. A large scale effort in the area of internal-consistency analysis was done using thousands of subjects. A tetrachoric item-test correlation was computed as a check on item selection. The items that remained became those incorporated into Form F of the MBTI which was used in this study. This form can be used on subjects in the 11th grade and older (Myers and Briggs, 1962).

Establishing reliability of psychological tests such as the MBTI is a difficult task. In the case of the MBTI, one method used was an investigation on various levels for reliability using a logically-split-halves procedure and a Spearman-Brown prophecy formula applied to the correlations yielded between halves. As a result of such analysis, the developers of the MBTI stated that the reliabilities they found appeared "creditable for an instrument of this sort, representing in general the upper range of coefficients found in self-report instruments of similar length" (Myers and Briggs, 1962). Clitsome and Kostrubala (1979), in their assessment, concluded likewise.

As stated earlier, the MBTI was based on Jung's theory of personality, which theorizes that

> . . . much apparently random variation in human behavior is actually quite orderly and consistent being due to certain basic differences in the way people prefer to use perception and judgement (Myers and Briggs, 1962, p. 51).

Further, the MBTI

> aims to ascertain, from self-report of easily reported reactions, people's basic preferences in regard to perception and judgement, so that the effects of the preferences and their combinations may be established by research and put to practical use (Myers and Briggs, 1962, p. 1).

Definitions

The following definitions which have been reported various places in the literature (Clitsome and Kostrubala, 1979) may lend an understanding of indices of preferences as measured by the MBTI and reported in this study:

Extraversion (E): "A direction of interest and attention to the outer world of objects, people, and action" (Clitsome and Kostrubala, 1979, p. 1012).

Sensing (S): "A preference for looking at the immediate, the real world, the tangible, the solid facts of experience" (Clitsome and Kostrubala, 1979, p. 1012).

Intuition (N): "A preference for seeing the possibilities, meanings, and relationships of experience, often with only a passing interest in the facts themselves" (Clitsome and Kostrubala, 1979, p. 1012).

Thinking (T):

> A rational process used in decision-making and a preference for making objectively,

> impersonally analyzing the facts and ordering them in terms of antecedents and consequences, materially oriented and following logical principles (Clitsome and Kostrubala, 1979, p. 1012).

Feeling (F):

> A rational process used in decision-making that is decided by a valuing process, weighing the importance of alternatives to oneself, or others; oriented toward working with or studying people (Clitsome and Kostrubala, 1979, p. 1012).

Judging (J): "A preference for living in a planned, decided, orderly way, aiming to regulate life and control it" (Clitsome and Kostrubala, 1979, p. 1012).

Perception (P): "A preference to live in a flexible, spontaneous way, aiming to understand life and adapt to it" (Clitsome and Kostrubala, 1979, p. 1012). The MBTI sees the area of perception as

> the processes of becoming aware--of things or people or occurrences or ideas. 'Judgement' is understood to include the processes or coming-to-conclusions about what has been perceived (Myers and Briggs, 1962, (p. 1).

EI Index: "The EI Index is designed to reflect whether the person is an extravert or an introvert (Myers and Briggs, 1962, p. 1).

SN Index: "The SN index is designed to reflect the person's preference as between two opposite ways of perceiving" (Myers and Briggs, 1962, p. 1). "Sensing" uses the five senses, while "Intuition" uses "indirect perception by way of the unconscious" (Myers and Briggs, 1962, (p. 1).

TF Index: "The TF Index is designed to reflect the person's preference as between two opposite ways of judging, i.e., whether he relies primarily on thinking . . . or primarily on feeling" (Myers and Briggs, 1962, p. 1).

JP Index:

> The JP Index is designed to reflect whether the person relies primarily upon a judging process (T or F) or upon a perceptive process (S or N) in his dealings with the outer world, that is, in the extraverted part of his life (Myers and Briggs, 1962, p. 1).

"In terms of theory, a person may reasonably be expected to develop most skill with the processes he prefers to use and in the areas where he prefers to use them" (Myers and Briggs, 1962, p. 1). The MBTI items offer "forced" choices to determine the subject's basic preferences in the four indexed areas outlined above.

