Pubertal Status and Problem Behavior

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An epidemiological study of 11-year-olds

Puberteit en Probleemgedrag

Een epidemiologisch onderzoek onder 11-jarigen

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Abbreviations

ADD	Attention Problems
AGG	Aggressive
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
AXD	Anxious/Depressed
BMI	Body Mass Index
CBCL	Child Behavior Checklist (parent-report)
CISC	Cross-Informant Syndrome Construct
DEL	Delinquent
EXT	Externalizing
INT	Internalizing
MANCOVA	Multivariate Analysis of Covariance
MANOVA	Multivariate Analysis of Variance
SES	Socio-Economic Status
SOC	Social Problems
SOM	Somatic Complaints
THT	Thought Problems
TPS	Total Problems
WTH	Withdrawn
YSR	Youth Self-Report

CHAPTER 1 INTRODUCTION

Subject of the present dissertation are the results of the first point of measurement of a longitudinal research project studying changes in the distribution of behavioral/emotional problems over puberty. The aim is to investigate the role of maturational stage in the distribution of behavioral/emotional problems.

It is described how the amount of problems and their patterning are distributed in an epidemiological sample of young adolescents in the larger Rotterdam area. Attention is paid to socio-economic differences and (dis-)agreement between informants.

1.1 Study motive

Many studies addressing the issue of continuity of behavioral/emotional problems over time point out changes in frequency and in distribution patterns of various types of psychopathology with age (e.g. Rutter, 1972 and 1985, Gersten, Langner, Eisenberg, Simcha-Fagan & McCarthy, 1976, Verhulst & Althaus, 1988, Ghodsian, Fogelman, Lambert & Tibbenham, 1980). In an early review of the results from the Isle of Wight study and a number of other studies, Rutter (1979) concluded that there appears to be a slight rise during adolescence in the overall rate of psychiatric disorder. More importantly, he mentioned several changes during adolescence in the pattern of disorder:

- Rates of nocturnal enuresis and encopresis - although low to begin with - markedly decreased.
- Rates of conduct disorders remained about the same (constituting about two-fifth of the adolescents with a psychiatric condition).
- Rates of delinquency sharply rose; rates of suicide, suicidal attempts, alcoholism, drug dependency, schizophrenia, anorexia nervosa, and depression also increased, although remaining a minority of the psychiatric conditions of adolescence.

In an overview of five community surveys (conducted in the United States, Canada, Puerto Rico, and New Zealand) of childhood psychopathology, Costello (1989) summarized the findings of age differences as follows:

> The three studies that covered a wide age range showed increases in the rates of conduct disorders *after puberty* (italics added) (...). The picture for the emotional disorders is less clear. (...) In general, depressive disorders showed a marked increase *after puberty* (italics added), and a changing sex distribution. Rates in children under 12 ranged from 2% to 4%, and in three out of four studies there were more cases among the boys than the girls (...). At the two sites that included older children (...), the rates of depression remained fairly stable for the boys but more than doubled for the girls(...). Anxiety disorders,

on the other hand, tended to diminish *after the age of puberty* (italics added). (pp. 839-840)

During adolescence the sex ratio of psychiatric disorders changes from a male preponderance in childhood to a female preponderance in adult life. Rutter (1979) "explained" this alteration in the first place by a marked increase in emotional disorders in females. The sex ratio of referred youth might be affected by changes in referral practice with age:

- Children with conduct disorders are likely to be referred to a mental health professional, but adults with conduct disorders are most likely to end up in the judicial channel. Conduct disorders form a major category of childhood and adolescent psychiatry, and they are most prevalent in males. The combination of a high prevalence rate of conduct disorders and their male preponderance with the change in referral destination with age, might lead to the observed change in sex ratio of psychiatric referrals with age.
- Children are almost always referred to mental health services by a third party (e.g. parents, teacher), while from adolescence on psychiatric help is increasingly obtained by self-referral. For the individual him-/herself, internalizing problems are more disturbing than externalizing problems, while the reverse holds for people in the vicinity of the individual. Overall, there is a female preponderance for problems of an internalizing nature, and a male preponderance for problems of an externalizing nature. The combination of a change of source of referral with age, differences between sources in likelihood to report specific types of psychopathology, and differences between the sexes in presenting with specific types of psychopathology, might lead to the observed change in sex ratio of psychiatric referrals with age.

The "age of puberty" (Costello, 1989) is indicated as the period during which changes in the distribution pattern of behavioral/emotional problems take place. "Puberty" is the physical process of sexual maturation. The start and completion of the outwardly observable developments of the secondary sex characteristics are taken as indicators for the lower and upper limits of the age period covered by puberty. The median ages for start and completion of the development of the secondary sex characteristics in Dutch youth (Roede and van Wieringen, 1985) are: 11.3 to 15.3 years of age in boys, and 10.5 to 14.2 years of age in girls. Roughly speaking then, "the age of puberty" covers the ages 10-15. (For more details on physical developments of puberty, see chapter 4).

Another term for "the age period of puberty" is "early adolescence". "Adolescence" in general indicates a wide developmental phase, encompassing physical, psychological and social changes, in which the adolescent has the developmental task to learn to function independently, both emotionally and materially, from his/her family of origin. Adolescence starts with puberty and ends with adulthood. The moment of transition between adolescence and adulthood is less marked and more flexible than that between childhood and

adolescence. The attainment of emotional independence is hard to assess. If financial independence is taken as the criterion, the transition occurs somewhere between the ages of 18 and 24 for most youth. With the prolongation of educational careers, and therefore the prolongation of financial dependence, the adolescent - adult transition moves to a higher age.

In the present study the focus is on the "age of puberty", or the period of early adolescence. Early adolescence is a period of change. Change is potentially stressful, with stress being defined as an imbalance between challenges that confront the individual and the currently available resources to meet these challenges.

On the basis of the idea that in early adolescence a heightened demand is made on the adaptational capacities of the individual, an increase of behavioral/emotional problems in general is to be expected. In addition, the specific changes associated with puberty can be (theoretically) linked to the development of specific boy/girl differences in behavioral/ emotional problems and to the discontinuation or new development of specific types of psychopathology. In paragraph 1.3 studies on age variations in psychopathology. In paragraph 1.4, the physical and related changes of puberty and what is known on their link with psychopathology will be discussed. Comparing results from various studies on the distribution of psychopathology, and in particular changes with age, is often difficult for methodological reasons. These methodological problems are elaborated upon in paragraph 1.2.

1.2 Methodological remarks

1.2.1 Lack of one common language

In general, in order to make comparisons between individuals' characteristics, they have to be measured with the same standard. This implies using one and the same definition of psychopathology. There are two main approaches for the delineation of various types of behavioral/emotional problems: Consensus based versus empirically based clusters.

In the consensus based approach, behavioral/emotional problems and symptoms are a priori grouped into problem clusters by a forum of clinical experts. The validity of these groupings is subsequently assessed. Examples of consensus based clusters of behavioral/ emotional problems are the diagnoses arrived at by means of the World Health Organization International Classification of Diseases (ICD, with version 10 as the most recent) (WHO, 1992) or the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM, with version III-revised as the most recent, and version IV nearing completion) (APA, 1987).

In the empirical approach, clustering of problems is arrived at through statistical assessment of the existence of relations between behavioral/emotional symptoms. An example of the empirical approach is the taxometric assignment of individuals to problem profile types as developed by Achenbach (1985). By this approach, quantitative indices are obtained that indicate the degree to which a particular child's behavior profile resembles various problem profiles identified in a clinical norm group.

There is a considerable amount of overlap in number and symptom content between empirically reached clusters of behavioral/emotional problems and psychopathology clusters defined by consensus. However, they do not correspond completely. There is no direct translation of one approach into the other. Therefore, the terms used to describe an individual's psychopathology and the content of these terms will vary with to the approach and with the version of the classification system used.

An important difference between the two approaches is that the consensus based approach is often categorical and the empirically based approach quantitative. A categorical approach of psychopathology means that a disease model is employed: Someone who meets certain symptom criteria is a diagnostic case; no distinction is made between those who have no symptoms and those who show some but not all symptoms - they are not a diagnostic case. In the quantitative approach of psychopathology, the normal-abnormal distinction is seen as a gradual, dimensional one, and individuals' characteristics are described as quantitative variations.

Again, the result is that one and the same individual may be described as suffering from several diagnoses by ICD or DSM criteria, or as resembling to a high degree a number of problem profiles by an empirical - for instance Achenbach's - approach. Thus, it is difficult if not impossible to compare results from studies employing various approaches.

1.2.2 Lack of instruments covering all age-ranges

For comparisons between subjects of various ages, instruments are needed that are applicable to persons of all the ages covered. Especially for the study of children and adolescents, developmental changes in capacities and behavioral repertoires make difficult the use of a common item pool:

- Symptoms that are found at one age may not exist at another age. To include all the items showing at some or other age, there is the risk of the resulting instrument being unappealing both by its size and by the presence of a number of items that are inappropriate for the individual respondent. There is no complete solution to the friction between general coverage and individual applicability. General coverage remains all-important. All that can (and should) be done to accommodate the individual respondent, is to be economic and to reduce the item pool as much as possible.
- Comparison of problem levels through raw totalled scores may be senseless, as the meaning of individual items may vary with age. A solution to this is standardizing scores according to age-specific norms.

Very few instruments exist that:

- Have been construed and tested for use on a wide age-range,
- Have one, common, pool of items, and
- Provide age-specific norms.

The few available instruments covering a wide age range are from a relatively recent date. Conclusions on age effects from (older) studies covering either a narrow age range or using different instruments for different age ranges must be interpreted with caution.

1.3 Age and psychopathology

1.3.1 Age variation in psychopathology around early adolescence

To study the effects of age, a study design with at least two age groups has to be employed; either by using two or more birth cohorts in a cross-sectional design, or by using two or more moments of measurement in a longitudinal design. To study changes with age associated with the period of early adolescence, a study design comparing an age group of early adolescents to an adjacent age group of subjects (pre-adolescents, late adolescents, or both) has to be employed. The period of early adolescence comprises the ages of roughly 10-15 (see paragraph 1.4).

Esser, Schmidt and Woerner (1990) studied prevalence rates and course of psychiatric disorder in a longitudinal study of a German birth cohort of children with first measurement at age 8 and follow-up at the age of 13 (roughly equivalent to pre-adolescence and early adolescence). Diagnoses were classified into five categories: Neurotic and emotional disorders, conduct disorders associated with emotional problems, antisocial and conduct disorders (not associated with emotional problems), hyperkinetic syndromes, and other specific symptoms and syndromes. Although the authors' emphasis was on the stability of problem behavior (persistence, remission, incidence), the data they present were used to compare prevalence rates over time:

- The overall rates of prevalence of moderate to severe psychiatric disorder remained the same from ages 8 to 13. There was a marginal decrease with age in males' rates, and a marginal increase with age in females' rates (by parental report).
- Rates of "neurotic and emotional disorders" slightly decreased with age. The already existing male preponderance increased with age.
- "Conduct disorders associated with emotional problems" had low prevalence at the age of 8, with female prevalence too low to estimate. At the age of 13 prevalence rates had increased, and a male preponderance was seen
- "Antisocial and conduct disorders" also had low prevalence at the age of 8, with female prevalence too low to estimate. However, at the age of 13 prevalence rates had increased dramatically. The sex ratio at the age of 13 approached unity.
- The "hyperkinetic syndromes" at both ages had too low a prevalence to be estimated in females. With increasing age, males' rates decreased.
- The category of "other specific symptoms and syndromes" was the only one to have a female preponderance at both ages. With increasing age prevalence rates dropped.
- The prevalence sequence of the various categories changed with age. At the age of 8, "neurotic and emotional disorders" formed the most common category, followed by

"hyperkinetic syndromes" and "other specific symptoms and syndromes". At the age of 13, neurotic and emotional disorders" shared the position of most common category with "antisocial and conduct disorders", followed at a distance by "conduct disorders associated with emotional problems".

In a report on prevalence rates and rates of service utilization found in their cross-sectional community survey of the Canadian province of Ontario (Ontario Child Health Study), Offord et al. (1987) divided subjects into two age groups: 4-11 and 12-16. These ranges may be considered equivalent for the periods of pre-adolescence and early adolescence. They focused on four categories of psychiatric disorder: Conduct Disorder, Hyperactivity, Emotional Disorder, and Somatization. In addition, rates for the presence of at least one of these disorders were given. Comparing prevalence rates by age and gender, they found the following:

- Overall (at least one disorder present), prevalence was significantly higher among boys than among girls in the pre-adolescent group, while the reverse was true in the early adolescent group. Although the presented rates were not aggregated over the sexes, from the available age- and gender-specific prevalence rates it would seem that the overall rate was higher for the older group.
- Conduct Disorder was significantly more frequent in boys than in girls, regardless of age; rates were significantly higher for early adolescents than for pre-adolescents. There was a tendency for the difference between younger and older subjects (older higher) to be greater for girls than for boys. From the available age- and gender-specific prevalence rates it would seem that the overall rate was higher for the older group.
- The prevalence of Hyperactivity was significantly higher for boys than for girls, regardless of age. No significant age effect was found, but there was a tendency for older boys to have lower rates. From the available age- and gender-specific prevalence rates it would seem that the overall rate was (slightly) lower for the older group.
- In the pre-adolescent group, rates for Emotional Disorder were about equal for boys and girls. In the early adolescent group, rates for boys were lower and rates for girls were higher than those in the pre-adolescent group, and the boy-girl contrast was significant. From the available age- and gender-specific prevalence rates it would seem that the overall rate was (slightly) lower for the older group.
- Somatization disorder was rare among pre-adolescents, and therefore no prevalence estimates were presented for that age group. In the group of early adolescents, rates were higher for girls than for boys. Although it could not be tested, the fact that prevalence estimates *were* obtained for the early adolescents points to an age effect.

For all disorders studied then, a parallel age effect in sex ratios was observed: Boy-girl contrasts changed "in favor of" girls, expressed as a move from pre-adolescent male preponderance towards male-female equality in early adolescence, and from pre-adolescent male-female near-equality to female preponderance in early adolescence.

From studies such as the above, where two age groups are compared, it remains unsolved whether the observed differences are part of a steady general developmental change in prevalence or are indicative of a temporary age-specific effect. To answer questions on specificity of change with age, studies are needed that examine differences between at least three birth cohorts of subjects and/or that examine differences between at least three repeated measurements.

Gersten et al. (1976) studied stability and change of disturbed behavior in 6 birth cohorts of 732 children and adolescents from the Manhattan general population originally aged 6-16 over two points of measurement. They assessed these children's scores on 12 problem scales. They found that:

- Across all cohorts there was a significant increase of psychopathology with time in: Conflict with parents, Delinquency, Self-destructive tendencies, and Undemandingness. Significant decreases over time were found for: Mentation problems, Regressive anxiety, Isolation, Conflict with siblings, and Repetitive motor behavior. The factors Fighting, Competition, and Dependence showed no significant mean difference over time.
- Examination of the mean change with age within age cohorts was restricted to six factors which had the strongest relationships with the evaluation of total impairment made by psychiatrists. Results indicated that for the factors Mentation Problems, Regressive Anxiety, Fighting, and Delinquency, the changes in disturbance within each cohort did not differ significantly from the change in disturbance evidenced by the sample as a whole. In the two oldest cohorts (which ranged from middle adolescence to early adulthood) the factor "Conflict with parents" failed to show the increased disturbance as seen on the total sample level. On "Delinquency", no increase in pathology was noted in the two youngest age groups (from latency to early adolescence), and the oldest age cohort evidenced declining rather than increasing pathology.

Kashani, Orvaschel, Rosenberg and Reid (1989) also presented information on more than two age cohorts. They compared age- and gender-specific rates of 7 diagnostic categories and one combined category, between 3 age cohorts (8, 12, and 17 years) from a midwestern USA general population sample. They used information from both the youth him/herself and from the parent. Unfortunately, the way they discuss their results leads to confusion on precisely the issue of specificity of change with age:

- From visual inspection of the presented prevalence rates, derived from children's self-reports, general age-trends appear for Conduct disorder (increase in rates with age) and for Enuresis/encopresis (decrease in rates with age). However, the authors report significant increases with age for conduct and substance disorders, and they do not mention a significant decrease with age for any disorder. Furthermore, they report greater frequency of oppositional and conduct problem behaviors in 17-year-olds but fail to mention whether this is in comparison with younger subjects as a whole or in

separate comparisons with both younger age cohorts. From visual inspection it would seem that the prevalence rates of Conduct disorders of 17-year-olds would indeed rise high above those of both 8- and 12-year-olds, but for Oppositional disorders the prevalence rates of 12-year-olds, instead of those of 17-year-olds, stand out.

- Parents' reports generally yielded lower overall rates of psychopathology when compared to children's self-reports. Kashani et al. state that no significant gender and age effects were noted according to parents reports.

Concluding, only very few studies have been conducted that would allow for conclusions on age-specificity of differences with time or between cohorts. The study by Gersten et al. (1976) seems to point to Delinquency as one area of psychopathology which is sensitive to aspects of early adolescence. The study by Kashani et al. (1989) is confusing on the issue of age effects. It does, however, make clear that for the rates of psychopathology being reported it makes a difference *who* reports on the behavioral/emotional problems. In the following paragraph the effect of informant will be discussed in more detail.

1.3.2 Age and informant

The use of parental reports in the assessment of child and adolescent psychopathology is almost standard, because as Achenbach (1991b) states:

> Parents (and parent surrogates) are typically among the most important sources of data about children's competencies and problems. They are usually the most knowledgeable about their child's behavior across time and situations. Furthermore, parental involvement is required in the evaluation of most children, and parents' views of their children's behavior are often crucial in determining what will be done about the behavior. (p. 2-3)

Especially in the assessment of psychopathology in adolescents, but also in younger children, youth themselves have increasingly become regarded to be valuable informants in their own right. Not only has the assumption that children could not understand or participate in clinical interviews been challenged. With increasingly independent functioning of the child/adolescent with age, parents may lose their "expertise" in describing their child. Results from a study by Edelbrock, Costello, Dulcan, Kalas and Conover (1985) support this. They interviewed 242 disturbed children aged 6-18 years and their parent twice. Although parents were found to be generally more reliable than children in reporting child symptoms, test-retest reliabilities of child and parent interviews revealed an opposite age pattern for parent and child: The reliability of the child's self-report increased with age while that of the parent's report decreased with age.

Next to overall differences in reliability of child and parent information with age, it is likely that differentiation exists between problems of an internalizing and problems of an externalizing nature. Problems of an internalizing nature are more difficult to assess by a third

party than problems of an externalizing nature. Growing capacities of the child/adolescent to recognize and label his/her emotions may increase their relative expertise in this area of functioning. As mentioned before, with increasing age, parents may lose their knowledgeability of their child. It follows that with age already existing discrepancies between parent-youth agreement on internalizing and on externalizing problems increase, mainly due to a decrease in parent-youth agreement on internalizing problems.

Verhulst and van der Ende (1992) provide partial evidence for this contention: They compared 883 parent reports and youth self-reports of 11-19-year-olds from the general population. Parent-child discrepancy was greater for older than for younger children for all syndromes. At all ages more problems were reported by the youth than by their parents, with one exception: On the Attention Problems syndrome parents of boys aged 11-14 mentioned more problems than the boys themselves, while this was reversed for older boys. For Internalizing type of problems, the age increase in parent-youth discrepancy was especially salient for girls. The authors noted that parents seemed to increasingly underreport Externalizing type of problems with increasing age. Contrary to my expectations, Verhulst and van der Ende's (1992) results indicated that differences between parents' and youth's mean scores were greater for Externalizing than for Internalizing (with youth scoring significantly higher than parents). No mention was made of differential increase of parent-youth contrasts with age between the Internalizing and the Externalizing groupings.

1.4 Puberty and psychopathology

The term "puberty" in this study is used for the physiological and somatic changes associated with sexual maturation which take place during early adolescence. Tanner (1974) summarizes these changes as:

> 1. A general increase in the growth rate of skeleton, muscles, and viscera, known as the adolescent growth spurt.
> 2. Gender-specific increases in growth rates, for example, of shoulder and hip width above the general spurt, leading to an enhancement of sexual dimorphism.
> 3. Changes in body composition caused by an increase in muscle, decrease in fat, and increase in cortical but not medullary bone more pronounced in boys than girls.
> 4. The development of the reproductive system and secondary sex characteristics.
> (p. 448)

1.4.1 Hormonal developments

The physical changes of adolescence are brought about by hormones (Tanner, 1975). Two neuroendocrine axes change during pubertal development: The hypothalamic-pituitary-adrenal (HPA) axis, and the hypothalamic-pituitary-gonadal (HPG) axis.

The HPA axis is activated during physical or emotional stress, and is responsible for the secretion of cortisol and adrenal androgens. They have an inhibitory influence on the functioning of the HPG axis. Only the secretion of adrenal androgens changes developmentally. The adrenal androgen secretion starts at ages 6-8 and increases gradually, continuing to rise through puberty, reaching asymptote in late adolescence. As recently as 1990 (Nottelmann, Inoff-Germain, Susman & Chrousos), no physiological role had been ascribed to adrenal androgens other than stimulation of growth of small amounts of pubic hair. The HPG axis as a whole changes developmentally. It is responsible for the secretion of the sex steroids testosterone in boys and estradiol in girls; these bring about the physical maturation of puberty and are responsible for sustaining reproductive function. The gonadal sex steroid secretion starts at ages 9-13, rises more steeply than adrenal androgens, and reaches asymptote in mid-adolescence. (Information on hormonal developments after Nottelmann et al., 1990.)

The fact that sex steroid levels are more clearly and in time more closely related to the physiological changes of puberty than adrenal androgen levels makes the gonadal hormones a more likely contributor to emotions/behavior during puberty. In addition, the gender-specific development of gonadal androgen secretion might be one cause of the change in sex ratio of psychopathology rates.

1.4.1.1 Hormones and psychopathology

> Because changes in adolescent behavior appear to coincide temporally with the physical changes of puberty, there has been a tendency to attribute behavioral changes to hormonal influences as well - especially the emergence of problem behavior. (Nottelmann et al., 1990, p. 88)

Despite the tendency to attribute the emergence of problem behavior to hormonal influences, only few studies have examined the relations between hormones and emotions/behavior. Two types of associations have usually been studied:

- The association between estrogens and depressive affect, typically studied in adult women, and
- The association between gonadal androgens (testosterone in particular) and aggression, studied in the first place in animals. Increasingly, this association is also studied in humans. In both cases the studies involve adult males.

The first, and to my knowledge only, study to investigate the role of a large complement of pubertal hormones in relation to a wide spectrum of behavioral measures, was a collaborative National Institute of Mental Health / National Institute of Child Health and Human Development (NIMH-NICHD) study (see Nottelmann, Susman, Inoff-Germain, Cutler, Loriaux & Chrousos, 1987; Susman, Inoff-Germain, Nottelmann, Loriaux, Cutler & Chrousos, 1987; Inoff-Germain, Arnold, Nottelmann, Susman, Cutler & Chrousos, 1988; Nottelmann et al., 1990).

In an overview article of the NIMH-NICHD study, Nottelmann et al. (1990) report the following results: In a group of 108 healthy middle to upper middle class white 9-14 year-old adolescents

- Hormones were significantly related to the total number of behavior problems in boys, but in girls the relationship was significant only for internalizing behavior problems.
- The only significant hormone correlates of total number of problems were HPA axis hormones. For boys, higher adrenal androgen levels were associated with more behavior problems in general. These associations held when controlling for some developmental markers, but not for others. For girls, hormone-behavior relations were relatively weak: Lower adrenal androgen levels were associated with more problem behaviors of an internalizing nature, but the correlations were rendered nonsignificant when controlling for other physical growth measures. The disappearance of significance in hormone-behavior correlations when controlling for other (non-hormonal) markers of development indicates that the developmental variation was not unique to hormone levels, but shared with the other developmental markers.
- For both boys and girls, hormone-behavior relations analyzed by individual scale generally reflected the findings of those for total number of problems for boys and internalizing problems for girls. In addition, for boys lower testosterone levels (HPG axis hormone) were associated with a higher degree of obsessive-compulsive behavior, and lower estradiol levels (HPG axis hormone) were associated with a higher degree of delinquency. These latter findings held even when controlling for other developmental markers.

Concluding, this first study with a broad approach seems to support a general puberty-related developmental model for psychosocial functioning during early adolescence. More significant correlations turned up for hormones on the HPA axis than for those on the HPG axis. The influence on hormone-behavior correlations of other than hormonal markers of physical development, such as chronological age, pubertal stage, and timing of maturation, points out that attention should be paid to these factors as well.

A major reason for the paucity of studies on hormone-behavior relations, especially during puberty, are problems with the assessment of hormone levels. This assessment is difficult, time- and money-consuming, and intrusive. The method used in the NIMH-NICHD study may serve as an example: (Serum) hormone level determinations were based on

separate radioimmunoassays of three blood samples, drawn at 20-minute intervals between 8 and 10 a.m. Even with this approach, Nottelmann et al. (1990) noted that "Some measurement error may have been introduced into the hormone values of girls, because the blood of postmenarchial girls was drawn without regard to the menstrual cycle." (p. 100-101) Subjects participating in studies using such intrusive measures may not be representative of the general population.

1.4.2 Somatic developments

Biometric data on height, weight, and maturation of Dutch children 0 - 19 years of age have been gathered by Roede and van Wieringen (1985) in a nation-wide survey. Their study provides reference norms for growth and sexual maturation. In addition, their data give an indication of the rapidity of the somatic changes.

A word of caution when interpreting Roede and van Wieringen's data in terms of change is in order: The data are cross-sectional. Information on the average duration of the maturational process is derived from mean ages of first somatic changes and of completed development of different groups of children. It is assumed that cohort (age group) differences do not have a significant effect, and that the data gathered for each cohort at the moment of measurement would have been applicable to the other cohorts were they the same age.

In Dutch girls the pubertal growth spurt on the average starts after age 10.5 and is at its peak between 11.5 and 12.0 years; in Dutch boys the pubertal growth spurt on the average starts after age 12.5 and is at its peak between 13.5 and 14.0 years.

Like the pubertal growth spurt, the development of secondary sex characteristics in girls starts about one year earlier than it does in boys: For girls, median ages at entry of puberty and at completion of puberty are 10.8 and 14.0 respectively for pubic hair, and 10.5 and 14.2 respectively for breast development. Menarche is reached on the average at 13.3 years of age. For boys, median ages at entry of puberty and at completion of puberty are 11.7 and 15.0 respectively for pubic hair, and 11.3 and 15.3 respectively for genital development. (All mentioned averages: Roede and van Wieringen, 1985.)

Both for boys and for girls, the somatic changes of puberty on the average cover a period of three-and-a-half to four years. Considering the amount of changes and the relatively short period in which they take place, these developments are a likely threat to the physical as well as the mental equilibrium.

The physical changes of puberty are outwardly observable, both by the individual and by his/her surroundings. The self-concept, and especially the body-image, may play an intermediary role between the physical changes of puberty and behavioral/emotional problems. Timing of the physical changes in comparison with age-mates is an important factor. Being developmentally early or late in comparison to age-mates means being "deviant". At an age where being conspicuous or standing out from the crowd is negatively valued, this may lead to a negative evaluation of one's body. A negative self-evaluation may

cause feelings of insecurity, misery, and anger, and problems in social relations (awkwardness, withdrawal).

Thus, the study of the relation between timing of maturation and positivism of the self-concept may point out areas of risk for the development of psychopathology.

Possibly the mental effects of atypical maturation only persist for a relatively short time; being developmentally early or late is a temporary phenomenon. Sexual maturity is reached by all, with the exception of those who have one of the few somatic diseases that preclude sexual maturation, such as Turner's syndrome and gonadal dysgenesis. As yet, it is unknown whether the (hypothesized) mental effects of atypical maturation will persist when the bodily differences have disappeared.

1.4.2.1 Sexual maturation and psychopathology

In 1985, Rutter noticed that only few studies had been aimed at the relation between age at puberty (timing aspect) and psychiatric disorder, and no clear-cut relationships between these two had been established. In addition, the studies had focused on girls and on delinquents, whereas he expected greater effects in emotionally disturbed boys.

What has been studied to a somewhat greater extent, is the relation between maturation and self-concept. The relation between maturational status (early/late) and self-conceptions was probably systematically studied for the first time in the Berkeley Adolescent Growth Study. Mussen and Jones (1957) found that boys with retarded physical development are more likely to have negative self-conceptions, feelings of inadequacy, strong feelings of being rejected and dominated, prolonged dependency needs, and rebellious attitudes toward parents. Contrary to their expectations, Jones and Mussen (1958) found results for girls - although not as strong - to be in the same direction more often than in the opposite direction as those for boys. They interpreted the contrast between late and early maturing adolescents "to indicate that late-maturing adolescents of both sexes are characterized by less adequate self-concepts, slightly poorer parent-child relationships, and some tendency for stronger dependency-needs." (p.500) The reliability of these findings is doubtful. In the first place, the number of subjects involved was rather low: 33 boys and 34 girls only. They were selected out of a general population sample of approximately 350 adolescents on the basis of consistent acceleration or retardation in physical maturity status from the ages of 13 to 17 years. In addition to the low sub-sample sizes, the authors make no mention of pre-adolescent assessment of self-conceptions measures. Thus, it may be that the observed differences in self-conceptions may be related to (pre-adolescent) inter-group differences other than timing of maturation.

Magnusson, Stattin and Allen (1985) studied the influence of adolescent girls' biological maturity and the mediating role of peer relations on norm violations in mid-adolescent girls. They found that "differences in norm violations among girls with different levels of maturity occurred for girls who had formed close contacts with older and more mature peers; the impact of having older friends was concentrated in the group of very early

maturing girls." (p. 281) In contrast with the above-mentioned conclusions of Jones and Mussen (1958), therefore, Magnusson et al. (1985) concluded that risk for problem behavior was higher for *early* than for late maturing girls in a short-term perspective. In a long-term perspective (follow-up to age 26), however, such an association was found no longer. They concluded that early maturing girls, instead of on a deviant pathway, were more advanced on the same pathway towards the adult status than later maturing girls. This suggests that the norms for judging behavior deviance should be maturation- rather than age-specific.

From the point of sample size and representativity, the study by Magnusson and colleagues is well-designed. The 466 girls they report on are part of an epidemiological sample representative of pupils in the compulsory school system in Sweden. Timing of maturation was assessed in grade 8 (mean age: 14.10 years) by self-reported age at menarche (before the age of 11, after the age of 13, or in-between). No reliability-checks of this information were provided, but in view of the salience of menarcheal status to girls at this age and the crudeness of the age boundaries employed, I assume the reliability to be sufficiently high. Another point, similar to that made for the Berkeley Adolescent Growth Study results, is that apparently no check was made for pre-menstrual differences in peer relations and norm violations. Thus, again, it may be that the observed differences in peer relations and norm violations may be related to (pre-adolescent) inter-group differences other than timing of maturation.

1.4.2.2 Other aspects of growth and psychopathology

Only one study has come to my attention in which psychopathology was related to an aspect of *pubertal* growth other than timing of maturation (such as rapidity of the pubertal growth spurt or differences in body composition): Hamburger, Swedo, Whitaker, Davies and Rapoport (1989) compared physical characteristics of an epidemiologically derived, non-referred sample of 11 obsessive-compulsive disordered 13-18-year-old boys with their population of origin (non-referred, non-obsessive-compulsive, semirural American subjects, $N = 2479$). They found that the obsessive-compulsive group was physically smaller (shorter and lighter in weight) than the comparison group. Another finding which is particularly relevant to puberty was that the regression line of height by age (apparently) was flatter for boys with obsessive-compulsive disorder. However, it fell within the 95% confidence limits of the line for the boys without obsessive-compulsive symptoms. The sample size of the obsessive-compulsive group may have been too small for significant results.

Relations between behavioral/emotional problems and growth abnormalities not specifically pertaining to aspects of pubertal growth have also been noted: Karlsson, Gillberg and Karlberg (1989) investigated the growth curves of 40 7-18-year-old children attending a Swedish Department of Child and Youth Psychiatry, in comparison with those of age- and gender-matched classmates. At a significance of $p < 0.1$, more abnormalities of growth were found in the psychiatric group (63%) versus the comparison group (15%). 81% of the conduct disordered group showed growth abnormalities, in particular being "big" (heights or weights

at or above +2 SD for their age during an observation period of at least 5 years). There was a greater tendency for the severe psychopathological disorders (psychosis, depression, and conduct disorder) to be accompanied by abnormalities of growth development than the less severe disorders (emotional, psychosomatic, and "other" disorders) (80% and 33%, respectively).

1.4.3 Cumulative change

The co-occurrence of several changes challenges the mental balance more than their separate occurrence. The focal model of adjustment (Coleman, 1974) argues that gradual adjustment to one change before confrontation with another will be beneficial. Simmons, Burgeson, Carlton-Ford and Blyth (1987), in a reformulation of this argument, stated, "The ability to cope with the discontinuities created by major life transitions will be easier if they come into focus at different stages." (p. 1221) The adaptational capacities and specific vulnerabilities of the individual determine which change or combination of changes tips the scale.

In addition to the somatic changes of puberty, several other developmental changes are associated with the period of early adolescence which may coincide with, and thus aggravate the mental effects of, puberty. The term "developmental changes" implies that these changes are universal, occurring for (almost) all individuals. Individual life events are not included, because they have no specific link with the developmental period of early adolescence.

1.4.3.1 School change

The majority of schoolchildren in western society encounter a change of schools from primary to secondary education around the age of 12. This not only involves a change from one building to another:

- In the Netherlands, there are many, relatively small, primary schools. The majority of children attend a school close to their home. Secondary schools are more aggregated (larger buildings, more pupils). A change from primary to secondary education therefore often means adaptation to a new and larger environment, new and more fellow pupils, and a greater travelling distance.
- There usually is an educational shift from one and the same group (class) of pupils with one and the same teacher across all study subjects, to separate pupil groups with different teachers for each study subject. This change means adaptation from a relatively constant to a continuously shifting social and learning environment.
- Usually for the first time, in secondary education homework is given. Making homework requires self-motivation, self-discipline, and the ability to work independently.

- Entering secondary school means becoming the youngest instead of the oldest, and following (new) role models instead of being the role models. Thus, the change of schools brings within reach a new behavioral repertoire (e.g. dating and sexual contacts, smoking, use of alcohol). Petersen (1988) stated, "Most of these behaviors would not be alarming in adults but are perceived as inappropriate for youngsters (...). Excessive engagement in many behaviors, of course, can be problematic at any age." (p.600) Engaging in these behaviors carries some risks, for example of unwanted teenage pregnancy or of becoming addicted to alcohol or drugs.

The changes associated with the transition from primary to secondary school may be extra difficult to adjust to for children who:

- Already have difficulties adjusting to new situations or making (new) friends,
- Have poor self-regulation / self-discipline,
- Are insecure and too dependent, or
- Are cognitively unable to oversee the consequences of (attractive but risky) behavior.

1.4.3.2 Cognitive development

According to Piaget's theory of cognitive development, most children start to develop the capacity of "formal-operational thinking" in early adolescence. This type of thought appears in adolescence under favorable circumstances. It continues to develop throughout early adulthood:

- In adolescents whose cognitive development had been slowed down by biological and cultural circumstances, and
- By application to an increasing number of areas and activities (Piaget, 1972).

In contrast with the previous cognitive phase (the period of "concrete-operational thinking") the youth becomes capable of letting go of the "here-and-now" of concrete relations between events. He/she can now apply formal logic to abstract, hypothetical relations. This entails:

- Abstract thinking: Becoming capable of thinking through problems on purely logical grounds (even if aspects of the problem are nonsense). This includes considering the (hypothetical) consequences of several lines of action, and making choices for the future on the basis of these considerations.
- Introspection: Becoming capable of stepping outside oneself - as it were - and looking in and judging oneself. This includes becoming increasingly aware of one's own looks, behavior, and emotions. As a consequence, self-concepts of youth in the formal-operational stage become more differentiated.
- Changing perspective: Becoming capable of considering things from someone else's point of view.

Development of the capacity for abstract thinking means expanding knowledge and abilities, but also becoming aware of one's own limitations and the unrealistic nature of some future perspectives. This awareness may lead to fear of failure, and to feelings of hopelessness and depression.

Development of the capacity for introspection may lead to a (temporary) preoccupation with oneself. Self-awareness and self-judgment are related. The combination of preoccupation with oneself, and negative self-judgments may lead to withdrawal and feelings of self-hatred, guilt, and depression.

Development of the capacity to change perspective opens up the youth's eye to all the injustice and misery in the world. Children who have trouble differentiating themselves from the outer world are at risk of feeling too responsible for this, and are prone to worrying and depressed feelings.

No normative data are available on when the capacities for abstract thinking, introspection, and change of perspective, develop. Kuhn et al. (1977) studied forms of thought in four age groups: 10- to 15-year-olds, 16- to 20-year-olds, 21- to 30-year-olds, and 45- to 50-year-olds. Their data show that in the three older age groups a higher percentage of people used some form of formal operational thought than earlier modes of thinking to solve a problem. In the 10-15 year olds the ratio was about equal. The overall proportion of formal versus non-formal thought was highest for the 16-20 year olds, while the percentage using the highest level of formal operations was highest in the group of 21-30 year olds.

For the purpose of the present study, this can be taken to indicate that the development of abstract thinking is all but complete by the end of early adolescence. Therefore, we can expect eventual effects of formal operational thinking on emotions/ behavior to operate on only part of the early adolescents.

1.4.3.3 Cumulative change and psychopathology

A group around Simmons and Blyth (see Simmons, Blyth, Van Cleave & Mitsch Busch, 1979; Simmons et al., 1987) has studied the impact of cumulative change in early adolescence. The changes they studied were school transition (from elementary to junior high school), pubertal development, early dating behavior, residential mobility, and family disruption. Two types of schools were involved in the study: Those with a transition from primary to secondary education after grade 6, and those with a transition after grade 8 (K-8 schools). The dependent variables they examined were self-esteem, grade-point average, and participation in extracurricular activities.

- For boys, the number of life changes had a significant, negative linear effect on extracurricular participation and grade-point average, but not on self-esteem.
- For girls, the number of life changes had a significant, negative linear effect on self-esteem and extracurricular participation, and a significant, negative curvilinear effect on grade-point average.

- Cumulative change most frequently involved transition to junior high school, followed by pubertal changes, and subsequently dating.

Although the authors have not studied the relation between cumulative change and psychopathology, their findings point out that children/adolescents who experience multiple changes are at risk. At risk for school problems, and through a negative self-evaluation also at risk for adjustment problems and psychopathology.

Albeit not specific for early adolescence, the link between cumulative change and psychopathology has also been made in life events research. Berden (1992) found that a high number of life events increases the risk for a high level of behavioral/emotional problems.

1.5 Conclusions

Early adolescence, or the age period of puberty, is an interesting period for the study of differences and changes in the distribution of behavioral/emotional problems and their correlates. It is a developmental phase in which children are confronted with a number of changes, both physical as well as social and psychological.

Several studies have focused on the psychological sequelae (particularly for the self-concept) of the physical changes of puberty. Very few studies, however, have directly assessed the relation between physical and other changes of early adolescence on one hand and the prevalence and patterning of psychopathology on the other hand. Those that have can often be criticized on methodological grounds, for example: Small study size, inadequacy of the instruments used for the assessment of age differences, psychometric weaknesses of the instruments used, and lack of control for pre-existing group differences.

