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Socio-cultural influences on physical activity and performance

by

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Socio-cultural factors which influence physical performance will be considered. Although biological factors as genotype, size, physique, body composition and rate of maturation (including the ageing process) influence performance and activity, they will not be considered in detail. Their effects on performance are generally more apparent at the extremes of size, physique, composition and maturity than within the broad range we label as average (MALINA 1975, 1980a). Such biological characteristics, however, do enter into the complex matrix of factors which influence performance and activity pursuits, and interact with socio-cultural factors. For example, do parents or teachers expect and/or encourage certain forms of behavior or performance levels from children differing in physique ? On the other hand, how does a child's level of motor performance influence parental rearing attitudes and expectations ?

Three sets of observations relative to socio-cultural influences on physical activity and performance will be evaluated : (1) motor development during infancy and early childhood ; (2) performance and activity habits during childhood and adolescence ; and (3) activity habits of adults. Central to the general theme of this report are two assumptions : (1) factors which influence performance and activity may have different effects depending upon the age of the individual, and (2) the effects of certain influences introduced at an early age, may have an effect at a later age.

Physical performance and physical activity are general concepts. Both can be viewed in a number of ways. For convenience, a threefold division of physical performance will be used : motor performance, muscular strength, and physiological performance. The motor component relates to the development and performance of motor or movement skills. The term motor fitness is commonly used. Muscular strength is the capacity to exert force against some resistance. The

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physiological or organic component relates to the processes of energy production and work output. It is sometimes referred to as health-related physical fitness. The three categories of physical performance are not mutually exclusive. Muscular strength, for example, is common to both motor fitness and health-related physical fitness. Flexibility, though not strictly a measure of physical performance, is a factor which influences performance and commonly appears as a separate factor in analyses of the factor structure of performance.

There is, in addition, a cultural component to physical performance. This aspect relates to societal influences on performance, i.e., culturally determined habits, attitudes and behavior patterns. It is essential to realize that whatever skills or talents an individual may have, they will be expressed within the context and limites of the individual's culture (MALINA 1969a).

Physical activities are the substrate performance, and comprise an integral component of the individual's behavioral repertoire. Physical activities occur in many contexts, for example, work, leisure, school and societal rituals, and take many forms, including subsistence (work) activities, exercise per se (calisthenics, running), play and games, dance, and competitive sports. The biological stress of physical activity is generally viewed as good for the organism during growth and throughout adulthood. Activities are likewise viewed as beneficial to the psychosocial competence and well-being of the individual. Physical activities vary in kind and intensity. The context of an activity, in turn, influences the kind, intensity and duration. Interest in and perceived need for physical activity vary with age, sex, biological characteristics and socio-cultural circumstances.

1. INFANCY AND EARLY CHILDHOOD

Motor development is a major developmental task of infancy and early childhood. It is the process through which a child acquires basic movement patterns and skills. It is a continuous process of modification based upon the interaction of (1) the maturation process, i.e., genetically controlled rate of neuromuscular maturation ; (2) residual effects of prior experiences ; and (3) the new motor experience.

The motor development of children is reasonably uniform in sequence, with considerable individual variation in developmental rate and proficiency. Independent walking is perhaps the major motor developmental task during infancy. Upright posture and locomotion are uniquely human traits, and the walking pattern is the foundation upon which other motor patterns and skills are developed or are learned.

With the development of refinement of the walking pattern, the child's control of his locomotor abilities improves so that independent action is considerable. Thus, the preschool years are a time of increasing experimentation with a variety of motor tasks, a period of gradual and progressive motor development and

learning ; the development of proficiency in fundamental motor skills is one of the basic tasks of the preschool years. Fundamental movements and/or skills are the elementary forms of movement which can be classified as *locomotor* (e.g., walk, run, jump, gallop, hop, skip, and so on), *non-locomotor* (e.g., push, pull, bend, swing, curl, and so on), and *manipulative* (e.g., throw, catch, strike, kick, dribble and related activities involving the projection and reception of objects). Locomotor, nonlocomotor and manipulative activities can occur in various combinations, e.g., skipping is a combination of hopping and walking, a hop being interspaced in the walking pattern. Running and reaching to catch a thrown ball combines all three categories of fundamental motor patterns.

Fundamental motor skills ordinarily develop by six or seven years of age, and it is generally agreed that after these ages, no new basic skills appear in the child's movement repertoire (ESPENSCHADE and ECKERT 1974). Rather, the quality of performance continues to improve as the fundamental patterns are refined and integrated into more complex movement sequences. There are, however, a number of normal children five through eight years of age who do not have sufficient coordination and control to successfully accomplish specified fundamental motor tasks.