Demographic Questionnaire

Along with the MBTI, a Demographic Questionnaire was also completed by the subjects. This sheet contained items of information such as age, height, weight, number of years running, number of miles a week training, educational status, income level, and occupation.

Subjects

The subjects of the study were female long distance runners. Their running could be described as of a

recreational nature in that most of them were not of a "national" or "world class" caliber and had mainly competed in races of five kilometers, 10 kilometers, and 15 kilometers, though some (N=24) had completed the marathon distance of 26.2 miles. They were selected at the following road races: (1) Tulsa Run (November 1, 1980), Tulsa, Oklahoma; (2) Jenks Half-Marathon (November 15, 1980), Tulsa County, Oklahoma; (3) Tulsa Road Runner's 25K and 5K (February 21, 1981) in Tulsa's Mohawk Park, Tulsa, Oklahoma; (4) Cowtown Marathon (February 28, 1981), Ft. Worth, Texas; (5) Oil Capitol Marathon (March 21, 1981), Tulsa, Oklahoma; (6) Diet Pepsi 10,000 Meter Series (April 11, 1981), Tulsa, Oklahoma; and (7) John A. Brown 10K and 2 Mile Run (June 20, 1981), Tulsa, Oklahoma.

Procedure

The subjects were contacted in person by the investigator at the above races. Possible subjects (N=125) who agreed to participate in the study were given a packet containing the MBTI and a demographic questionnaire. Of those contacted, 83 returned the materials. A prerequisite for the subjects to be at least 18 years of age was not met by three of the 83 responding. These three subjects who were less than 18 years old were not included in the study, leaving a final number of 80 subjects who were used. Results of the study were made available to all subjects, while their anonymity was respected.

Statistical Analysis

From the data provided by the MBTI, frequencies, mean scores, standard deviations, and X^2 were computed for the subjects in the present study. From the data provided by the demographic questionnaire, means and standard deviations were computed. A t-ratio was also used to determine any significance of difference between mean scores of the demographic data from the present study and that found from the females (N=17) in Clitsome and Kostrubala's (1979) earlier study. The formulas used appear in Appendix I.

CHAPTER IV

RESULTS

The use of the MBTI yielded the personality types for the 80 female long distance runners in the areas of extraversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceiving. Table I displays the frequencies, means, and standard deviations for these preferences. A chi-square (X^2) test for significant difference was computed on the frequencies of these preferences in personality type. No significant difference was found for X^2 values between extraversion versus introversion, intuition versus sensing, thinking versus feeling, and judging versus perceiving. These results are shown in Table II.

Figure 1 represents the frequency distribution of the 16 possible personality types of the 80 female long distance runners. A X^2 value of 18.86, which was significant at the .05 level, was found for the frequencies for all 16 personality types. This sample showed a maximum frequency of 11 for ESFJ types and a minimum of zero frequency for the ESTP personality types. Clitsome and Kostrubala (1979), in their study, found no significant difference for the frequency distribution of the 16 personality types of their 17 female

TABLE I

FREQUENCY DISTRIBUTION OF TYPES FOR FEMALE LONG DISTANCE RUNNERS* (N=80)

	Sensing (S)		Intuition (N)	
	Thinking (T)	Feeling (F)	Feeling (F)	Thinking (T)
Introverted (I)				
Judging (J)	ISTJ 7	ISFJ 8	INFJ 3	INTJ 2
Perception (P)	ISTP 2	ISFP 4	INFP 6	INTP 6
Extroverted (E)				
Perception (P)	ESTP	ESFP 6	ENFP 8	ENTP 3
Judging (J)	ESTJ 6	ESFJ 11	ENFJ 2	ENTJ 6

*X^2=18.86; $p<0.05$

TABLE II

CHI-SQUARE COMPARISON OF FREQUENCIES OF EXTRAVERTED VERSUS INTROVERTED OF FEMALE LONG DISTANCE RUNNERS

Personality Type	Frequency	X^2
Extrovert	42	0.20
Introvert	38	
Sensing	44	0.40
Intuitive	36	
Thinking	32	3.20
Feeling	48	
Judging	45	1.26
Perceiving	35	