Studies on hormone-psychopathology relations are hampered by subject recruitment difficulties and problems with the reliable assessment of hormone levels. Studies on the relations between outwardly observable physical developments and psychopathology seem feasible, but have scarcely been undertaken. School transition effects are hard to determine in a society where almost all children transfer to secondary education at the same age (with the exceptions forming an unrepresentative sample of the population). The effects of cognitive developments are more likely to emerge in middle and late adolescence.

Results of the studies discussed have pointed out that attention should be paid to the separate effects of various markers of physical development (such as chronological age, pubertal stage, and timing of maturation), and of informant.

1.6 Research questions

In the present study an attempt will be made to clarify the role of maturational differences and of informant in the distribution of behavioral/emotional problems during early adolescence. The general research question can be stated as follows:

How is variation in behavioral/emotional problems related to variation in physical characteristics of puberty?

This general question is re-phrased into the following sub-questions:

- What do the relations between physical characteristics of puberty and behavioral/emotional problems look like?
- How strong are the relations between physical characteristics of puberty and behavioral/emotional problems?
- Are there differences in the puberty-psychopathology relations depending on:
  * The gender of the child (boy versus girl) studied, and/or
  * The informant (parent versus child) reporting the behavioral/emotional problems?
- Are there differences in the puberty-psychopathology relations depending on the type of problem (internalizing versus externalizing) studied?
- Are there (combinations of) physical characteristics that indicate a potential risk for psychopathology?

CHAPTER 2 METHOD

2.1 Introduction

The aim and research questions of the present study as outlined in the previous chapter called for a design which allowed for:

- Examination of the relations between physical maturation (as distinct from age) and the distribution of behavioral/emotional problems in early adolescence, paying attention to the effects of informant, and
- Making general developmental interpretations.

The first requirement specifies the type of measurements (instruments) needed. Details on the instruments used in the present study are given in later paragraphs of this chapter. The second requirement was met by using a sample representative of the general population of early adolescents. The sample was deemed large enough to:

- Detect sufficient numbers of subjects with (possibly low-frequent) types of psychopathology that were related to maturation, and
- Cover the full range of maturation present in the general population at that age.

2.2 Subjects

The target group was the total population of children born in 1978 and attending regular schools ($N=3460$) or attending schools for non-retarded children with learning and/or emotional problems ($N=170$) in the greater Rotterdam area (Rotterdam, Hoek van Holland, Hoogvliet, Pernis, Heijplaat) during the 1989/1990 school year. For children attending regular schools, the target populations of boys and girls were virtually equal in size ($N=1736$ and 1724, respectively). For children attending special schools, the target population of boys was three times as large as the target population of girls ($N=128$ and 42, respectively). This distribution reflects the sex ratio in special schools.

Children attending special schools for the retarded and children with a non-Dutch nationality were excluded, because the completion of the Child Behavior Checklist (parent version, see paragraph 2.3.2.1) and the Youth Self-Report (youth version, see paragraph 2.3.2.2) require fifth-grade reading skills. These children and/or their parents were expected not to reach that level.

2.3 Instruments

2.3.1 Introduction

Instruments were needed that measure a wide range of behavioral/emotional problems (with both parents and youth as informants) and of pubertal maturation, and that were

appropriate for (possible) follow-ups of the study group across middle and late adolescence into early adulthood. Last but not least, the instruments should be psychometrically sound.

Especially in a large-scale population survey, time (test duration) and financial considerations are important factors in the choice of instruments.

2.3.2 Behavioral/emotional problems

For the measurement of child behavioral/emotional problems, the Dutch translations of the Child Behavior Checklist (CBCL; Achenbach, 1991b; Achenbach and Edelbrock, 1983; translation by Verhulst, 1985) and of the Youth Self-Report (YSR; Achenbach, 1991c; Achenbach and Edelbrock, 1987; unpublished translation by Verhulst) were used. These instruments are designed to describe a child's (problem) behavior in a standardized way. They consist of two parts, a competence part and a behavior problem part.

The emphasis of the checklist is on the behavior problem part. The competence part gives a global indication of the child's functioning in important other fields, such as taking part in out-of-school activities, quality of contact with parents, peers, and siblings, and academic functioning. In the present study, the results from the behavior problem part were focussed upon.

The behavior problem part contains items describing problematic behavior or emotions. Respondents can indicate on a three-point scale to what extent the items are true of the child. A Total Problems Score (TPS) is calculated by summing the 1- (somewhat true) and 2- (true) item scores.

Achenbach (1991a) derived both instrument-specific syndrome scales and cross-informant syndrome constructs (CISCs) through principal components analyses (PCAs) on clinical samples. For the construction of the CISCs, only those 89 items were used that had equivalents in both CBCL, YSR and Teacher Report Form (TRF, teacher version, see Achenbach and Edelbrock, 1986). Because one purpose of this thesis was to study differences in reports on psychopathology between parents and youth, when making comparisons on the syndrome scale level, only CISCs were used. After separate PCAs on the 89 items common to the three instruments, items that were found on core syndromes for at least two of the three instruments were used to form the CISCs. Eight cross-informant constructs were identified: Aggressive, Anxious/Depressed, Attention Problems, Delinquent, Social Problems, Somatic Complaints, Thought Problems, and Withdrawn Behavior. Construct scores (scale scores) were calculated by summing the 1- (somewhat true) and 2- (true) scores of the contributing items.

For some CISCs, the core syndrome of a particular instrument included items beside those that qualified for the CISC. These items were retained for the syndrome scale to be scored by that particular informant. For score comparisons between parent and youth, in the present study the instrument-specific scale scores were corrected for the *number* of contributing items.

In addition to these so-called "narrow-band" syndromes, two broad-band groupings of problem items, namely Internalizing and Externalizing, were derived through principal factor

analyses on the correlations among syndrome scale scores. Internalizing consists of the Anxious/Depressed, Somatic Complaints, and Withdrawn Behavior scales. Externalizing consists of the Aggressive and Delinquent scales. Grouping scores are calculated by summing the scores of the underlying scales.

In the present study, behavioral/emotional problems were defined by the narrow-band constructs. The broad-band groupings were considered to represent two broader, more abstract, types of problems. The combination of problem items into a Total Problems "scale" was used as a measure of overall psychopathology. The scores on these 11 "scales" were taken to represent the amounts of the various problems.

Because the composition of some syndrome scales differs across checklists, there are small differences in item content among the CBCL, YSR, and TRF versions of the Internalizing and Externalizing groupings. For comparisons between checklists and/or problem scales in the present study, the instrument-specific scale scores were corrected for the *number* of contributing items.

2.3.2.1 Parent reports

For the measurement of child psychopathology from the viewpoint of the parent, the Dutch translation by Verhulst (1985) of the Child Behavior Checklist (CBCL, Achenbach and Edelbrock, 1983) was used (see Appendix A). This version of the CBCL is designed to be completed by parents of 4- to 16-year-olds (a newer version has an upward extension to the age of 18).

The CBCL contains 20 competence items and 120 behavior problem items. Parents should possess at least fifth grade reading skills. Average duration of completion of the CBCL takes 15 to 20 minutes. On the "professional" side only minimal instruction and clarification by someone (e.g. lay interviewer) familiar with the instrument are needed.

Data on reliability of the Dutch translation of the CBCL were reported by Verhulst, Koot, Akkerhuis and Veerman (1990). Reliability was measured through Intraclass Correlation Coefficients (ICCs). Three-week test-retest reliability of Total Problems Scores was .78 ($N=104$); inter-interviewer agreement was .99 ($N=58$); inter-parent agreement was .70 ($N=23$).

2.3.2.2 Youth self-reports

For the measurement of child psychopathology from the viewpoint of the child/adolescent, the Dutch translation by Verhulst (unpublished) of the Youth Self-Report (YSR, Achenbach and Edelbrock, 1987) was used (see Appendix B). The YSR is designed to be completed by 11- to 18-year-olds having a mental age of at least 10 and fifth grade reading skills. Completion of the structured items takes about 15 minutes, but respondents who write much on the open-ended items may take longer. Like the CBCL, on the "professional" side

only minimal instruction and clarification by someone (e.g. lay interviewer) familiar with the instrument are needed.

The YSR is to a large extent similar to the CBCL, with the main exception that wording of the questions is in the first person. It contains 17 competence items similar to those on the CBCL. Of the 119 behavior problem items, 103 are equivalent to the CBCL items. The other 16 are neutral ("socially desirable") items that replace CBCL-items deemed inappropriate to ask adolescents. The YSR does not contain the final item of the CBCL, which is an open-ended question for "other problems not previously mentioned".

Reliability of Total Problems Scores of the Dutch version of the YSR, as measured through three-week test-retest correlations (ICC), was .87 (Verhulst, Prince, Vervuurt-Poot & de Jong, 1989). Data on inter-interviewer agreement were not available.

2.3.3 Physical maturation

Maturational *status* is one's actual position on the line from immature to fully mature. Aspects of maturational status that are relevant to a developmental perspective, are:

- Maturational *timing*: One's maturational status relative to a referent group or a norm (usually age-mates).
- Maturational *rate*: The velocity with which maturational changes occur (this can only be studied in a longitudinal approach)
- The *duration* of maturation (this can only be studied in a longitudinal approach).
- *A-synchrony* of maturation: Differences between individuals in the sequence of maturational events (e.g. breast development less or more advanced than stage of pubic hair)
- Differences between individuals in *salience* of maturational events.

Brooks-Gunn and Warren (1985) discuss measures for nine physical parameters associated with puberty, namely height, weight, body fat, bone age, and the secondary sexual characteristics of breast, body and pubic hair, penile, testicular, and menarcheal development.

- Height and weight in themselves give no indication of maturational status; height and weight velocity do, but their assessment requires repeated measures. The same goes for body fat and muscle mass.
- Bone, or skeletal, age measures are time- and money-consuming, and the use of radiation forms a health threat to the individual.
- The system devised by Tanner (1975) for rating secondary sexual characteristics (amount of growth in breasts and pubic hair for girls and in the penis and pubic hair for boys) is the most widely used method for the assessment of maturation. Status, timing, and a-synchrony can be assessed with one measurement; for the assessment of duration and rate repeated measures are needed. Although measurement by a professional (physician, nurse) is desirable, alternatives such as self-reports are available. Assessment is relatively quick and interrater reliability is reportedly

reasonable (see also data from the present study in the following). Good lighting is essential for the correct appraisal of pubic hair. Size and appearance of the male genitalia and of the female breasts are to some extent influenced by factors like environmental temperature and cremaster reflex (male genitalia).

- Although Brooks-Gunn and Warren (1985) mention that growth of the testes is usually the first sign of puberty in the male, they do not comment on usefulness or reliability of its measurement. Palpation of the testis and comparison with ellipsoids of known volume is the most commonly used method.
- Menarche is judged to be a useful measure for maturational status. However, as it occurs relatively late in the pubertal process, it is not adequate for the classification of status or timing in girls under age 12 or under seventh grade. Thus, it is not a suitable measure in the present study.

On the basis of the above considerations, the Tanner system for rating secondary sexual characteristics (amount of growth in breasts and pubic hair for girls and in the penis and pubic hair for boys) was chosen as the primary measure of maturational status and timing. The assessment of testis volume was added because at the age of measurement, the majority of boys could be expected to be pre-pubertal by other standards. Any opportunity of differentiating this majority into a group of truly pre-pubertal and beginning pubertal boys was welcome.

Although not useful for the assessment of maturational status when measured only once, height and weight were added as measures known to have psychological significance. An advantage of the choice of these measures was that all but the measurement of testis volume were common practice among the group of school physicians cooperating in the study.

As measure of the reliability of the secondary sex characteristics, the Kappa coefficient of agreement between raters was used. This measure of agreement is the ratio of the proportion of times that raters agree to the maximum proportion of times that the raters could agree, both corrected for agreement expected to occur by chance. Two procedures were followed to get an indication of the amount of inter-rater agreement:

- *In vivo* (observations on live subjects):
  During a pilot study, the same children were rated twice. This was done by two school physicians who were blind to each other's ratings. Two "pairs" of school physicians were involved.
- *In vitro* (observations on anonimized subjects portrayed on slides):
  Prior to the start of the actual assessment period, school physicians were trained in the application of the rating criteria (see Appendix C). First, decision rules were discussed. Then, slides depicting the breast or pubic areas were presented, and the school physicians were asked to record their rating of the relevant characteristics on a recording form. These ratings were (anonymously) compared with norm ratings set by the author and two senior school physicians leading the training sessions.

In Table 2.3.1 inter-rater agreement results (Kappas) for the secondary sex characteristics are given.

Table 2.3.1. Kappa (K) coefficients of agreement for secondary sex characteristics by measurement procedure

Secondary sex characteristic		Live rating		Slide rating	
				First training session	
		n	K	*n*	K
Boys	Pubic Hair	20	.30	71	.60
	Genitals	20	.33	70	.25
Girls	Pubic Hair	16	.33	160	.37
	Mammae	16	.71	69	.34

Agreement was generally low, especially for the ratings of genital development. The live ratings were conducted before the training sessions. The lack of training in and experience with the application of the rating criteria may have lowered the amount of agreement in the live ratings. Ratings from slides may be more difficult to make than those on live subjects. Reasons for this are the invariability of the presentation (one cannot adjust one's standpoint to get a better view) and the dependence on the quality of the slide. As mentioned before, good lighting is essential for the correct appraisal of pubic hair. Size and appearance of the male genitalia and of the female breasts are to some extent influenced by factors like environmental temperature and cremaster reflex (male genitalia). It was commonly agreed that a number of slides were of inferior sharpness, but there was no better alternative. These disadvantages may have lowered inter-rater agreement based on slides.

Unfortunately, no reliability information on testis volume by palpation was found in the literature, and we saw no opportunity of including a reliability check for this measurement in our assessments.

2.4 Procedure

2.4.1 Approach for participation

Parents of the target children were approached for participation in two ways:

CHILDREN ATTENDING REGULAR SCHOOLS

In the Rotterdam area, children attending regular schools obtain routine medical examinations by the school physician at ages 4½, 7, and 11 years, and in the second year of

high school. Assessment of the present study took place at the moment of routine examination at age 11. Along with the usual invitation for the routine examination by the school physician, both a letter explaining the study and the Child Behavior Checklist (parent version, see paragraph 2.3.2.1) were mailed to the parents. By bringing the completed questionnaire to the medical examination, or by filling out the questionnaire at the physician's office, parents gave their consent for participation of their child in the study.

CHILDREN ATTENDING SPECIAL SCHOOLS

Children in special schools do not receive a routine medical examination at age 11. Their bi-annual examinations are timed by their moment of entry into special education. For the purpose of the present study, they received a so-called "examination on indication" when parents agreed to participate. To this purpose parents first received a letter explaining the study, accompanied by the Child Behavior Checklist (parent version, see paragraph 2.3.2.1). By handing a completed questionnaire to the school physician, they gave their consent for participation of their child in the study, whereupon the child received an invitation for the medical examination.

2.4.2 Measurement

All data were gathered around the moment of medical examination.

PHYSICAL DATA

Data on secondary sex characteristics, testis volume, height and weight were gathered by the school physical during the medical examination. These data were noted on a recording sheet designed for the present study (see Appendix D). The medical examination lasted about 10 to 15 minutes. Children attending most of the regular elementary schools were examined at special school physicians' centers. Children attending special schools, and children attending some of the (larger) regular elementary schools were examined in a room set aside within their schools.

CBCL (PARENT-QUESTIONNAIRE)

As indicated in the paragraph on approach for participation, most parents filled out the questionnaire at home. The invitation for the routine medical examination was usually sent two to three weeks before the date scheduled, resulting in a maximum interval between completion of the CBCL and gathering of the physical and YSR data of three weeks. The examination on indication for children attending special schools was planned only after reception of the completed CBCL. A maximum of three months between CBCL-completion and gathering of the physical data was set. Occasionally, parents completed and sent in a CBCL after the medical examination. This was the case when they had not filled out a CBCL on forehand, indicated a willingness when asked at the medical examination, but had no time to complete it on the spot.

YSR (YOUTH-QUESTIONNAIRE)

Children attending regular schools filled in the YSR at the physician's office after completion of the medical examination. After a general instruction, children were expected to complete the questionnaires without help. Parents were instructed not to help or supervise their children, and where possible children were seated in a separate room.

Children attending special schools filled in the YSR at school, in the same classroom as, but independently from, other children attending that school. Research-assistants gave general instructions, read each item out aloud, and answered questions on the meaning of terms. This special approach for children attending special schools was taken, because these children were expected to have some reading and other educational, but no intellectual, retardation.

Children attending regular schools needed an average of 50 minutes for completion, children attending special schools an average of 90 minutes. This was much longer than indicated in the manual of the checklist.

2.5 Data analysis and presentation

For the descriptions of the study sample and of the distributions of pubertal characteristics and of problem scores (chapters 3, 4, and 5, respectively) summarizing analysis techniques were used.

For the examination of the relations between pubertal measures ("independent variable") and problem scales ("dependent variable") (chapter 6), regression techniques were used when the pubertal variable was at the interval level of measurement, and analysis of (co-)variance techniques were used when the measurement level of the pubertal variable was (ordered) categorical.

Where possible and relevant, (significant) results were summarized in tables and visualized in figures. For the presentation of frequency distributions, histograms (continuous variables) or barcharts (discrete variables) were used. For the presentation of the joint distribution of two continuous variables, bivariate scatterplots were used. For the presentation of the joint distribution of a continuous or ordered categorical dependent variable with a discrete independent variable, two types of charts were used:

- In case of (approximately) normally distributed dependent variables, barcharts were used. The height of a bar represents the mean of the dependent variable for the independent category in question.
- In case of dependent variables that were characterized by a skewed distribution, boxplots were used. The level of the median is the main indicator for differences between categories. More information on the meaning of boxplot details is given at the location of the box plots.

CHAPTER 3 DESCRIPTION OF THE STUDY POPULATION

3.1 Participation

The agreement to participate was obtained of 71.3% of the target population. Reasons for non-participation were:

- Objections against the study, such as: Privacy, questions asked, general refusal to participate in studies, length/duration of the investigations ($N=530$).
- Private circumstances, such as: Problems at home, removals, child ill ($N=22$).
- No invitations sent out, because: Known lack of knowledge of the Dutch language (mostly naturalized families of Chinese or Cape Verdian origin), physical examination not within the study period ($N=224$), or
- Reason unknown: Failure to respond to invitations by school physician, or absence of parents (and CBCL) when child showed up at physician's office ($N=267$).

Although admitted "problems at home" was a minor argument for non-participation, non-response by children from problem families and/or by children with problems was likely (as in any general population sample study of psychopathology on a voluntary basis). This may have affected the number of children with higher levels of behavioral and/or emotional problems in the present study. However, unless there are systematic differences in physical characteristics between responding and non-responding high problem level children, the (eventual) under-representation of children with higher problem levels should not affect the results of the present study.

Unfortunately, usable information dropped to 55.6% of the target population because of missing data on CBCL and/or YSR. Details on differences between children for which checklists were complete versus those for which checklists were incomplete are given in paragraph 3.2.

In Table 3.1.1, the distribution by type of school and gender is displayed for:

- The target population,
- Those parent/youth combinations who agreed to participate ("participants"), and
- Those participants for whom both CBCL and YSR contained less than 8 missing items on the behavior part of the questionnaire ("checklists complete").

Differences in response ratios of the "complete" versus the target group were examined with the binomial test for proportions:

- Boys versus girls: Response ratios were significantly higher for girls than for boys, both overall ($z=-2.609$, $p<.01$, onesided) and for children attending regular education ($z=-2.725$, $p<.01$, onesided). For children attending special education, response ratios of boys and girls were not significantly different ($z=0.080$).

- Regular versus special education: Response ratios of children attending regular schools and children attending special schools were not significantly different ($z=-0.541$).

3.2 Missing data

A condition for computing Total Problems Scores on the CBCL (parent version) and the YSR (youth version) is that no more than 8 items on the problem part of the questionnaire are left unanswered. On the 2x2587 questionnaires returned by parents and children, 104 parents and 503 children left more than 8 items open. Both checklists were complete (no more than 8 behavior items missing) for 2019 subjects.

Table 3.1.1 Distribution by gender and type of school of target population, participants and those with complete questionnaires

Sample selection and type of school	Boys			Girls			Total		
	n	row %	% of target	*n*	row %	% of target	*N*	col %	% of target
Target population									
Regular	1736	50.2		1724	49.8		3460	95.3	
Special	128	75.3		42	24.7		170	4.7	
Total	1864	51.3		1766	48.7		3630		
Participants									
Regular	1234	49.9	71.1	1241	50.1	72.0	2475	95.7	71.5
Special	83	74.1	64.8	29	25.9	69.0	112	4.3	65.9
Total	1317	50.9	70.7	1270	49.1	71.9	2587		71.3
Checklists complete									
Regular	924	48.1	53.2	997	51.9	57.8	1921	95.1	55.5
Special	74	75.5	57.8	24	24.5	57.1	98	4.9	57.6
Total	998	49.4	53.5	1021	50.6	57.8	2019		55.6

Reasons for not completing the questionnaires might make the group of subjects for which material wasn't complete substantially different from the one for which material was complete. If the reason for omitting answers to checklist items were difficulty with understanding the questions, subjects with lower cognitive abilities would most likely be involved. If the reason for omitting answers were refusal to disclose problematic functioning, selective loss from the study of subjects with more problems might result. Lower cognitive abilities and higher levels of problems are both associated with lower socio-economic status

(Anderson, Williams, McGee & Silva, 1989; Rutter, Tizard & Whitmore, 1970) and thus selective dropout from the study of subjects with lower socio-economic status might occur.

On the subjects from the "participating" group for whom material was not complete some information was available. This allowed for comparisons with those subjects from the "participating" group for whom both questionnaires were complete.

3.2.1 Evidence for bias

For 2019 subjects, the Total Problems Score was complete for both CBCL and YSR; for 2483 subjects it was complete for the CBCL; for 2085 subjects it was complete for the YSR; and for 39 subjects the Total Problems Score was missing for both checklists. To assess possible bias by completion, the basic strategy was to compare groups differing in availability of the Total Problems Score (available or missing) on characteristics which were available for both. Children attending special schools were excluded from the analyses on YSR Total Problems Score availability, because their completing the questionnaire was controlled for by research-assistants (see paragraph on measurement procedure).

Differences between the two groups (TPS available/missing) were tested with T-tests. When variances were significantly different between the groups, separate-variance estimates for the *t*-value were used; when variances between the groups were not significantly different, pooled-variance estimates for the *t*-value were used. A significant *t*-value indicates that the groups cannot be considered to represent the same population.

3.2.1.1 Cognitive bias

No direct measure of the cognitive level of the child or the parent was available, nor was there an indirect measure of the cognitive level of the parent. Available indirect measures of the child's cognitive level were school achievement data and actual versus expected school grade. These data were available from the CBCL, allowing for the comparison on YSR Total Problems Score availability.

SCHOOL ACHIEVEMENT

The CBCL total school score was used. The higher the score, the better the achievement. In Table 3.2.1.1.1, the mean total school scores are shown.

School achievement was significantly lower (worse) for the group for whom the YSR TPS was missing versus the group for whom the YSR TPS was available.

Table 3.2.1.1.1. Comparison of school achievement between YSR-completion groups

Total Problems	*n*	M	SD
Missing	434	4.78	1.04
Available	1860	5.23	0.83
		T-test for unequal variances: $t=-8.39$, d.f.$=569.62$, $p<.001$	

ACTUAL VERSUS EXPECTED GRADE IN SCHOOL

In the Netherlands, october 1st used to be an important date for deciding when children would enter primary school: For the birth cohort studied, children born before october 1st 1978 would be expected to be in grade 6 (group 8), those born on or after october 1st 1978 would be expected to be in grade 5 (group 7), during the school year 1989-1990. Connecting date of birth to grade in school, subjects from regular schools were divided into three "timing" groups: Fast for age (score=1), on-time for age (score=2), and slow for age (score=3). In Table 3.2.1.1.2, the mean timing scores are shown.

Table 3.2.1.1.2. Comparison of school grade timing between YSR-completion groups

Total Problems	*n*	M	SD
Missing	465	2.26	0.47
Available	1980	2.11	0.35
		T-test for unequal variances: $t=6.71$, df$=591.51$, $p<.001$	

Timing was significantly higher (slower for age) for the group for whom the YSR TPS was missing versus the group for whom the YSR TPS was available. Being relatively slow for age would mean these children were in grade 5 at the most. Possessing fifth grade reading skills is thought to be a minimum level for being able to complete the checklists. The present data justify this minimum level.

3.2.1.2 Socio-economic bias

Subjects with lower socio-economic status could be overrepresented among those for whom the Total Problems Score of either checklist was missing. Groups were compared on parental occupational and educational level. This information was available from the CBCL.

In the present study, two measures of socio-economic status of the household were employed: Parental level of occupation and parental level of completed education. The two are related:

- It is likely that people will seek employment fitting their level of education, and
- Attainable upper level of occupation is likely to be determined by the level of education completed.

PARENTAL OCCUPATION

Occupation mentioned was scored on a six-point scale ranging from manual labor to higher professions. The scale used was the one developed by the Institute for Applied Sociology in Nijmegen, the Netherlands (van Westerlaak, Kropman & Collaris, 1975). It is semi-hierarchally ordered; category 4 (self-employed worker) is rather arbitrarily placed in between category 3 (lower employees) and category 5 (middle employees), the other five categories do have a hierarchical ordering. Parents with a self-employed occupation constituted a minority of the employed (fathers: $n=135$, 6.4%, mothers: $n=35$, 3.7%). The higher the score, the higher the socio-economic status of the respondent (higher wages, more responsibility, more education required).

Information was gathered on occupation of both father and mother. The highest occupational scale of the two was taken as a first indication of the socio-economic status of the family. Mean scores of parental occupation by completion of YSR are shown in Table 3.2.1.2.1.

Table 3.2.1.2.1. Comparison of parental occupation between YSR-completion groups

Total Problems	*n*	M	SD
Missing	379	3.11	1.25
Available	1719	3.49	1.44
		T-test for unequal variances: $t=-5.26$, $df=619.9$, $p<.001$	

Parental level of occupation was significantly lower for the group for whom the YSR TPS was missing versus the group for whom the YSR TPS was available.

PARENTAL LEVEL OF EDUCATION

Type of education last completed was scored on a six-point scale used by the Dutch Central Bureau of Statistics (C.B.S., 1987), ranging from nursery school to doctorate. It is hierarchically ordered. The higher the score, the higher the level of education.

The highest educational scale of the two was taken as a second indication of the socio-economic status of the family. Mean scores of parental education by completion of YSR are shown in Table 3.2.1.2.2.

Educational level was significantly lower for the group for whom the YSR TPS was missing versus the group for whom the YSR TPS was available.

Table 3.2.1.2.2. Comparison of parental education between YSR-completion groups

Total Problems	*n*	M	SD
Missing	361	3.60	0.85
Available	1654	3.80	0.90
		T-test for equal variances: $t=-3.94$, df=2013, $p<.001$	

3.2.1.3 Psychopathology bias

Completion subgroups on one checklist were compared on the (available) Total Problems Score from the other checklist. In Table 3.2.1.3.1, the mean Total Problems Scores on the CBCL and on the YSR are shown for the completion subgroups defined by YSR or CBCL completion respectively.

Table 3.2.1.3.1. Comparison of CBCL- and YSR- Total Problems scores between YSR- and CBCL-completion groups

Total Problems		*n*	M	SD
CBCL -	YSR missing	455	24.15	18.03
	YSR available	1921	18.66	15.00
			T-test for unequal variances: $t=6.75$, df=611.14, $p<.001$	
YSR -	CBCL missing	61	29.51	18.17
	CBCL available	1921	21.88	15.42
			T-test for equal variances: $t=3.92$, df=2083, $p<.001$	

Total Problems Scores on the CBCL were significantly higher for the group for whom the YSR TPS was missing versus the group for whom the YSR TPS was available. Total Problems Scores on the YSR were significantly higher for the group for whom the CBCL TPS was missing versus the group for whom the CBCL TPS was available.

3.2.2 Conclusion

Compared to those subjects for whom checklist data were complete, participants for whom either checklist was incomplete were characterized by:

- Lower cognitive levels, as indicated by the results from the analyses on school achievement and actual versus expected grade in school,
- Lower socio-economic status, as indicated by the results from the analyses on parental occupational and educational level, and
- Higher problem level, as indicated by the results from the analyses on the Total Problems Score of the CBCL and YSR.

Further analyses will be restricted to those subjects for whom both checklists were complete. This analyzed sample is not fully representative for the population of origin. However, selective cognitive and/or socio-economic non-response will not restrict the generalizability of results of analyses on the relations between physical characteristics and psychopathology, unless these relations are affected by cognitive and/or socio-economic factors. Selective problem level non-response will only restrict the generalizability of the relations found if this non-response is systematically related to physical characteristics of the child.

3.3 Demographics

3.3.1 Gender and type of school

The distribution of subjects by gender and type of school is displayed in Table 3.3.1.1.

Table 3.3.1.1. Distribution of subjects by gender and type of school

Type of school	Boys		Girls		Total	
	n	row %	*n*	row %	*N*	col %
Regular Education	924	48.1	997	51.9	1921	95.1
Special Education	74	75.5	24	24.5	98	4.9
Total	998	49.4	1021	50.6	2019	

Overall and for children attending regular education the proportion of boys and girls in the study is about equal. Children attending special education form a minority (one-twentieth) of the total study group. Among the children attending special education in the

present study, boys outnumber girls by three to one. This is representative for the general sex ratio of children attending special education.

The mean age at measurement was 11.4 years (s.d. 0.3), with a minimum of 10.7 and a maximum of 12.5 years.

3.3.2 Neighborhood location

The municipality of Rotterdam consists of 74 neighborhoods, aggregated into 16 administrative units (districts), and 6 industrial zones. The neighborhoods and districts vary in size and population density. The respondents in the study came from 68 neighborhoods (representing all 16 districts) of the municipality of Rotterdam. The distribution of subjects by neighborhood, aggregated per district, is given in Appendix E.

3.3.3 Socio-economic characteristics

Two types of socio-economic characteristics were available for the study population: Characteristics that describe socio-economic status at the neighborhood level, and those that describe socio-economic status at the household level.

The neighborhood level socio-economic variable used is the so-called "disadvantage score", determined by the GBOS ("Gemeentelijk Bureau voor Onderzoek en Statistiek" = Rotterdam City Bureau of Research and Statistics, see Das & Oomens, 1988). This score was derived through principal components analysis on correlations between eight indices of social inequality (or disadvantage) aggregated at the neighborhood level:

- Permillage of 17-year-olds enrolled in education
- Permillage of inhabitants 20 years and older on welfare
- Permillage of inhabitants with non-Dutch nationality, or born in Surinam or the Dutch Antilles
- Permillage of professional males that are registered as non-employed
- Permillage of inhabitants that have moved in a one-year time span
- Mean building age of the houses
- Permillage of households that are "families" (spouses with/without children and singles with children)
- Mean income.

The disadvantage score is a weighted z-score (mean of zero, standard deviation one); scores were standardized for the city of Rotterdam. Scores below zero indicate relative disadvantage, scores above zero relative advantage. The GBOS has calculated a disadvantage score for each neighborhood. Quite large differences in socio-economic welfare exist between the Rotterdam area neighborhoods (Das & Oomens, 1988). The disadvantage scores of the neighborhoods are displayed in the last column of Appendix E. The mean disadvantage

score of the subjects in the present study was slightly higher than the city average (0.27, s.d. = 0.93).

Two household level socio-economic characteristics were measured: Parental level of occupation and of education (see paragraph 3.2.1.2). In Table 3.3.3.1 the distribution of subjects by parental level of occupation and of education is displayed.

Table 3.3.3.1. Distribution of subjects by parental occupational and educational category

Parental Occupation	Parental Education							
	Primary Ed.	Lower Sec.Ed.	Higher Sec.Ed	Tertiary Ed.	Post-doc	Sub-total	Missing	Total
Unskilled labor	5	33	7	1	0	46	12	58
Skilled labor	16	216	95	5	0	332	69	401
Lower Empl.	10	274	295	48	0	627	77	704
Self-empl.	2	33	46	7	0	88	15	103
Middle Empl.	1	27	82	109	2	221	16	237
Higher Prof.	0	9	25	165	44	243	12	255
Sub-total	34	592	550	335	46	1557	201	1758
Unempl./Missing	22	91	23	10	0	146	115	261
Total	56	683	573	345	461	1703	316	2019

The most common level of parental occupation was lower employment; the most common level of parental education was lower secondary education. The most common combined category was that of lower employment and higher secondary education. The majority of children with working parents had parents with highest level of occupation in the lower three categories (1163 out of 1758, or 66.2%). None of the children had parents with incomplete primary education only. The majority of children had parents with highest completed level of education in the higher three categories (964 out of 1703, or 56.6%).

As can be observed, there is a close correspondence between educational and occupational level (Pearson $r = .67$). In further analyses involving socio-economic status, only one household level socio-economic variable, namely parental level of occupation, will be used.

CHAPTER 4 DISTRIBUTION OF PHYSICAL CHARACTERISTICS

4.1 Sexual maturation

4.1.1 Boys

For boys, the following indications of sexual maturation were measured:

- The stage of development of pubic hair, and
- The stage of development of the genitals.

The developmental stages of pubic hair and the genitals are often, but not always, the same. Both measures were used because they are under control of different hormones, and these hormones could have their own, distinct, effect upon behavior.

In case the genital stage was pre-pubertal, an additional measure was taken: The volume of the testes. This provided an opportunity to increase the differentiation of pubertal stage within the study population. At the age of measurement, the majority of boys was likely to be pre-pubertal. Growth of the testes beyond the childhood volume of three milliliters is usually the first outwardly observable phenomenon of entry into puberty (Zachmann, Prader, Kind, Haefliger & Budliger, 1974). The information on testis volume was used to divide the group that was pre-pubertal according to genital stage in two:

- A truly pre-pubertal subgroup, and
- An advanced pre-pubertal subgroup, added to the beginning pubertal group.

In Figures 4.1.1.1 and 4.1.1.2, the pubertal development of boys as indicated by genital and pubic hair stages, respectively, is displayed.

- "Pre" stands for pre-pubertal (Tanner stage 1)
- "begin" stands for beginning pubertal development (Tanner stage 2)
- "mid" stands for mid-pubertal development (Tanner stage 3)
- "advanced" stands for advanced pubertal development (Tanner stage 4), and
- "post" stands for completed pubertal development completed (Tanner stage 5).

As expected, according to both characteristics the majority of boys was either pre- or beginning pubertal. The effect of the addition of information on testis volume was that the genital stage of 3.6% of the boys was re-classified. Adding these advanced pre-pubertal boys to the beginning pubertal group, the difference in size between the pre-pubertal and beginning pubertal groups was increased by a factor 3.9: Without re-classification, the sizes of the beginning pubertal and pre-pubertal groups were 468 and 444 (difference 24), respectively; with re-classification they were 503 and 409 (difference 94), respectively.

The figures are displayed separately to avoid the suggestion that the columns are linked (e.g. that the subjects in genital stage 1 and pubic hair stage 1 were mostly the same). Naturally, there is a large amount of correspondence between the two developmental

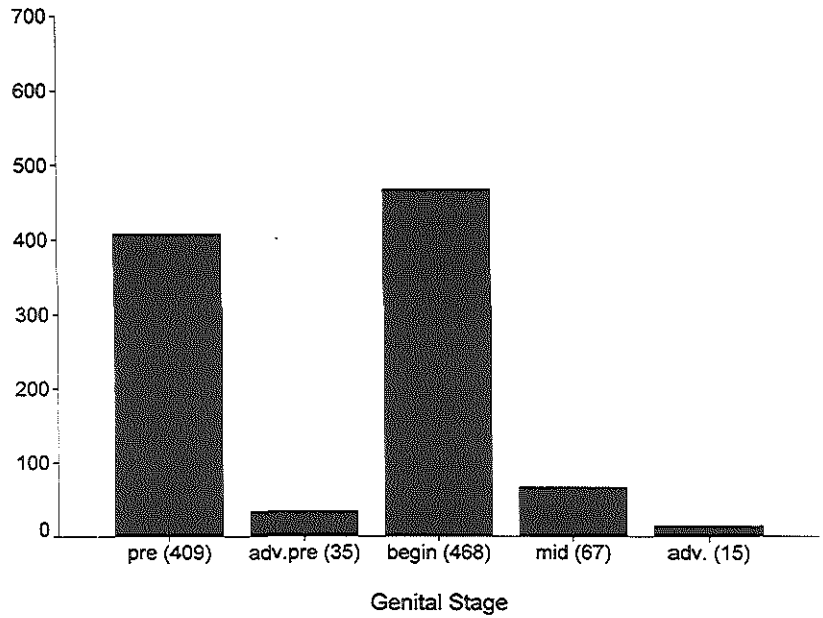

Fig.4.1.1.1. Distribution of boys by genital stage

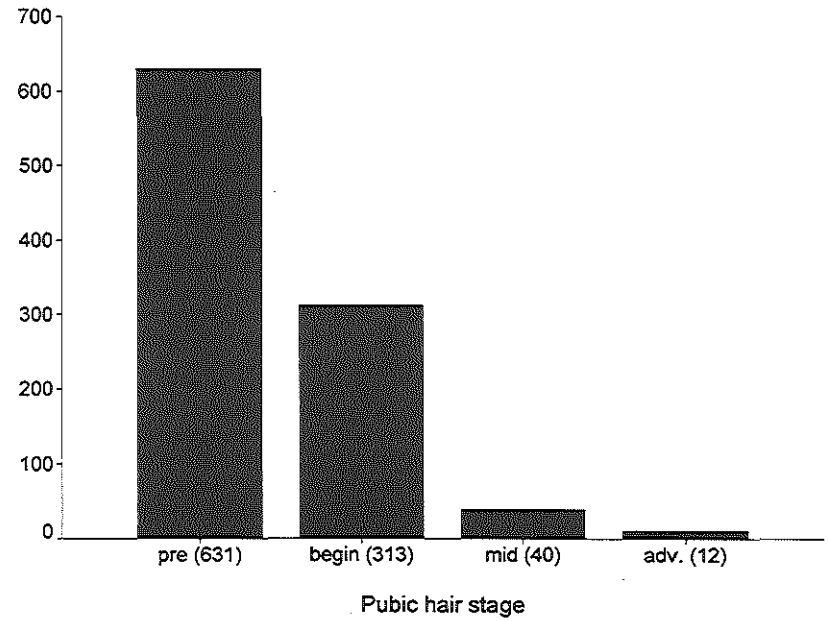

Fig.4.1.1.2. Distribution of boys by pubic hair stage

characteristics. This is expressed in Table 4.1.1.1, where the difference scores between pubic hair and genital stage are displayed. A negative score means that the subject's genital stage was more advanced than his pubic hair stage; a positive score means that his genital stage was less advanced than his pubic hair stage; a score of zero means that he was in the same stage of genital and of pubic hair development. If the genital stage was advanced pre-pubertal and the pubic hair stage was either 1 or 2, there was considered to be no difference (difference score zero).