Motor proficiency improves with age during the preschool years, though not necessarily in a smooth progression. Variation in performance within an age group, from age to age, and within individual children is considerable. Preschool children often show a tendency to perform well at one occasion only to perform poorly at the next. Such seemingly irregular developmental trends may be related to the fact that preschool children are learning many new activities. And, when a mature pattern is attained in one task, attempts at new tasks detract from the mature pattern originally demonstrated, resulting in a reversion to a less proficient movement pattern. For example, a youngster may have mastered the overhand throw from a stationary position, but reverts to an underhand pattern when trying to throw while running.

Factors influencing motor development and activity during infancy and early childhood are many. Several will be summarized subsequently. More detailed discussions with appropriate citations are contained in Malina (1980a, 1982a).

Sex differences.

Sex differences in motor development during infancy are not systematically apparent, although sex differences in rearing practices and play behavior are apparent. Mothers treat sons differently than daughters, and this sex difference begins early in infancy. Behavioral differences are also apparent early in life. One year old boys, for example, already spend more time in gross motor activity, while girls of the same age spend more time in fine motor activity. Boys are also more vigorous in their play and show more exploratory behavior than girls, who prefer

a more quiet style of play. Observations on nursery school children offer similar evidence. Boys spend more time in «rough and tumble» gross motor activities, while girls spend more time in activities requiring fine motor manipulation. In a related study, Walker (1962) compared behavior of mesomorphic (muscular) boys and girls. Although similar in physique, mesomorphic girls tend to channel their energies into social activities, while mesomorphic boys channel their energies into gross motor activities. Walker suggests that variations in physical energy and in body sensitivity to energy needs may thus be important mediating links between physique and behavior. It would appear, however, that at these early ages, the expectations of our culture already have an impact on what children sense is appropriate behavior for each sex.

In contrast to the first year or two of life, sex differences in motor development and performance are apparent during early childhood. From about two to five years of age, girls, on the average, excel in tasks requiring jumping, hopping, rhythmic locomotion and balance, while boys generally perform better in tasks requiring strength and speed (SINCLAIR 1971 ; ESPENSCHADE and ECKERT 1974). From the age of five or six years on, boys generally perform better in running, jumping and throwing activities, while girls excel in hopping (KEOGH 1965 ; ESPENSCHADE and ECKERT 1974). Balancing activities show no consistent pattern of sex difference after the preschool years, although girls continue to show better performances at some ages (KEOGH 1965). There is, nevertheless, considerable overlap in motor achievements of boys and girls in many tasks, but a notable exception is overhand throwing. Observations on sex differences in motor development must be related to sex differences in activity interests, opportunity for practice, opportunity and frequency of participation, and the availability of role models. The cultural socialization of both boys and girls, and the exclusion of the young girl from some activities requiring physical strength and skill may be important factors in establishing and maintaining sex differences.

Rearing and Birth Order.

A child's position in the family and sibling-sex status are also factors that influence early motor development. Some data suggest that first born children perform slightly better on motor tasks early in life, an observation generally related to greater maternal involvement and therefore stimulation of the first born compared to later born. On the other hand, rearing studies of single child families suggest overprotection, greater restriction on physical mobility, and a strong tendency to keep close track of the child on the part of mothers. In contrast to an only child, children with opposite sex siblings have more of the characteristics of the opposite sex than children with siblings of the same sex. It would be interesting to relate such observations to the motor development and performance of children. For example, does a girl with an older brother develop differently in

motor activities or have different activity interests than a girl who has an older sister as a sibling ? The same question can be raised for boys with female and male siblings respectively. On the other hand, the role of a younger sibling in possibly influencing the motor behavior of an older child also warrants study.

Although the data are limited, one can inquire as to the effects of child care practices on motor development and motor activity during infancy and childhood. More specifically, how are child rearing practices translated into different motor development levels or performance styles ? Do children reared in overprotective or restrictive atmospheres develop and behave differently in motor activities than children reared in permissive, less protective atmospheres ? Some observations, for example, suggest a relationship between a permissive, nonrestrictive child rearing environment and enhanced early motor development (BLANK 1964 ; WILLIAMS and SCOTT 1953). Such an environment may provide for greater levels of interaction with people and objects, perhaps stimulating early motor progress. Mothers of infants rated as competent on the Bayley developmental scales and other behavioral measures do in fact interact more with their infants in a manner that focuses on the child's abilities and interests (MOORE 1977). Data at older ages are not extensive. Limited observations (SCHNABL-DICKEY 1977) suggest that rearing attitudes and styles may be specific to the motor skill observed, and might differentiate between a skill that is perhaps more culturally sensitive (e.g., throwing) and one that is more phylogenetic (e.g. jumping). Further study of such relationships is obviously warranted in order to identify other patterns of relationships between rearing and motor development.