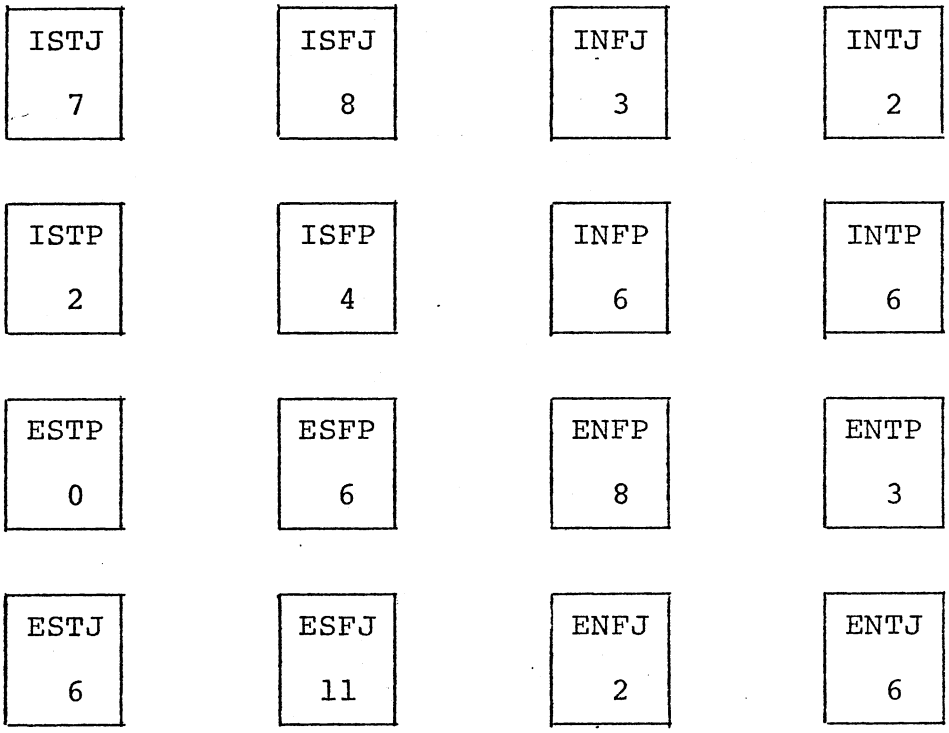

Figure 1. The Frequency Distribution of the 16 Personality Types for the 80 Female Long Distance Runners ($X^2=18.86$; $p<0.05$)

marathoners. However, Gontang and Others (1979), in their study of 50 sub-3 hour male marathoners, did find significant difference for this distribution at the 0.000005 level.

Comparing frequencies by percentage of the 16 personality types between the 80 female long distance runners of the present study and the 17 female marathoners of Clitsome and Kostrubala (1979), it was found that the 80 females reported 8.75% ISTJ: 10% ISFJ; 3.75% INFJ; 2.5% INTJ; 2.5% ISTP; 5% ISFP; 7.5% INFP; 7.5% INTP; 0% ESTP; 7.5% ESFP; 10% ENFP; 3.75% ENTP; 7.5% ESTJ; 13.75% ESFJ; 2.5% ENFJ; and 7.5% ENTJ. The 17 female marathoners reported 5.88% ISTJ; 5.88% ISFJ; 0% INFJ; 11.76% INTJ; 5.88% ISTP; 0% ISFP; 11.76% INFP; 5.88 INTP; 0% ESTP; 5.88% ESFP; 11.76% ENFP; 11.76% ENTP; 17.64% ESTJ; 0% ESFJ; 5.88% ENFJ; and 0% ENTJ.