Table 4.1.1.1. Difference in number of stages between pubic hair and genital stages in boys

	Difference (no. of stages)	% of total (N = 993)
Pubic hair stage less advanced than genital stage	-3	0.2
	-2	1.2
	-1	23.5
No difference	0	71.3
	1	3.7
Pubic hair stage more advanced than genital stage	2	0.1
	3	-

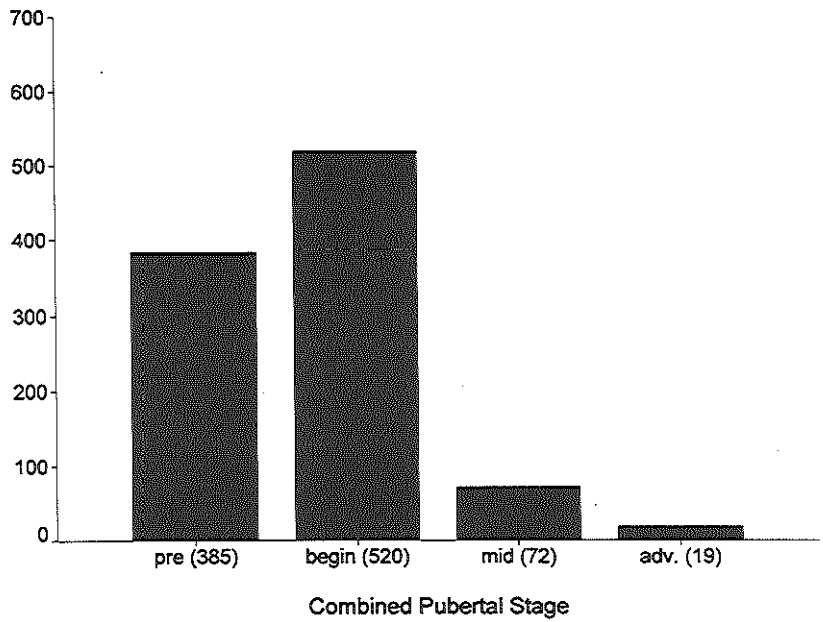

Fig.4.1.1.3. Distribution of boys by combined pubertal stage

As expected, there was a large degree of correspondence between the two characteristics of pubertal development (Pearson $r=.64$, possible confounding by socio-economic status partialled out). A discrepancy of two or three stages was rare (1.5 %). If there was a stage difference, most often the genitals were furthest in their development (24.9%, versus 3.8% in which the pubic hair stage was more advanced). This is in agreement with the growth studies by Tanner (1975) and Roede & van Wieringen (1985). For further analyses involving pubertal development of boys, the two measures were combined into one (individual characterized by most advanced stage). The distribution of boys over these combined pubertal stages is shown in Figure 4.1.1.3.

4.1.2 Girls

For girls, the following indications of sexual maturation were measured:

- The stage of development of pubic hair, and
- The stage of development of the breasts (mammae).

In Figures 4.1.2.1 and 4.1.2.2, the pubertal development of girls as indicated by mammary and pubic hair stages, respectively, is displayed.

- "Pre" stands for pre-pubertal (Tanner stage 1)
- "begin" stands for beginning pubertal development (Tanner stage 2)
- "mid" stands for mid-pubertal development (Tanner stage 3)
- "advanced" stands for advanced pubertal development (Tanner stage 4), and
- "post" stands for completed pubertal development completed (Tanner stage 5).

The majority of girls was still in the pre-pubertal or first pubertal stage, but to a lesser extent than boys. In Table 4.1.2.1 the difference scores between pubic hair and mammary stage are displayed. A negative score means that the subject's mammary stage was more advanced than her pubic hair stage; a positive score means that her mammary stage was less advanced than her pubic hair stage; a score of zero means that she was in the same stage of mammary and of pubic hair development.

There was a large degree of correspondence between the two characteristics of pubertal development (Pearson $r=.77$, possible confounding by socio-economic status partialled out). For over half of the girls the pubertal stages of the two characteristics of pubertal development were the same. A discrepancy of two or three stages existed for 4.2% of the girls, which means it was uncommon but less rare than for boys. If there was a stage difference, most often the mammae were furthest in their development (26.8%, versus 15.1% in which the pubic hair stage was more advanced). Again, this is in agreement with the growth studies by Tanner (1975) and Roede & van Wieringen (1985). For further analyses involving pubertal development of girls, the two measures were combined into one (individual characterized by most advanced stage). The distribution of girls over these combined pubertal stages is shown in Figure 4.1.2.3.

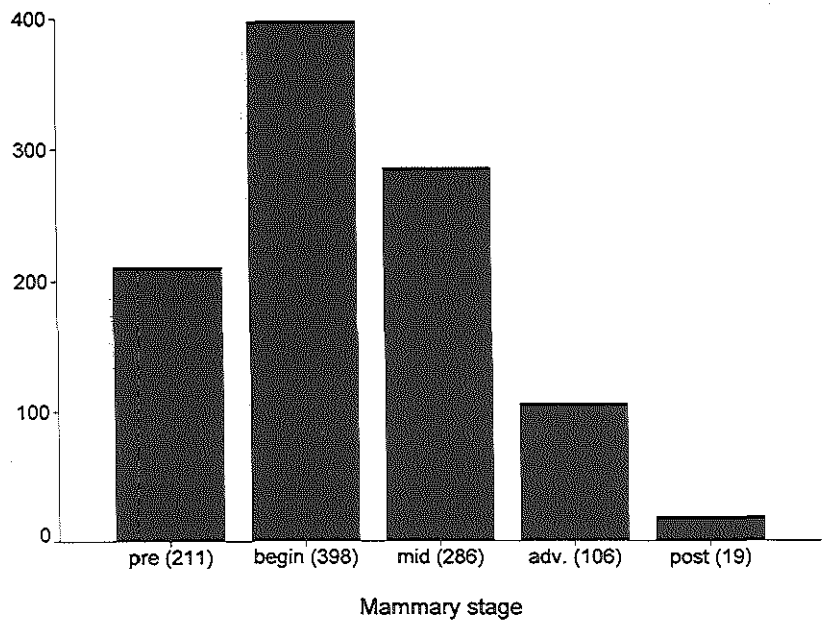

Fig.4.1.2.1. Distribution of girls by mammary stage

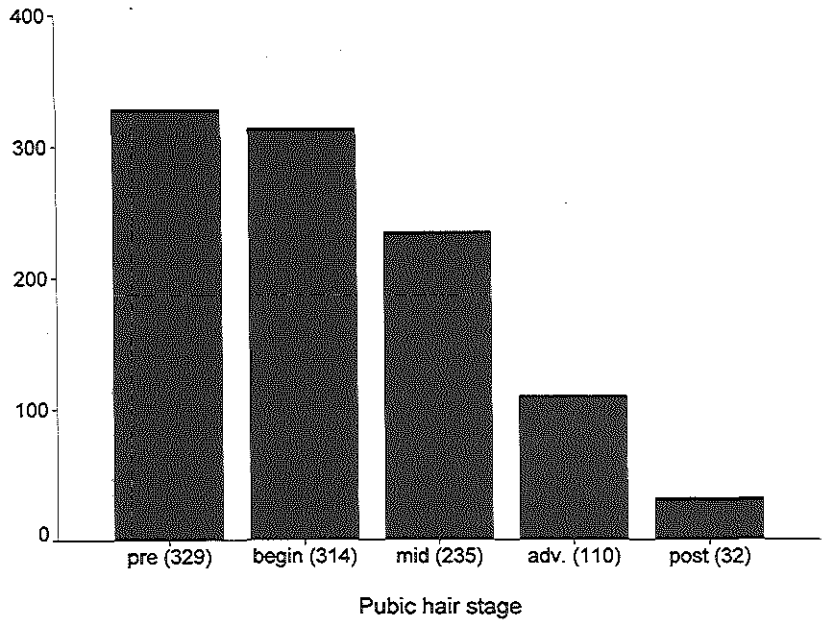

Fig.4.1.2.2. Distribution of girls by pubic hair stage

Table 4.1.2.1. Difference in number of stages between pubic hair and mammary stages in girls

	Difference (no of stages)	% of total (N = 1019)
Pubic hair stage less advanced than mammary stage	-3	-
	-2	2.2
	-1	24.6
No difference	0	59.1
Pubic hair stage more advanced than mammary stage	1	12.1
	2	1.8
	3	0.2

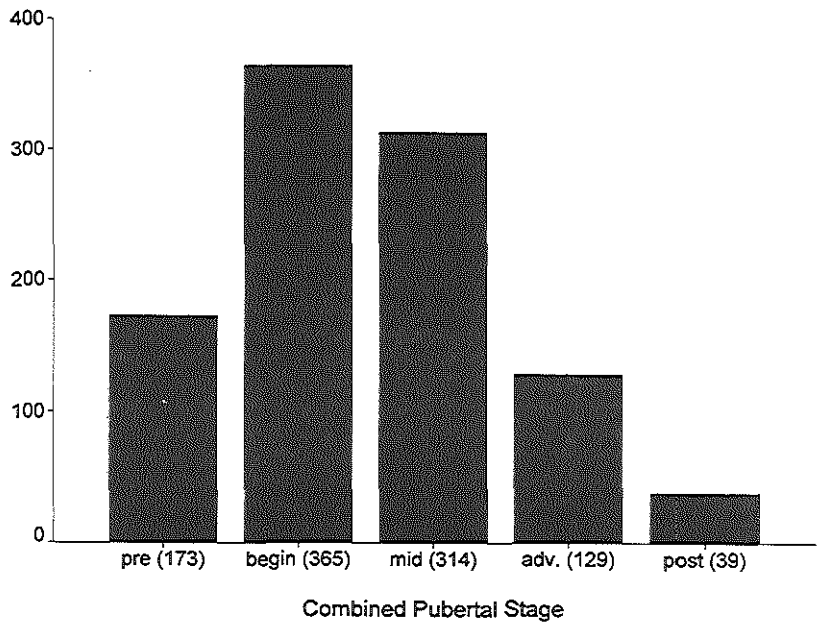

Fig.4.1.2.3. Distribution of girls by combined pubertal stage

4.2 Height

The distribution of subjects according to height is shown in Figures 4.2.1 and 4.2.2., respectively for boys and for girls.

Height of the respondents was approximately normally distributed (skewness and kurtosis close to zero). At the age measured (between 10.7 and 12.5 years, with an average of 11.4), girls were slightly taller than boys ($t=-4.7$, $df=2015$, $p<.001$).

4.3 Weight-for-height (Body Mass Index)

The Body Mass Index (BMI, also known as Quetelet Index) was used as a measure for weight relative to height. It's formula is:

BMI = [weight in KG X 100] / [height in CM squared]

This index is a measure of relative body weight that correlates highly with adiposity (Hamburger et al., 1989). With age, weight increases relatively faster than the square of height. Thus, the BMI increases with age (van Deursen & Deurenberg, 1986).

The distribution of subjects according to BMI is shown in Figures 4.3.1 and 4.3.2., respectively for boys and for girls.

At the age studied, boys' and girls' BMI distributions were practically the same, with a slightly higher mean BMI score for girls ($t=-4.7$, $df=2015$, $p<.001$). The distribution of Body Mass Index scores of the respondents deviated from normality: Scores were skewed towards the higher end (positive skew), that is: There were more extreme values higher than the mean than there were extreme values lower than the mean. In addition, there were more cases in the tails of the distribution than in a normal distribution with the same variance (positive kurtosis). It is unknown whether this is typical for the distribution of BMI-scores in general or for the age-group studied, or whether it is the result of some sort of bias of the study sample.

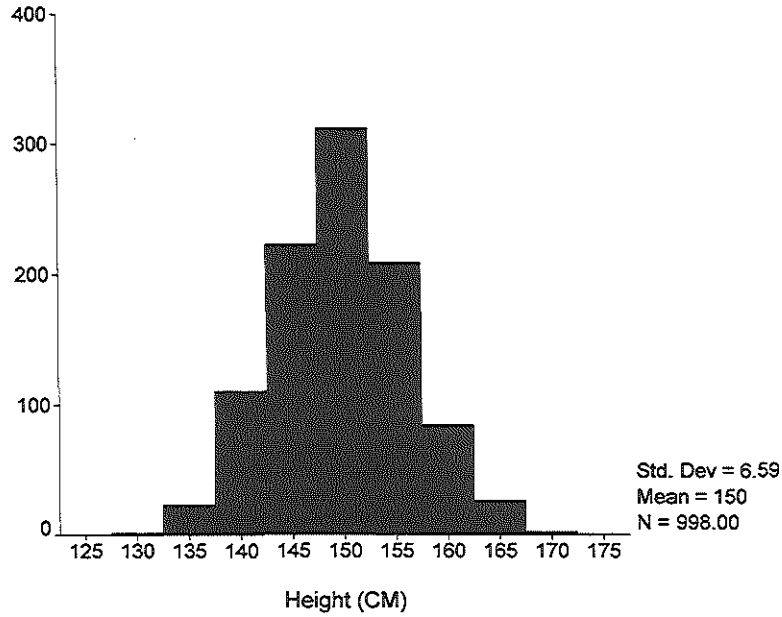

Fig.4.2.1. Histogram of boys' height

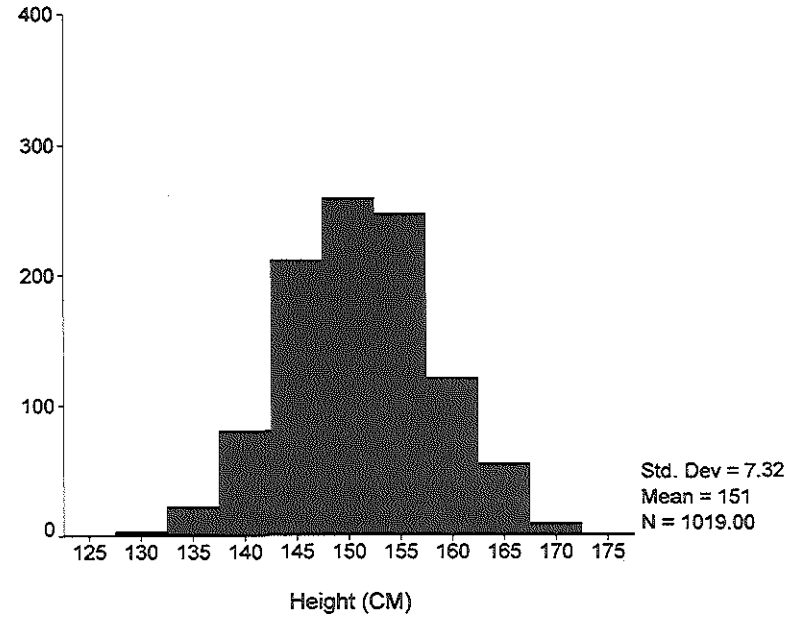

Fig.4.2.2. Histogram of girls' height

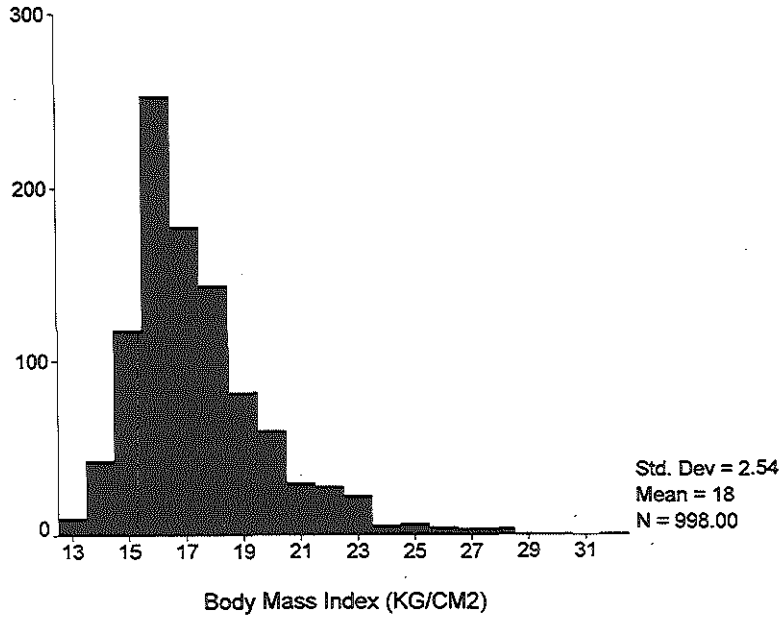

Fig.4.3.1. Histogram of boys' BMI

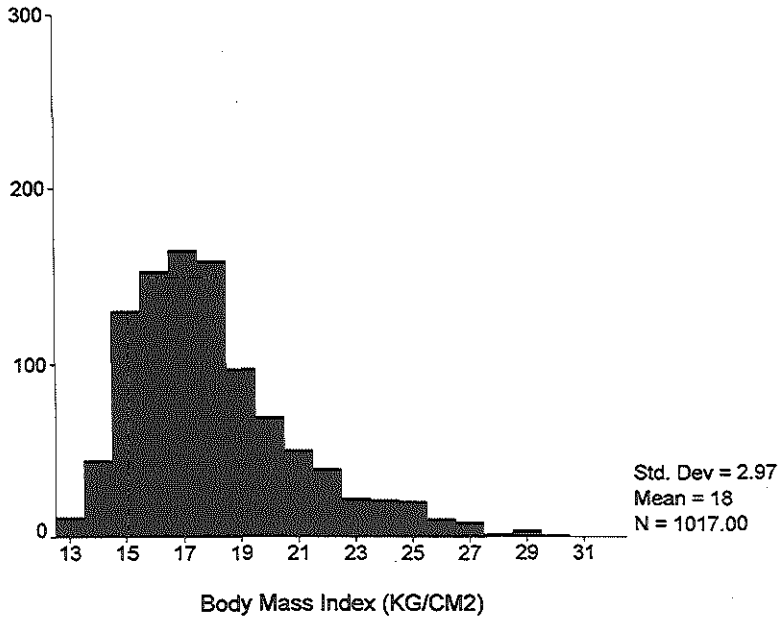

Fig.4.3.2. Histogram of girls' BMI

4.4 Physical characteristics and socio-economic status

In the Dutch national growth study (Roede & van Wieringen, 1985), differences in height and weight for height of children were reported in relation to the socio-economic status of the family (measured by occupational status of the parents). The relation with parental occupational status was positive for height (taller children had parents with higher occupational status) and negative for weight for height (heavier children had parents with lower occupational status). Explanations for these findings were sought in differences in cultural patterns between socio-economic layers, including "medical attitudes, nutrition, choice of secondary education, and living conditions." (p. 21) Although this growth study included data on sexual maturation, the authors did not report on the relation between stage of secondary sex characteristics and socio-economic status.

The relation between physical status and socio-economic factors might confound the interrelations of the various physical measures, and the relations between these measures and measures of psychopathology. In the following, the strength of the relations between physical status and socio-economic factors are examined for the data of the present study.

The relations of the physical variables with the socio-economic variables parental occupation and neighborhood disadvantage score were examined with multivariate analyses of variance (MANOVA), separately for each gender. Neighborhood disadvantage scores were grouped into 3 levels, representing the number of standard deviations away from the mean: One to two s.d.'s away from the mean in negative direction, less than one s.d. away from the mean in either direction, or one to two s.d.'s away from the mean in positive direction. None of the neighborhoods in the present study had a disadvantage score of 2 or more standard deviations away from the mean. The results of the MANOVA's are displayed in Table 4.4.1.

All multivariate effects were significant, but their effect size was small. For boys, the significant multivariate effect of parental occupation could be attributed to a small, significant, univariate effect on Body Mass Index: Boys in the highest two occupational groups had lower than average weight-for-height, while boys from self-employed parents or parents employed as skilled laborers had higher than average weight-for-height. For girls, none of the univariate results associated with parental occupation reached significance, indicating that the effect was not specific for a particular physical variable.

For boys, the significant multivariate effect of neighborhood disadvantage could be attributed to small, significant, univariate effects on Pubertal Stage and on Body Mass Index: For both these variables a negative relation existed with neighborhood disadvantage score, meaning a higher than average pubertal stage and BMI for boys from relatively disadvantaged neighborhoods, and a lower than average pubertal stage and BMI for boys from relatively advantaged neighborhoods. For girls, the significant multivariate effect of neighborhood disadvantage could be attributed to a small, significant, univariate effect on Body Mass Index: Girls from relatively advantaged neighborhoods had lower than average weight-for-height.

Table 4.4.1. Differences in physical scales by socio-economic variables per gender (MANOVA)

Effect	Boys		Girls	
	F (d.f.) (a)	Effect Size (%) (b)	*F* (d.f.) (a)	Effect Size (%) (b)
Effect of parental occupation				
Multivariate (a)	2.03* (d.f. – 15)	1.1	2.08** (d.f. – 15)	1.2
Univariate -Pubertal Stage	n.s.	n.a.	n.s.	n.a.
- Height	n.s.	n.a.	n.s.	n.a.
- BMI	2.55* (d.f. – 5877)	1.4	n.s. (d.f. – 5865)	n.a.
Effect of neighborh. disadv. score				
Multivariate	6.86*** (d.f. – 6)	2.1	2.72* (d.f. – 6)	<1.0
Univariate -Pubertal Stage	13.28***	2.7	n.s.	n.a.
- Height	n.s.	n.a.	n.s.	n.a.
- BMI	3.05* (d.f. – 2962)	<1.0	5.53** (d.f. – 2981)	1.1

Notes:
a) Multivariate test used: Pillais'
n.s. not significant
* $p<.05$
** $p<.01$
*** $p<.001$
b) Effect size – percentage of explained variance
n.a. not applicable (effect not significant)

Mean standardized physical scores (Z-scores) by parental occupation are displayed in Figures 4.4.1 and 4.4.2. (respectively for boys and for girls). Mean standardized physical scores (Z-scores) by neighborhood disadvantage group are displayed in Figures 4.4.3 and 4.4.4. (respectively for boys and for girls).

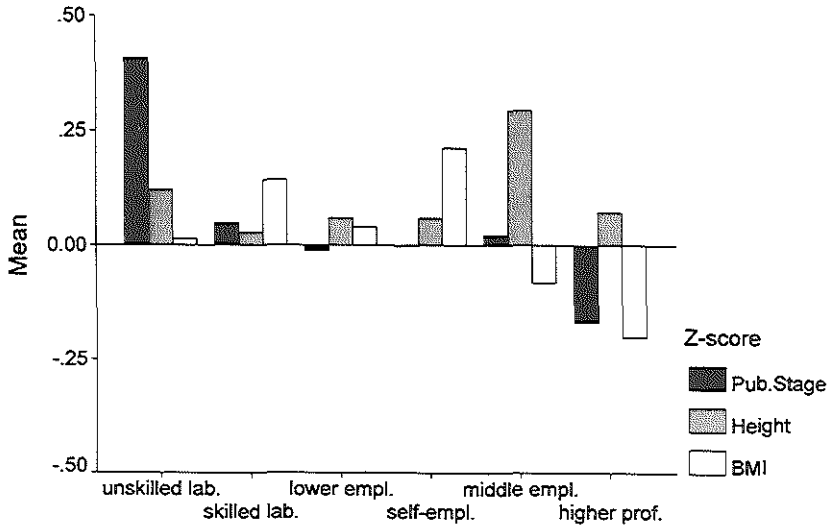

Fig.4.4.1. Mean Z-scores of physical variables by parental occupation - boys

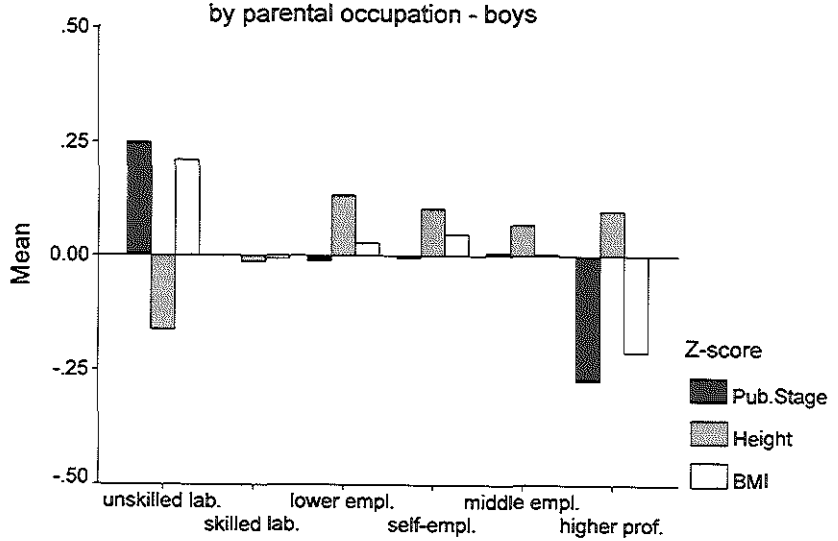

Fig.4.4.2. Mean Z-scores of physical variables by parental occupation - girls

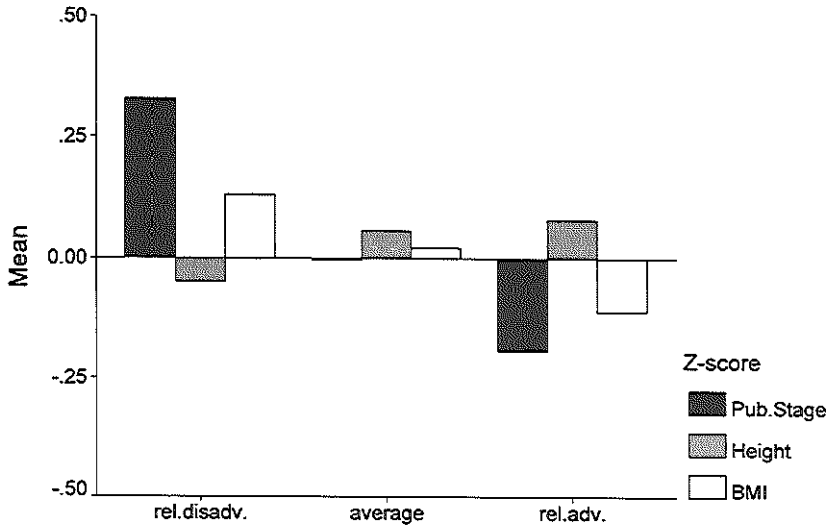

Fig.4.4.3. Mean Z-scores of physical variables by neighborh.disadvantage - boys

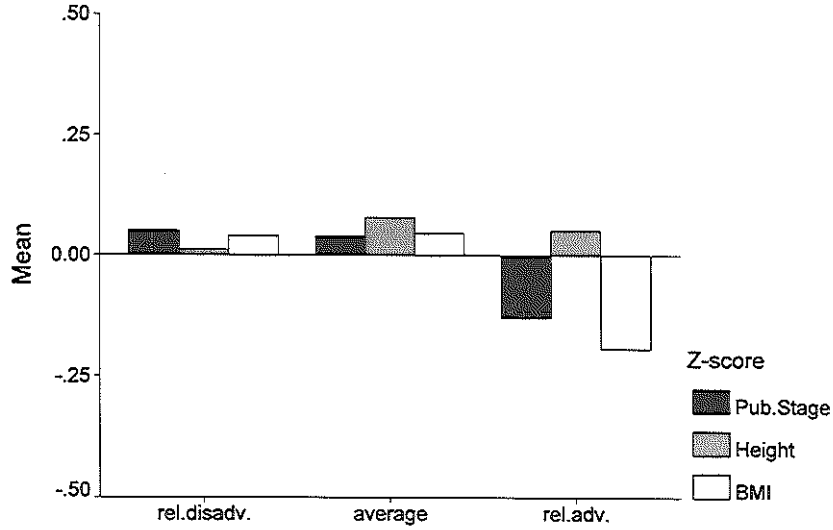

Fig.4.4.4. Mean Z-scores of physical variables by neighborh.disadvantage - girls

4.5 Interrelations of physical characteristics

To describe the interrelations of the various physical measures used in the present study, Pearson *r* correlation coefficients were determined separately for each gender. The results are displayed in Tables 4.5.1 and 4.5.2.

All correlation coefficients between the physical variables were positive and of at least medium size (between .10 and .30), both for boys and for girls. Thus, the more sexually mature, the heavier and the taller children were.

For boys, the correlation between height and pubertal stage were positive and of medium size, for girls this correlation was positive and of large (>.50) size. Thus, the taller the child, the more sexually mature. Girls' coefficients of the correlations of sexual maturation with height or BMI were higher than those for boys. Maybe these relations are gender-specific. Maybe the difference is an artefact of the lesser differentiation of sexual maturation (concentration in less advanced pubertal stages) in boys.

Coefficients of the correlations between physical variables and socio-economic variables were negative and small to medium, both for boys and for girls. Thus, the higher the socio-economic status, the less sexually mature and the lower the relative weight of the child. Intercorrelations of physical variables remained virtually unchanged when partialling out the influence of level of parental occupation.

The relation between height, BMI-score and pubertal stage is shown in Figures 4.5.1 and 4.5.2 (boys and girls, respectively).

The positive linear relation of both height and BMI with pubertal stage is obvious. For height, this was expected, because the pubertal growth spurt is one of the events associated with (the developmental period of) sexual maturation. However, along with the pubertal growth spurt one would expect a temporary decrease of the relative weight (BMI-score) of the child. The (cross-sectional) results are not in terms with this expectation. They do, however, support the hypothesis that body fat is positively related to the advancement of sexual maturation.

The change in angle of the BMI line after pubertal stage 4 in girls could mean that these girls had completed their growth spurt and were "filling out" again. In boys, no such change was observed for the BMI line. Possibly, they had not yet completed their growth spurt. The angle of boys' height line changed after developmental stage 3. This could mean that their pubertal growth spurt started around that stage of sexual maturation. In girls, no such change was observed for the height line. Possibly, the pubertal growth spurt is an early event in the developmental period of sexual maturation in girls.

Table 4.5.1. Pearson *r* correlation coefficients of physical variables - boys

	Pubertal Stage	Height	Body Mass Index
Parental Occupation	-.08*	n.s.	-.10**
Neighborhood Disadvantage	-.16	n.s.	-.10**
Pub.Stage	n.a.	.31	.14
Height	.32	n.a.	.23
BMI	.13	.24	n.a.

Notes:
n.s. not significant
n.a. not applicable
Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

Table 4.5.2. Pearson *r* correlation coefficients of physical variables - girls

	Pubertal Stage	Height	Body Mass Index
Parental Occupation	-.09**	n.s.	-.07*
Neighborhood Disadvantage	-.10**	n.s.	-.14
Pub. Stage	n.a.	.51	.29
Height	.51	n.a.	.24
BMI	.28	.25	n.a.

Notes:
n.s. not significant
n.a. not applicable
Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

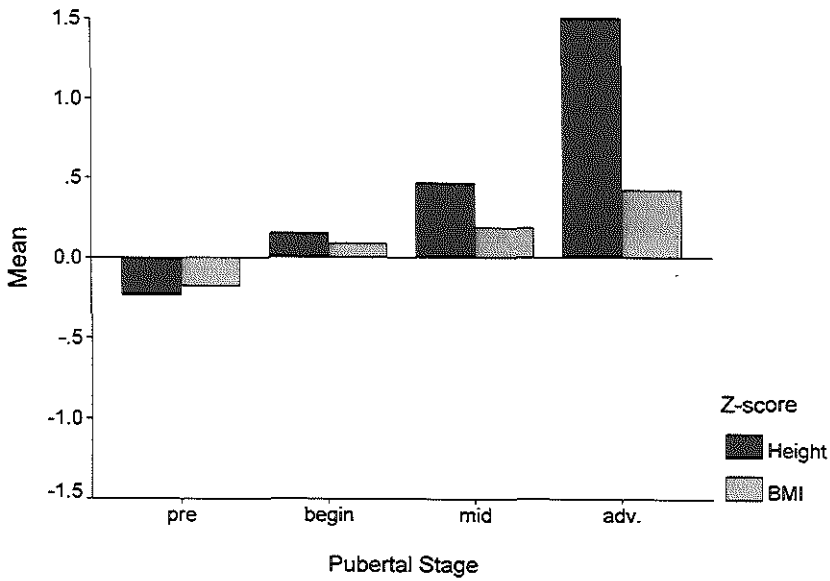

Fig.4.5.1. Mean Z-scores of height and BMI
by combined pubertal stage - boys

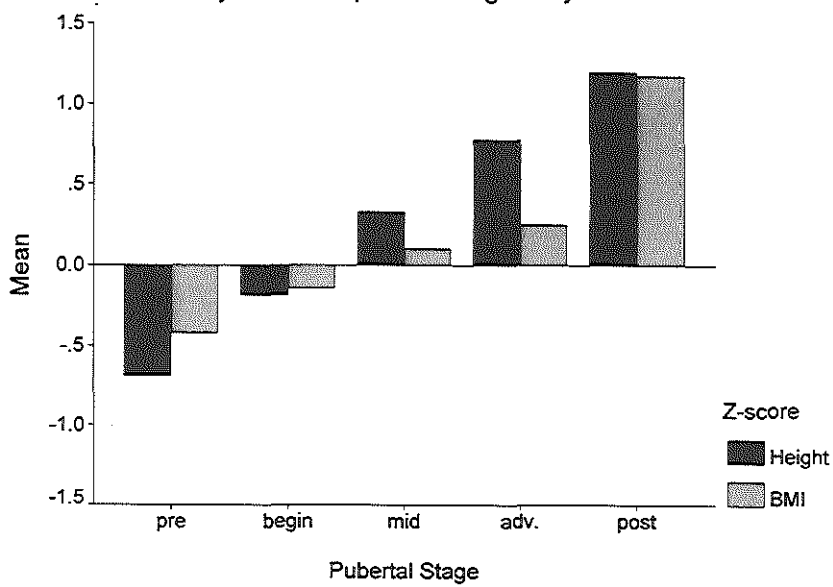

Fig.4.5.2. Mean Z-scores of height and BMI
by combined pubertal stage - girls

4.6 Combination of physical characteristics

For the purpose of some analyses in chapter 6, the three physical variables (pubertal status, height and Body Mass Index) have been combined in the following way:

- First pubertal status has been dichotomized (low/high; high = advanced), and height and BMI have been trichotomized (lowest 10%/intermediate/highest 10%).
- Then combinations of these have been made, resulting in 18 categories.

In Table 4.6.1, the categorization of the characteristics, and the resulting number of subjects for each cell, are displayed.

Table 4.6.1 Combination of physical variables into joint categories

	Physical variable			n	
Cat.No*	Puberty	Height	BMI	Boys	Girls
1-LLL	-	-	-	15	19
2-LLM	-	-	0	83	57
3-LLH	-	-	+	6	3
4-LML	-	0	-	77	49
5-LMM	-	0	0	574	368
6-LMH	-	0	+	64	29
7-LHL	-	+	-	3	1
8-LHM	-	+	0	68	9
9-LHH	-	+	+	15	1
10-HLL	+	-	-	0	1
11-HLM	+	-	0	7	11
12-HLH	+	-	+	0	1
13-HML	+	0	-	7	25
14-HMM	+	0	0	40	297
15-HMH	+	0	+	7	49
16-HHL	+	+	-	0	2
17-HHM	+	+	0	25	79
18-HHH	+	+	+	5	16

*) The first letter stands for the pubertal category,
the second for the height category,
the third for the BMI category;
L = low
M = medium
H = high

Some combinations of physical variables' categories are rare or non-existent in the study group:

- Category 3: Low pubertal status, small height, heavy weight (girls in particular)
- Category 7: Low pubertal status, tall height, light weight (both boys and girls)
- Category 9: Low pubertal status, tall height, heavy weight (girls)
- Category 10: High pubertal status, small height, light weight (both boys and boys)
- Category 12: High pubertal status, small height, heavy weight (both boys and girls)
- Category 16: High pubertal status, tall height, light weight (both boys and girls).

In view of the findings on relations of the separate distributions of physical variables with socio-economic status (see paragraph 4.4), it was expected that the combination of physical characteristics would be more strongly related to socio-economic status. In Figures 4.6.1 through 4.6.4, boxplots are displayed of parental occupation and neighborhood disadvantage scores for each joint physical category per gender.

The box borders are defined by the 25th percentile (lower border) and 75th percentile (higher border) of the problem scores. The median is indicated by a slightly thicker line within the box. The lines extending down- and/or upwards from the boxes, the so-called "tails", indicate the subjects that are within a distance of 1.5 times the box length away from either box border. Outliers (marked "o") are cases that are at a distance between 1.5 and 3 times the box length away from either box border. Extremes (marked "x") are cases that are at a distance of more than 3 times the box length away from either box border. Group differences are most easily studied by examining the medians and the boxes: Groups that may be considered to differ in terms of the "dependent" variable are those for which a) the medians differ, *and* b) the boxes show no or hardly any overlap.

For boys, the parental occupation medians were the same, except for two low-frequency joint physical categories. This means that, even though some boxes only showed overlap on the medians, no meaningful differences in parental occupation were found for boys in different joint physical categories.

For girls, the parental occupation medians were the same, except for three low-frequency joint physical categories and for category 11 (high pubertal status, small height, medium weight). The box of joint physical category 11 showed no overlap with those of joint physical categories 5 (low pubertal status, medium height, medium weight), 8 (low pubertal status, tall height, medium weight), 17 (high pubertal status, tall height, medium weight) and 18 (high pubertal status, tall height, high weight): Parental occupation was lower for girls in category 11 than for children in categories 5, 8, 17, and 18.

For boys, although the medians for neighborhood disadvantage varied over the physical categories, all boxes but one showed considerable overlap. Boys in category 15 (high pubertal status, medium height, heavy weight) came from relatively advantaged neighborhoods compared to boys in category 7 (low pubertal status, tall height, low weight), 14 (high pubertal status, medium height, medium weight), and 18 (high pubertal status, tall height, heavy weight).

For girls, two low-frequency categories had low medians and boxes that showed no or little overlap with most other categories, and one category had a high median and a box showing no overlap with some other categories. Girls in categories 3 (low pubertal status, small height, heavy weight) and 16 (high pubertal status, tall height, low weight) came from relatively disadvantaged neighborhoods. Girls in category 8 (low pubertal status, tall height, medium weight) came from relatively advantaged neighborhoods compared to girls in categories 1 (low pubertal status, small height, light weight), 3 (low pubertal status, small height, heavy weight), 6 (low pubertal status, medium height, heavy weight).