Social Class.

Several studies have examined social class criteria relative to early motor development. Neligan and Prudham (1969) reported a social class difference in the age of independent walking among a sample of Newcastle (England) children, the social class difference favoring the lower class children. The data were interpretetd as possibly reflecting "... deprivation of the opportunity to learn resulting from overprotection ..." in the upper social class (NELIGAN and PRUDHAM 1969, p. 417). In an earlier study, Bayley and Jones (1937) reported no relationship between socio-economic variables and age of first walking independently. There was, however, a tendency in their data for a high incidence of slightly negative correlations between motor scores and socio-economic variables during the first year of life, implying somewhat more rapid motor development in children from the lower social strata. Hindley et al. (1966), on the other hand, did not find any social class difference in the age of walking among five European longitudinal samples. There were, however, significant differences between the five samples in the mean age of walking alone. The authors suggested genetic, nutritional and maternal handling factors as possibly underlying the observed differences, but were not able to identify a specific role for each factor.

Data considering social class and motor achievements at other ages than the first or second year are not extensive. However, socio-economic background is often implicated as an important factor affecting the activity pursuits of children and presumably their motor development (MALINA 1973a). In general, data suggest greater freedom to move about the neighborhood among children from lower socio-economic backgrounds. Such an atmosphere might be conductive to greater freedom of motor activity and opportunity for practice. It should be noted that most studies of social class and/or ethnic variation in rearing, life style and patterns of socialization, have not chosen to assess motor behavior and physical activity.

Ethnic Considerations.

Ethnic comparisons of early motor development are most common for Black and White children. Comments will be limited to American Black and White children as nutrition and infectious disease are confounding factors in African comparisons (see below). The data indicate advanced motor development in Black children during the first two or three years of life with the differences being most apparent during the first year. Superiority in any one class of motor behavior is not responsible for the Black motor precocity (BAYLEY 1965 ; MALINA 1973a). These generalizations are not, however, without exception as several studies indicate minor or inconsistent differences in early motor development of Black and White children (KNOBLOCH and PASAMANICK 1958 ; WALTERS 1967). Explanations offered for the observations vary. Some implicate genetic factors, while others indicate socio-economic and child rearing variables as affecting the results, inasmuch as social class and ethnicity are closely related in the United States.

The socio-economic hypothesis applied to studies of Black infants suggests that a more permissive rearing atmosphere characterizes lower socio-economic classes and in turn enhances motor development. This is generally, but not always, the case. When ethnic and socio-economic differences are controlled in several studies, higher class children perform better than lower socio-economic class children on the Bayley scale of motor development, i.e. higher class Black infants do better than lower class Black infants and higher class White infants do better than lower class White infants on the Bayley tasks. Since it is established that ethnicity and socio-economic status are confounded, it is possible that Black infants, who are generally advanced on many early infant measures, are more preponderant in lower socio-economic samples and that it is their ethnicity rather than socio-economic conditions that mediates the differences.

The fact that differences in early motor development between samples of American Black and White children are apparent in most, but not all studies, is significant in itself. Why do findings of separate studies differ ? Sampling variation and testing procedures, of course, must be recognized. One may ask, however,

whether the socio-economic explanation, particularly the permissiveness theme, operates by permitting the full development of the infant's genotype, which might in fact differ between populations ?

Cross-Cultural Considerations.

Cross-cultural observations of early motor development are available for a number of cultural groups. These generally include data from developmental tests and are available for sub-Saharan African populations, with less extensive data for Jamaica, Mexico, Guatemala and Japan (MALINA 1977 ; see also LEIDERMAN et al. 1977). After the age of two, the cross-cultural motor development data are scanty at best, with little systematically collected motor ability information. This probably reflects the orientation of the researchers, which commonly focuses on cognitive development, mother-infant attachment and infant-caretaker interactions. Although observed differences in motor development are generally related to social variation in mothering and caretaking practices, such relationships do not imply a cause-effect sequence. Children in developing areas of the world often progress reasonably well in early motor development during the first year of life. A developmental lag towards the end of the first year and during the second and third years of life is probably related to the break in continuity of rearing at weaning and to the effects of undernutrition. After weaning, children do not get the adult treatment and attention they had before. Also delayed motor development and reduced levels of physical activity accompany protein-energy malnutrition. It is also at these ages that stunting in physical growth becomes especially apparent.

Nutrition.