Due to the rather limited sample size of females in Clitsome and Kostrubala's (1979) study, any effective comparison by percentage was difficult. Just the same, it may be interesting to observe that neither study produced any subjects of the ESTP type. Such was also the case for Gontang and Others (1979) in their study of 50 male sub-3 hour marathoners. Also of note was that the highest frequency occurring for the 80 females was the ESFJ (N=11) type, whereas for the 17 female marathoners a frequency of zero was reported for the ESFJ type.

A comparison of the 80 females was made for Extraversion versus Introversion, which yielded ratios of approximately one to one (1:1); likewise with a comparison of Sensing versus Intuition. Clitsome and Kostrubala (1979) had earlier reported the same findings. They pointed out that for the general population in this country there is a three to one (3:1) ratio of Extraverts versus Introverts. Thus, for their study and the present one, there were almost two times as many runners (2:1) who were Introverted versus Extraverted. The same two to one (2:1) ratio was experienced in both studies for Sensing versus Intuitive as compared to the general population.

The range in age for the 80 female runners was from 18 to 52 years, and from 18 to 45 years for the 17 female marathoners. The mean number of years running was 3.50 for the 80 female runners and 3.76 years for the 17 female marathoners. Also, the number of miles of training per week was 37.26 for the 80 female runners and 43.0 for the 17 female marathoners. A t-test was computed for each of these items of demographic data to determine if there was any significant difference. A t-value of 1.99 was needed to establish significant difference at the .05 confidence level. No significant difference was found between these demographic data. These results appear in Tables III and IV.

The number of years the 80 female long distance runners had been running showed a range of from one to ten

TABLE III

FREQUENCY AND MEAN SCORE COMPARISONS
FOR PERSONALITY TYPES OF FEMALE
LONG DISTANCE RUNNERS
VERSUS C+K*

	Female Long Distance Runners				C+K	
Personality Type	80 Female LDR N	C+K N	Mean Scores	SD	Mean Scores	SD
Extrovert	43	9	33.84	11.46	22.75	12.07
Introvert	37	8	29.05	16.89	20.11	11.19
Sensing	44	7	26.77	17.35	18.71	12.30
Intuitive	36	10	26.67	14.39	25.20	14.41
Thinking	33	9	20.64	13.07	23.44	14.17
Feeling	47	8	24.45	9.38	22.38	13.23
Judging	44	9	31.77	12.38	21.00	9.27
Perception	36	8	30.72	12.69	23.00	14.74

*Clitsome and Kostrubala, "A Psychological Study of 100 Marathoners Using the MBTI," Annals of New York Academy of Sciences (1979).

years. Clitsome and Kostrubala's (1979) runners revealed a range of from one to thirteen years. The range of miles per week spent training was from 15 to 90 for the 80 female long distance runners, while the 17 female marathoners yielded a range of 25 to 125 miles.

TABLE IV

COMPARISON OF DEMOGRAPHIC DATA OF C+K* FEMALE MARATHONERS AND FEMALE LONG DISTANCE RUNNERS

Group	N	Age		No. Years Running		No. Miles/Week Training	
		Mean	SD	Mean	SD	Mean	SD
a. C+K	17	30.53	7.37	3.76	3.79	43.00	25.17
b. Female LDR	80	30.06	7.84	3.50	2.17	37.26	17.52
	df=95	t=.236		t=.032		t=.895	

*Clitsome and Kostrubala, "A Psychological Study of 100 Marathoners Using the MBTI," Annals of New York Academy of Sciences (1979).

In the area of educational level, Clitsome and Kostrubala (1979) reported that 82% of their female marathoners had achieved one year of college or more. At the time of their study, 30% was the national average for females who had one or more years of college. Thus, they concluded that their runners "were significantly more

educated than the average populace of the United States (p. 1014). In the present study it was found that 80% of the female runners had attained at least one year of college, suggesting the same characteristic exhibited by the female marathoners of the previous study. More specifically, in the present study the following percentages were found for the different levels of education: 20%, high school; 50%, college; 25%, graduate school; and 5% doctorate (Table V).