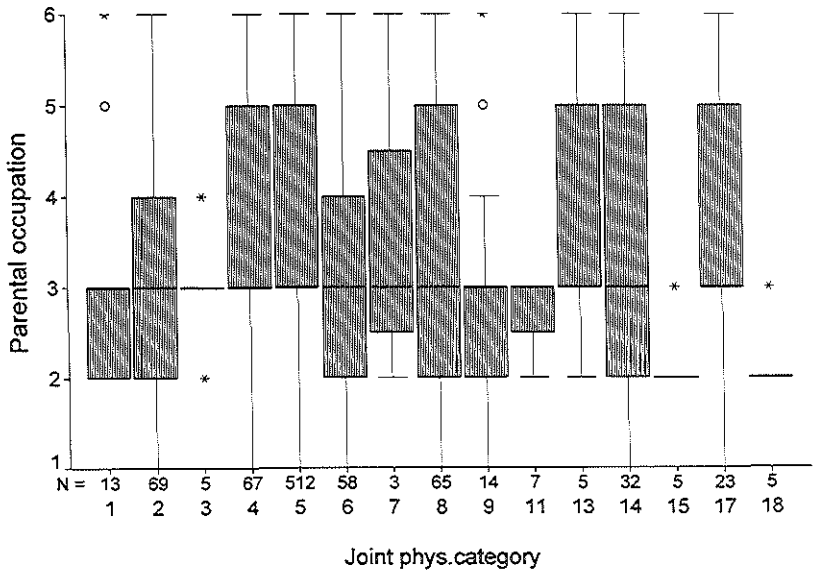

Fig.4.6.1. Boxplot of parental occupation by joint physical category - boys

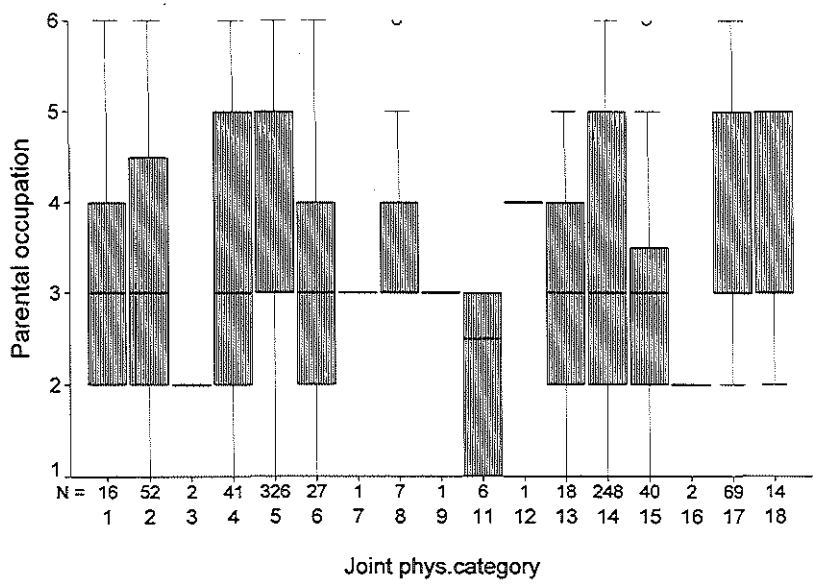

Fig.4.6.2. Boxplot of parental occupation by joint physical category - girls

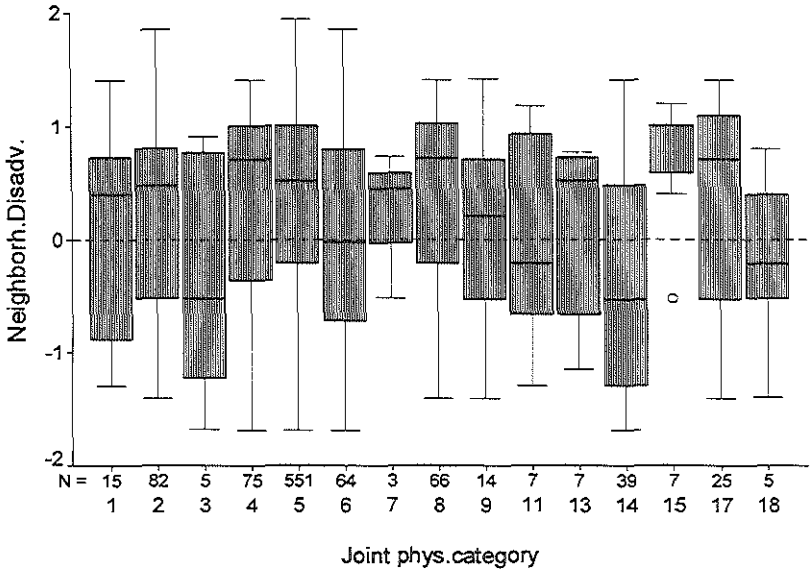

Fig.4.6.3. Boxplot of neighborhood disadvantage by joint physical category - boys

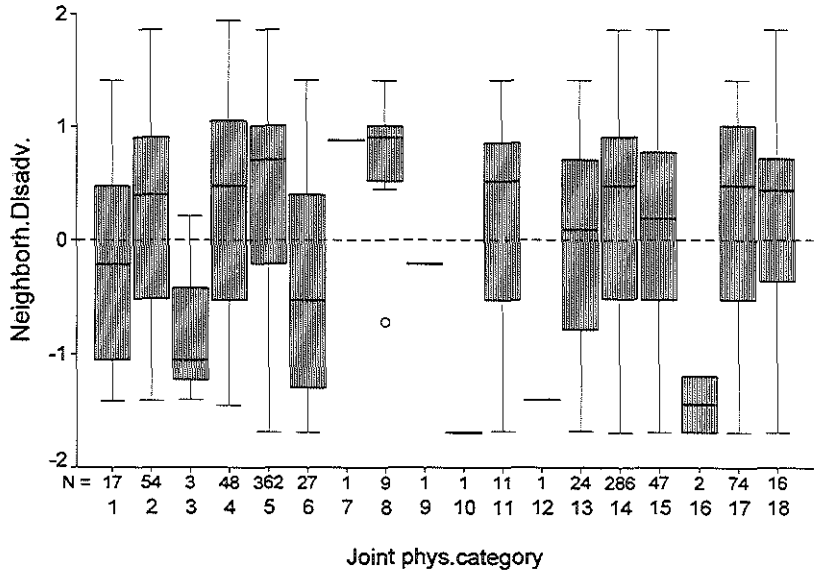

Fig.4.6.4. Boxplot of neighborhood disadvantage by joint physical category - girls

CHAPTER 5 DISTRIBUTION OF BEHAVIORAL/EMOTIONAL PROBLEMS

In this chapter the distribution of behavioral/emotional problems and differences therein with respect to various demographic characteristics of the respondents are discussed. Behavioral/emotional problems were measured by questionnaires for parents and for youth. The item-content of the parent and youth questionnaires used is not completely identical (Achenbach, 1991a). The YSR has one item less than the CBCL, and the contents of 16 of its items have been replaced with so-called "socially desirable" statements. Eleven groupings of behavioral/emotional problems are distinguished (see Chapter 2, paragraph 3.2): Eight narrow-band problem constructs, two broad-band groupings of problems, and one overall ("Total Problems") score. A few item-contributions towards the narrow-band constructs (and as a consequence to the broad-band groupings) are questionnaire-specific (see Appendix F).

The distribution of problem scores is discussed per gender and informant. First, characteristics of the individual problem scale score distributions are given. Second, the relative preponderance of one type of problem versus the other is examined for each narrow-band scale versus the other narrow-band scales, and for the broad-band scales. Third, the relation between problem scale scores and socio-economic differences between children is looked into. Fourth, attention is paid to boy-girl differences in problem scale scores. Finally, the amount of agreement between parents and their children on the rankings of problem scores are discussed.

Both for informant-specific analyses of differences between groups (socio-economic status, gender) as well as for analyses of agreement between informants, "raw" scale scores were used. The slight differences in item content between CBCL and YSR syndrome scales were expected not to have any systematic effect on rankings of subjects' scores (and thus agreement results). For the informant-specific analyses of differences in preponderance between problem scales and for comparisons of problem scale scores between informants, problem scores were standardized. This was achieved by dividing the "raw" scale scores by the number of contributing items.

5.1 Characteristics of problem scale score distributions

In Tables 5.1.1 and 5.1.2 (results from parent and youth questionnaires, respectively), the 25th, 50th (median), and 75th percentiles and the maximum (P100) of the various problem scales are shown for each gender. The theoretical maximum score of the problem scales (that is: If a maximum score were obtained for all contributing items) is also given. The minimum score is zero for every problem scale. The names of scales are abbreviated. A list of abbreviations can be found after the thesis index, on page iv. The distributions of problems scales are visualized in Figures 5.1.1 through 5.1.44, grouped per problem scale by informant and gender.

Table 5.1.1 Distributive characteristics of problem scales - CBCL

Problem scale	Boys				Girls				Theor. Max.
	P25	P50	P75	P100	P25	P50	P75	P100	
ADD	1	3	5	19	1	2	4	17	22
AGG	2	5	10	36	1	4	7	28	40
AXD	0	2	4	19	0	2	4	23	28
DEL	0	1	2	12	0	0	1	9	26
SOC	0	1	2	12	0	1	2	13	16
SOM	0	0	1	13	0	1	2	12	18
THT	0	0	0	4	0	0	0	4	14
WTH	0	1	3	14	0	1	3	14	20
INT	2	4	8	30	2	4	8	36	64
EXT	2	6	12	43	1	4	8	36	66
TPS	9	17	28	95	7	15	24	103	240

Table 5.1.2 Distributive characteristics of problem scales - YSR

Problem scale	Boys				Girls				Theor. Max.
	P25	P50	P75	P100	P25	P50	P75	P100	
ADD	1	3	5	13	1	2	4	15	18
AGG	2	5	8	27	2	4	7	29	38
AXD	1	2	5	21	1	2	5	26	32
DEL	1	2	3	12	0	1	2	10	22
SOC	0	1	3	12	0	1	3	11	16
SOM	0	1	3	15	0	1	3	11	18
THT	0	0	1	8	0	0	1	11	14
WTH	1	2	3	12	1	2	3	11	16
INT	3	5	10	43	3	6	10	46	64
EXT	3	7	11	33	2	5	9	32	60
TPS	12	21	32	115	10	18	30	129	206