People eat food ; they do not eat nutrients. Hence, food intake is influenced largely by social and cultural factors, i.e., what is food or not food, how is food distributed. Interest in nutrition as a critical correlate of motor development and physical activity during infancy and childhood is considerable. An adequate nutrition intake is essential to support the needs of normal growth and development, including motor development. This is especially apparent in cases of nutritional inadequacies. Severely undernourished children are stunted in physical growth, delayed in skeletal maturation, delayed in motor development, and have reduced levels of physical activity. In addition, some have signs of neuromuscular involvement (e.g., reduced nerve conduction velocities). When nutritional stress is considered, the role of organic changes in the nervous system is usually emphasized. However, disturbances in social experiences also accompany malnutrition and may interact with the organic changes (e.g., the social and kinesthetic stimulation necessary to support the developing nervous system). There is thus more to the relationship of undernutrition and delayed development than food alone.

The persistence of detrimental changes with severe undernutrition are apparently dependent upon the timing, severity and duration of the nutritional stress. Children put on nutritionally adequate diets show some catch-up in growth, but motor and perceptual deficits commonly persist.

The preceding refers to severe nutritional inadequacy early in life, primarily due to the widespread prevalence of protein-energy malnutrition. What level of development might we expect from children reared at marginally adequate nutritional levels, as compared to those who have been hospitalized for severe nutritional inadequacy ?

At the other end of the nutritional continuum, overnutrition ordinarily manifests itself in the form of a gross overweight condition and obesity. Excess fat represents dead weight that must be moved, and evidence indicates a negative effect of excess fatness on performance. Overweight may also function to limit the physical activity of children, and thus indirectly influence their developing motor capacities.

2. Childhood and adolescence

In contrast to the developmental emphasis in the preschool years, there is more emphasis on performance during childhood and adolescence. Motor performance is viewed within the context of tasks (tests) which are performed under specified conditions and which are amenable to precise measurement. Efforts are generally directed to documenting the motor performance achievements of children and youth, i.e., time required to hop or run a specified distance, the distance the body is projected in a jump, the distance a ball is thrown, or the number of successful throws at a target. Muscular strength is commonly viewed in terms of static strength, i.e., the force exerted without change in muscle length, and explosive strength or power, i.e., the ability of muscles to release maximal force in the shortest possible time (Clarke 1967). The physiological aspect of physical performance is most often viewed in terms of aerobic capacity or power. It refers to the capacity to work as long as possible under aerobic conditions, and treadmill running, cycling on an ergometer and step tests are the most commonly used modes of exercise. Since aerobic capacity is related to endurance or stamina, running tests, i.e., distance run in a specified time or time elapsed in covering a specified distance, are often used.

Motor performance improves with age during childhood and adolescence, but the pattern of improvement is not uniform for all motor tasks. Running, jumping, throwing and hopping performances improve progressively and almost linearly from 5 through 12 years of age, while balancing performance shows an irregular pattern of improvement. Sex differences are apparent during middle childhood. Boys are, on the average, better performers in running, jumping and throwing tasks, while girls excel in hopping and related tasks. Balancing shows no

consistent pattern of sex difference over middle childhood, although girls more often show better performance.

Performance during adolescence shows clear sex differences in a variety of tasks (ESPENSCHADE 1940, 1960). Boys increase steadily and markedly in running, jumping, throwing and general agility (shuttle runs, side step) performance through 18 years of age. Girls, on the other hand, reach a plateau in performance at approximately 14 years of age, with slight improvement thereafter. For boys, jumping and throwing performance show an acceleration during the adolescent years. Peak gains in a number of motor tasks tend to occur after peak height velocity and to occur more coincident with peak weight velocity (BEUNEN et al. 1981).

Sex differences in motor performance are consistent throughout adolescence and become more marked with increasing age. The age slopes of the performance curves are rather steep for boys, while those for girls are rather flat. In a longitudinal study of California children, Espenschade (1940) noted that in all performance tests except throwing, the average performances of girls fell within one standard deviation of the boys' means during early adolescence. From 14 years of age on, however, the average performances of girls were consistently beyond the limits encompassed by one standard deviation below the boys' means. In throwing performance, few, if any girls, approximated the performance of boys, especially at 16 and 17 years of age.

Muscular strentgh increases linearly with chronological age from early childhood to approximately 13-14 years of age in males, when there is a marked acceleration in strength development through the late teen-ages. Strength, however, continues to increase into the third decade of life. In girls, strength improves linearly with age through 17 years, with no clear evidence of an adolescent spurt. Boys demonstrate, on the average, greater strength than girls at all ages. Sex differences throughout childhood are consistent, though generally small. The marked acceleration of strength development during male adolescence enlarges the pre-adolescent sex difference.