TABLE V

FREQUENCY OF EDUCATIONAL LEVELS OF 80 FEMALE LONG DISTANCE RUNNERS VERSUS C+K'S FEMALE MARATHONERS

Group	N	High School	College	Graduate School	Doctorate
Female LDR	80	16	40	20	4
C+K	17	3	10	3	1

Other demographic data collected for the subjects of the present study included marital status, income, occupation, number of marathons, number of children, best marathon time, number of marathons before first

sub 3-hour marathon, if any, as well as height (inches) and weight (pounds). Tables VI-X summarize these general characteristics.

TABLE VI

GENERAL CHARACTERISTICS OF FEMALE LONG DISTANCE RUNNERS

Characteristics	Mean	SD
Age	30.06	7.84
Height (inches)	65.25	2.42
Weight (pounds)	120.15	11.25
Years Running	3.5	2.17
Age Began Running	26.59	8.25
No. Days/Week Run	5.83	0.98
Average Miles/Week Run	37.26	17.52
Average Pace	8:29	:49

For marital status it was found that 38.8% of the subjects were single, 55% were married 0% were widowed, 5% were divorced, and 1.25% were separated. Also, it was found that 36.25% had children, with an average of 2.1 children (SD=1.11) for those who had them.

In terms of income, 46.25% of these runners make $15,000 or more a year, either alone or with a spouse. The percentage who reported making above $25,000 per year

was 26.25%, while 25% (almost all students) reported making less than $4,000 yearly. Over 22% of the subjects were students, over 36% were professionals, over 12% were white collar workers, over 8% were low collar workers, 1.25% were high blue collar workers, none were low blue collar workers, and over 18% were homemakers.

TABLE VII

EIGHTY FEMALE LONG DISTANCE RUNNERS - MARITAL STATUS

Marital Status	N
Single	31
Married	44
Widowed	0
Divorced	4
Separated	1
No. with Children	29
Average No. of Children	2.1

In the group, 24 had run at least one marathon, with two subjects having run nine marathons. The range in times were from two hours and forty-five minutes to five hours. Two were under three hours, 16 were between three and four hours, four were between four and five hours, and one was over five hours.

TABLE VIII

EIGHTY FEMALE LONG DISTANCE
RUNNERS - INCOME LEVEL

Income Level ($ x 1000)	N
0-4	20
4-9	2
9-12	4
12-15	17
15-20	12
20-25	4
25+	21

TABLE IX

EIGHTY FEMALE LONG DISTANCE
RUNNERS - OCCUPATION

Occupation	N
Student	18
Professional	29
High White Collar	10
Low White Collar	7
High Blue Collar	1
Low Blue Collar	0
Homemaker	15

TABLE X

EIGHTY FEMALE LONG DISTANCE RUNNERS - NUMBER DAYS/WEEK RUN

No. Days/Week Run	N
4	7
5	22
6	31
7	20

Discussion

Findings of the study have suggested that there was very little difference between this study's subjects and those of Clitsome and Kostrubala (1979). The only findings of significant difference were seen in that the 80 female long distance runners had approximately twice as many Introverts as Extroverts when compared to general population norms. Also, using X^2 at the .05 level of confidence, significant difference was found in the frequencies of the preferences for the 16 personality types, as well as in the area of Extraversion versus Introversion, and Sensing versus Intuition. Again, this first characteristic was exhibited in Clitsome and Kostrubala's subjects.

The subjects of both studies also were found to have approximately 50% more who had at least one year of

college education than in the general population. In this study, 46% made above $15,000 a year, and over 60% were either in professional and high white collar jobs or seemed to be headed there by way of their college education. Almost one-fifth of these subjects were homemakers.

The results of the present study seem to bear out the earlier characteristics found among marathoners versus the nonmarathoning public. This group of people in our society seem to possess a certain drive or discipline in the area of their health that may not exist in other groups. It is obvious, also, that the more gifted the athlete, the more these characteristics are exhibited. It has been seen that the more elite the talent, the more the tendency towards an introverted, toughminded, and individualistic personality. However, it must be recognized that almost all of the personality combinations are represented in these runners and the present author believes that if the activity continues to grow this trait will grow proportionately.