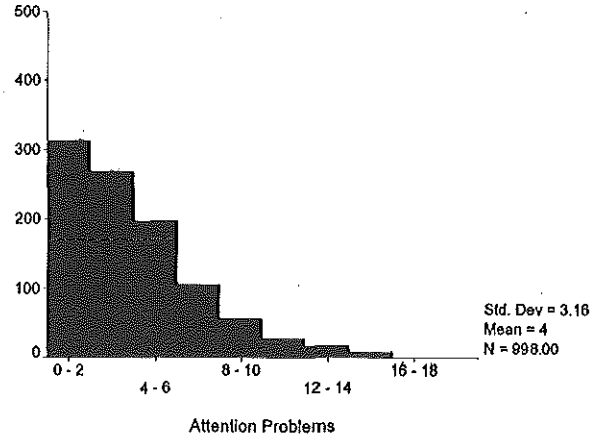

Fig.5.1.1. Histogram of Attention Problems
CBCL - boys

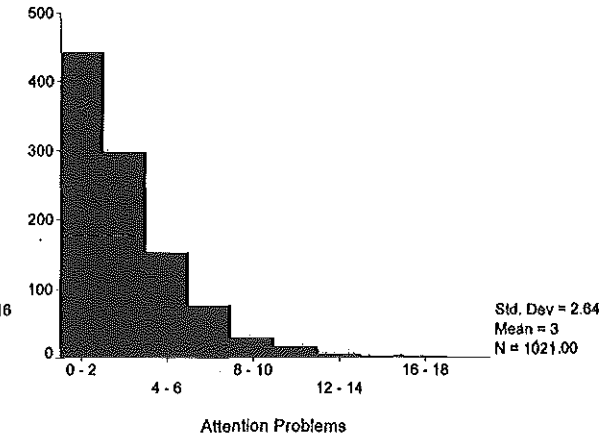

Fig.5.1.2. Histogram of Attention Problems
CBCL - girls

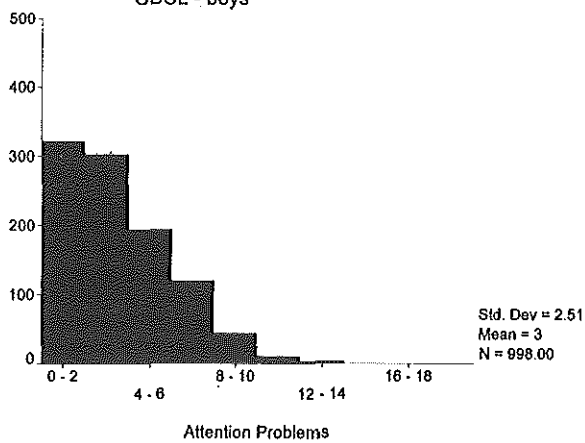

Fig.5.1.3. Histogram of Attention Problems
YSR - boys

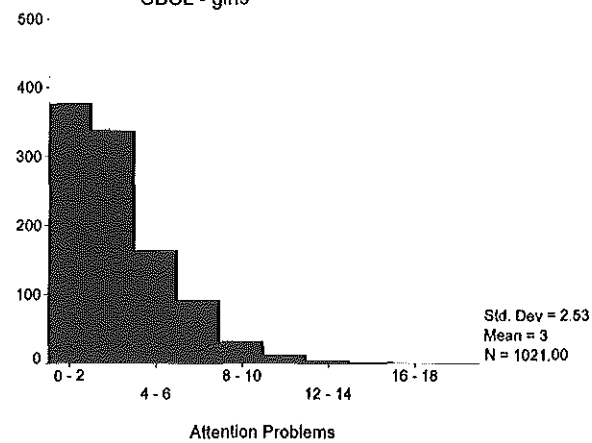

Fig.5.1.4. Histogram of Attention Problems
YSR - girls

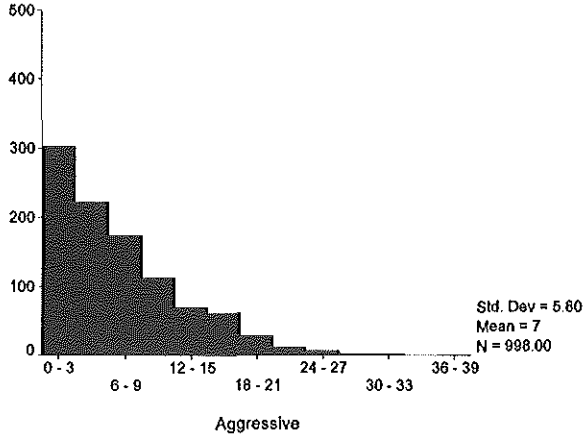

Fig.5.1.5. Histogram of Aggressive CBCL - boys

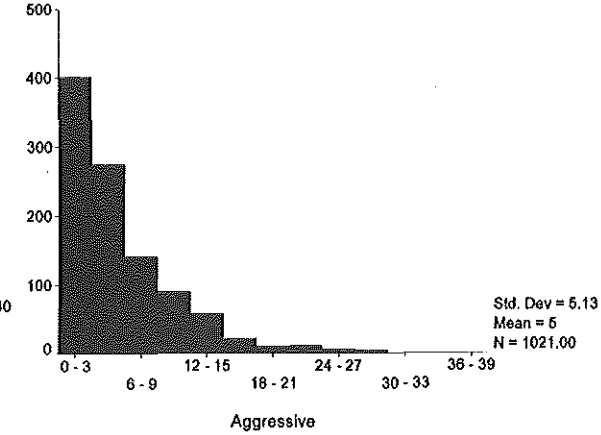

Fig.5.1.6. Histogram of Aggressive CBCL - girls

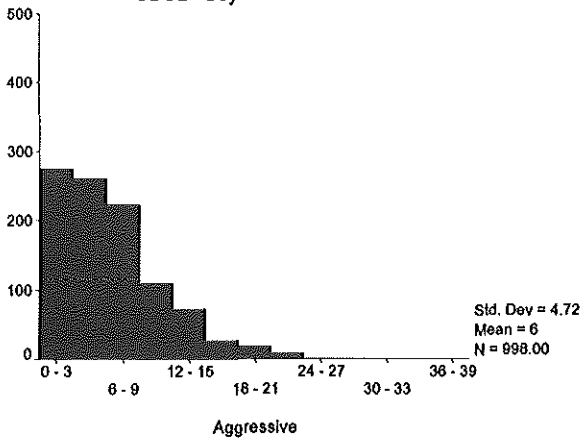

Fig.5.1.7. Histogram of Aggressive YSR - boys

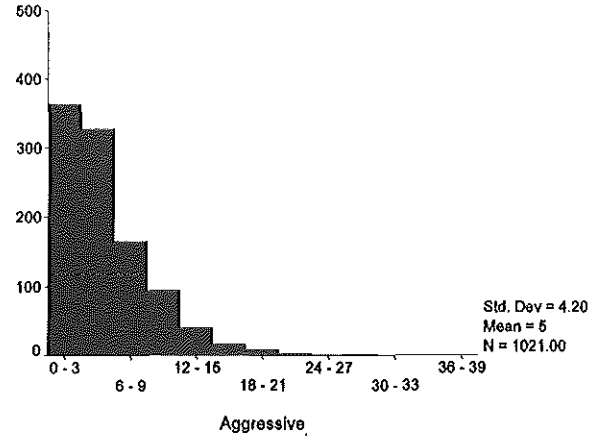

Fig.5.1.8. Histogram of Aggressive YSR - girls

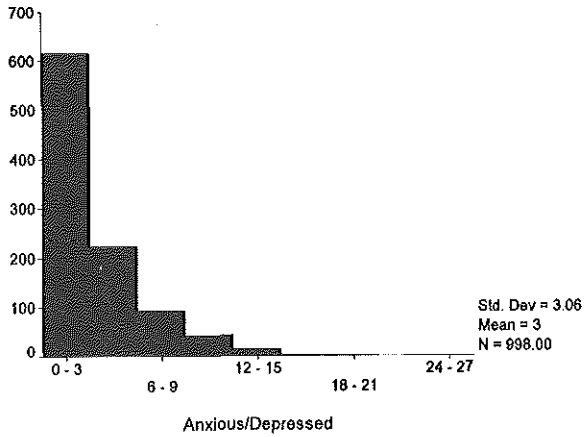

Fig.5.1.9. Histogram of Anxious/Depressed CBCL - boys

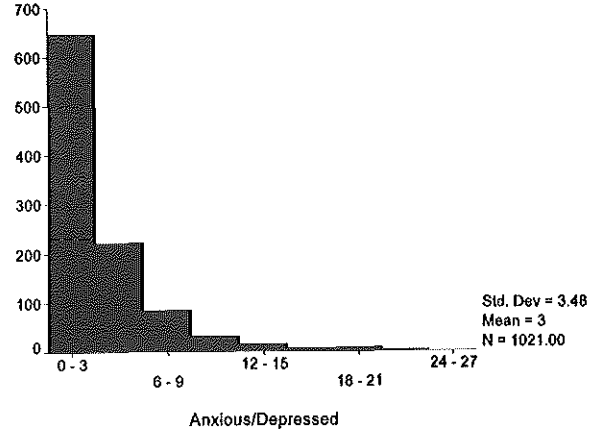

Fig.5.1.10. Histogram of Anxious/Depressed CBCL - girls

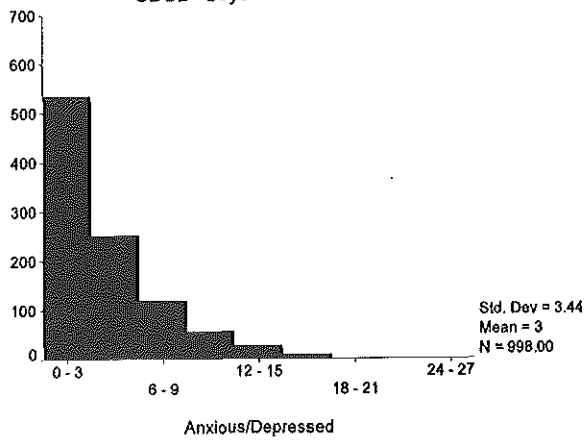

Fig.5.1.11. Histogram of Anxious/Depressed YSR - boys

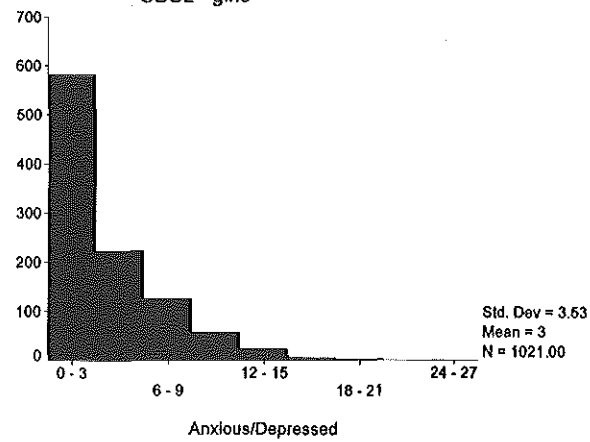

Fig.5.1.12. Histogram of Anxious/Depressed YSR - girls

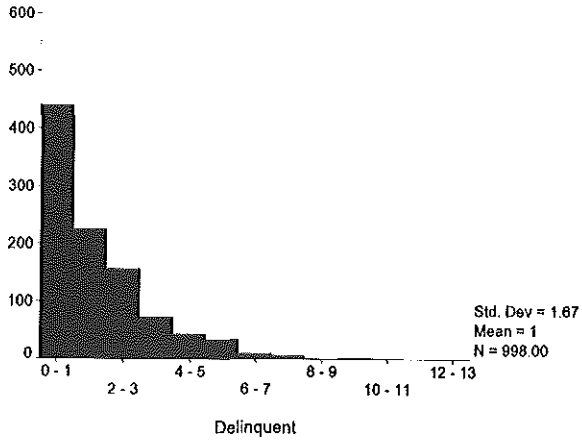

Fig.5.1.13. Histogram of Delinquent
CBCL - boys

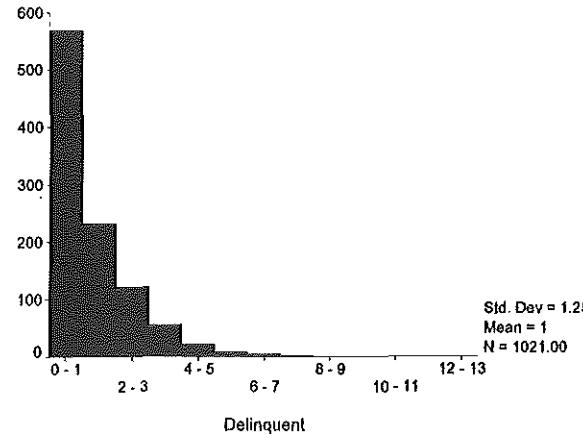

Fig.5.1.14. Histogram of Delinquent
CBCL - girls

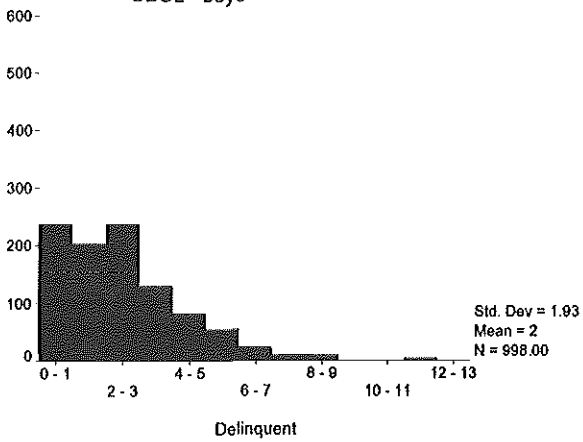

Fig.5.1.15. Histogram of Delinquent
YSR - boys

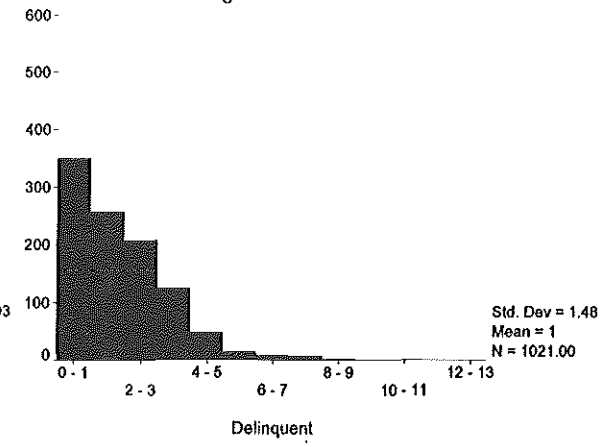

Fig.5.1.16. Histogram of Delinquent
YSR - girls

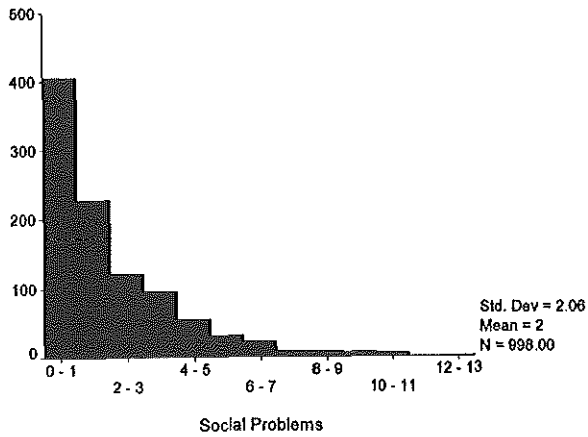

Fig.5.1.17. Histogram of Social Problems
CBCL - boys

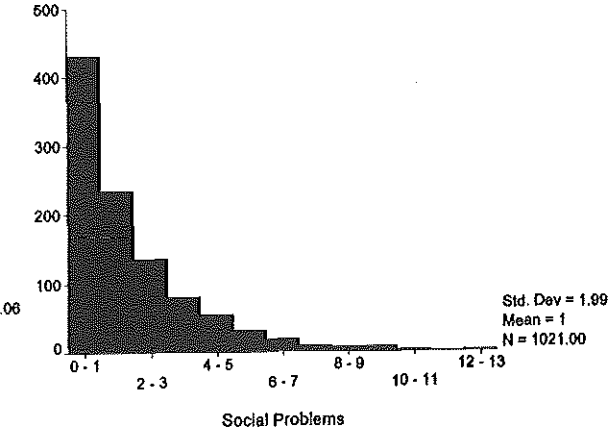

Fig.5.1.18. Histogram of Social Problems
CBCL - girls

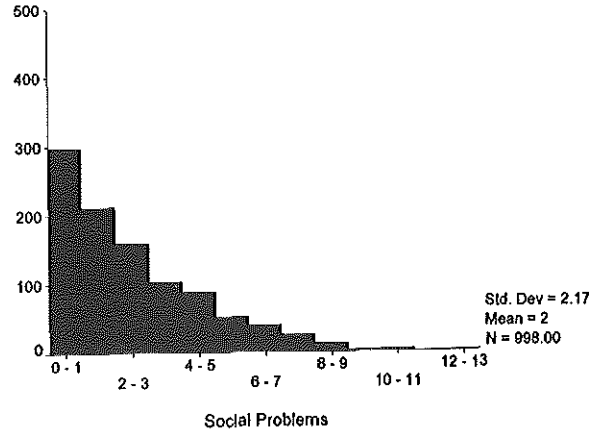

Fig.5.1.19. Histogram of Social Problems
YSR - boys

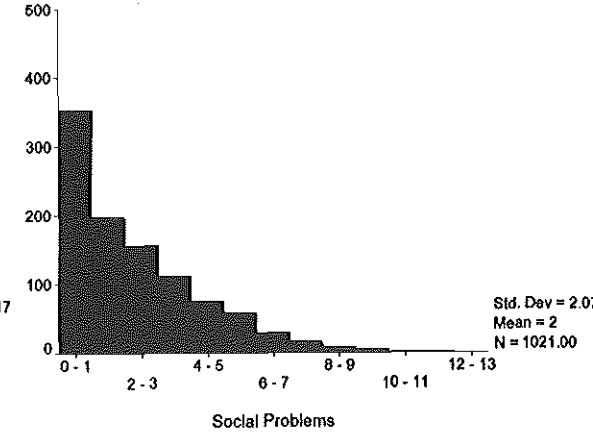

Fig.5.1.20. Histogram of Social Problems
YSR - girls

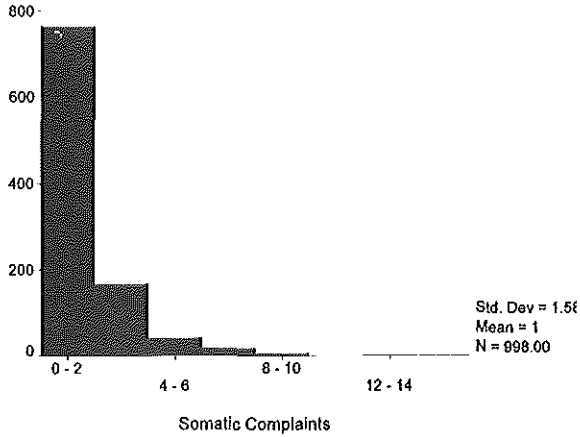

Fig.5.1.21. Histogram of Somatic Complaints
CBCL - boys

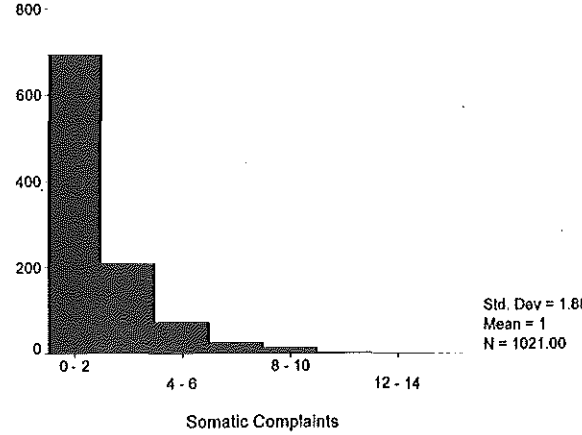

Fig.5.1.22. Histogram of Somatic Complaints
CBCL - girls

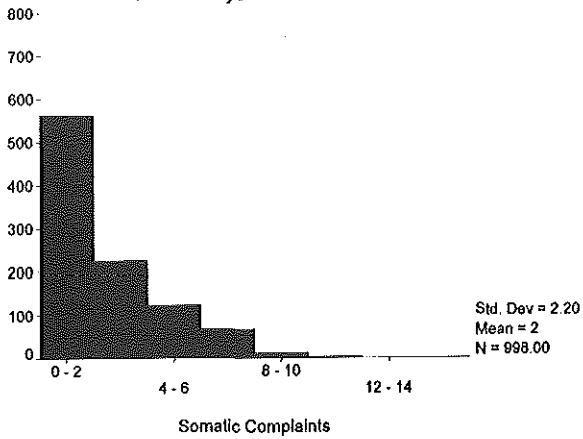

Fig.5.1.23. Histogram of Somatic Complaints
YSR - boys

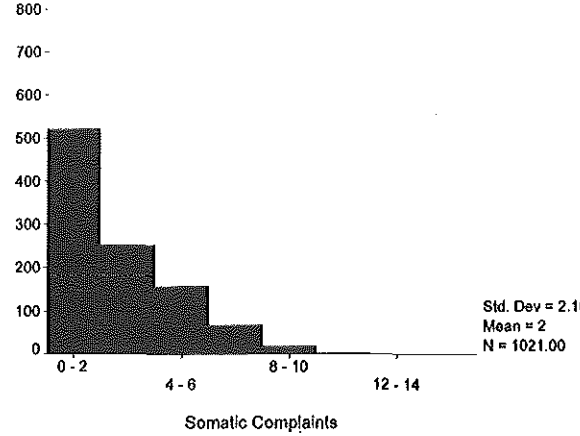

Fig.5.1.24. Histogram of Somatic Complaints
YSR - girls

Fig.5.1.25. Histogram of Thought Problems
CBCL - boys

Fig.5.1.26. Histogram of Thought Problems
CBCL - girls

Fig.5.1.27. Histogram of Thought Problems
YSR - boys

Fig.5.1.28. Histogram of Thought Problems
YSR - girls

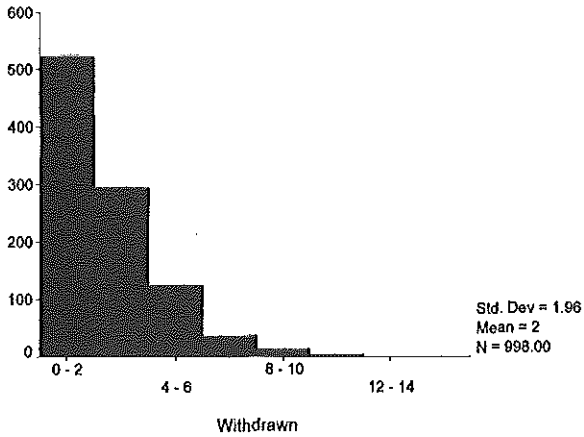

Fig.5.1.29. Histogram of Withdrawn
CBCL - boys

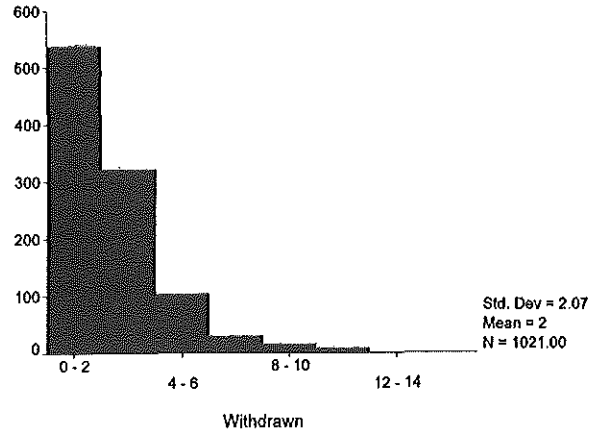

Fig.5.1.30. Histogram of Withdrawn
CBCL - girls

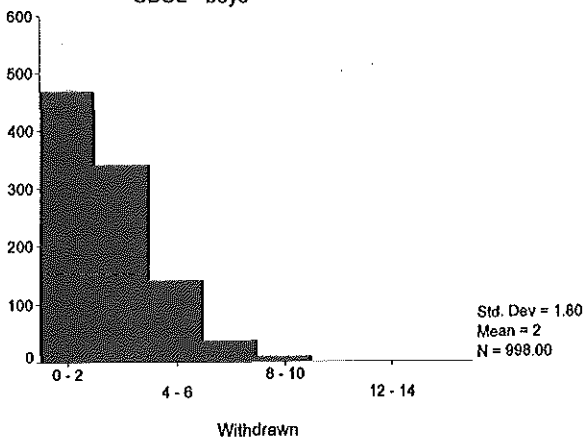

Fig.5.1.31. Histogram of Withdrawn
YSR - boys

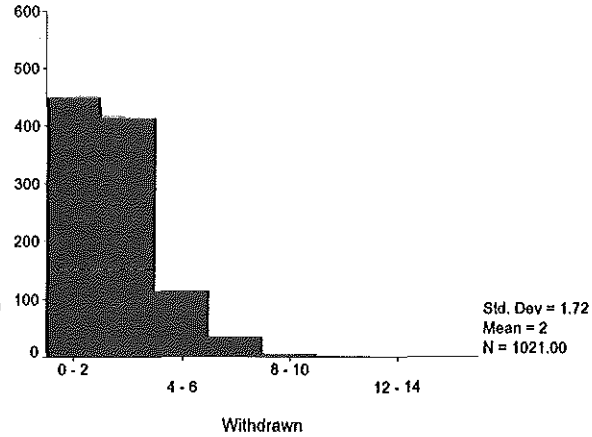

Fig.5.1.32. Histogram of Withdrawn
YSR - girls

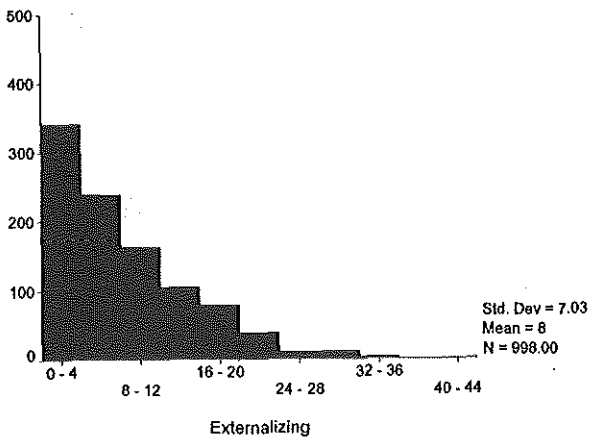

Fig.5.1.33. Histogram of Externalizing
CBCL - boys

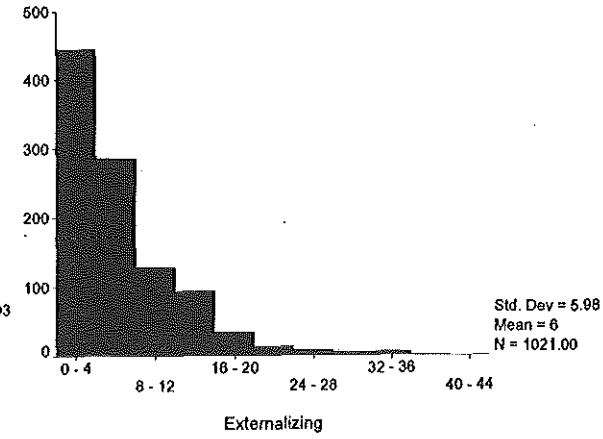

Fig.5.1.34. Histogram of Externalizing
CBCL - girls

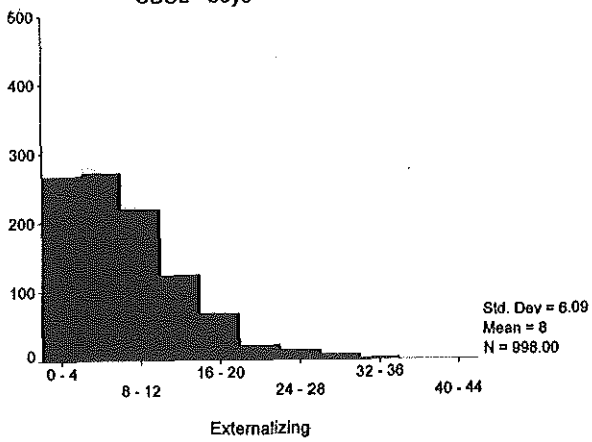

Fig.5.1.35. Histogram of Externalizing
YSR - boys

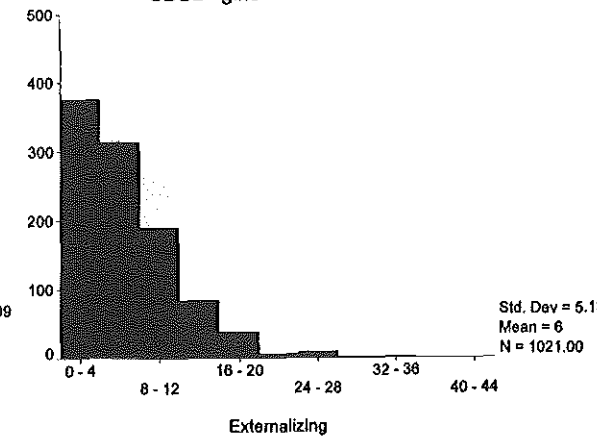

Fig.5.1.36. Histogram of Externalizing
YSR - girls

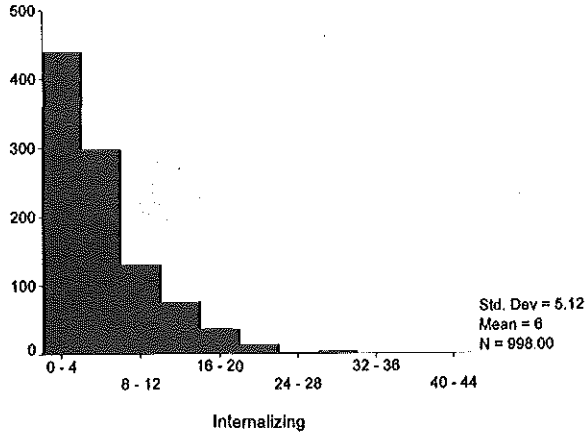

Fig.5.1.37. Histogram of Internalizing
CBCL - boys

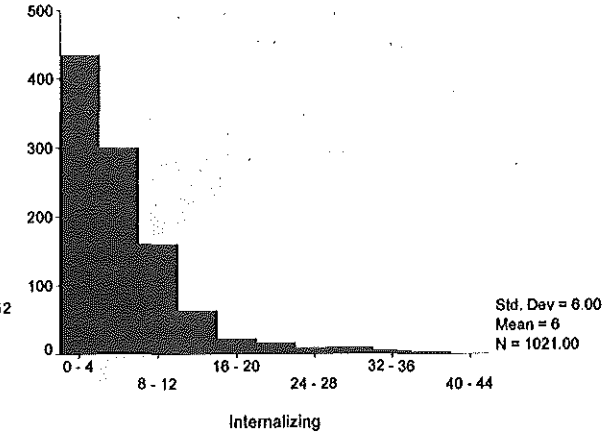

Fig.5.1.38. Histogram of Internalizing
CBCL - girls

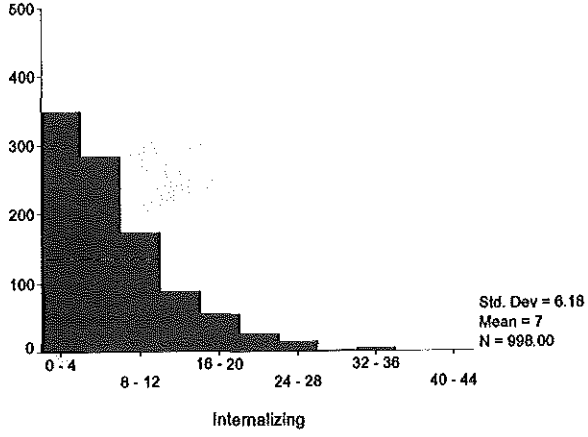

Fig.5.1.39. Histogram of Internalizing
YSR - boys

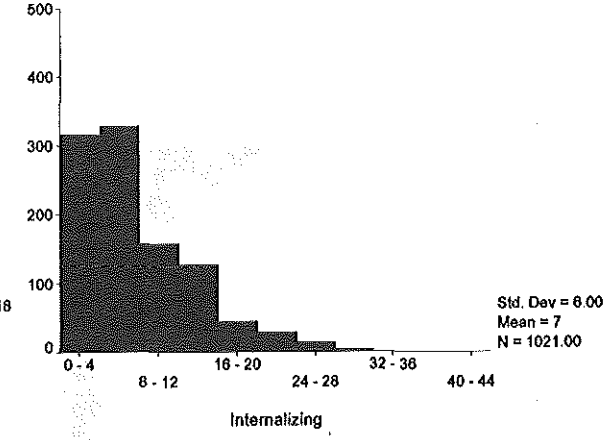

Fig.5.1.40. Histogram of Internalizing
YSR - girls

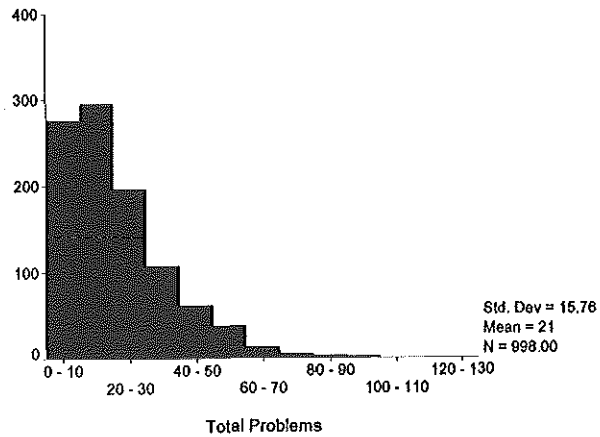

Fig.5.1.41. Histogram of Total Problems
CBCL - boys

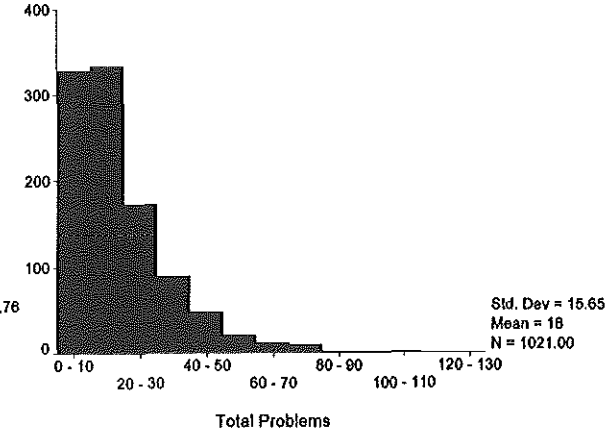

Fig.5.1.42. Histogram of Total Problems
CBCL - girls

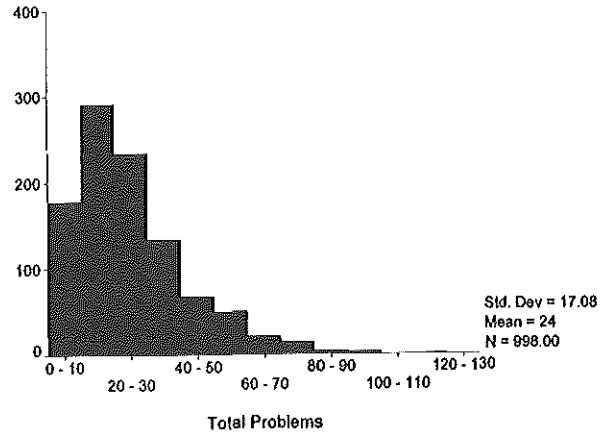

Fig.5.1.43. Histogram of Total Problems
YSR - boys

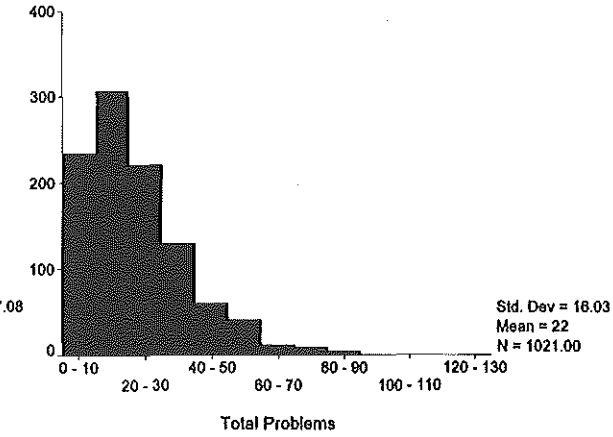

Fig.5.1.44. Histogram of Total Problems
YSR - girls

The measuring unit of the problem scores is one. In line with the low prevalence of clinically significant behavioral/emotional problems, most problem scale scores in the present general population sample were low. This is expressed in the generally low scores up to the 75th percentile. A combination of low medians and little spread in the scores (small range) indicates that the scale in question is not suitable for making discriminations between subjects (in general population samples). This seems to be particularly the case for: Thought Problems as reported by parents as well as youth both for boys and for girls, Delinquent as reported by parents for girls, and Somatic Complaints as reported by parents for boys.

The distribution of problem scores deviated from normality (higher than zero skewness and kurtosis) for all problem scales: The distributions were slanted towards the lower scores with a tail extending on the higher side due to a concentration of scores in the lower region delimited by the minimum score. Because parametric analyses assume normality, non-parametric techniques were used to analyze problem score differences. Using non-parametric techniques has a few disadvantages: They have less power to detect significant differences and no non-parametric techniques are available yet that permit both the analysis of several dependent variables at the same time (multivariate technique) *and* the control for confounders (analysis of covariance).

To assess whether differences between pairs of variables were significantly different, Wilcoxon signed-ranks tests were performed for all combinations of narrow-band constructs and for the pair of broad-band groupings, per informant. The Wilcoxon test:

> "(...) computes differences between pairs of variables, ranks the absolute differences, sums ranksfor the positive and the negative differences, and computes the test statistic *Z* from the positive and negative rank sums." (Norušis, 1992)

Standardized scale scores were used to correct for varying numbers of contributing items. The results are displayed in Table 5.1.3. Only significant differences are mentioned. A minus-sign means that the average absolute score difference ("mean rank") of "minus" pairs (pairs for which the value of second-mentioned variable was less than that of first-mentioned variable) was higher than that of "plus" pairs (pairs for which the value of second-mentioned variable was greater than that of first-mentioned variable). A plus-sign indicates the reverse. For example "ADD-AGG, girls, CBCL: +" means that for the "plus" pairs (AGG > ADD) score differences were greater than for the "minus" pairs (AGG > ADD), or in other words: On the average, according to parents' reports, girls' Aggression scores were higher than Attention Problems scores.

The majority of differences found were significant, with the exception of:

- Boys' CBCLs: Attention Problems versus Aggressive, Anxious/Depressed versus Social Problems, Anxious/Depressed versus Withdrawn Behavior, Delinquent versus Somatic Complaints, and Social Problems versus Withdrawn Behavior.
- Girls' CBCLs: Anxious/Depressed versus Social Problems, Anxious/Depressed versus Withdrawn Behavior.

- Boys' YSRs: Anxious/Depressed versus Somatic Complaints, and Social Problems versus Withdrawn Behavior.
- Girls' YSRs: Aggressive versus Withdrawn Behavior, and Social Problems versus Somatic Complaints.

Table 5.1.3 Results of Wilcoxon signed-ranks tests between pairs of narrow-band constructs or broad-band groupings per gender

Problem scale pairs	CBCL				YSR			
	Boys		Girls		Boys		Girls	
	Z (a)	Dir. (b)	Z (a)	Dir. (b)	Z (a)	Dir. (b)	Z (a)	Dir. (b)
ADD-AGG	n.s.		-2.2*	+	-4.3	-	-7.7	-
ADD-AXD	-15.5	-	-7.6	-	-16.7	-	-14.7	-
ADD-DEL	-22.8	-	-22.3	-	-17.1	-	-19.4	-
ADD-SOC	-15.4	-	-7.9	-	-11.1	-	-9.7	-
ADD-SOM	-20.1	-	-10.3	-	-13.5	-	-8.1	-
ADD-THT	-24.8	-	-23.8	-	-22.8	-	-21.9	-
ADD-WTH	-13.2	-	-5.1	-	-10.8	-	-5.0	-
AGG-AXD	-16.3	-	-9.4	-	-15.4	-	-8.9	-
AGG-DEL	-24.7	-	-23.8	-	-17.2	-	-18.4	-
AGG-SOC	-14.8	-	-9.4	-	-7.1	-	-2.8**	+
AGG-SOM	-20.5	-	-12.1	-	-12.5	-	-2.1*	-
AGG-THT	-25.6	-	-24.7	-	-22.8	-	-20.1	-
AGG-WTH	-13.8	-	-7.1	-	-8.2	-	n.s.	
AXD-DEL	-12.9	-	-17.4	-	-2.4*	-	-10.7	-
AXD-SOC	n.s.		n.s.		-6.5	+	-4.7	+
AXD-SOM	-11.2	-	-5.0	-	n.s.		-5.1	+
AXD-THT	-22.6	-	-22.6	-	-16.6	-	-15.6	-
AXD-WTH	n.s.		n.s.		-6.8	+	-9.7	+
DEL-SOC	-12.0	+	-16.2	+	-7.5	+	-12.4	+
DEL-SOM	n.s.		-13.4	+	-2.4*	+	-13.2	+
DEL-THT	-17.4	+	-14.5	-	-15.4	-	-9.0	+
DEL-WTH	-14.1	+	-19.7	+	-8.0	+	-17.6	+
SOC-SOM	-11.7	-	-4.7	-	-5.4	-	n.s.	
SOC-THT	-20.1	-	-19.8	-	-17.2	-	-15.5	-
SOC-WTH	n.s.		-2.3*	+	n.s.		-3.4	-
SOM-THT	-15.1	-	-19.2	-	-15.0	-	-16.8	-
SOM-WTH	-11.4	+	-5.4	+	-5.2	-	-3.2**	-
THT-WTH	-22.5	+	-23.0	+	-18.1	+	-19.4	+
INT-EXT	-9.8	-	-2.4*	-	-8.9	-	-4.6	+

a) All mentioned Z-values significant at $p<.001$, except:
* $p<.05$
** $p<.01$
b) Direction of differences. Mean rank highest for:
\- first-mentioned variable
\+ second-mentioned variable

From the direction of the differences, the problem scales were put in sequence of endorsement (from least to most often endorsed). Problem scales that occupy the same position in the sequence are separated by a forward slash. Problems to the left of a comma are less often endorsed than problems to the right of that comma.

- Boys' CBCL scales: ADD/ AGG, AXD/ SOC/ WTH, SOM, THT, DEL
- Girls' CBCL scales: AGG, ADD, AXD, WTH, SOC, SOM, DEL, THT
- Boys' YSR scales: ADD, AGG, SOC, SOM, WTH, AXD, DEL, THT
- Girls' YSR scales: ADD, SOC, AGG, SOM, WTH, AXD, THT, DEL.

This did not imply that children were more likely to be referred for one type of problem than for the other; it merely indicated relatively how often problems were reported. From these sequences it became apparent that the likeliness to report specific types of problems was more strongly related to the informant than to the gender of the child.

Agreement between parents and their children on the amount of problems of the child was assessed through Pearson product-moment correlations. The results of these analyses are shown in Table 5.1.4.

Table 5.1.4. Product-moment correlations (*r*) between CBCL and YSR syndrome scores

Problem scales		Boys	Girls	Total
Narrow-band syndromes				
	ADD	.50	.55	.52
	AGG	.43	.57	.50
	AXD	.35	.51	.44
	DEL	.31	.37	.35
	SOC	.43	.55	.49
	SOM	.30	.44	.38
	THT	.30	.36	.33
	WTH	.29	.44	.36
Broad-band syndromes				
	INT	.36	.51	.45
	EXT	.43	.55	.49
Total Problems		.44	.58	.51

All product-moment correlations significant at $p < 0.001$

For the total sample of the present study the following three correlations were large (≥.50) according to Cohen's (1988) criteria: Agreement on level of the syndromes Attention Problems and Aggressive, and of Total Problems. The other correlations were of medium size (≥.30). Of the gender-specific results, only the agreement for boys on the Withdrawn Behavior construct was of less than medium size. In general, agreement was higher for girls than for boys.

5.2 Gender differences

Achenbach and Edelbrock (1981) did not find a gender-effect for the CBCL Total Problems Score. In their study of psychopathology in the Dutch general population of 4-16 year-olds, Verhulst, Akkerhuis and Althaus (1985) found that the mean CBCL Total Problems Score was slightly higher for boys than for girls. For the present study we had no a-priori expectation for gender-differences in problem scale scores. Scale scores of boys and girls were compared with the independent T-test. The distribution of mean CBCL and YSR problem scale scores by gender, and the results of the T-test, are displayed in Table 5.2.1.

Table 5.2.1. Means for problem scales per gender, with T-test results for boy- girl comparisons

Problem scale	CBCL			YSR		
	M		t	M		t
	Boys	Girls		Boys	Girls	
ADD	3.5	2.6	7.34	3.1	2.8	2.95
AGG	6.6	5.0	6.32	5.9	4.7	5.96
AXD	2.7	2.7	n.s.	3.3	3.2	n.s.
DEL	1.3	0.8	6.92	2.1	1.4	8.43
SOC	1.6	1.5	n.s.	2.1	1.9	2.02*
SOM	1.0	1.4	-4.84	1.9	2.1	n.s.
THT	0.2	0.1	n.s.	0.9	0.9	n.s.
WTH	1.9	1.9	n.s.	2.0	2.0	n.s.
INT	5.5	5.9	n.s.	7.1	7.2	n.s.
EXT	7.8	5.8	6.87	8.0	6.1	7.31
TPS	20.6	18.3	3.41	24.3	21.8	3.33

Note:
n.s. not significant
All mentioned *t*-values significant at $p<.001$, except * $p<.05$

Girls had significantly higher mean scores than boys only on Somatic Complaints reported by parents. Boys had significantly higher mean scores than girls according to both informants on: Attention Problems, Aggressive, Delinquent, Externalizing, and Total Problems. In addition, boys reported more Social Problems than girls (but no significant difference was found on the parent version of the questionnaire).

5.3 Socio-economic status differences

It has repeatedly been shown that there is a negative relation between amount of behavior problems and socio-economic status as measured by (parental) occupational level (see for example Rutter and Madge, 1976, or Achenbach, 1991b). In the present study two

types of socio-economic variables were used: Indicators at the household level and indicators at the neighborhood level. Before the present study, differences in problem scores between neighborhood disadvantage groups had not been examined.

Differences in problem scores between groups defined by parental occupation or by neighborhood disadvantage score were assessed with multivariate analyses of variance (MANOVA) for the narrow- and broad-band scales, and with a general analysis of variance for the Total Problems Score. The results of these analyses are shown in Table 5.3.1.

All multivariate effects on both CBCL and YSR narrow- and broad-band scales, and the univariate effect on Total Problems, of socio-economic status (level of parental occupation or neighborhood disadvantage level) were significant, albeit small. In the analyses on broad-band scales, univariate tests were significant for both scales on all occasions. In the analyses on narrow-band scales, univariate tests which accounted for the multivariate effect varied per analysis:

- CBCL narrow-band scales by parental occupation:
  Univariate effects were significant, albeit small, for Attention Problems, Aggressive, Delinquent, and Somatic Complaints.
- YSR narrow-band scales by parental occupation:
  Univariate effects were significant, albeit small, for Attention Problems, Aggressive, Anxious/Depressed, Social Problems, Somatic Complaints, and Withdrawn.
- CBCL narrow-band scales by neighborhood disadvantage:
  Univariate effects were significant, albeit small, for Aggressive, Anxious/Depressed, Delinquent, Social Problems, Somatic Complaints, and Thought Problems.
- YSR narrow-band scales by neighborhood disadvantage:
  Univariate effects were significant, albeit small, for Attention Problems, Aggressive, Anxious/Depressed, Delinquent, Social Problems, Somatic Complaints, and Withdrawn.

On all occasions, problem scale scores were negatively related to socio-economic status (higher problem scores for children from families with lower socio-economic status, lower problem scores for children from families with higher socio-economic status). This is visualized in Figures 5.3.1. and 5.3.2. (Mean CBCL Total Problem scores by parental occupation and by neighborhood disadvantage level, respectively).

Table 5.3.1. Differences in problem scales by socio-economic variables per informant (MANOVA/GENERAL ANOVA)

Effect		CBCL		YSR	
		F (d.f.) (a)	Effect size (%) (b)	*F* (d.f.) (a)	Effect size (%) (b)
Effect of parental occupation - narrow-band scales					
Multivariate (d.f. = 40)		2.17***	<1.0	2.21***	1.0
Univariate (d.f. = 5172)	ADD	2.94*	<1.0	5.98***	1.7
	AGG	7.74***	2.2	4.18***	1.2
	AXD	n.s.	n.a.	3.26**	<1.0
	DEL	5.04***	1.4	n.s.	n.a.
	SOC	n.s.	n.a.	7.52***	2.1
	SOM	3.02**	<1.0	2.72*	<1.0
	THT	n.s.	n.a.	n.s.	n.a.
	WTH	n.s.	n.a.	3.55**	1.0
Effect of neighborhood disadvantage group - narrow-band scales					
Multivariate (d.f. = 16)		2.95***	1.2	2.34**	<1.0
Univariate (d.f. = 21952)	ADD	n.s.	n.a.	3.30*	<1.0
	AGG	6.74***	<1.0	5.67**	<1.0
	AXD	3.06*	<1.0	6.18**	<1.0
	DEL	3.73*	<1.0	7.10***	<1.0
	SOC	10.03***	1.0	9.53***	<1.0
	SOM	4.63**	<1.0	4.75**	<1.0
	THT	6.45**	<1.0	n.s.	n.a.
	WTH	n.s.	n.a.	5.63**	<1.0
Effect of parental occupation - broad-band scales					
Multivariate (d.f. = 10)		4.37***	1.2	2.15*	<1.0
Univariate (d.f.. = 5172)	EXT	7.92***	2.2	3.07**	<1.0
	INT	2.30*	<1.0	3.74**	1.1
Effect of neighborhood disadvantage group - broad-band scales					
Multivariate (d.f. = 4)		3.80**	<1.0	4.43***	<1.0
Univariate (d.f. = 21952)	EXT	6.65***	<1.0	6.90***	<1.0
	INT	4.70**	<1.0	7.68***	<1.0
Effect of parental occ. - Total Problems (d.f. = 5)		6.48***	1.8	4.95***	1.4
Effect of neighborh. group - Total Problems (d.f. = 2)		8.12***	<1.0	8.57***	<1.0

Notes:
a) Multivariate test used: Pillais'
n.s. not significant
* $p<.05$
** $p<.01$
*** $p<.001$
b) Effect size = percentage explained variance
n.a. not applicable (effect not significant)

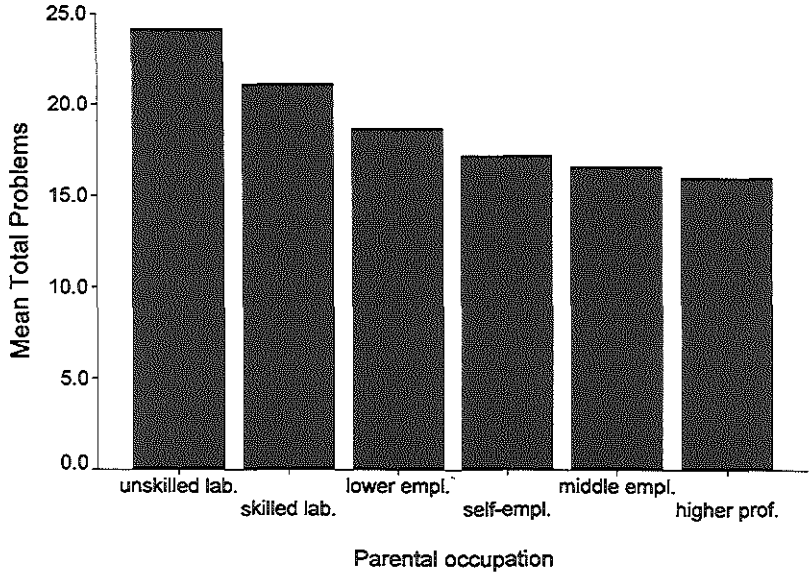

Fig.5.3.1. Mean CBCL Total Problem score by parental occupation

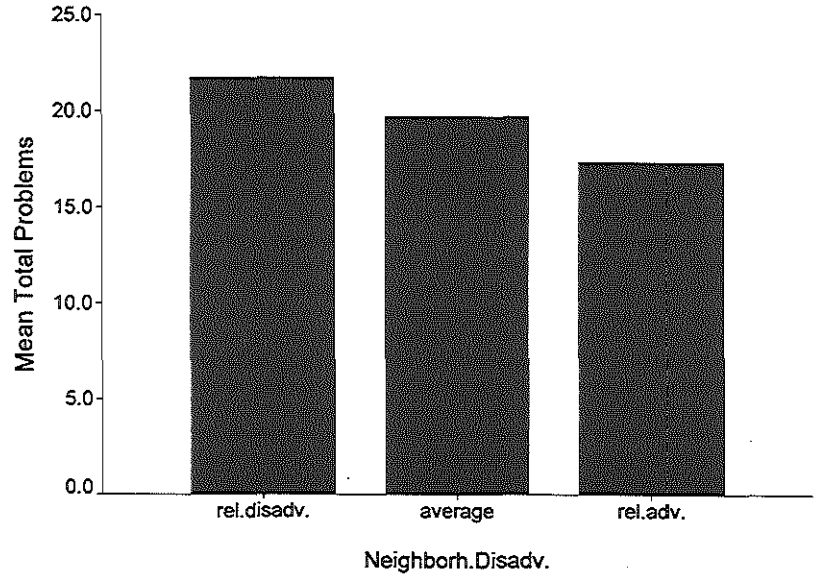

Fig.5.3.2. Mean CBCL Total Problem score by neighborhood disadvantage group

5.4 Comparison with Dutch reference data

The mean CBCL Total Problems Score in the present study was 19.4 (s.d. = 15.8, $N = 2019$). This was not significantly different from the one found by Verhulst (18.6, s.d. = 15.0, $n = 157$; dataset at our disposal) for 11-year olds from the Dutch general population sample studied in 1983 (T-test for equal variances: $t = 0.68$, df = 2174).

Neither was the mean YSR Total Problems Score in the present study (23.4, s.d. = 16.6, $N = 2019$) significantly different from the one found by Verhulst (21.5, s.d. = 16.0, $n = 122$; dataset at our disposal) for the 11-year olds from the Dutch general population sample studied at follow-up in 1987 (T-test for equal variances: $t = 0.98$, df = 2139).

CHAPTER 6 PHYSICAL CHARACTERISTICS AND BEHAVIORAL / EMOTIONAL PROBLEMS

6.1 Introduction

In this chapter an attempt is made to answer the central questions of this thesis:

- What shapes do the distributions of various combinations of physical characteristics of puberty and behavioral/emotional problems have?
  Shapes of distributions are displayed in scatterplots (problem scores by height and Body Mass Index) or boxplots (problem scores by pubertal status, combination of physical variables), and are described by visual inspection of these plots. Total Problems, Internalizing Behavior, and Externalizing are treated separately. The narrow-band scales are analyzed jointly to account for and express their inter-relations. This is achieved by extracting problem clusters through Principal Components Analysis, and using the cluster (or factor) scores (which express the differential contribution of the various scales to the cluster in question) instead of the scale scores.
- How strong are the relations? For interval-level variables (displayed in scatterplots) this is examined with linear and quadratic regression analyses, with the problem scale as the dependent, and the physical characteristic as the independent variable. For ordered and categorical variables (displayed in boxplots), this is examined with ANCOVA's, with the problem scale as the dependent, the physical characteristic as the independent variable, and parental occupation as covariate.
  For significant regression coefficients, the best fitting regression line is displayed in the plots. A significant linear regression coefficient indicates that higher physical status (taller/heavier) is associated with more problems than lower physical status (or with less problems than lower physical status in case of a negative coefficient). This would suggest a developmental hypothesis of increase in problem behavior (or decrease in case of a negative coefficient) with advances in physical development (growing taller/ heavier). A significant quadratic regression coefficient indicates that extreme physical status is associated with more problems than medium physical status (or with less problems than medium physical status, depending on the shape of the curve). This would suggest a deviation hypothesis of elevation of problem behavior (or lessened problem behavior in case of a reversed U-shaped curve) with increases in physical deviance from the norm.
  For significant ANCOVA's, 95% confidence intervals of group problem scores are compared to determine which group(s) is/are deviant from the others.
- Are there differences in the puberty-psychopathology associations in relation to:
  * The gender of the child (boy versus girl) studied, and/or
  * The informant (parent versus child) reporting the behavioral/emotional problems?

To this purpose the scatter- and boxplots previously mentioned are displayed two-by-two (informant by gender) for each combination of problem variables with physical variables. Interpretation of the eventual differences is based on visual inspection, and thus must remain speculative.

- Are there differences in the puberty-psychopathology associations in relation to the type of problem (internalizing versus externalizing) studied?
- Are there (combinations of) physical characteristics that indicate a potential risk for psychopathology?

The display of the results is structured as follows:

- The first partition is by level of behavioral/emotional problem scale scores, namely:
  * Total Problems level
  * Broad-band grouping level
  * Narrow-band problem level.
- The second level of partition is by physical variable.
- The third level of partition is by informant.
- The fourth level of partition is by gender.

Comparisons are always carried out on the lowest (=fourth) partition level.

For the visual examination of the relation between two continuous variables, scatterplots were used. In the scatterplots, subjects are displayed as so-called "sunflowers". The more petals on the sunflower, the more subjects to the data point. The 90th percentile of the problem scores for the particular informant and gender is represented by a dotted line. When no solid line is shown, no significant regression coefficient was found. When solid lines are shown, these represent the best fitting, significant, regression line with its upper and lower 95%-confidence lines: Straight lines for a linear regression coefficient, curved lines for a quadratic regression coefficient. When only 2 solid lines are shown, the lower confidence line included the null-line.

For the visual inspection of the relation between continuous variables that are characterized by a skewed distribution and categorical or ordered variables, boxplots were used. The box borders are defined by the 25th percentile (lower border) and 75th percentile (higher border) of the problem scores. The median is indicated by a slightly thicker line within the box. The lines extending down- and/or upwards from the boxes, the so-called "tails", indicate the subjects that are within a distance of 1.5 times the box length away from either box border. Outliers (marked "o") are cases that are at a distance between 1.5 and 3 times the box length away from either box border. Extremes (marked "x") are cases that are at a distance of more than 3 times the box length away from either box border. Group differences are studied by examining the medians and the boxes: Groups that may be considered to differ in terms of the "dependent" variable are those for which a) the medians differ, *and* b) the boxes show no or hardly any overlap. (Curvi-)linearity of relations may be judged by drawing an imaginative line between the medians (of ordered categories).

6.2 Total Problems scores

6.2.1 Total Problems and Height

In Figures 6.2.1.1 through 6.2.1.4 scatterplots of the distribution of Total Problems scores by Height are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. The problem variable scores are standardized for the number of items contributing to the scale. For the regression equations, Z-scores of Height were used, and all standardized Total Problems scores were linearly transformed by adding .01 to avoid the problem of calculating with many zero-scores.

None of the linear or quadratic regression coefficients were significant. This meant that there was no relation between a subject's height and his/her Total Problems scores. Comparing the plots of boys' with those of girls', and those of parent-reported with those of self-reported, Total Problems, no systematic differences between sexes and/or between informants emerged.

6.2.2 Total Problems and Body Mass Index

In Figures 6.2.2.1 through 6.2.2.4 scatterplots of the distribution of Total Problems scores by Body Mass Index are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. The problem variable scores were standardized for the number of items contributing to the scale. For the regression equations, Z-scores of BMI were used, and all standardized Total Problems scores were linearly transformed by adding .01 to avoid the problem of calculating with many zero-scores. Regression coefficients and their *R*-squared are given in Table 6.2.2.1.

Table 6.2.2.1 Regression coefficient (B) and its *R*-squared (R^2) for Total Problems by Body Mass Index

	CBCL				YSR			
	Boys		Girls		Boys		Girls	
	B	R^2	B	R^2	B	R^2	B	R^2
Linear	n.s.		.02***	.01	.02***	<.01	.02***	.01
Quadratic	.01**	.01	.01*	<.01	.01**	<.01	.01*	<.01

Notes:
n.s. B not significant (R^2 not given)
* $p<.05$
** $p<.01$
*** $p<.001$

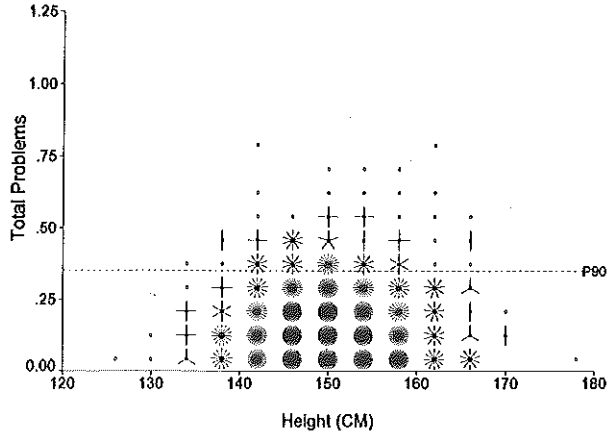

Fig.6.2.1.1. Scatterplot of CBCL Total Problems by height - BOYS

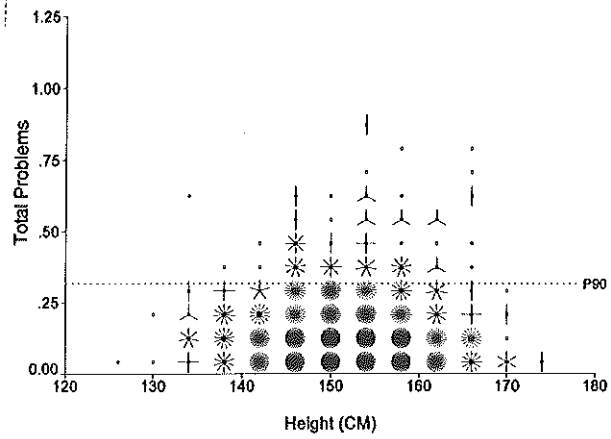

Fig.6.2.1.2. Scatterplot of CBCL Total Problems by height - GIRLS

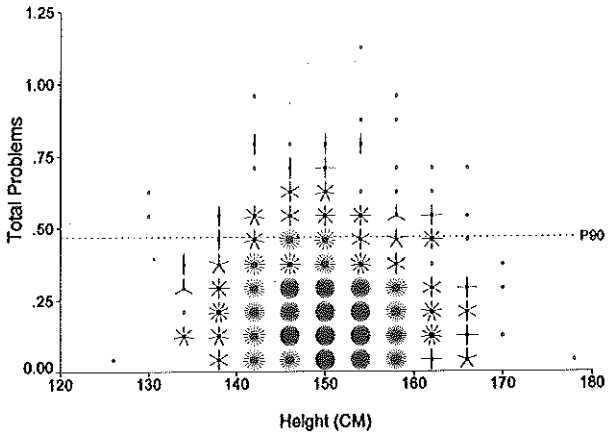

Fig.6.2.1.3. Scatterplot of YSR Total Problems by height - BOYS

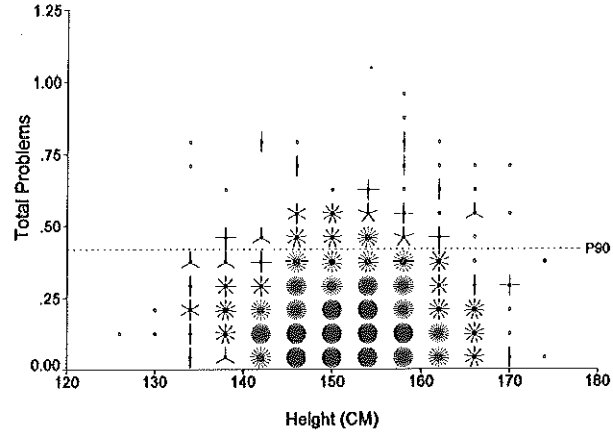

Fig.6.2.1.4. Scatterplot of YSR Total Problems by height - GIRLS

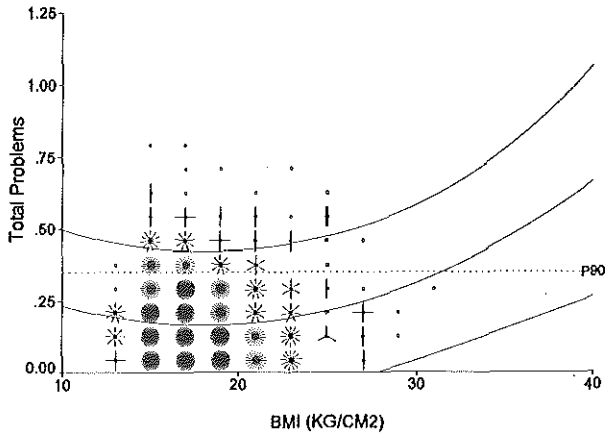

Fig.6.2.2.1. Scatterplot of CBCL Total Problems by Body Mass Index - BOYS

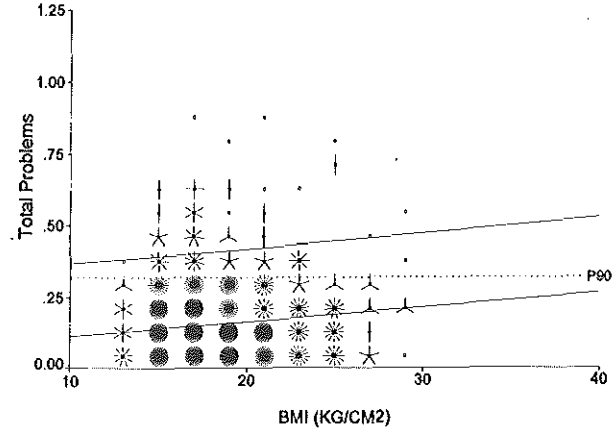

Fig.6.2.2.2. Scatterplot of CBCL Total Problems by Body Mass Index - GIRLS

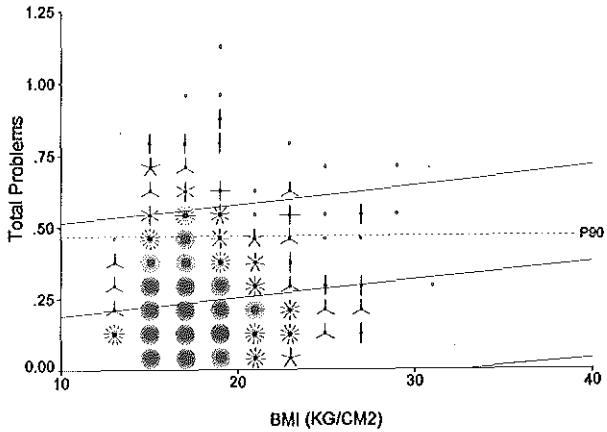

Fig.6.2.2.3. Scatterplot of YSR Total Problems by Body Mass Index - BOYS

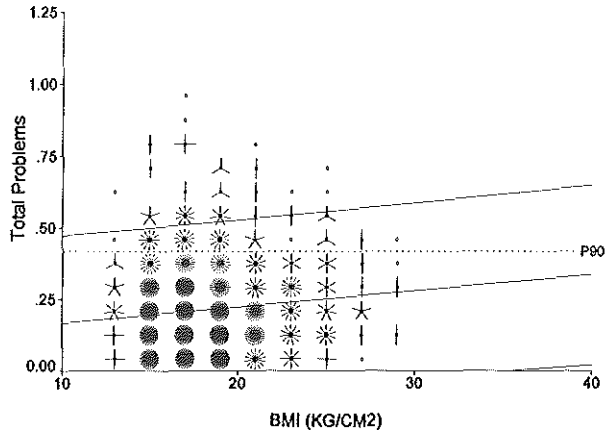

Fig.6.2.2.4. Scatterplot of YSR Total Problems by Body Mass Index - GIRLS

For parent-reported Total Problems of boys, a quadratic regression line "best" fitted the data. The curve was U-shaped, indicating higher Total Problems scores for boys with more extreme BMIs. For self-reported Total Problems of boys, and for both parent- and self-reported Total Problems of girls, a linear regression line "best" fitted the data. The direction of the linear regression lines was positive, indicating higher Total Problems scores for subjects with higher BMIs. However, both for the quadratic and the linear solutions, the slope of the regression line was not very steep (indicated by a small regression coefficient), and the amount of variance in problem scores, explained by the regression equation (expressed by the *R*-squared and by the large range between the 95%-confidence lines) was very small. This meant that although some association between Total Problems and BMI existed, no differentiation in subjects' Total Problems scores could be made on the basis of their BMI. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, Total Problems, no systematic differences between sexes and/or between informants emerged.

6.2.3 Total Problems and Pubertal Status

In Figures 6.2.3.1 through 6.2.3.4 boxplots of the distribution of Total Problems scores by Pubertal Status are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. There is a box for each level of Pubertal Status. All box areas showed overlap, and the medians were virtually equal. None of the ANCOVA effects of pubertal status (effect of socio-economic status as measured by parental occupation partialled out) were significant. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, Total Problems, no systematic differences between sexes and/or between informants emerged.