Strength is related to body size and lean body mass (MALINA 1975), so that sex differences in strength might relate to a size advantage in boys. Sex differences in strength after adjusting for height differences are not apparent in lower extremity strength from 7 to 17 years of age. However, from 7 years of age on, boys are significantly stronger in upper extremity and trunk strength even after adjusting for sex differences in height (ASMUSSEN 1973).

The relationship between strength development and general growth and maturation during male adolescence is such that the strength spurt is frequently considered as a maturity indicator. Maximum strength development occurs after peak velocity of growth in height (STOLZ and STOLZ 1951 ; CARRON and BAILEY 1974 ; BEUNEN et al. 1981). It appears more closely related to peak weight gain and it is probably related to peak muscle mass development during adolescence

(MALINA 1978a). On the other hand, the pattern of maximum strength development in girls during adolescence is not clear. The apex of strength development occurs more often after peak height velocity in girls, but variation is considerable (FAUST 1977). In more than one-half of the girls studied by Faust, peak dynamometric strength gain preceded peak weight gain. Thus, the timing of peak strength development in adolescent girls is not as meaningful an indicator of maturity as in adolescent boys.

Absolute maximal aerobic power (l/m) increases with age during childhood and adolescence in both sexes. After about age 13, aerobic capacity increases markedly in boys, but only slightly in girls. Thus, sex differences, which were minor in childhood, become marked during adolescence and persist into adulthood. When maximal aerobic power is expressed relative to body size (ml/Kg/min), the adolescent sex difference in aerobic power is more marked. From about 8 to 18 years of age, maximal oxygen uptake per kilogram of body weight increases slightly in boys, but over the same age range, it decreases in girls (BAILEY 1973 ; MOCELLIN 1975 ; ÅSTRAND and RODAHL 1977). This of course reflects the male adolescent spurt in muscle mass and the female gain in fat during puberty. There is variation in age trend among some samples of North American and European adolescents. The variation most likely reflects physical education program differences.

The preceding discussion of age trends and sex differences in physical performance indicated several socio-cultural influences. Perhaps the most significant are related to the marked sex difference in performance during adolescence and biological maturity-associated variation. Relative to sex differences, a question of concern is the relative flatness of the age curves for girls during adolescence, i.e., their level of performance shows little improvement after 13 or 14 years of age. Is this trend in the performance of girls related primarily to biological changes of female adolescence – sexual maturation, fat accumulation and broadening of the hips, or to cultural factors – limited opportunities for girls to participate in performance-related physical activities, changing interests, social pressures from peers, motivation, and so on ? It most likely reflects both biological and cultural factors, and with recent emphasis on athletic competition for young girls and wider acceptability of women in the role of an athlete (MALINA 1978b), the age pattern of motor performance during female adolescence may change. It is perhaps interesting to note that some cross-sectional data indicate a slight, but continued improvement in the running, jumping, throwing and ball handling performance of teen-age girls through 17 or 18 years of age (FLEISHMAN 1964 ; HUNSICKER and REIFF 1966, 1977; VINCENT 1968). Fleishman's (1964) observations, for example, indicate an increase in jumping and throwing performance from 16 to 18 years of age, after a "long plateau of no improvement" from approximately 13 to 16 years.

Early maturing boys generally perform at better levels than late maturing boys, while the opposite is true for girls. The size and strength advantage of early compared to late maturing boys underlies the differences apparent among males of contrasting maturity groups during adolescence (ESPENSCHADE 1940 ; JONES 1949 ; CLARKE 1971 ; MALINA 1978b). It should be noted that the emphasis is upon differences during the adolescent years as there is some catch-up when late maturing boys experience their adolescent growth spurt.

In contrast, late maturing girls generally perform better than early maturing girls (ESPENSCHADE 1940 ; BEUNEN et al. 1978 ; MALINA 1978b). The physique (linear and narrow) and body composition (less fat) of late maturing girls are more suitable to better performance. Further, late maturing girls are more in-phase in a developmental or biological maturity sense with early and average maturing boys of the same chronological age. They thus may enjoy a more favored position in the social setting, which of course influences their interactions with boys for whom physical activity and sport have a premium position. The early maturing girls, on the other hand, are advanced by a year or two in biological maturity. They are thus three to four years advanced biologically relative to most of their male chronological age peers. And, given the importance of peer reationships during adolescence, such a difference in developmental status is a considerable maturity distance which influences social interactions, social roles, self-concept, and interests. In this way, the biological earliness of early maturing girls may underlie a socialization away from physical activity within a given chronological age group (MALINA 1982b).