Perhaps the most striking observation lies in the areas of occupation and education where those who are in professional positions with the high levels of schooling are the ones doing the running. It is suspected that this trend will continue. Also, it is believed that the future will find increased numbers of mother-homemakers joining the running ranks.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to investigate the personality types of a selected group of female long distance runners (N=80) as determined by the Myers-Briggs Type Indicator, Form F. Sub-problems were:

1. To determine a demographic data profile of the subjects in the study.

2. To compare psychological profiles of this study's subjects to those females in other studies done by Clitsome and Kostrubala (1979).

3. To determine if a predictable personality type can be established among female long distance runners.

Conclusions

Based on the data collected in this study, the following conclusions were drawn:

1. The hypothesis put forth was accepted because there was no significant difference found in the psychological and demographic data profiles between this study's subjects and those of Clitsome and Kostrubala (1979).

2. A psychological profile of the 80 female long distance runners was similar to that of the 17 female

marathoners of Clitsome and Kostrubala (1979), suggesting that such a profile may be predicted for these runners where, for every two Extraverted, Intuitive types found in the general population one would expect to find one Introverted, Sensing type among the runners (2:1). Normally, a ratio of three to one (3:1) Extraverted, Intuitive types to Introverted, Sensing types would be expected.

3. The female runners of both studies showed that at least 50% more of them had at least one year of college education than the norms for the general population. They were about 30 years old and had an annual income of $15,000 or more.

4. The one difference found between the two studies occurred in the combination of the type preferences making up the 16 personality types. Clitsome and Kostrubala (1979, p. 1010) found "an unusual uniformity" for those frequencies, whereas a significant difference was found in the present study with a X^2 value of 18.86 for the 16 personality type preferences which was significant at the .05 level of confidence. A similar finding was reported for these preferences among Gontang and Others (1979) sub 3-hour male marathoners.

Based on data reported from this study, it may be concluded that female long distance runners, much like female marathoners, exhibit psychological as well as

demographical differences from the non-running general public, even in spite of their modest talent in running.

Recommendations

Further research into the area of the personality of the female runner using the Myers-Briggs Personality Type Indicator, Form F, is recommended. Future studies should aim at a broader sample population where sub-groups, including the common recreational runner, can be compared with as large a sample of elite class marathoners as possible. To date, no studies have been done in this area among the elite runners. This instrument could be used with short to middle distance runners who could be compared to the long distance runners. Studies should also be undertaken between female athletes of other sports with the Myers-Briggs Personality Type Indicator, and all of these could be compared.

Other recommendations might inlcude the construction of more detailed demographic data questionnaires, as well as conducting this type of study among various regions of the country to try to discover differences that may be evident from region to region. Finally, a longitudinal study of female runners could be done to determine any changes that may be occurring in their profiles in relation to their running.

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APPENDIXES

APPENDIX A

DEMOGRAPHIC INFORMATION

Characteristic

Marathoner	___
Recreational Runner (includes competition)	___
Age	___
Height (feet + inches)	___
Weight (pounds)	___
Years Running	___
Age Started Running	___
Best Marathon Time	___
No. of Marathons Before First Sub-3-Hour, If Any	___
Total No. of Marathons Run	___
No. of Days a Week That You Train	___
Average Miles Training Per Week	___
Average Pace per Training Mile	___

Educational Level

High School	___
College	___
Graduate School	___
M.D., D.O., Ph.D., J.D.	___

Marital Status

Single	___
Married	___
Widowed	___
Divorced	___
Separated	___
No. of Children	

Income Level ($ x 1000)

0-4	___
4-9	___
9-12	___
12-15	___
15-20	___
20-25	___
25+	___

Occupation

Student	___
Professional	___
High White Collar	___
Low White Collar	___
High Blue Collar	___
Low Blue Collar	___
Homemaker	___