6.2.4 Total Problems and combined physical variables

In Figures 6.2.4.1 through 6.2.4.4 boxplots of the distribution of Total Problems scores by combined physical categories are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. Some of the categories contained few or no subjects. Categories with less than 5 boys or less than 5 girls were excluded from the ANCOVA analyses of variance. For parent-reported Total Problems of girls a significant effect of combined physical category was found ($F = 1.885$, $p < .05$, df = 10,861, ETA-squared = .02). Differences between the category means and the overall mean were examined with T-tests. None of the t-values reached significance. This meant that although there existed overall differences, it was not possible to differentiate girls' parent-reported Total Problems scores on the basis of their individual combined physical category. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, Total Problems, no systematic differences between sexes and/or between informants emerged.

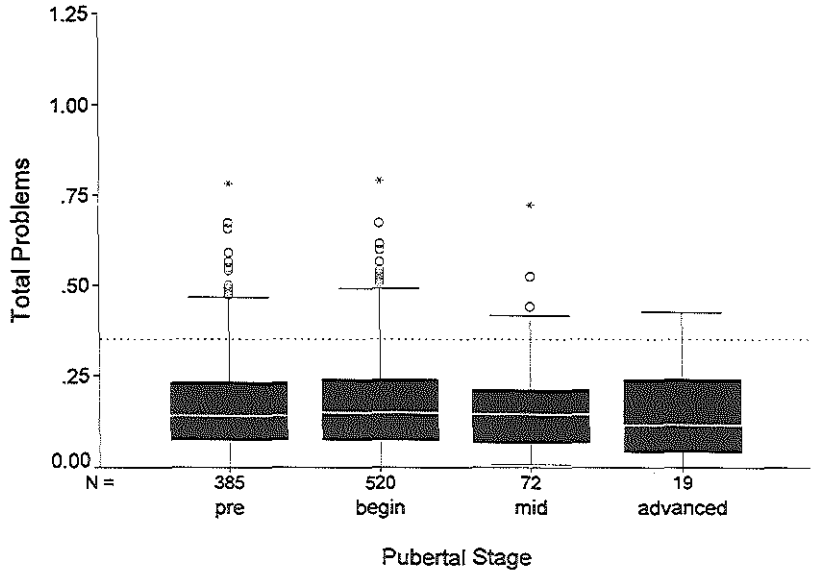

Fig.6.2.3.1. Boxplot of CBCL Total Problems by Pubertal Stage - BOYS

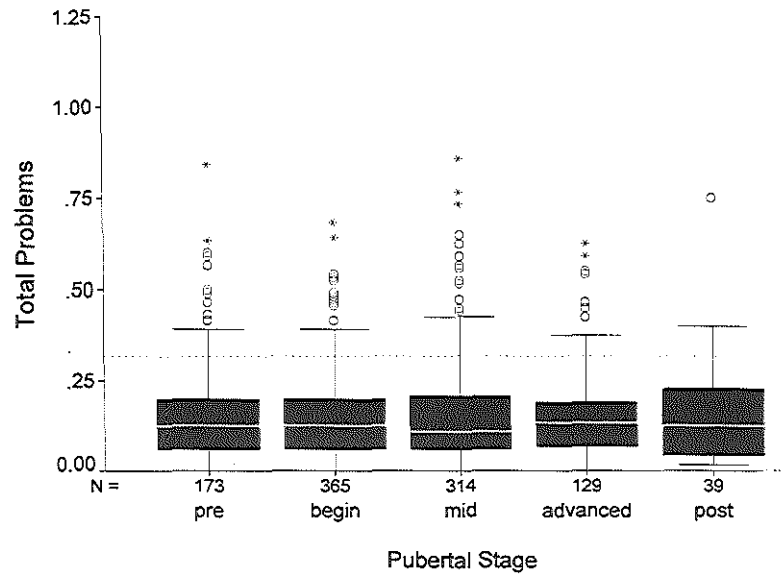

Fig.6.2.3.2. Boxplot of CBCL Total Problems by Pubertal Stage - GIRLS

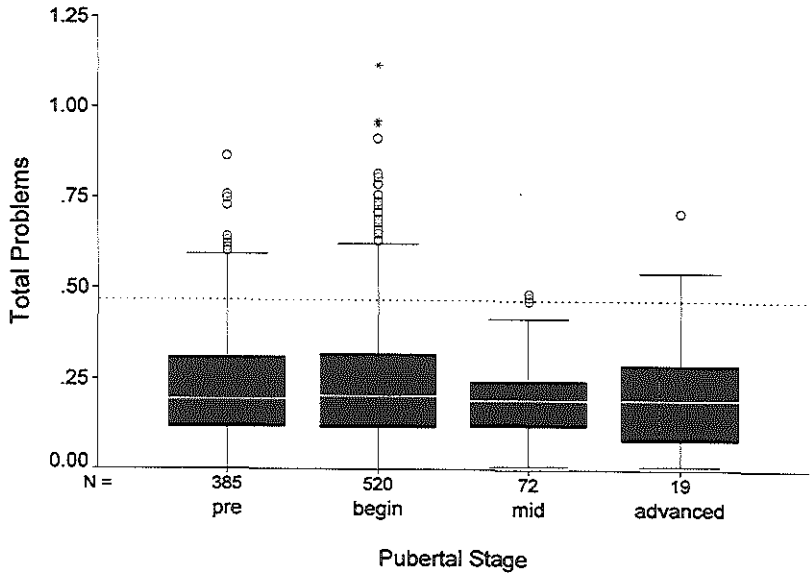

Fig.6.2.3.3. Boxplot of YSR Total Problems by Pubertal Stage - BOYS

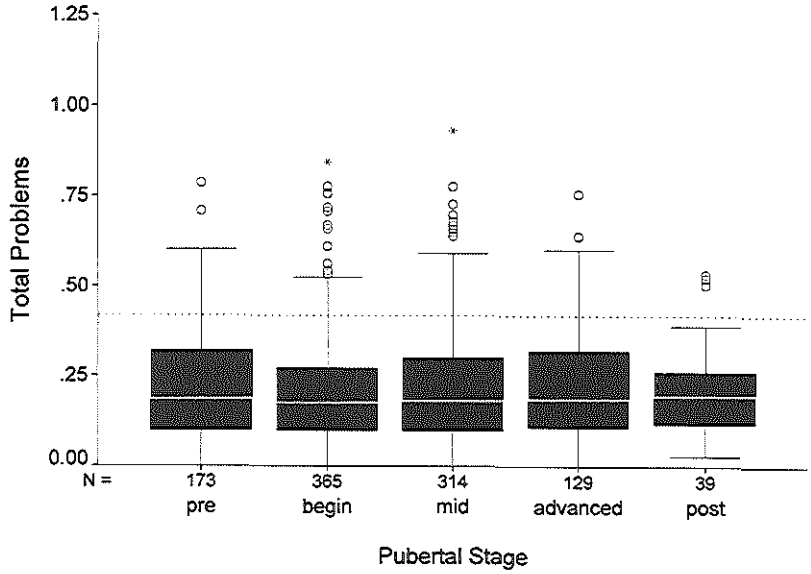

Fig.6.2.3.4. Boxplot of YSR Total Problems by Pubertal Stage - GIRLS

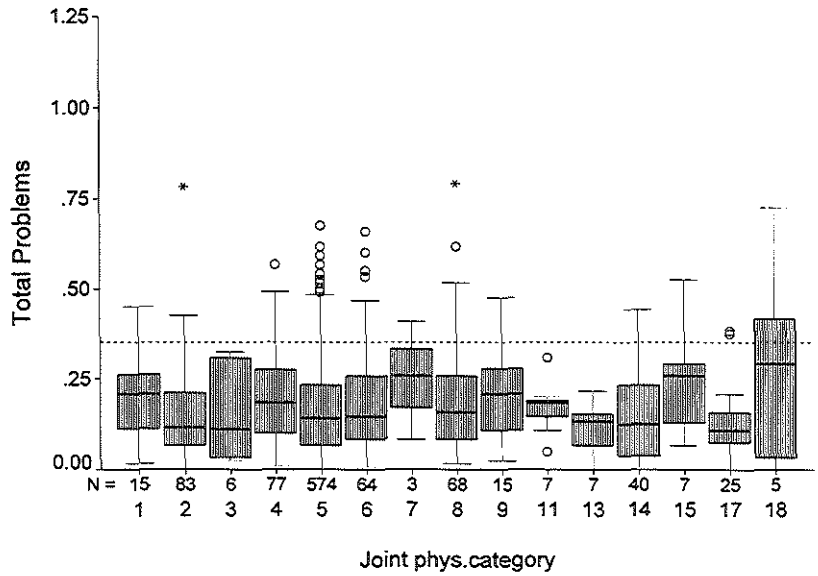

Fig.6.2.4.1. Boxplot of CBCL Total Problems
by Joint Physical Category - BOYS

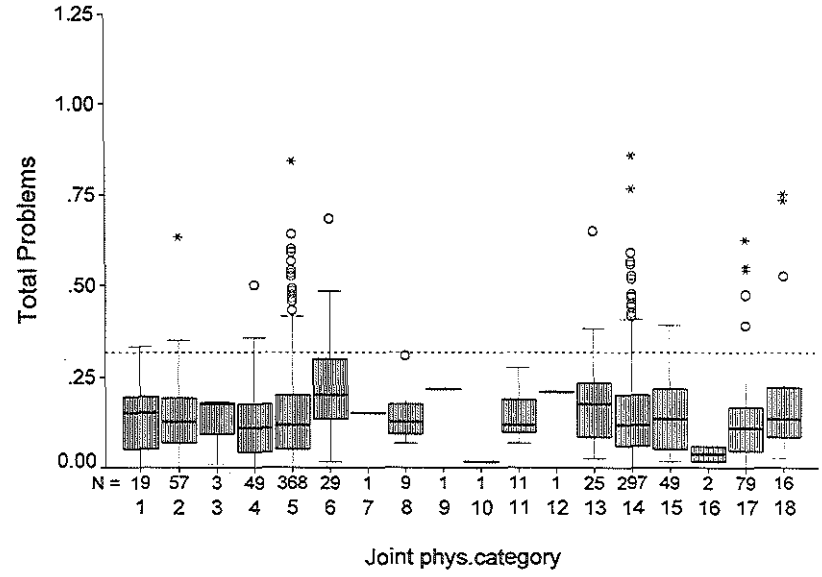

Fig.6.2.4.2. Boxplot of CBCL Total Problems
by Joint Physical Category - GIRLS

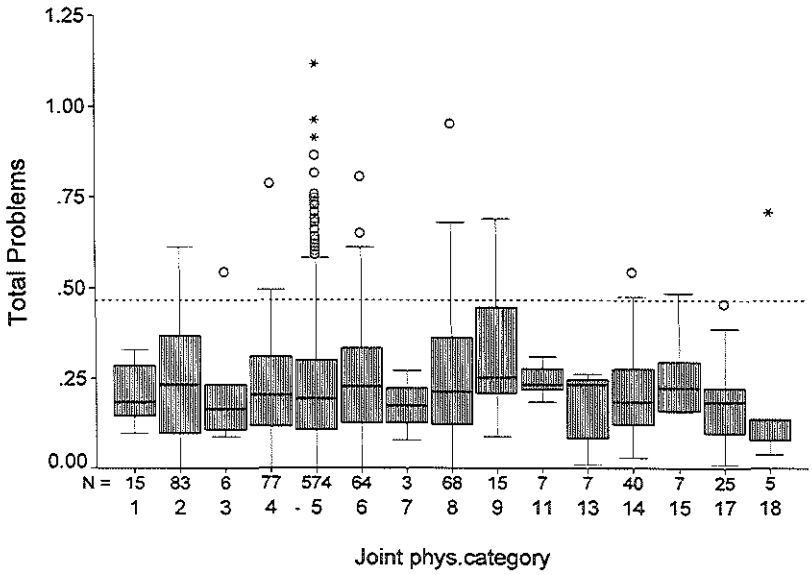

Fig.6.2.4.3. Boxplot of YSR Total Problems
by Joint Physical Category - BOYS

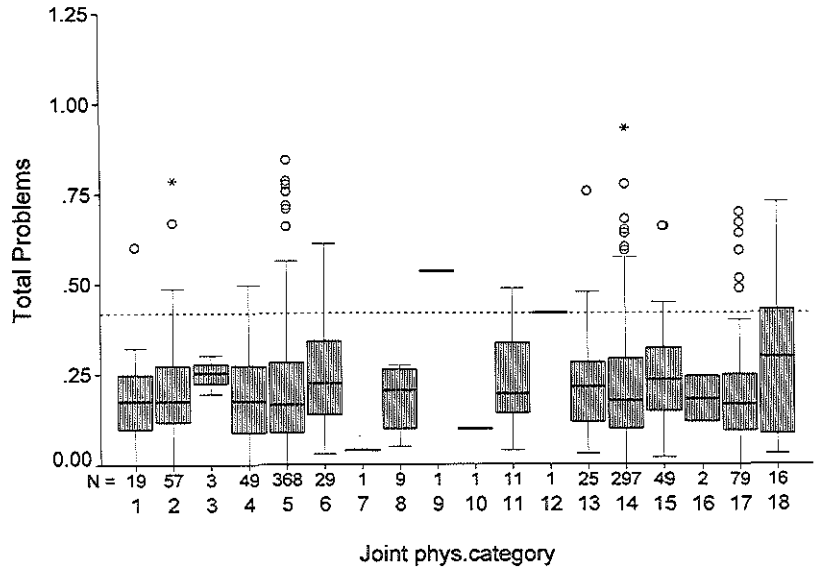

Fig.6.2.4.4. Boxplot of YSR Total Problems
by Joint Physical Category - GIRLS

6.3 Broad-band problem scores

6.3.1 Broad-band problems and Height

In Figures 6.3.1.1 through 6.3.1.4 scatterplots of the distribution of Internalizing scores by Height are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. In Figures 6.3.1.5 through 6.3.1.8 their counterparts for Externalizing are displayed. The problem variable scores were standardized for the number of items contributing to the scale. For the regression equations, Z-scores of Height were used, and all standardized Internalizing and Externalizing scores were linearly transformed by adding .01 to avoid the problem of calculating with many zero-scores. Regression coefficients and their *R*-squared are given in Table 6.3.1.1.

Table 6.3.1.1 Regression coefficient (B) and its *R*-squared (R^2) for broad-band problems by Height

	CBCL				YSR			
	Boys		Girls		Boys		Girls	
	B	R^2	B	R^2	B	R^2	B	R^2
INT -Linear	n.s.		.01*	<.01	n.s.		n.s.	
INT - Quadratic	n.s.		n.s.		n.s.		.01*	<.01
EXT -Linear	n.s.		n.s.		n.s.		.01*	<.01
EXT - Quadratic	n.s.		n.s.		n.s.		n.s.	

Notes:
n.s. B not significant (R^2 not given)
* $p<.05$
** $p<.01$
*** $p<.001$

For parent-reported Internalizing of girls, and for self-reported Externalizing of girls, a linear regression line "best" fitted the data. The direction of the linear regression lines was positive, indicating higher problem scores for taller girls. For self-reported Externalizing of girls, a quadratic regression line "best" fitted the data. The curve was U-shaped, indicating higher problem scores for girls with more extreme height.

However, both for the quadratic and the linear solutions, the slope of the regression line was not very steep (indicated by a small regression coefficient), and the amount of variance in problem scores, explained by the regression equation (expressed by the *R*-squared and by the large range between the 95%-confidence lines) was very small. This meant that although some association between broad-band scores and height existed, no differentiation in subjects' broad-band problem scores could be made on the basis of their height. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, broad-band problems, no systematic differences between sexes and/or between informants emerged.

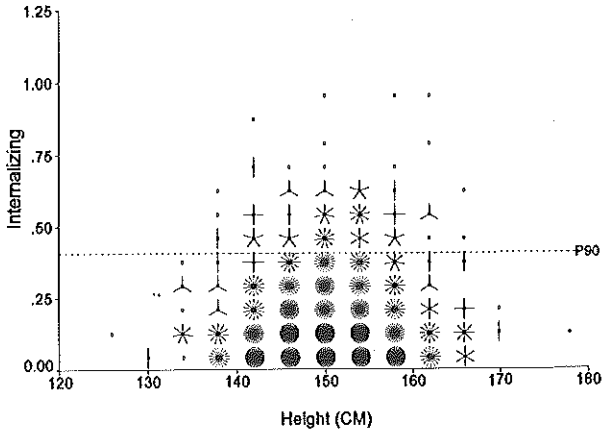

Fig.6.3.1.1. Scatterplot of CBCL Internalizing by height - BOYS

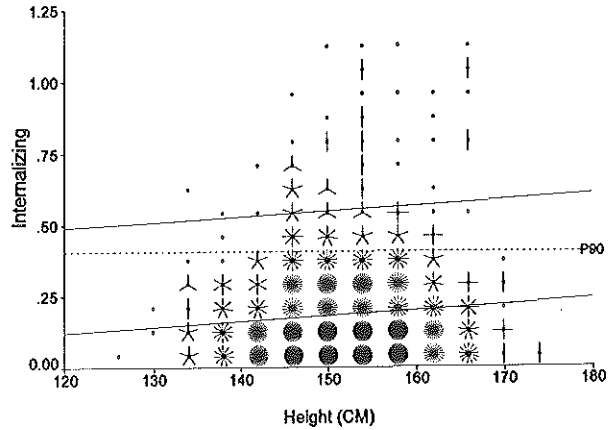

Fig.6.3.1.2. Scatterplot of CBCL Internalizing by height - GIRLS

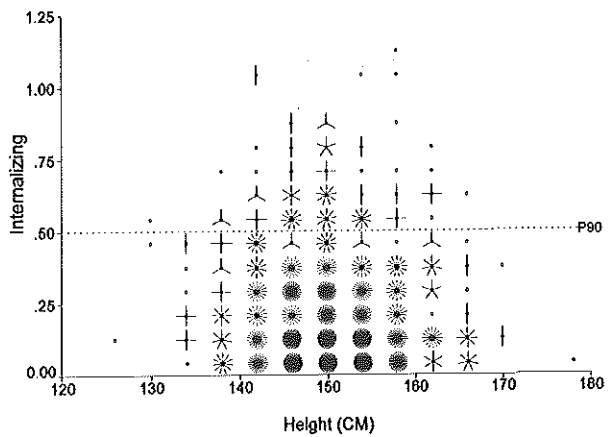

Fig.6.3.1.3. Scatterplot of YSR Internalizing by height - BOYS

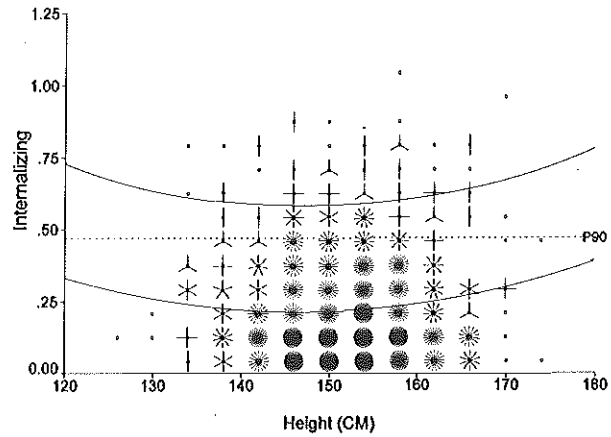

Fig.6.3.1.4. Scatterplot of YSR Internalizing by height - GIRLS

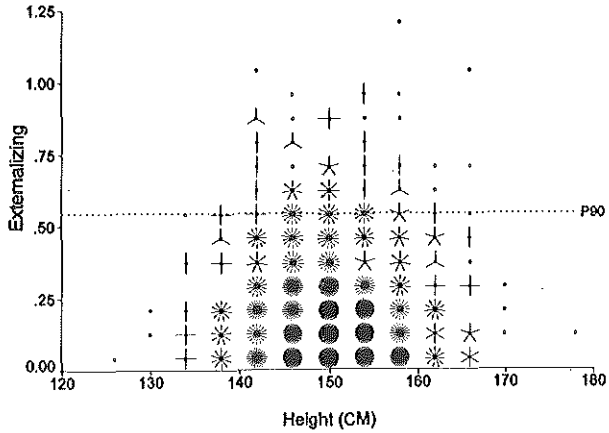

Fig.6.3.1.5. Scatterplot of CBCL Externalizing by height - BOYS

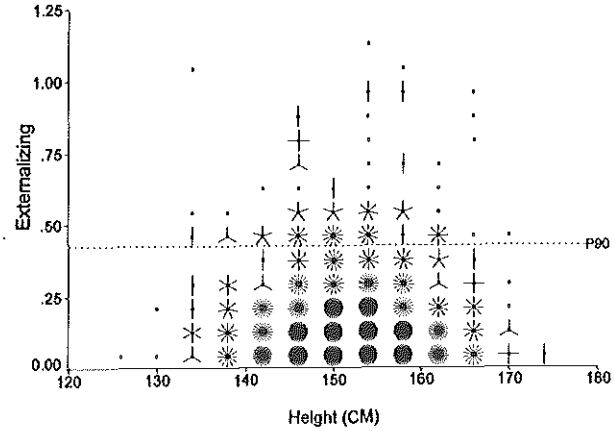

Fig.6.3.1.6. Scatterplot of CBCL Externalizing by height - GIRLS

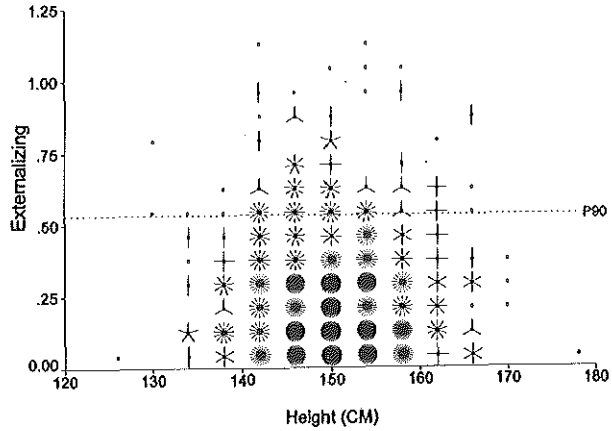

Fig.6.3.1.7. Scatterplot of YSR Externalizing by height - BOYS

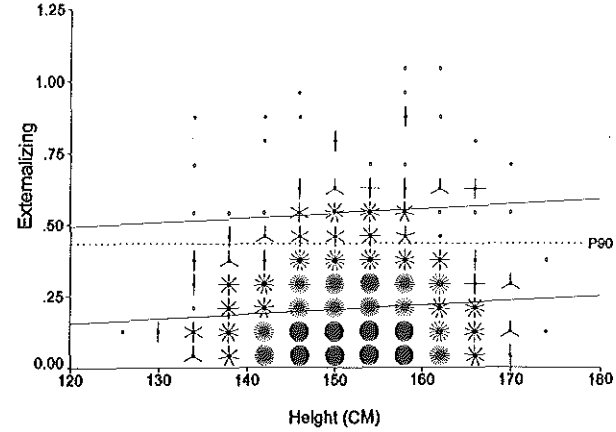

Fig.6.3.1.8. Scatterplot of YSR Externalizing by height - GIRLS

6.3.2 Broad-band problems and Body Mass Index

In Figures 6.3.2.1 through 6.3.2.4 scatterplots of the distribution of Internalizing scores by Body Mass Index are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. In Figures 6.3.2.5 through 6.3.2.8 their counterparts for Externalizing are displayed. The problem variable scores were standardized for the number of items contributing to the scale. For the regression equations, Z-scores of BMI were used, and all standardized Internalizing and Externalizing scores were linearly transformed by adding .01 to avoid the problem of calculating with many zero-scores. Regression coefficients and their *R*-squared are given in Table 6.3.2.1.

Table 6.3.2.1 Regression coefficient (B) and its *R*-squared (R^2) for broad-band problems by BMI

B(R^2)		CBCL		YSR	
		Boys	Girls	Boys	Girls
Internalizing	Linear	n.s.	.02(.01**)	n.s.	.01(<.01*)
	Quadratic	n.s.	.01(.01***)	.01(<.01**)	.01(<.01*)
Externalizing	Linear	n.s.	n.s.	.01(<.01*)	.01(<.01*)
	Quadratic	.01(<.01**)	n.s.	n.s.	n.s.

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

For self-reported Internalizing of girls, a linear regression line fitted the data as "well" as a quadratic regression line. For parent- and self-reported Externalizing of girls, a linear regression line "best" fitted the data. The direction of the linear regression lines was positive, indicating higher problem scores for heavier subjects. For parent-reported Internalizing of girls, a quadratic regression line fitted the data slightly "better" than a linear regression line. For parent-reported Externalizing of boys, and for self-reported Internalizing of boys, a quadratic regression line "best" fitted the data. The curve was U-shaped, indicating higher problem scores for subjects with more extreme BMI.

However, both for the quadratic and the linear solutions, the slope of the regression line was not very steep (indicated by a small regression coefficient), and the amount of variance in problem scores, explained by the regression equation (expressed by the *R*-squared and by the large range between the 95%-confidence lines) was very small. This meant that although some association between broad-band scores and BMI existed, no differentiation in subjects' broad-band problem scores could be made on the basis of their BMI. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, broad-band problems, no systematic differences between sexes and/or between informants emerged.

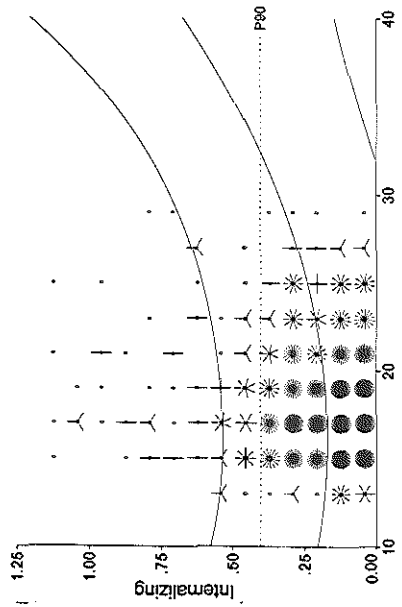

Fig.6.3.2.1. Scatterplot of CBCL Internalizing by Body Mass Index - BOYS

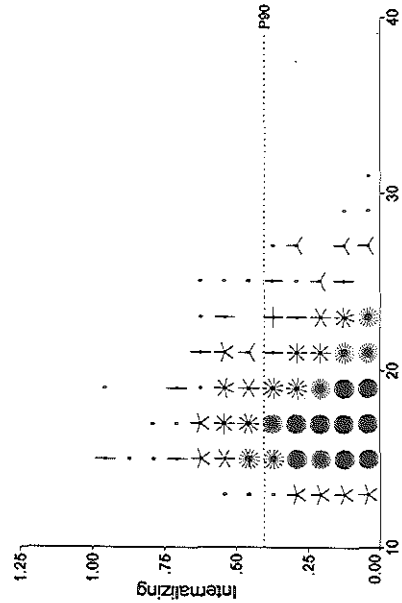

Fig.6.3.2.2. Scatterplot of CBCL Internalizing by Body Mass Index - GIRLS

Fig.6.3.2.3. Scatterplot of YSR Internalizing by Body Mass Index - BOYS

Fig.6.3.2.4. Scatterplot of YSR Internalizing by Body Mass Index - GIRLS

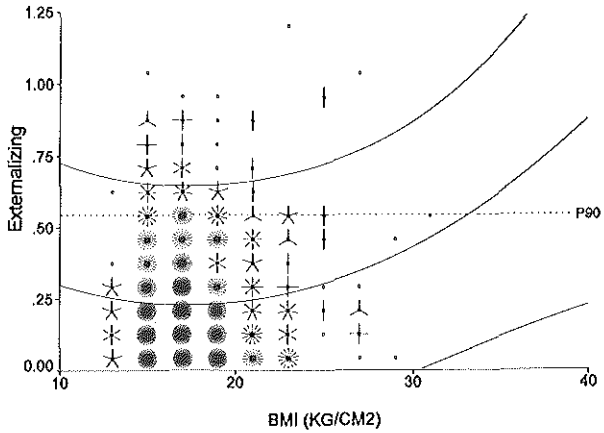

Fig.6.3.2.5. Scatterplot of CBCL Externalizing by Body Mass Index - BOYS

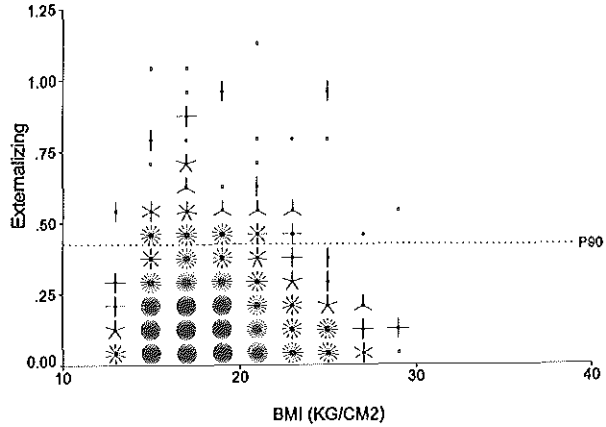

Fig.6.3.2.6. Scatterplot of CBCL Externalizing by Body Mass Index - GIRLS

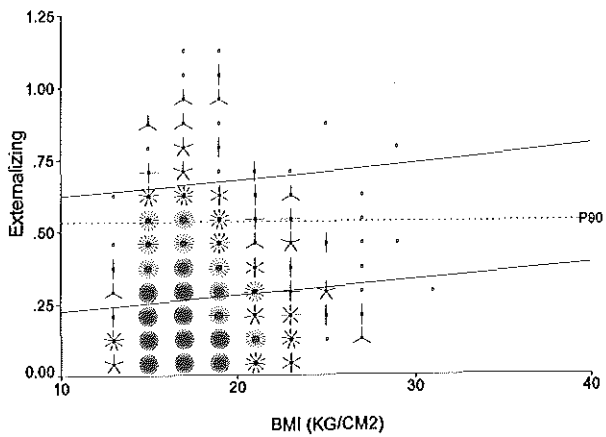

Fig.6.3.2.7. Scatterplot of YSR Externalizing by Body Mass Index - BOYS

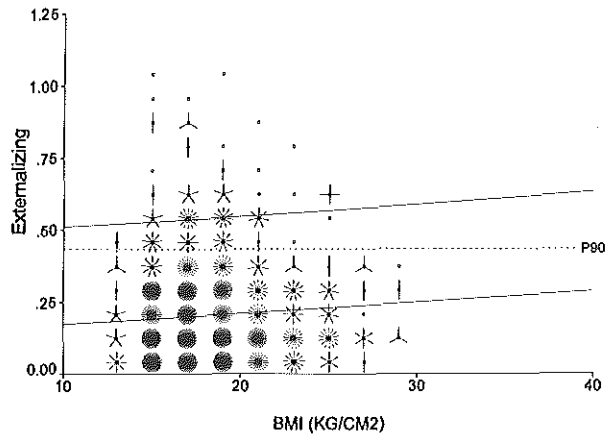

Fig.6.3.2.8. Scatterplot of YSR Externalizing by Body Mass Index - GIRLS

6.3.3 Broad-band problems and Pubertal Status

In Figures 6.3.3.1 through 6.3.3.4 boxplots of the distribution of Internalizing scores by Pubertal Status are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. In Figures 6.3.3.5 through 6.3.3.8 their counterparts for Externalizing are displayed.

All box areas showed overlap, and the medians were virtually equal. None of the ANCOVA effects of pubertal status (effect of socio-economic status as measured by parental occupation partialled out) were significant.

Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, broad-band problems, no systematic differences between sexes and/or between informants emerged.

6.3.4 Broad-band problems and combined physical variables

In Figures 6.3.4.1 through 6.3.4.4 boxplots of the distribution of Internalizing scores by combined physical categories are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. In Figures 6.3.4.5 through 6.3.4.8 their counterparts for Externalizing are displayed.

Some of the categories contained few or no subjects. Categories with less than 5 boys or less than 5 girls were excluded from the ANCOVA analyses of variance. For parent-reported Internalizing of girls a significant effect of combined physical category was found ($F(10,861) = 2.805$, $p < .01$, ETA-squared = .03). Differences between the category means and the overall mean were examined with T-tests. None of the *t*-values reached significance. This meant that although there existed overall differences, it was not possible to differentiate girls' parent-reported Internalizing scores on the basis of their individual combined physical category. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, broad-band problems, no systematic differences between sexes and/or between informants emerged.