Ethnic considerations in physical performance during childhood and youth imply the operation of socio-cultural influences. In the United States, ethnic comparisons are largely between American Black and White children. As noted earlier, evidence from motor development in infancy suggests some advancement of Black infants relative to White infants, and a socio-economic hypothesis for the observed differences is commonly offered. During middle childhood, Black children generally perform better than White children, particularly boys, on a number of strength and motor performance tasks. The differences are most consistant for running and jumping (MALINA 1973a). There is, on the other hand, little differences in physiological working capacity (MALINA 1980b). Factors underlying the observed differences are many, but differences in physical development are minor.

Size differences (height and weight) and maturity differences are negligible, while Black children have less body fatness as indicated by thinner skinfold thickness and relatively longer lower extremities (MALINA 1969b, 1973b). Socio-cultural factors are thus implied. The performance advantage of Black children, especially boys, is perhaps related to styles of rearing and adult supervision. Black boys tend to have greater freedom to move about in and explore their neighborhoods. Equipment and facilities are usually less extensive and perhaps not readily

available. Hence, in the course of moving about the neighborhood, basic motor skills are refined under a variety of situations in street and playground activities. Adult supervision as well as adult pressures to conform or to win are minimal. In contrast, White elementary school age boys receive a good portion of their experiences in physical activities through organized programs, especially organized sports. Although White children usually live in better neighborhoods and have more equipment and facilities, they are generally limited in the duration and extent of unsupervised mobility in their neighborhoods. Adult supervision, organization and pressures are maximal.

During adolescence data are less extensive. The data suggest little differences in strength and performance between Black and White boys except for consistently better vertical jumping performance in the former (MALINA 1973a). Perhaps the characteristic variability of male adolescence in conjunction with teenage male concern with physical prowess and activities in the form of heightened athletic competition might offset the performance advantages noted in elementary school age Black boys. Too often, however, emphasis during the adolescent years is on interscholastic sports competition in which the better performers are selected and trained to the neglect of the average and poorer performers.

Performance data for Black and White girls are less extensive, although at elementary school age Black girls tend to perform somewhat better in running and jumping tasks (MALINA 1973a). Perhaps similar rearing and adult supervision factors are involved for the young girls as in the case of boys. As noted earlier, the cultural socialization of female adolescents may serve to reduce interest in physical skills and athletic pursuits.

Data are lacking on the effects of other socio-cultural factors on performance during childhood and youth. For example, what is the role of rearing practices at these ages, or, the role of family size and composition as a factor influencing the performance of children ? Do the effects of early rearing styles persist into middle childhood and adolescence ? How do these interact with peer pressures which are important at these ages ? Do children from small families (1 or 2 children) perform the same or differently compared to those from larger families ? Do girls with an older brother as a sibling perform better than those with a sister as a sibling ? Do they have similar activity habits ? What is the influence of parental physical activity habits on the activity habits of their children ? These and many other questions merit more detailed study. Data on such relevant socio-cultural factors are lacking and are essential if we are to understand the many factors influencing physical performance and activity habits.

Data on the activity habits and attitudes of children and youth are not extensive. They are commonly based upon retrospective data, with the inherent problem of error in recall. Nevertheless, such limited observations provide some insight into the activity habits and attitudes of children and youth. In a longitudinal study of West German adolescents, 25 girls and 26 boys, Ilmarinen and Rutenfranz (1980)

used four annual retrospective interviews with a standardized questionnaire. There was a clear decrease in yearly sport activity in both sexes from 14 to 17 years. In boys, the relative decrease in yearly sport activity was 70% between 15 and 17 years; the corresponding value for girls was 57%, most of the decrease occuring from 14 to 15 years. Comparison of the sport activity scores between the sexes indicated a total sport activity score for boys that was about four times greater then girls at 15 years of age, but only two times greater at 17 years of age. Similar age and sex differences were apparent when sport activity scores were viewed on a monthly basis.

In this study, youngsters were studied in more detail at 17 years of age, a transitional period from school to work for some. Among boys, those who continued in school and those who pursued an occupation (work) or vocational training, did not differ in yearly sport activity scores. Among girls, on the other hand, the sport activity scores of those who continued in school were two times greater than the occupational/vocational group. What is of interest in this comparison of sport activity of girls are the kinds of activities pursued. The school group participated most often in gymnastics and swimming at 17 years of age, especially the former, while the occupational group showed greater activity in skiing and cycling. In this regard, it is of interest that the girls in the occupational group had higher absolute and relative values of maximal oxygen consumption than the school group at 16 and 17 years, though both groups decreased in this index of fitness from 16 to 17 years.

At 17 years of age, boys in the school and occupational groups did not differ in activities pursued, although the school group participated somewhat more in football (soccer). Maximal oxygen consumption did not differ at 17 years in the boys, but the occupational group decreased significantly in this index from 16 to 17 years. Over this period, the school group maintained their absolute and decreased slightly in relative aerobic capacity (Ilmarinen and Rutenfranz 1980).