APPENDIX B

RAW CHI-SQUARE DATA TABLE, COMPARISON OF 16 PERSONALITY TYPES

TABLE XI

RAW CHI-SQUARE DATA: COMPARISON OF 16 PERSONALITY TYPES

(1) Cell	(2) Observed	(3) Expected	(4) O-Ex	(5) $(O-Ex)^2$	(6) $\frac{(O-Ex)^2}{Ex}$
1	8	3.75	3.25	10.56	2.82
2	8	7.25	0.75	0.56	0.08
3	3	4.75	-1.75	3.06	0.64
4	2	4.25	-2.25	5.06	1.19
5	2	3.38	-1.38	1.90	0.56
6	4	6.53	-2.53	6.40	0.98
7	6	4.28	1.72	2.96	0.69
8	6	3.83	2.17	4.71	1.23
9	0	3.19	-3.19	10.18	3.19
10	6	6.16	-0.16	0.03	0.01
11	8	4.04	3.96	15.68	3.88
12	3	3.61	-0.61	0.37	0.10
13	6	4.69	-1.31	1.72	0.37
14	11	9.06	-1.94	3.76	0.42
15	2	5.94	-3.94	15.52	2.61
16	6	5.31	0.69	0.48	0.09
					df=9 $\sum=18.86^{*}=X^2$

*Significant at .05 level.

APPENDIX C

RAW CHI-SQUARE DATA TABLE, EXTRAVERT VERSUS INTROVERT

TABLE XII

RAW CHI-SQUARE DATA: EXTRAVERT VERSUS INTROVERT

Cell	Observed	Expected	0-Ex	$(0-Ex)^2$		$\frac{(0-Ex)^2}{Ex}$
1	42	40	2	4		0.1
2	38	40	-2	4		0.1
					df=1	$\sum=0.2=X^2$

APPENDIX D

RAW CHI-SQUARE DATA TABLE, SENSING VERSUS INTUITIVE

TABLE XIII

RAW CHI-SQUARE DATA: SENSING VERSUS INTUITIVE

Cell	Observed	Expected	0-Ex	$(0-Ex)^2$		$\frac{(0-Ex)^2}{Ex}$
1	44	40	4	16		0.4
2	36	40	-4	16		0.4
					df=1	$\sum 0.8 = X^2$

APPENDIX E

RAW CHI-SQUARE DATA TABLE, THINKING VERSUS FEELING

TABLE XIV

RAW CHI-SQUARE DATA: THINKING VERSUS FEELING

Cell	Observed	Expected	0-Ex	$(0-Ex)^2$	$\frac{(0-Ex)^2}{Ex}$
1	32	40	-8	64	1.6
2	48	40	8	64	1.6
				df=1	$\sum=3.2=X^2$

APPENDIX F

RAW CHI-SQUARE DATA TABLE, JUDGING VERSUS PERCEIVING

TABLE XV

RAW CHI-SQUARE DATA: JUDGING VERSUS PERCEIVING

Cell	Observed	Expected	0-Ex	$(0-Ex)^2$		$\frac{(0-Ex)^2}{Ex}$
1	45	40	5	25		0.63
2	35	40	-5	25		0.63
					df=1	$\sum=1.26=X^2$

APPENDIX G

FORMULAS USED IN COMPUTATIONS

FORMULAS USED IN COMPUTATIONS*

1. Mean:

$$\bar{X} = \frac{\sum X}{n}$$

2. Standard Deviation of Each Mean:

$$S = \sqrt{\sum X^2/(n-1)}$$

3. t-ratio:

$$t = \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{(S_1^2/n_1) + (S_2^2/n_2)}}$$

4. Chi-Square

$$X^2 = \sum \left[\frac{(f_o - f_e)^2}{f_e} \right], \text{ or}$$

$$X^2 = \sum \frac{(O-E)^2}{E}$$

*Sources: Sheehan, T. J., An Introduction to the Evaluation of Measurement Data in Physical Education, Reading, Mass.: Addison-Wesley Publishing Co. (1971), p. 179; and Weinberg, G. and Schumaker, J., Statistics: An Intuitive Approach, Monterey, Calif.: Brooks/Cole Publishing Co. (1974), p. 226.

VITA[2]

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