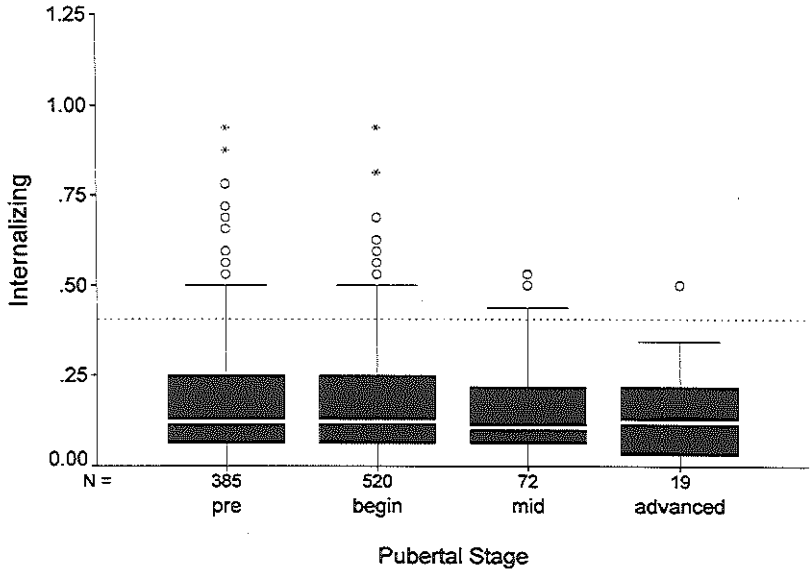

Fig.6.3.3.1. Boxplot of CBCL Internalizing by Pubertal Stage - BOYS

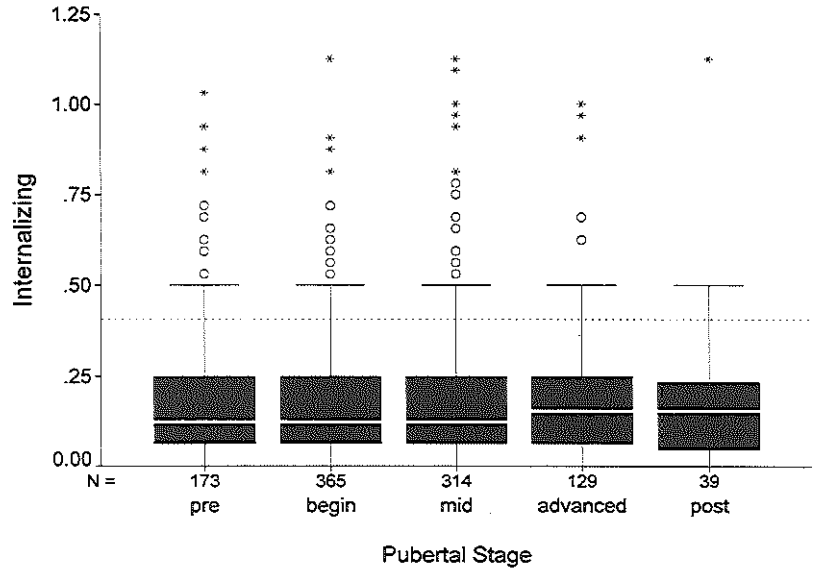

Fig.6.3.3.2. Boxplot of CBCL Internalizing by Pubertal Stage - GIRLS

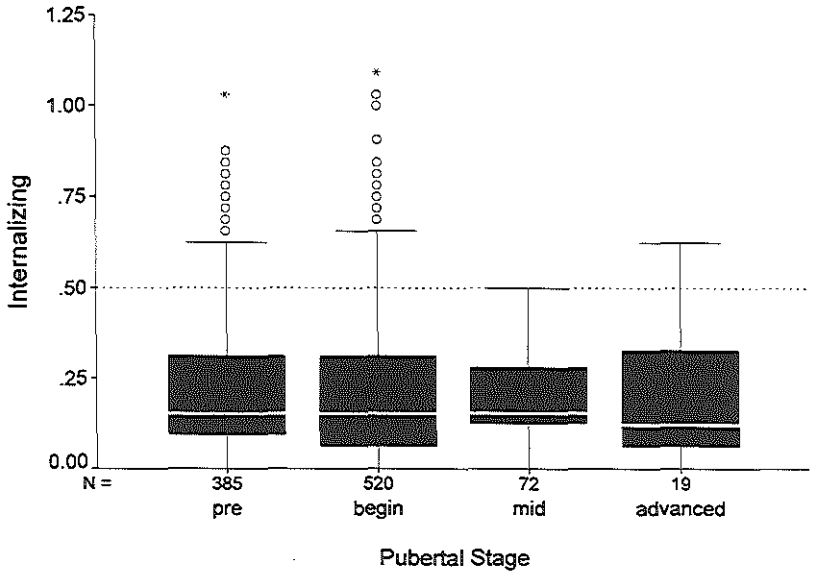

Fig.6.3.3.3. Boxplot of YSR Internalizing by Pubertal Stage - BOYS

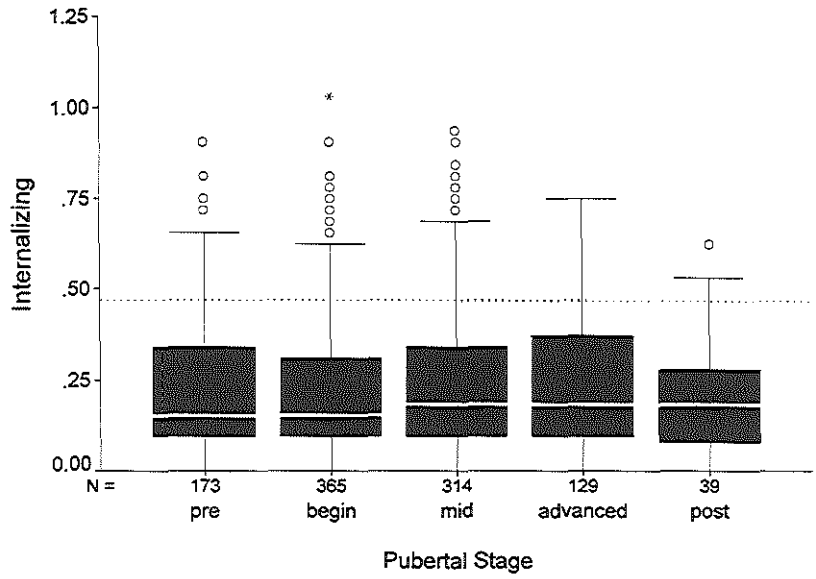

Fig.6.3.3.4. Boxplot of YSR Internalizing by Pubertal Stage - GIRLS

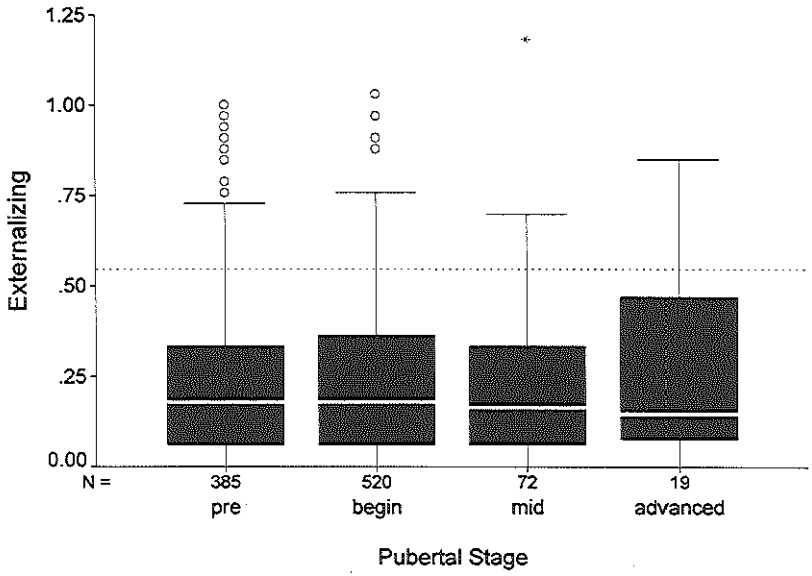

Fig.6.3.3.5. Boxplot of CBCL Externalizing by Pubertal Stage - BOYS

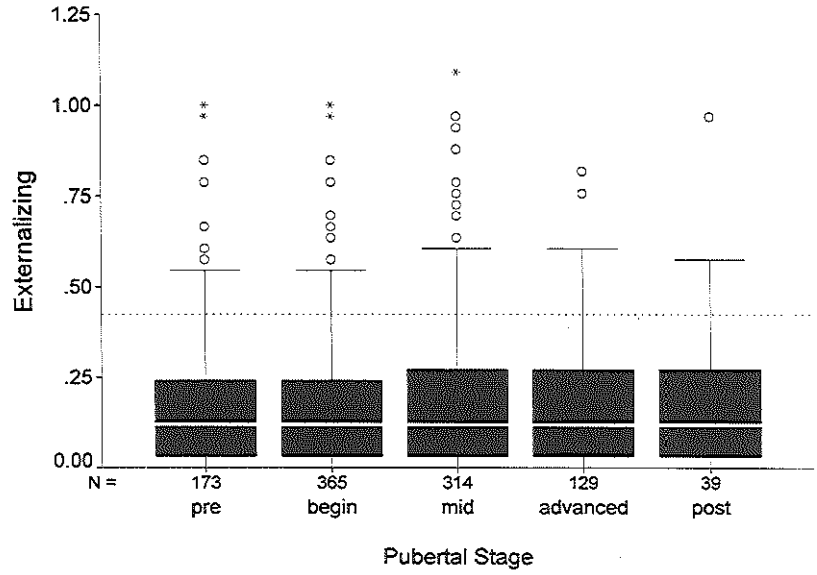

Fig.6.3.3.6. Boxplot of CBCL Externalizing by Pubertal Stage - GIRLS

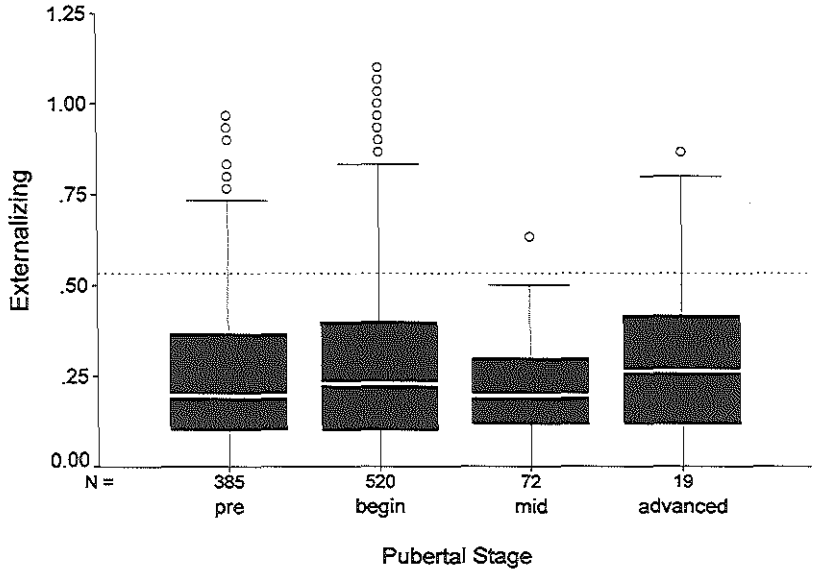

Fig.6.3.3.7. Boxplot of YSR Externalizing by Pubertal Stage - BOYS

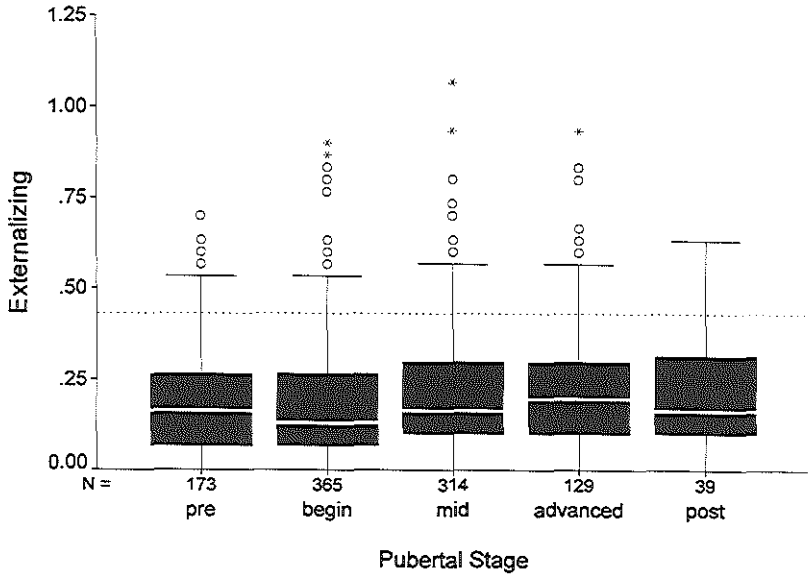

Fig.6.3.3.8. Boxplot of YSR Externalizing by Pubertal Stage - GIRLS

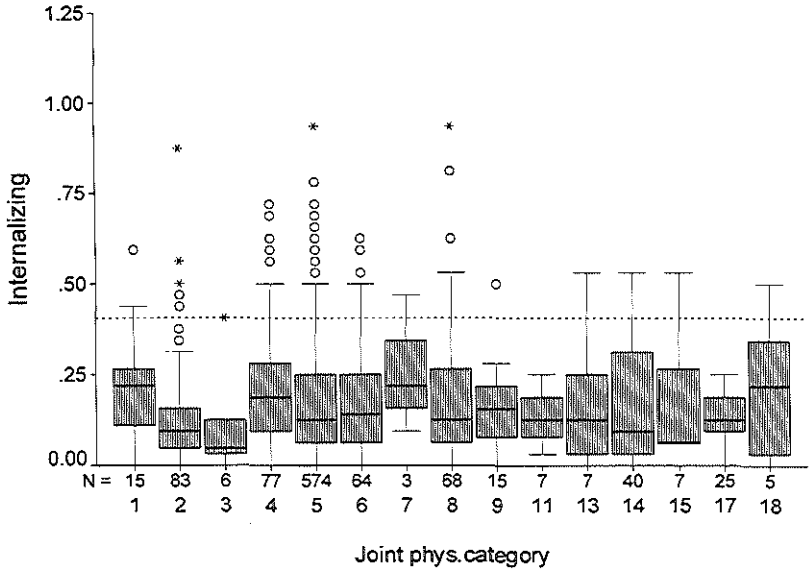

Fig.6.3.4.1. Boxplot of CBCL Internalizing
by Joint Physical Category - BOYS

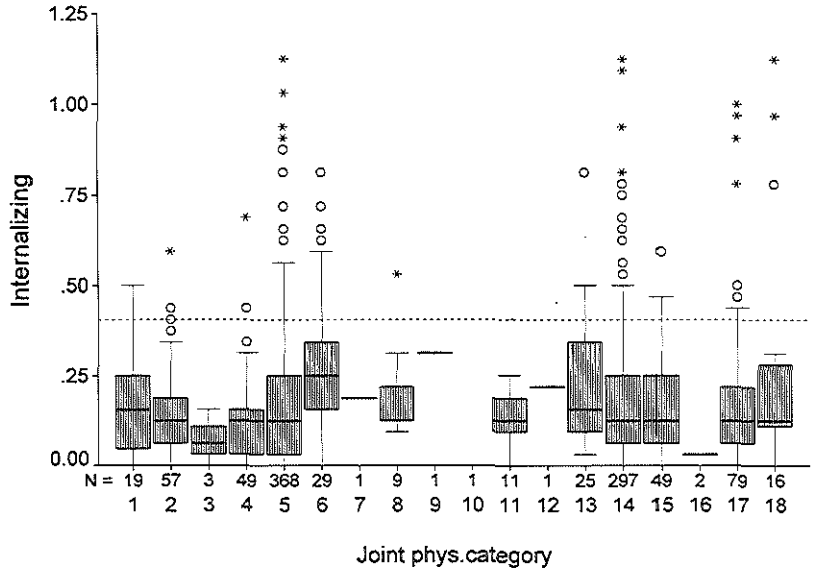

Fig.6.3.4.2. Boxplot of CBCL Internalizing
by Joint Physical Category - GIRLS

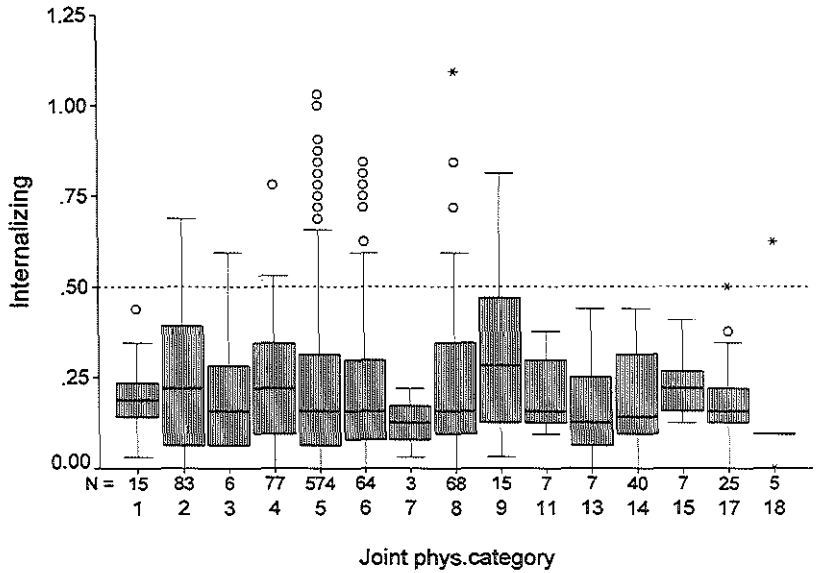

Fig.6.3.4.3. Boxplot of YSR Internalizing
by Joint Physical Category - BOYS

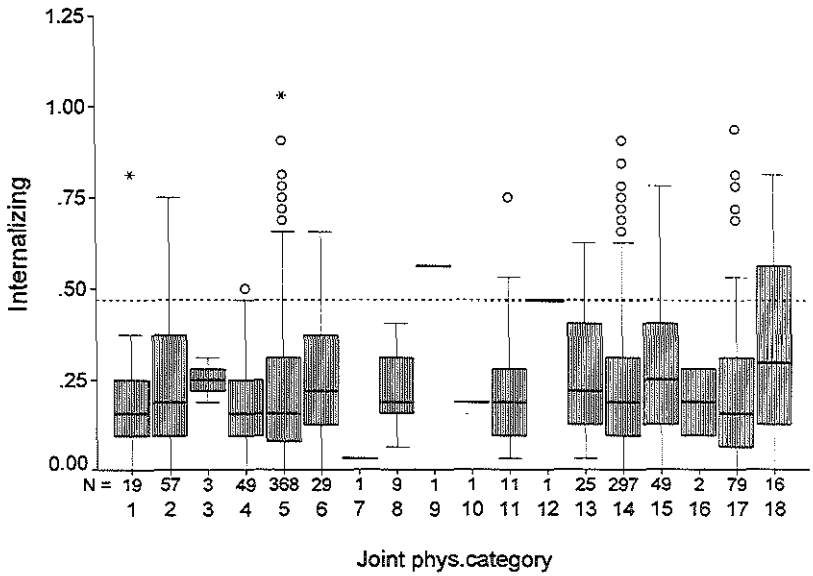

Fig.6.3.4.4. Boxplot of YSR Internalizing
by Joint Physical Category - GIRLS

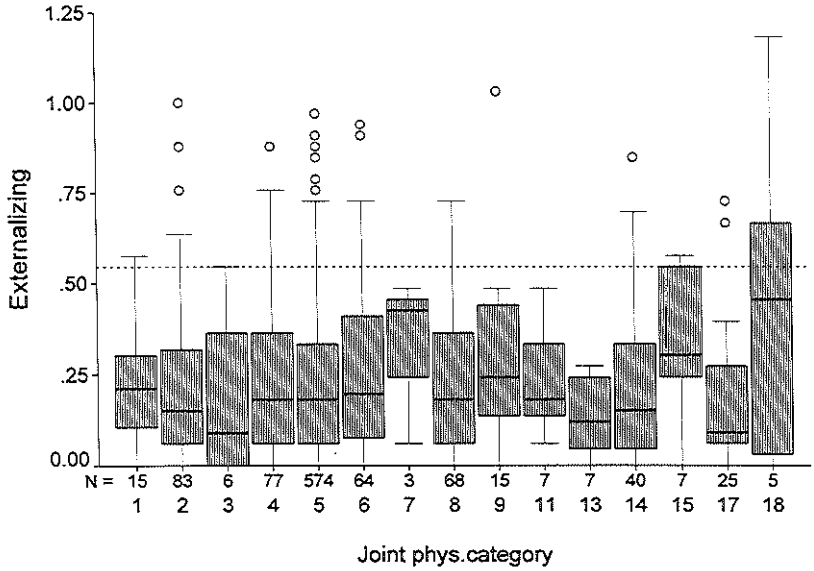

Fig.6.3.4.5. Boxplot of CBCL Externalizing
by Joint Physical Category - BOYS

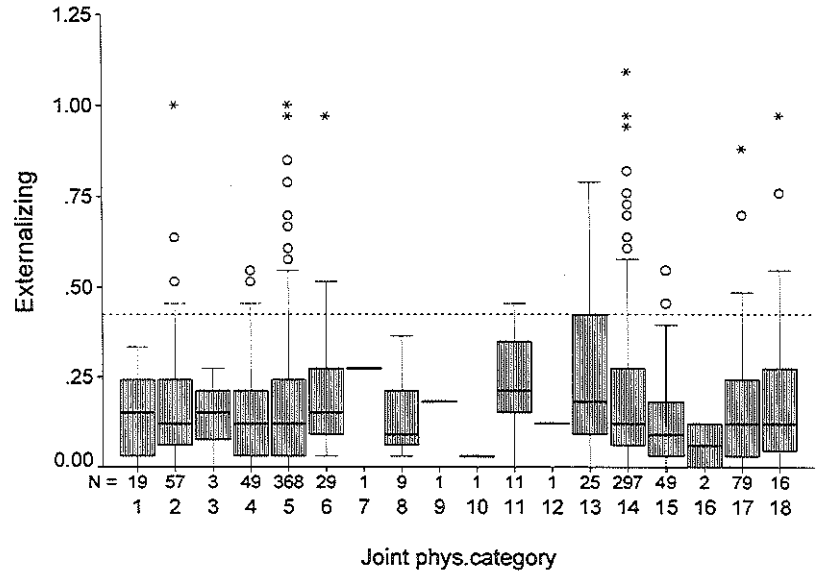

Fig.6.3.4.6. Boxplot of CBCL Externalizing
by Joint Physical Category - GIRLS

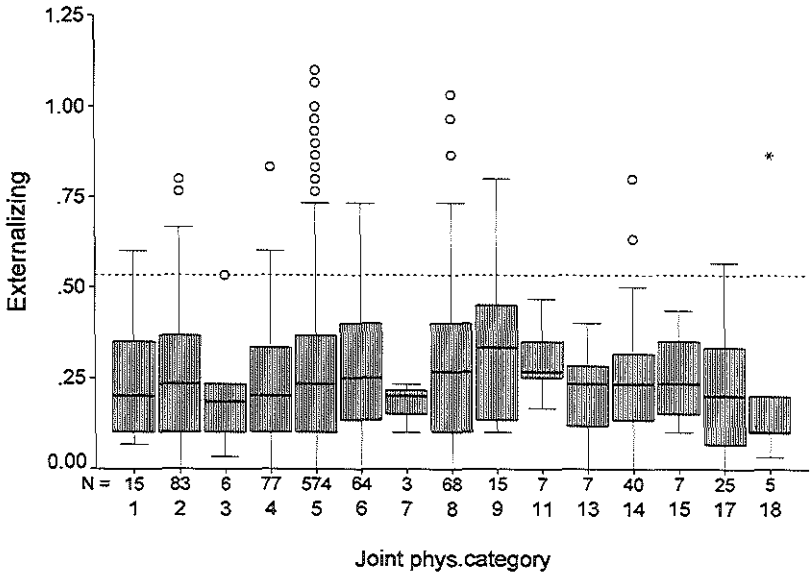

Fig.6.3.4.7. Boxplot of YSR Externalizing
by Joint Physical Category - BOYS

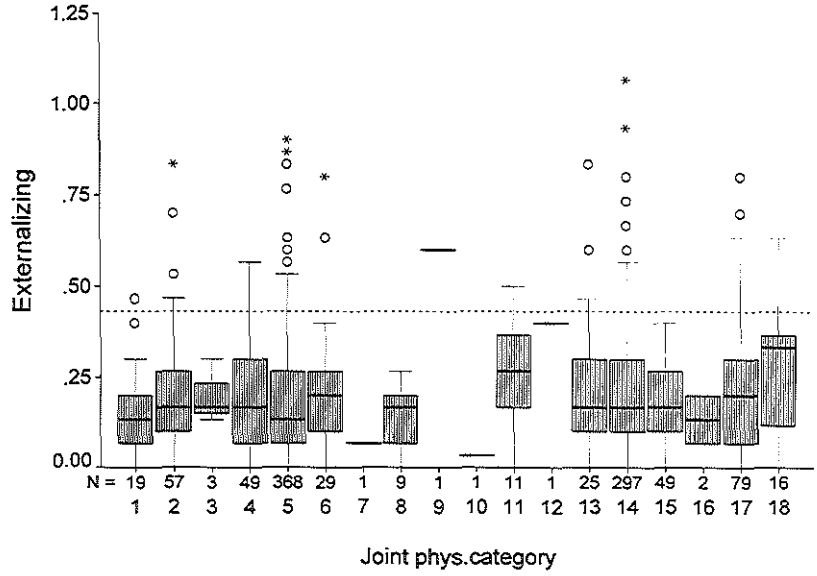

Fig.6.3.4.8. Boxplot of YSR Externalizing
by Joint Physical Category - GIRLS

6.4 Narrow-band problem scores

6.4.1 Clustering of narrow-band problems

Although they did not measure the same sort of problems, narrow-band scale scores were inter-correlated (see Appendices H1 to H4 for correlation coefficients for CBCL-boys, YSR-boys, CBCL-girls, and YSR-girls, respectively). The correlations were predominantly of medium (>.30) and large (>.50) size. To express the inter-relatedness of the narrow-band scales, and to avoid repetition, the choice was made to treat narrow-band variables as a set and to relate physical variables to the combination of problem variables.

To arrive at a combination of problem variables, Principal Components Analyses were carried out on the narrow-band variables, separately for each gender and informant. By these analyses, clusters ("factors") of problem variables were extracted which behaved in a similar way. A two-factorial solution was sought. In search of the most easily interpretable factor solution, two types of rotation were tried. Varimax rotation is an orthogonal rotation method that minimizes the number of variables loading high on each factor. This method is supposed to facilitate interpretation of the factors. Oblique rotation allows for correlated factors. Neither of these two types of rotation improved the interpretation of the factors, because on several occasions rotation led to loading of problem variables above .50 on both instead of on one factor, and factor loadings sometimes decreased instead of increased. In Tables 6.4.1.1 through 6.4.1.4 unrotated factor loadings above .50 of the individual narrow-band problem scales are displayed.

Table 6.4.1.1 PCA unrotated factor loadings - boys' CBCL narrow-band variable scores

Scale	Fact.1	Fact.2
ADD	.80	
AGG	.80	
AXD	.80	
DEL	.67	-.51
SOC	.76	
SOM		
THT		.55
WTH	.69	

The factor solutions were practically the same for boys and girls, and for parent- and self-reported problems: Only one, "general", factor had an eigenvalue over 1. It explained 48.5%, 53.3%, 55.8%, and 53.4% of the variance, for parent-reported problems of boys, parent-reported problems of girls, boys' self-reported problems, and girls' self-reported problems, respectively. With the exception of parent-reported problems of boys, all variables loaded above .50 on this first factor. For parent-reported problems of boys, Somatic

Table 6.4.1.2 PCA unrotated factor loadings - girls' CBCL narrow-band variable scores

Scale	Fact.1	Fact.2
ADD	.80	
AGG	.81	
AXD	.85	
DEL	.69	
SOC	.76	
SOM	.61	
THT	.54	.65
WTH	.73	

Table 6.4.1.3 PCA unrotated factor loadings - boys' YSR narrow-band variable scores

Scale	Fact.1	Fact.2
ADD	.78	
AGG	.82	
AXD	.86	
DEL	.70	
SOC	.77	
SOM	.70	
THT	.55	.70
WTH	.75	

Table 6.4.1.4 PCA unrotated factor loadings - girls' YSR narrow-band variable scores

Scale	Fact.1	Fact.2
ADD	.82	
AGG	.79	
AXD	.86	
DEL	.64	
SOC	.75	
SOM	.65	
THT	.55	.69
WTH	.73	

Complaints and Thought Problems did not load above .50. The sequence of loadings was virtually the same for boys and girls, and for parent- and self-reported problems, with Attention Problems, Aggressive, and Anxious/Depressed problems loading highest, followed by Social Problems, then by Withdrawn Behavior, then by Delinquent or Somatic Complaints, and finally by Thought Problems.

Thought Problems loaded above .50 on the other factor for all combinations. In case of double loading, Thought Problems loaded highest on this second factor. For parent-

reported problems of boys only, Delinquent loaded above .50 on the second factor as well; its loading on the first factor was higher, however.

Because of the low eigenvalue of the second factor, and because Thought Problems scores showed little spread (see Chapter 5.1), the second factor was not considered any further. Subjects' scores of factor 1 were used to represent the combination of narrow-band problem scores. These scores are standardized scores, with a mean of zero (0), and a standard deviation of one (1).

6.4.2 Narrow-band problem combination and Height

In Figures 6.4.2.1 through 6.4.2.4 scatterplots of the distribution of narrow-band problem combination scores by Height are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. For the regression equations, Z-scores of Height were used.

None of the linear or quadratic regression coefficients were significant. This meant that there was no relation between a subject's height and his/her narrow-band problem combination. Comparing the plots of boys' with those of girls', and those of parent-reported with those of self-reported, narrow-band problem combination, no systematic differences between sexes and/or between informants emerged.

6.4.3 Narrow-band problem combination and Body Mass Index

In Figures 6.4.3.1 through 6.4.3.4 scatterplots of the distribution of narrow-band problem combination scores by Body Mass Index are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. For the regression equations, Z-scores of BMI were used. Regression coefficients and their *R*-squared are given in Table 6.4.3.1.

Table 6.4.3.1 Regression coefficient (B) and its *R*-squared (R^2) for narrow-band combination by Body Mass Index

B(R^2)	CBCL		YSR	
	Boys	Girls	Boys	Girls
Linear	n.s.	.11(.01***)	n.s.	.07(<.01*)
Quadratic	.04(<.01**)	.04(<.01*)	.03(<.01*)	n.s.

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

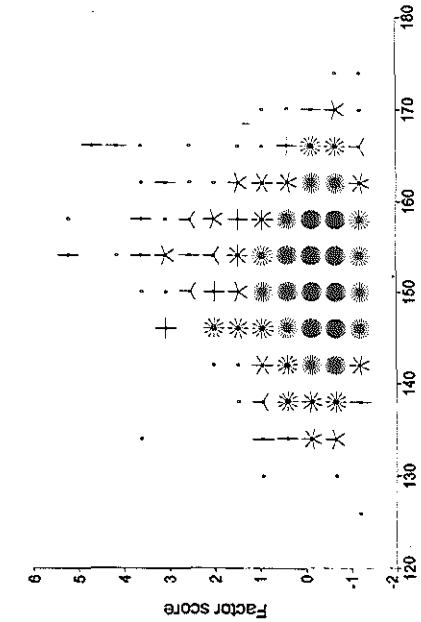

Fig.6.4.2.1. Scatterplot of CBCL narrow-band combination by height - BOYS

Fig.6.4.2.2. Scatterplot of CBCL narrow-band combination by height - GIRLS

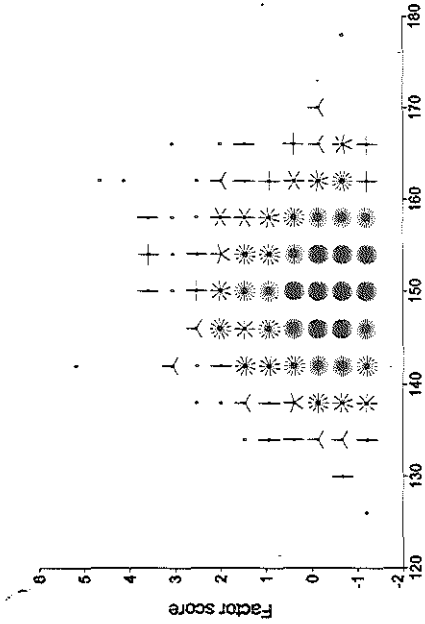

Fig.6.4.2.3. Scatterplot of YSR narrow-band combination by height - BOYS

Fig.6.4.2.4. Scatterplot of YSR narrow-band combination by height - GIRLS

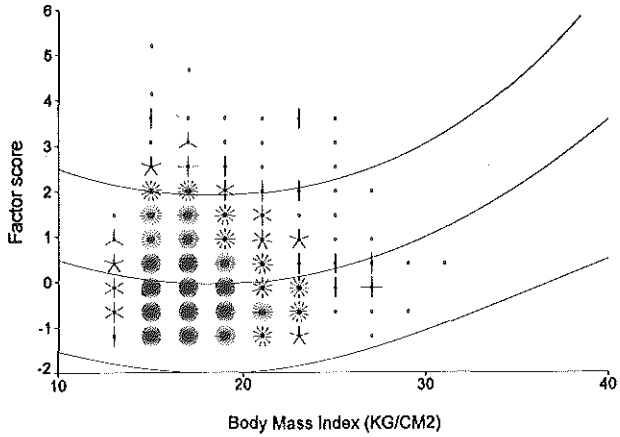

Fig.6.4.3.1. Scatterplot of CBCL narrow-band combination by BMI - BOYS

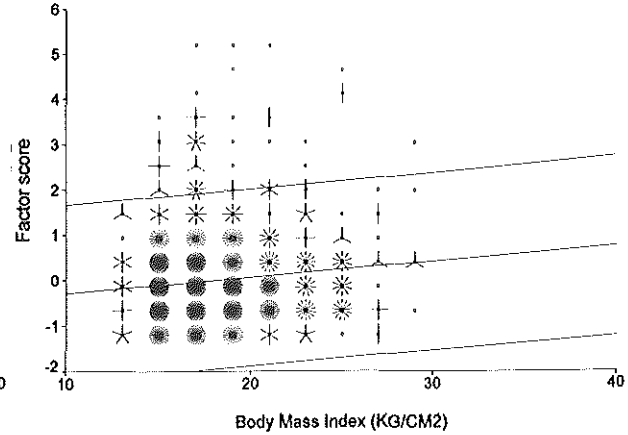

Fig.6.4.3.2. Scatterplot of CBCL narrow-band combination by BMI - GIRLS

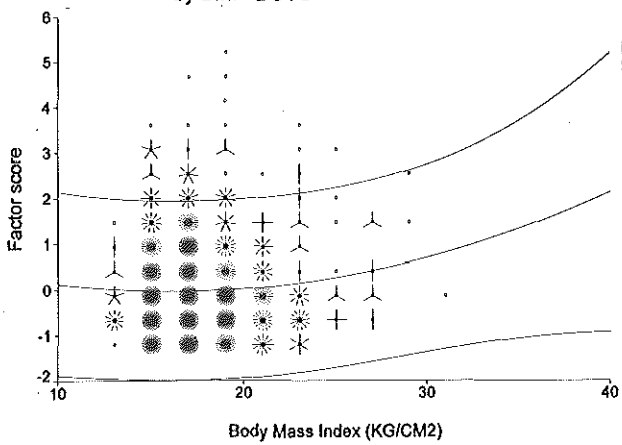

Fig.6.4.3.3. Scatterplot of YSR narrow-band combination by BMI - BOYS

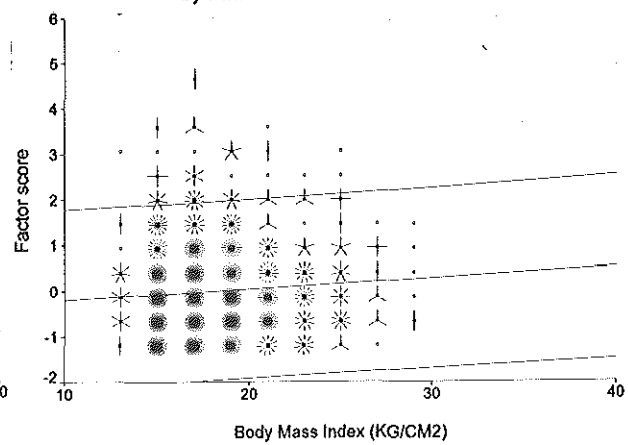

Fig.6.4.3.4. Scatterplot of YSR narrow-band combination by BMI - GIRLS

For parent-reported and self-reported narrow-band combination scores of boys, a quadratic regression line "best" fitted the data. The curve was U-shaped, indicating higher narrow-band combination scores for boys with more extreme BMIs. For parent-reported and self-reported narrow-band combination scores of girls, a linear regression line "best" fitted the data. The direction of the linear regression lines was positive, indicating higher narrow-band combination scores for girls with higher BMIs. However, both for the quadratic and the linear solutions, the slope of the regression line was not very steep (indicated by a small regression coefficient), and the amount of variance in problem scores, explained by the regression equation (expressed by the *R*-squared and by the large range between the 95%-confidence lines) was very small. This meant that although some association between narrow-band combination and BMI existed, no differentiation in subjects' narrow-band combination scores could be made on the basis of their BMI. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, narrow-band combination scores, no systematic differences between informants emerged. There did appear to be a gender effect: There was a tendency for boys to have higher narrow-band combination scores in relation to deviance from the mean of their BMI, while for girls lower scores were related to lower BMIs and higher scores to higher BMIs. Possibly, the linearity of the relation for girls is associated with the female ideal of slenderness.

6.4.4 Narrow-band problem combination and Pubertal Status

In Figures 6.4.4.1 through 6.4.4.4 boxplots of the distribution of narrow-band combination scores by Pubertal Status are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. There is a box for each level of Pubertal Status. All box areas are within one standard deviation from the mean. None of the ANCOVA effects of pubertal status (effect of socio-economic status as measured by parental occupation partialled out) were significant. Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, narrow-band combination scores, no systematic differences between sexes and/or between informants emerged.

6.4.5 Narrow-band problem combination and combined physical variables

For the combination of physical variables, the same categorization is used as in paragraph 6.2.4. In Figures 6.4.5.1 through 6.4.5.4 boxplots of the distribution of narrow-band combination scores by combined physical categories are displayed for parents' reports on boys, parents' reports on girls, self-reports by boys, and self-reports by girls, respectively. All box areas showed overlap, and the medians were within one standard deviation from zero. Some of the categories contained few or no subjects. Categories with less than 5 boys or less than 5 girls were excluded from the ANCOVA analyses of variance. None of the ANCOVA effects of combined physical category (effect of socio-economic status as measured by parental occupation partialled out) were significant.

Comparing the plots of boys' with those of girls', and of parent-reported with those of self-reported, Total Problems, no systematic differences between sexes and/or between informants emerged.

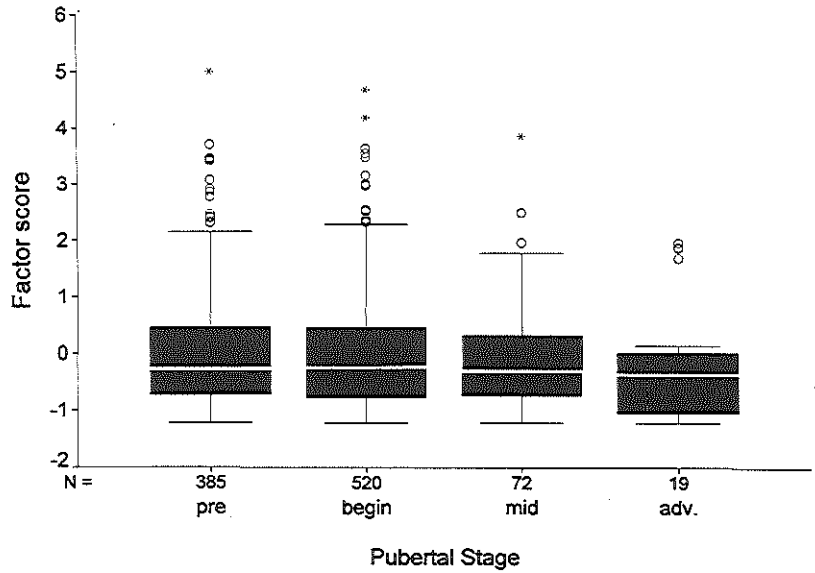

Fig.6.4.4.1 Boxplot of CBCL narrow-band combination by Pubertal Stage - BOYS

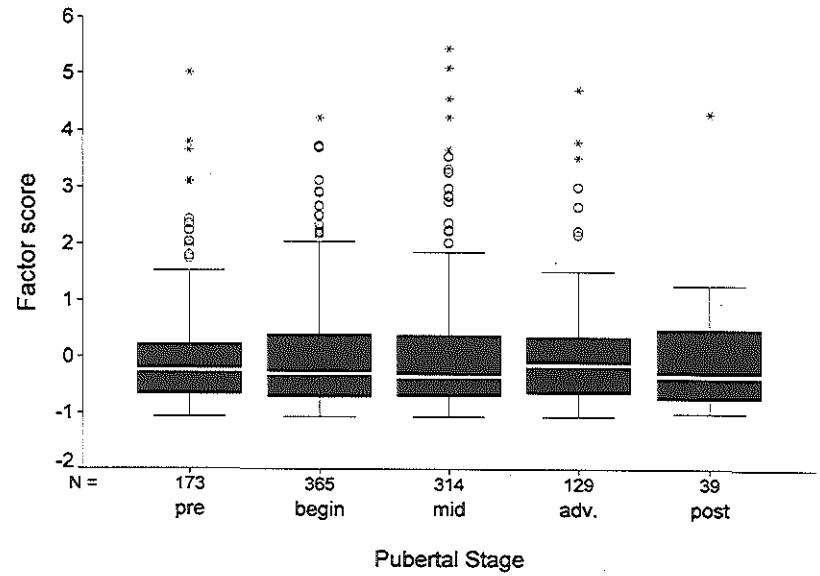

Fig.6.4.4.2. Boxplot of CBCL narrow-band combination by Pubertal Stage - GIRLS

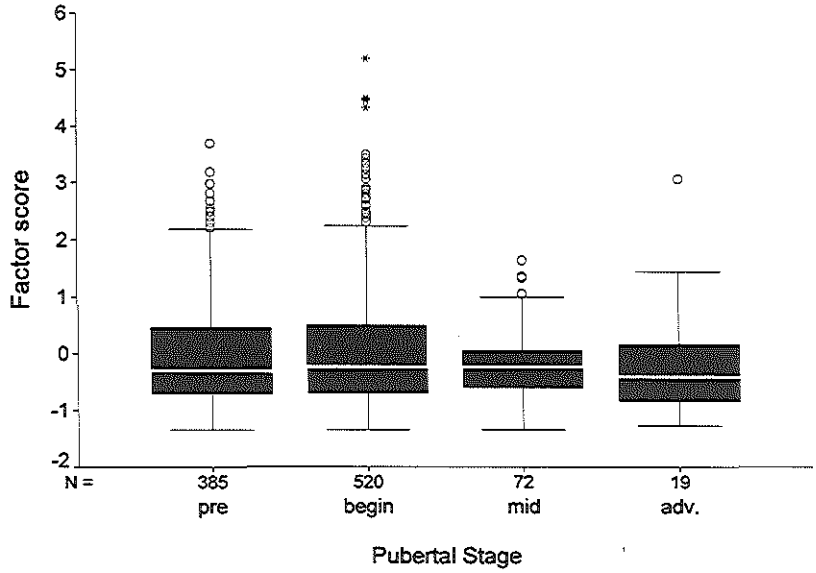

Fig.6.4.4.3. Boxplot of YSR narrow-band combination by Pubertal Stage - BOYS

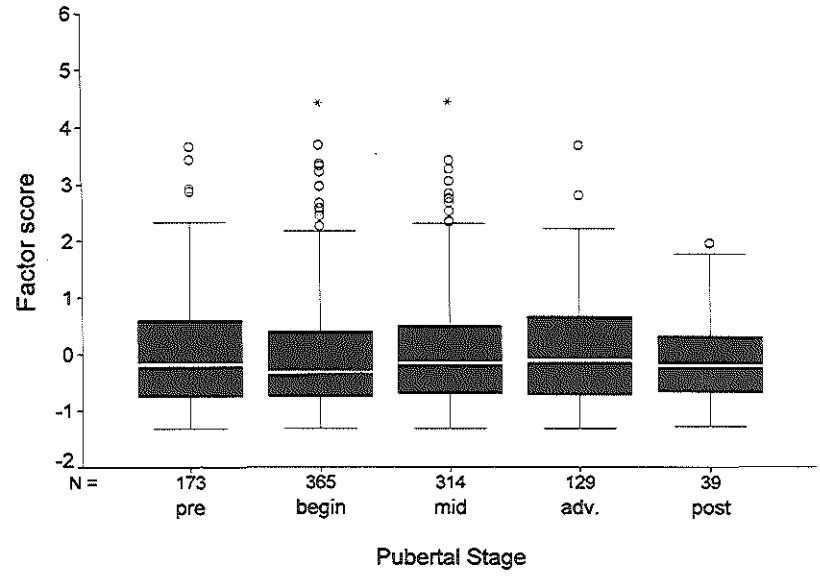

Fig.6.4.4.4. Boxplot of YSR narrow-band combination by Pubertal Stage - GIRLS

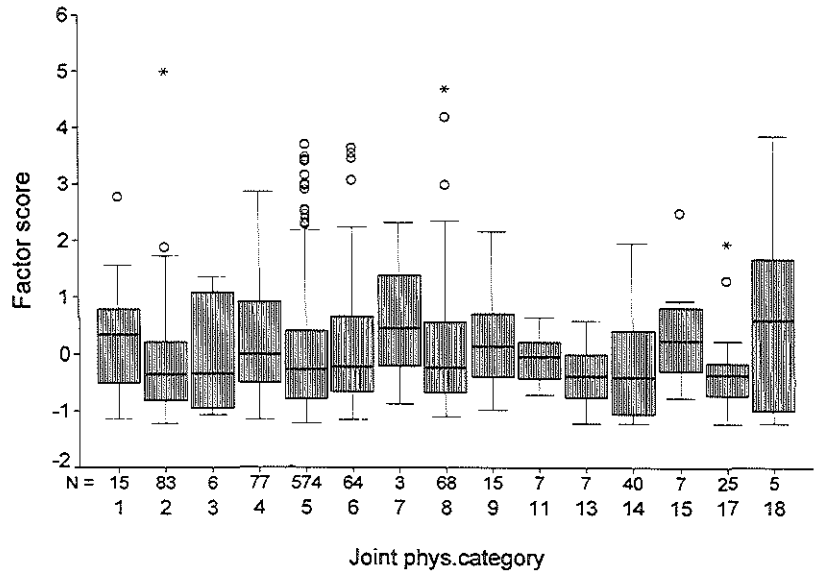

Fig.6.4.5.1. Boxplot of CBCL narrow-band combination by joint physical category - BOYS