In another study, the attitude towards and scope of physical activity (hours per week) were followed in a sample of Swedish males and females at 15, 20 and 25 years of age (22% drop out in the original sample) (Engström 1979). The youth and young adults expressed a very positive attitude towards physical activity. However, the amount of activity did not correspond to this attitude. The average hours of physical activity per week for boys decreased from 4.8 hours at 15 years to 2.6 hours at 20 years, and then increased to about 2.9 hours per week at 25 years. Corresponding values for girls were 3.3 hours per week at 15 years, 1.8 hours per week at 20 years and 2.2 hours per week at 25 years. The decrease from 15 to 20 years in both sexes (46%) may relate to adolescence per se with its concomitant social demands and career choices.

When viewed in terms of sports club membership, about 18% of the girls were members of sports clubs at each of the three ages compared. In contrast, the percentage of boys who were members of sports clubs decreased from 45% at 15

to 35% at 25 years of age. Members of sports clubs, however, were more active than non-members at all ages. Choice of activities was perhaps related to the sports club membership. Girls most often chose recreational activities (swimming, cycling, walking, dancing) at each age. For boys, competitive sports (ice-hockey and soccer) were most common at 15. At age 20 years recreational activities (dancing, table tennis) received an equal share with competitive sports (soccer), while at 25 years, recreational activities were most common (dancing, walking, cycling, badminton, jogging).

Although surveys of activity habits are limited, the relevance of such surveys to youth programs needs consideration. Activities offered in youth sports programs are more competition oriented and more oriented to the physically/motorically talented. Nevertheless, those who participate in such programs do tend to continue participation in regular physical activity as adults. Perhaps familiarity and success in sporting activities during youth engenders a favorable self-concept in and attitude towards activity in general and/or other sporting and recreational activities.

There must also be concern, on the other hand, for those who do not pursue physical activities during youth, and those who drop out. We may ask why the former do not participate ; what is unique about them ? And, why the latter cease or reduce participation ? Many of those who do not continue to participate remove themselves voluntarily, some are "cut" by coaches, and some simply shift from one activity to another. Research efforts in these areas are increasing, and available results provide some interesting insights. Orlick (1973), for example, interviewed two small samples (16 each of 8 and 9 years old who were and were not participating in sports). Many of the non-participants simply never tried out, believing they could not make the team. Such a view is perhaps related to their own self-concept. Some dropped out, the most often given reason being "they never let me play". Thus, some youngsters are seemingly turned-off at these ages. Is it the emphasis on winning ? In a subsequent interview study of 60 youths 7 to 19 years of age who dropped out of sports (hockey, soccer, baseball, basketball, swimming, cross-country skiing), Orlick and Botterill (1975) noted that 67% dropped out for reasons related to the emphasis on competition (e.g. too serious, emphasis on winning, sense of failure), 31% left due to the development of other interests, and 2% dropped out due to injuries. Of those who cited competition as a reason for quitting, the program per se and the coach were most often indicated as primary factors (McPherson 1978 ; Seefeldt and Gould 1980).

3. Adulthood and ageing

Physical performance during adulthood is variable and depends upon the function tested. Muscular strength generally increases through the twenties and perhaps into the thirties, and then declines with age (Shephard 1978, Hodgson

and BUSKIRK 1981). The rate of decline is greater with advancing age. The general pattern of age change and rate of decline varies, however, with the muscle group tested. Data on the performance of motor tasks similar to those used during childhood and adolescence are not extensive, but indicate a linear decrease with age after the early twenties (LARSON 1946 ; SELIGER and BARTUNEK 1976). Aerobic working capacity also declines with age from the early twenties, the rate of decrease being greater with advancing age (ÅSTRAND and RODAHL 1977 ; SHEPHARD 1978).

Of particular relevance to ageing in physical performance is the role of regular physical activity. More active individuals generally show greater functional capacity at all ages and this may function to alleviate changes with ageing (see SHEPHARD 1978). Specific training programs, for example, can delay the age-associated deterioration in aerobic capacity. Furthermore, changes in a general sense of well-being (physical and psychological) and perhaps in self-concept associated with regular physical activity are probably quite significant. More active individuals also have less body fat (MALINA 1979), and the extent to which regular physical activity reduces fatness or prevents fat accumulation may be significant in that fat reduction itself can lead to improved functional capacity and mobility.

Although the available evidence suggests a beneficial role for physical activity during adulthood, and although most adults do not harbor negative attitudes towards exercise and sport, active participation in physical activities is not a part of the life style of many adults. Two relatively recent national surveys of the exercise and sport habits of American adults in the 1970's, for example, indicated that 49 million adults (45%) in one survey and 69 million adults (51%) in the other survey did not exercise regularly (President's Council on Physical Fitness and Sports 1973, 1974 ; National Center for Health Statistics 1978). Those who did not exercise were older, less educated, less affluent, and non-white.

There was a decrease in activity with age, deriving perhaps from a change in life style and/or from a loss of vigor. The loss of vigor with age, in turn, may be related to a low level of physiological fitness (aerobic power). The change in activity habits with age may also be related to cultural perceptions of ageing, i.e., as people get older they are not expected to be physically active and the nature of their activities may change. There is also the possibility that the less educated and less affluent are engaged in jobs which require physical effort. Hence, off-the-job or leisure time physical activity is minimal.

Similar trends are apparent in survey data from other countries. Among Canadian adults, for example, there is a progressive reduction in participation in sports and other vigorous activities with age so that less than 9% of those over 55 years of age deliberately exercise (SHEPHARD 1978). Among parents of boys in the Leuven Growth Study, 53% indicated a history of participation in sport ; however, after 30 years of age, only 19% indicated active participation in sport

activities (RENSON and VERMEULEN 1972). Those in the higher educational and occupational categories had a greater level of sports participation, and those resident in the more urban areas indicated greater levels of sports participation. In a survey of the activity habits of the adult population of Busselton, Western Australia, about 60% of the adults did not exercise, the number increasing from about 45% in the twenties to about 68% in the sixties (CULLEN et al. 1978). The percentages of the population exercising daily and four to six times per week were 5% respectively, and these percentages did not vary much with age except in the oldest age category (70 + years). About 17% of the population exercised two or three times per week ; when viewed by age, the percentage in this group decreased from about 28% in the twenties to about 10% in the sixties. The preceding would seem to suggest a small core of active individuals in the population at all ages except the oldest, while the majority of the adult population is inactive or only moderately active. It would be interesting to focus on the physical, psycho-social and demographic characteristics of the small nucleus of active individuals in the population.

Although all surveys have limitations, the data from several surveys of activity habits of adults indicate levels of activity that are quite low or at best moderate. People are less active with age and the physiological intensity of the activities pursued is also less. The most popular exercise among American adults who engage in various forms of exercise was walking, followed by bicycling, swimming, calisthenics and jogging. Very few of those who cycle, swim or jog did so regularly (at least three times per week). The most popular participatory sport was bowling (20% of American adults participated, but only one in five did so once or twice a week). Second to bowling was swimming (18% of adult population), followed by golf (9%), softball (8.5%), and skiing (2%). Of these sports, only three, swimming, golf and tennis, met the criterion for regular exercise (at least three times per week) (President's Council on Physical Fitness and Sports 1973).

It is difficult to infer that the activity habits of adults in the several surveys cited are a carry-over from school physical education or community activity programs, but the possibility exists. It has been suggested that the activities learned in sports-oriented physical education programs and in youth sports programs are not suitable for participation in adult years, and many activities emphasized are not sufficiently vigorous in terms of cardiorespiratory fitness. However, in one survey of American adults, individuals who have experienced physical education programs in school or college did engage in exercise more so than those who did not. In addition, former athletes (those who participated in two or more sports in school or college) indicated greater levels of physical activity as adults, particularly in the more vigorous activities, suggesting some carry-over effect (President's Council on Physical Fitness and Sports 1973, 1974).

Of particular concern in surveys of adult activity habits is the motivation for or perceived need for physical activity. One of the United States surveys inquired into

reasons for exercising or not exercising (President's Council on Physical Fitness and Sports 1973). Among the 55 % who exercise, the majority do so for reasons of health, "feeling better" and weight control. The latter reason is more common to women than men. Among the 45 % who do not exercise, the primary reasons are not enough time, enough activity at work, and medical reasons.

The health benefits of physical activity in adulthood, whether perceived or real, merit consideration, especially in light of generally low levels of cardiorespiratory fitness in adults. There is generally little correlation between level of physical activity and level of commonly accepted cardiovascular disease risk factors, i.e., excess weight, blood pressure, blood lipids, uric acid, smoking habits, electrocardiogram abnormalities (CULLEN et al. 1978 ; KANNEL and SORLIE 1979). In the Framingham study, however, there was a modest inverse effect of activity level on cardiovascular and ischemic heart disease mortality in men only (KANNEL and SORLIE 1979). Note that the effect of activity is only modest compared to other risk factors. Nevertheless it is there, and one may inquire as to what level of physical activity is necessary for a protective effect ? The situation is undoubtedly complex and likely includes many factors such as health status, dietary habits, physiological effects of activity, social aspects of activity, perceived feeling of well-being, and so on.

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