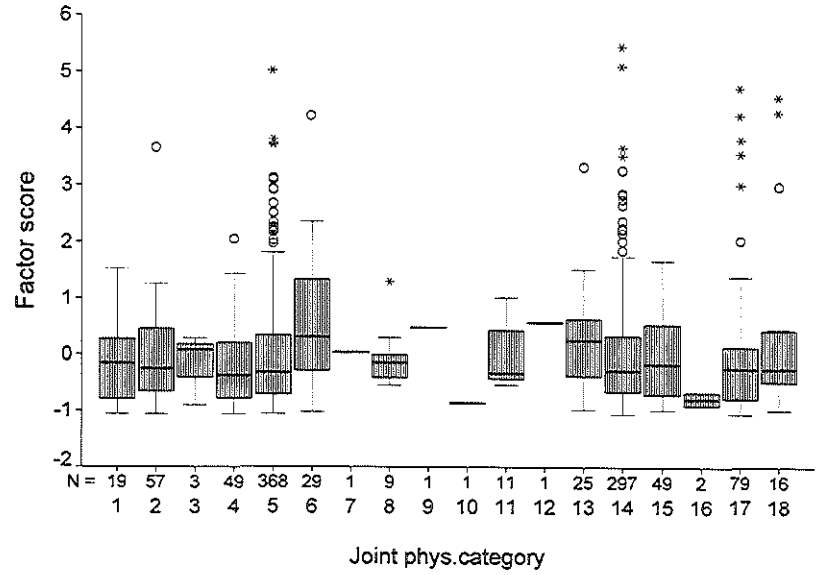

Fig.6.4.5.2. Boxplot of CBCL narrow-band combination by joint physical category - GIRLS

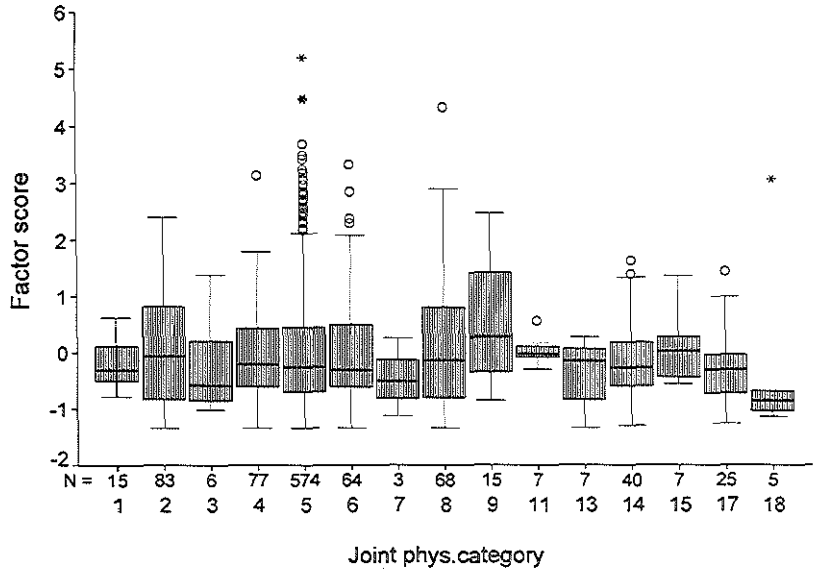

Fig.6.4.5.3. Boxplot of YSR narrow-band combination by joint physical category - BOYS

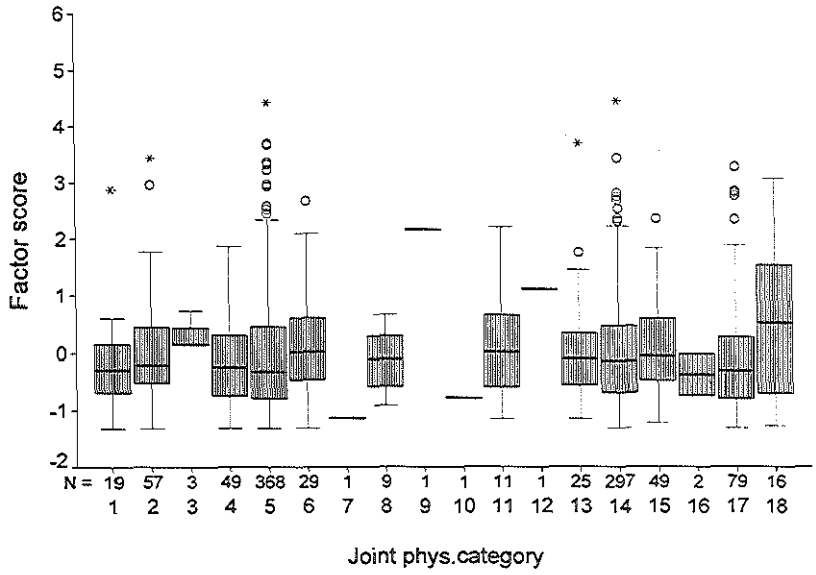

Fig.6.4.5.4. Boxplot of YSR narrow-band combination by joint physical category - GIRLS

CHAPTER 7 DISCUSSION

7.1 Introduction

The primary aim of this study was to assess the relationship between behavioral/ emotional problems and differences in sexual maturation and/or other physical characteristics of early adolescents. Do physically more advanced children have a different amount of problems than physically less advanced children? Do they have a different type of problems? Do children who are deviant in physical respect compared to their agemates have more problems than children who are physically closer to the norm? Do they have a different type of problems?

Answers to these questions were sought by comparing behavioral/emotional problem scores between 11-year-old children from the general population who varied in physical status.

7.2 A word of caution

Differences in psychopathology found between children of varying developmental status are easily misinterpreted as indicative for a developmental pathogenic effect, and thus as support for a developmental theory of psychopathology. To assess the developmental nature of an effect, a longitudinal study following children over time (and thus over development) is needed. Only then can developmental effects be separated from unknown and inessential individual differences. The part of the study that was presented here measured same-aged children varying in developmental status at one point in time. Therefore, no conclusions on developmental mechanisms may be drawn from the present study. Results may however serve to formulate developmental hypotheses to be tested in a longitudinal study.

7.3 Methodological shortcomings

Before going into the results of the analyses on the relation between physical characteristics and psychopathology, the possible antecedents and consequences of "negative", or "no significant relation found", results are discussed.

A failure to find significant relations between physical characteristics and psychopathology could mean two things:

- No relations between the two exist. This leads to the question which other (developmental?) factors account for the existing variation in behavioral/emotional problems in early adolescence.

- Relations between the two do exist, but they were not found. Reasons for not finding an existing relation must be sought in the methodology of the study: The validity and reliability of the instruments used, and the composition of the sample studied.

The possibility of methodological shortcomings is discussed in the following paragraphs.

7.3.1 Psychopathology measures

The CBCL and YSR are carefully designed instruments, on which a large body of psychometric information is available. Reliability data are generally good. However, the reliability of the YSR data may be somewhat reduced due to the age of the subjects. The YSR is designed to be completed by 11-to 18-year-olds having a mental age of at least 10 years and fifth grade reading skills (Achenbach, 1991c). The children in the present study were 11 years of age, and thus at the lower end of the instrument's age range. In a small-sample ($N = 50$) test-retest examination of reliability, Achenbach and Edelbrock (1987) found the YSR ratings by 11- to 14-year-olds not quite to be as reliable (median $r = .77$) as those of 15- to 18-year-olds (median $r = .89$). Still, a median r of .77 can be considered reasonable (Cohen, 1988). It is therefore unlikely that a failure to find physically related differences in psychopathology is due to unreliability of the psychopathology measures.

7.3.2 Physical measures

Failure to find effects of pubertal status might be related to the reliability of the measure used. Low reliability of measures leads to greater than necessary variance in scores, and thus to a lesser likeliness to find substantial, significant relations if they exist.

From what has been found during the training sessions of school physicians in the application of the Tanner / van Wieringen rating criteria, the reliability of these instruments is uncertain (see Chapter 2, paragraph 3). Agreements on ratings from slides were reasonable to very low, depending on the type of secondary sex characteristic rated. Agreement results from pre-training measurements on live subjects were inconsistent with the slide results and varied with the combination of physicians doing the ratings.

The effect of low precision of ratings depends on the detail of the scale used. A deviation of one centimeter on a height of about 150 centimeters (mean height in the present study) would hardly lead to a height distribution different from the "true" one. However, a deviation of one or possibly two stadia on a scale of maximally six could lead to a pubertal stage distribution that greatly deviated from the "true" distribution.

The general feeling was that ratings on live subjects after the training would be much more accurate and consistent than the live pre-training and in-vitro training results. During the training much attention was paid to the necessity of uniformly applying rating decisions; for instance, uniformly "rounding off" downwards (that is: In case of doubt to rate the lowest of the categories considered) was stressed. Unfortunately, no post-training measurement of rating accuracy has been conducted. As a result, the feeling that the data gathered on secondary sex

characteristics (live, after training) were reliable cannot be substantiated and must remain a matter of faith.

From the point of validity, the rating of secondary sex characteristics seems to satisfy. A careful weighing of various types of measures was made (see Chapter 2, paragraph 3.3). Possibly the measurement of sex hormone secretions would have been even "better", but technical and economical considerations prevented this from being a true alternative.

Failure to find effects of height or relative weight are less likely to be related to the measure used: The reliability of measuring height by the yardstick and weight by the balance is good. There is no question of failing validity, as height and weight are defined by their measurement.

7.3.3 Composition of the "sample"

The low prevalence of many types of psychopathology and the desire to measure a wide array of behavioral/emotional problems necessitated a large sample size. This was achieved efficiently by attaching the measurement of behavioral/emotional problems to a standard physical health measurement reaching all 11-year olds attending the majority of regular and special school in the greater Rotterdam area. Thus, amount and patterning of behavioral/emotional problems and developmental/physical status were studied in a general population sample of 11-year-olds, in specific: The cohort of children born in 1978, in the school year 1989/1990 attending those regular schools or schools for the learning and emotionally disabled that receive services from the section of Youth Health of the Rotterdam municipal Health Department.

All in all, 2587 children and their parents participated in the study, on 2019 of which data were complete. Although children on whom material was complete on the average had somewhat lower ("better") problem scores than those on whom material was incomplete, there was no reason to suspect that the "complete" sample was not suitable for measuring the intended effects on grounds of lacking differentiation in problem scores.

In the present study, there were less subjects, and in particular a lack of boys, in the higher stages of puberty. If pubertal effects (for boys) become apparent only in the later stages of puberty, this would mean that the sample composition has not been suitable for measuring the intended effects on grounds of lacking differentiation in pubertal stages.

7.4 Discussion of results

7.4.1 Physical characteristics

Both in boys and in girls two characteristics of sexual maturation were measured. The developments of the two characteristics are supposedly under the control of different hormones. Their stage of development was rated on a five-point scale from pre-pubertal to fully mature. In the present study, the developmental advancement per gender of the two

sexual maturation characteristics was about equal for the majority of children. This may be because the developmental processes of the two characteristics, though under the influence of separate hormones, run such a parallel course in time that a five-point scale is too crude to observe developmental differences. Alternatively, the moment of measurement may have been too close to the start of puberty for the majority of subjects (especially boys) to allow for sufficient differentiation between the two sexual maturation characteristics.

Whichever the reason, the lack of differentiation between the characteristics made that a differential effect upon the distribution of behavioral/emotional problems was not to be expected. For reasons of efficiency it was decided to combine the measures obtained by using the stage of the developmentally most advanced characteristic.

Height and weight were included in the study as anthropometric measures with psychological significance. The psychological meaning of weight was considered to lie in its relation with adiposity. Because of its alleged relation with adiposity, the Body Mass Index (BMI) was used as a measure of weight-for-height. There were medium sized positive correlations between BMI and height and pubertal stage, indicating that heavier children tended to be taller and more sexually advanced than lighter children. Findings of a relatively greater increase of absolute weight than of height with age (Forbes, 1987) thus seem to apply not only to age, but to maturation (within the same age group) as well.

Children who were sexually more mature were both taller and relatively heavier than children who were sexually less mature. Greater height in more mature children is to be expected, because one aspect of pubertal development is the pubertal growth spurt. This is a relatively early pubertal event for girls, and an mid-pubertal event for boys.

Greater relative weight in more mature children is not as easily explained. On the one hand, this finding might be an artifact of using the BMI-score as indication of relative weight. As outlined earlier, this index should be independent from height, but in the present study the two were found to be positively related ($r=.25$). The size of the correlation indicates that the two cannot be equated. On the other hand, this finding is in agreement with a hypothesis by Frisch (1974) that menarche is triggered by critical body weight and body fat levels. This hypothesis has generated "interest in the possible role of body fat as a determinant of mature sexual function in the female." (Forbes, 1987, p. 163)

The socio-economic status of subjects varying in physical size and/or maturation was also studied. It has often been observed that a negative linear relation between socio-economic status and psychopathology exists: Children of parents of lower socio-economic status have more behavioral/emotional problems than children of parents of higher socio-economic status. This also held in the present study. If, as expected from the literature, socio-economic status were unequally distributed with regards to physical variables, findings on relations between physical characteristics and psychopathology might be confounded by the effects of socio-economic status. Therefore, the physical distribution of socio-economic groups was compared.

Boys whose parents were in the highest occupational groups were lighter than boys with parents in lower occupational groups. For girls there was a general, but no specific, small-sized effect of parental occupation on physical characteristics. Boys living in relatively disadvantaged neighborhoods had higher than average pubertal status and they were heavier than boys from relatively advantaged neighborhoods. Girls from relatively advantaged neighborhoods were relatively light.

The findings on weight-for-height were in agreement with the literature (Roede & van Wieringen, 1985). For the finding on pubertal status, no directly related literature was found. The above-mentioned possible role of body fat (Forbes, 1987) could provide a link. In view of the relation between weight for height (Roede & van Wieringen, 1985) and socio-economic status, this could mean that low socio-economic status boys (who, on the average, are heavier) mature earlier. However, the causal link between weight/body fat and maturation has not (yet?) been proven. Forbes (1987) criticizes the accuracy of the data and statistical techniques underlying the above-mentioned hypothesis by Frisch (1974). Thus, whether maturational status is directly related to socio-economic status or whether there is an indirect relation through the mediation of BMI, remains unclear at present.

For the present research questions, it was not necessary to solve the question of causality concerning the relations between physical and socio-economic status. What mattered here was that such relations existed, even though they were only small in size (1-2% of explained variance). This meant that the influence of socio-economic variation had to be controlled for in the analyses of problem behavior in relation to physical characteristics.

7.4.2 Problem scores

As was to be expected in a general population sample, mean problem scores were low. For the Thought Problems scale (both informants, both sexes), for the Somatic Complaints scale (parents' reports for boys) and for the Delinquent scale (parents' reports for girls), the spread of scores was so low that they could not serve to identify children at risk for clinically relevant behavioral/emotional problems. The spreads of scores of the other informant-by-gender combinations of problem scales were sufficient for this purpose.

In case of the Thought Problems scale, reasons for the low spread might be either that the problems involved were not relevant for 11-year-olds, or that they were a basis for selective drop-out from the study. In case of boys' Somatic Complaints and girls' Delinquent, parents apparently were not as informative as the youth themselves. Were they unaware of their children's problems in these areas? Did they underreport these problems? But then, why just these, and not the other types of problems? Did the children themselves overreport these problems? Unawareness by parents of the existing problems of boys in the area of Somatic Complaints and of girls in the area of Delinquent seems the most plausible answer. Boys are supposed to be tough, to express problems through aggression, not somatic complaints. Girls are supposed to be nice, and to express problems through somatic complaints or anxious feelings, not delinquency. If children's feelings and behaviors are incompatible with their

parents' expectations, parents may well be blind to them. Thus, for these two problem scales in particular, it seems important to gather information not only from parents but from their children as well.

In the study group, there were about as many boys as there were girls. Boys had slightly more behavioral/emotional problems than girls. Children attending schools for special education formed five percent of the study group. Among the respondents from schools for special education, the number of boys was three times as high as that of girls. This reflects the general boy/girl proportion in special education. As expected by definition, children attending special schools had more behavioral/emotional problems than children attending regular schools.

Children themselves in general reported more problems than their parents. It is likely that parents and children have different norms for judging problem behavior as "somewhat or sometimes true", with parents tending to sentence a one-time happening as irrelevant. In addition, children may be more likely to forget the time limit of the past six months, and include any past occurrence of the event they can remember.

Agreement on problem level between parents and their children in general was moderate (Pearson *r* for Total Problems=.51), with correlations being higher for girls than for boys. These findings are in agreement with those of Verhulst and van der Ende (1992). Other authors have reported lower correlation coefficients (e.g. Achenbach, McConaughy & Howell, 1987; Phares, Compas & Howell, 1989).

As mentioned in paragraph 7.4.1., children of parents of lower socio-economic status have more behavioral/emotional problems than children of parents of higher socio-economic status. In the present study this also held on a general level, and for the majority of univariate tests. The effect sizes were small, however. The examination of the distribution of behavioral/emotional problems in relation to neighborhood disadvantage information was new. Differences between socio-economic variables measured at the family level and the neighborhood level were marginal.

Considering the existing (albeit small) negative relations between socio-economic status and problem level, the inclusion of measures for promoting mental health along with measures aimed at other disadvantage targets in city programs for reducing disadvantage seems worth considering.

7.4.3 Physical characteristics and problem scores

From the results of the present study it must be concluded that no substantial association exists between physical characteristics and the distribution of psychopathology in early adolescence; neither for boys nor for girls; neither for problems reported by parents nor for problems reported by youth themselves.

This holds in particular for the effects of pubertal status. At the age of 11, even though differentiation in pubertal status did exist between the studied subjects (particularly girls) no associations with problem level were found at all. For height, a minority of the analyses

showed a weak association with psychopathology. Relative weight, as expressed through the Body Mass Index, most consistently showed some association with problem level, regardless of gender or informant, although again the strength of the associations was weak.

How can this lack of association found in the present study be explained? From the literature that was available at the start of the project in 1988/1989 (see for a review Chapter 1, in particular paragraphs 1.4.1, 1.4.2.1, and 1.4.2.2), puberty (the physical process) was implied as a causal factor in a number of behavioral/emotional problems. However, the relation between puberty and psychopathology had only rarely been studied directly, and results of these studies were equivocal (Rutter, 1985). Possibly, the "positive" results of the studies by Nottelmann and colleagues (Nottelmann et al., 1990) were unreliable due to sample composition effects (selection bias of subjects, small sample size, socio-economic bias). A more substantial body of studies had focused on the relation between puberty and psychopathology-related areas such as self-concept (Mussen and Jones, 1957; Jones and Mussen, 1958; Magnusson et al., 1985). Expectations of the existence of a puberty-psychopathology relation were *inferred* from the study results. Concluding, at the start of the present study no firm grounds but only circumstantial and indirect evidence and an intuitive appeal existed for the expectation of a (causal) relation between puberty and behavioral/emotional problems of early adolescence.

Does the lack of association found in the present study disprove the existence of a puberty-psychopathology relation in early adolescence? Yes and no. Yes, because of the epidemiological nature of the study (sample size and representation) and the soundness of the behavioral measures used. No, because:

- Maybe the effect of puberty on behavioral/emotional problems is not immediate but delayed (possibly due to mediation of psychological factors). Because the type of association of BMI with behavioral/emotional problems for girls seemed to agree with the influence of cultural values (ideal of slenderness), some influence of psychological factors is implied. It is true that at the age studied (roughly 11 years) subjects who did show some amount of pubertal development had probably only undergone these changes relatively recently. In case of a delayed effect, a follow-up of the subjects at a later age should bring this out.
- An alternative hypothesis is that those types of psychopathology that first emerge or increase in adolescence are linked to puberty through genetic mechanisms. This means that only those subjects that had a genetically determined vulnerability would react to puberty with behavioral/emotional problems. In that case, no universal effect of puberty was to be expected. To uncover such a mechanism, a different design (twin studies) is needed.

7.5 Conclusions

The present study is unique in that an attempt is made to relate a *wide* array of behavioral/emotional problems, assessed in a *general* population, epidemiological, sample of

young adolescents, to puberty-related physical characteristics. The large size of the sample and the reliability of the measures used warrant the firmness of the conclusion that no substantial, direct, associations between physical characteristics and the distribution of psychopathology in early adolescence exist. Although the idea of a pubertal background for changes in psychopathology across adolescence remains appealing, the likelihood must be faced that such a relation is in fact non-existent.

This conclusion implies that other, not measured, factors must be much more important for explaining the variance in problem scores in early adolescence. Some known, general, risk factors for psychopathology are: Previous problem level, life events and other stresses, difficult temperament, specific vulnerabilities and predispositions. These factors cannot explain changes in psychopathology distributions across adolescence. However, their influence might have prevented physical effects from showing. If that is the case, the prediction of risk for developing psychopathology over adolescence from physical characteristics would require an extensive, complicated, study involving information on these general risk factors as well. For such a study there are still many hurdles to be taken. For one, the large number of variables involved would require an enormous sample size. In addition, for several of the variables involved, suitable instruments are still lacking.

Publications that have appeared since the start of the project support a multifactorial and interactive approach for the study of causal mechanisms in early adolescent psychopathology. Hill, in a recent (1993) review of research on adolescent development, states that "It seems very unlikely that any single unifying theory or metaphor of adolescent development will prove sufficiently rich to be useful, academically or clinically." (p. 93)

REFERENCES

Achenbach,T.M.

- (1985). *Assessment and taxonomy of child and adolescent psychopathology.* Newbury Park,CA: Sage.
- (1991a). *Integrative guide for the 1991 CBCL/4-18, YSR, and TRF profiles.* Burlington,VT: University of Vermont Department of Psychiatry.
- (1991b). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile.* Burlington,VT: University of Vermont Department of Psychiatry.
- (1991c). *Manual for the Youth Self-Report and 1991 Profile.* Burlington,VT: University of Vermont Department of Psychiatry.

Achenbach,T.M. & Edelbrock,C.

- (1981). Behavioral problems and competencies reported by parents of normal and disturbed children aged four through sixteen. *Monographs of the Society for Research in Child Development,* **46** (1, Serial No. 188).
- (1983). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile.* Burlington,VT: University of Vermont Department of Psychiatry.
- (1986). *Manual for the Teacher's Report Form and Teacher Version of the Child Behavior Profile.* Burlington,VT: University of Vermont Department of Psychiatry.
- (1987). *Manual for the Youth Self-Report and Profile.* Burlington,VT: University of Vermont Department of Psychiatry.

Achenbach,T.M., McConaughy,S.H. & Howell,C.T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin,* **101**, 213-232.

American Psychiatric Association (APA). (1987). *Diagnostic and Statistical Manual of mental disorders* (3d ed., rev.). Washington, DC: Author.

Anderson,J., Williams,S., McGee,R. & Silva,Ph. (1989). Cognitive and social correlates of *DSM-III* disorders in preadolescent children. *Journal of the American Academy of Child and Adolescent Psychiatry,* **28**, 842-846.

Berden,G.F.M.G. (1992). *De ontwikkeling en toepassing van een levensgebeurtenissen-vragenlijst en van een levensgebeurtenissen-interview.* Unpublished doctoral dissertation, Erasmus University, Rotterdam.

Brooks-Gunn,J. & Warren,M.P. (1985). Measuring physical status and timing in early adolescence: A developmental perspective. *Journal of Youth and Adolescence,* **14**, 163-189.

Centraal Bureau voor de Statististiek (CBS). (1987). *Standaard onderwijsindeling SOI - 1978.* Voorburg: Centraal Bureau voor de Statistiek.

Cohen,J. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale,NJ: Lawrence Erlbaum Associates.

Coleman,J.C. (1974). *Relationships in adolescence.* Boston: Routledge & Kegan Paul.

Costello,E.J. (1989). Developments in child psychiatric epidemiology. Introduction. *Journal of the American Academy of Child and Adolescent Psychiatry*, **28**, 836-841.

Das,P. & Oomens,M.A.C. (1988). *Achterstandscores van Rotterdamse buurten in 1987.* Rotterdam: Gemeentelijk Bureau voor Onderzoek en Statistiek (GBOS).

Edelbrock,C., Costello,A.J., Dulcan,M.K., Kalas,R. & Conover,N.C. (1985). Age differences in the reliability of the psychiatric interview of the child. *Child Development*, **56**, 265-275.

Esser,G., Schmidt,M.H. & Woerner,W. (1990). Epidemiology and the course of psychiatric disorders in school-age children - results of a longitudinal study. *Journal of Child Psychology and Psychiatry*, **31**, 243-263.

Forbes,G.B. (1987). *Human body composition. Growth, aging, nutrition, and activity.* New York: Springer Verlag.

Frisch,R.E. (1974). Critical weight at menarche, initiation of the adolescent growth spurt, and control of puberty. In M.M.Grumbach, G.D.Grave & F.E.Mayer (Eds.), *Control of the onset of puberty* (pp. 403-423). New York: Wiley.

Gersten,J.C., Langner,T.S., Eisenberg,J.G., Simcha-Fagan,O. & McCarthy,E.D. (1976). Stability and change in types of behavioral disturbances of children and adolescents. *Journal of Abnormal Child Psychology*, **4**, 111-127.

Ghodsian,M., Fogelman,K., Lambert,L. & Tibbenham,A. (1980). Changes in behaviour ratings of a national sample of children. *British Journal of Social & Clinical Psychology*, **19**, 247-256.

Hamburger,S.D., Swedo,S., Whitaker,A., Davies,M. & Rapoport,J.L. (1989). Growth rate in adolescents with obsessive-compulsive disorder. *American Journal of Psychiatry*, **146**, 652-655.

Hill,P. (1993). Recent advances in selected aspects of adolescent development. *Journal of Child Psychology and Psychiatry*, **34**, 69-99.

Inoff-Germain,G., Arnold,G.S., Nottelmann,E.D., Susman,E.J., Cutler,G.B. & Chrousos,G.P. (1988). Relations between hormone levels and observational measures of aggressive behavior of young adolescents in family interactions. *Developmental Psychology*, **24**, 129-139.

Jones,M.C. & Mussen,P.H. (1958). Self-conceptions, motivations, and interpersonal attitudes of early- and late-maturing girls. *Child Development*, **29**, 491-501.

Karlsson,A., Gillberg,C. & Karlberg,P. (1989). Abnormalities of growth in 7- to 18-year-old psychiatric patients. *Journal of the American Academy of Child and Adolescent Psychiatry*, **28**, 269-273.

Kashani,J.H., Orvaschel,H., Rosenberg,T.K. & Reid,J.C. (1989). Psychopathology in a community sample of children and adolescents: A developmental perspective. *Journal of the American Academy of Child and Adolescent Psychiatry*, **28**, 701-706.

Magnusson,D., Stattin,H. & Allen,V.L. (1985). Biological maturation and social development: A longitudinal study of some adjustment processes for mid-adolescence to adulthood. *Journal of Youth and Adolescence*, **14**, 267-283.

Mussen,P.H., Jones,M.C. (1957). Self-conceptions, motivations, and interpersonal attitudes of late- and early-maturing boys. *Child Development*, **28**, 243-256.

Norušis,M.J. (1992). *SPSS for Windows Base System User's Guide Release 5.0*. Chicago: SPSS Inc.

Nottelmann,E.D., Inoff-Germain,G., Susman,E.J. & G.P. Chrousos (1990). Hormones and behavior at puberty. In J. Bancroft & J.Machover Reinisch (Eds.), *Adolescence and puberty* (pp. 88-123). New York: Oxford University Press.

Nottelmann,E.D., Susman,E.J., Inoff-Germain,G., Cutler,G.B., Loriaux,D.L. & Chrousos,G.P. (1987). Developmental processes in early adolescence: Relationships between adolescent adjustment problems and chronologic age, pubertal stage, and puberty-related serum hormone levels. *Journal of Pediatrics*, **110**, 473-480.

Offord,D.R., Boyle,M.H., Szatmari,P., Rae-Grant,N.I., Links,P.S., Cadman,D.T., Byles,J.A., Crawford,J.W., Blum,H.M., Byrne,C., Thomas,H. & Woodward,C.A. (1987). Ontario Child Health Study. II. Six-month prevalence of disorder and rates of service utilization. *Archives of General Psychiatry*, **44**, 832-836.

Petersen,A.C. (1988). Adolescent development. *Annual Review of Psychology*, **39**, 583-607.

Phares,V., Compas,B.E. & Howell,D.C. (1989). Perspectives on child behavior problems: Comparisons of children's self-reports with parent and teacher reports. *Psychological Assessment*, **1**, 68-71.

Piaget,J. (1972). Intellectual evolution from adolescence to adulthood. *Human Development*, **15**, 1-12.

Roede,M.J. & van Wieringen,J.C. (1985). Growth diagrams 1980. Netherlands third nation-wide survey. *Tijdschrift voor Sociale Gezondheidszorg*, **63** (Suppl.).

Rutter,M.

- (1972). Relationships between child and adult psychiatric disorders. *Acta Psychiatrica Scandinavica*, **48**, 3-21.
- (1979). *Changing youth in a changing society: Patterns of adolescent development and disorder.* London: Nuffield Provincial Hospitals Trust.
- (1985). Psychopathology and development: Links between childhood and adult life. In M. Rutter & L.Hersov (Eds.), *Child and adolescent psychiatry: Modern approaches* (pp. 720-739). London: Blackwell.

Rutter,M. & Madge,N. (1976). *Cycles of disadvantage*. London: Heinemann Educ.

Rutter.M., Tizard,J. & Whitmore,K., (1970). *Education, health and behaviour*. London: Longman Inc.

Simmons,R.G., Blyth,D.A., Van Cleave,E.F. & Mitsch Bush,D. (1979). Entry into early adolescence: The impact of school structure, puberty, and early dating on self-esteem. *American Sociology Review*, **44**, 948-967.

Simmons,R.G., Burgeson,R., Carlton-Ford,S. & Blyth,D.A. (1987). The impact of cumulative change in early adolescence. *Child Development*, **58**, 1220-1234.

Susman,E.J., Inoff-Germain,G., Nottelmann,E.D., Loriaux,D.L., Cutler,G.B. & Chrousos,G.P. (1987). Hormones, emotional dispositions, and aggressive attributes in young adolescents. *Child Development,* **58,** 1114-1134.

Tanner,J.M. (1974). Sequence and tempo in the somatic changes in puberty. In M.M. Grumbach, G.D.Grave & F.E.Mayer (Eds.), *The control of the onset of puberty* (pp. 448-470). New York: Wiley.

- (1975). Growth and endocrinology of the adolescent. In J.D. Gardner (Ed.), *Endocrine and genetic diseases of childhood* (pp. 19-60). Philadelphia: W.B. Saunders.

van Deursen,C. & Deurenberg,P. (1986). De lichaamssamenstelling van 12-17 jarigen in relatie tot enkele sociaal-psychologische factoren. *Tijdschrift voor Sociale Gezondheidszorg,* **64,** 580-585.

van Westerlaak,J.M., Kropman,J.A. & Collaris,J.W.M. (1975). *Beroepen klapper.* Nijmegen: Instituut voor Toegepaste Sociologie.

Verhulst,F.C. (1985). *Mental health in Dutch children. An epidemiological study.* Unpublished doctoral dissertation, Erasmus University, Rotterdam.

Verhulst,F.C. & Althaus,M. (1988). Persistence and change in behavioral/emotional problems reported by parents of children aged 4-14: An epidemiological study. *Acta Psychiatrica Scandinavica,* 77 (Suppl. 339).

Verhulst,F.C. & van der Ende,J. (1992). Agreement between parents' reports and adolescents' self-reports of problem behavior. *Journal of Child Psychology and Psychiatry,* **33,** 1011-1023.

Verhulst,F.C., Akkerhuis,G.W. & Althaus,M. (1985). Mental health in Dutch children. I. A cross-cultural comparison. *Acta Psychiatrica Scandinavica,* **72** (Suppl. 323).

Verhulst,F.C., Koot,J.M., Akkerhuis,G.W. & Veerman,J.W. (1990). *Praktische handleiding voor de CBCL (Child Behavior Checklist).* Assen: Van Gorcum.

Verhulst,F.C., Prince,J., Vervuurt-Poot,C. & de Jong,J. (1989). Mental health in Dutch adolescents: Self-reported competencies and problems for ages 11-18. *Acta Psychiatrica Scandinavica,* **80** (Suppl. 356).

World Health Organization (WHO). (1992). *The ICD-10 classification of mental and behavioural disorders.* Geneva: Author.

Zachmann,M., Prader,A., Kind,H.P., Haefliger,H. & Budliger,H. (1974). Testicular volume during adolescence. *Helvetica Paediatrica Acta,* **29,** 61-72.

Appendix A. Child Behavior Checklist for Children 4-16 years

GEDRAGSVRAGENLIJST VOOR KINDEREN VAN 4 - 16 JAAR

NAAM VAN HET KIND

GESLACHT ☐ Jongen ☐ Meisje

LEEFTIJD

NATIONALITEIT: LAND VAN HERKOMST:

DATUM VAN INVULLEN: Dag ____ Maand ____ Jaar ____

GEBOORTEDATUM KIND: Dag ____ Maand ____ Jaar ____

WELKE GROEP: (Bij voortgezet onderwijs) KLAS:

SOORT SCHOOL:

S.v.p. dit formulier invullen zoals U Uw kind ziet, ook al komt dat niet overeen met wat anderen eventueel vinden. U kunt naast de vragen, of op blz. 2 eventueel aanvullende informatie geven.

SOORT WERK VAN DE OUDERS, ook al werkt U op dit moment niet.
(s.v.p. zo duidelijk mogelijk - bijvoorbeeld: automonteur, onderwijzer, metaalarbeider, schoenverkoper enz., ook al woont het kind niet bij de ouder)

SOORT WERK VAN VADER: _____

Oefent beroep uit: ☐ ja ☐ nee, vanwege: (WW, WAO, etc.)

Sedert: _____

SOORT WERK VAN MOEDER: _____

Oefent beroep uit: ☐ ja ☐ nee, vanwege: (WW, WAO, etc.)

Sedert: _____

Laatst afgemaakte hoofdopleiding Vader: _____

Laatst afgemaakte hoofdopleiding Moeder: _____

Dit formulier werd ingevuld door: ☐ Moeder ☐ Vader ☐ Ander (geef aan): _____

I. Vermeld hier de sporten die Uw kind het liefst beoefent.
Bijvoorbeeld: voetballen, zwemmen, fietsen, rolschaatsen, vissen, paardrijden, enz.

☐ geen

	Vergeleken met leeftijdgenoten, hoeveel tijd besteedt Uw kind aan elk van deze sporten?				Vergeleken met leeftijdgenoten, hoe goed is Uw kind in elk van deze sporten?			
	Onbekend	Minder dan gemiddeld	Gemiddeld	Meer dan gemiddeld	Onbekend	Minder dan gemiddeld	Gemiddeld	Beter dan gemiddeld
a. _____	☐	☐	☐	☐	☐	☐	☐	☐
b. _____	☐	☐	☐	☐	☐	☐	☐	☐
c. _____	☐	☐	☐	☐	☐	☐	☐	☐

II. Vermeld hier de favoriete hobbies, bezigheden en spelletjes (behalve sport) van Uw kind.
Bijvoorbeeld: postzegels, poppen, boeken, handenarbeid, zingen, enz. (uitgezonderd radio of TV).

☐ geen

	Hoeveel tijd besteedt Uw kind vergeleken met leeftijdgenoten aan elk van deze hobbies, bezigheden of spelletjes?				Vergeleken met leeftijdgenoten, hoe goed is Uw kind daarin?			
	Onbekend	Minder dan gemiddeld	Gemiddeld	Meer dan gemiddeld	Onbekend	Minder dan gemiddeld	Gemiddeld	Meer dan gemiddeld
a. _____	☐	☐	☐	☐	☐	☐	☐	☐
b. _____	☐	☐	☐	☐	☐	☐	☐	☐
c. _____	☐	☐	☐	☐	☐	☐	☐	☐

III. Geef hier aan de clubs, verenigingen (of andere organisaties) waar Uw kind lid van is of toe behoort.

☐ geen

	Vergeleken met leeftijdgenoten, hoe actief stelt Uw kind zich op in elk van deze clubs of verenigingen?			
	Onbekend	Minder actief	Gemiddeld	Meer actief
a. _____	☐	☐	☐	☐
b. _____	☐	☐	☐	☐
c. _____	☐	☐	☐	☐

IV. Vermeld hier de eventuele baantjes van Uw kind; dit betreft ook huishoudelijke karweitjes of klusjes (bedoeld worden zowel betaalde als onbetaalde baantjes).
Bijvoorbeeld: krantenwijk, baby-oppas, autowassen enz.

☐ geen

	Vergeleken met leeftijdgenoten, hoe goed doet Uw kind dit werk?			
	Onbekend	Minder dan gemiddeld	Gemiddeld	Beter dan gemiddeld
a. _____	☐	☐	☐	☐
b. _____	☐	☐	☐	☐
c. _____	☐	☐	☐	☐

S.V.P. aankruisen wat van toepassing is.

Nederlandse vertaling: F. C. Verhulst, Academisch Ziekenhuis Rotterdam/Sophia Kinderziekenhuis

Appendix A (continued) Child Behavior Checklist for Children 4-16 years

V. 1. Hoeveel "echte" vrienden en/of vriendinnen heeft Uw kind? ☐ geen ☐ 1 ☐ 2 of 3 ☐ 4 of meer

2. Hoeveel keren per week trekt Uw kind met hen op, buiten normale schooltijden? (broers en zusters niet meegerekend) ☐ minder dan 1 ☐ 1 of 2 ☐ 3 of meer

VI. Vergeleken met leeftijdgenoten, hoe goed:

	n.v.t.	minder goed	ongeveer hetzelfde	beter
a. gaat uw kind om met broers en/of zusters?	☐	☐	☐	☐
b. gaat Uw kind om met andere kinderen?		☐	☐	☐
c. gedraagt Uw kind zich t.o.v. zijn/haar ouders?		☐	☐	☐
d. speelt of werkt Uw kind in z'n eentje?		☐	☐	☐

VII. 1. Huidige schoolresultaten - alleen voor kinderen van 6 jaar en ouder (indien Uw kind geen onderwijs volgt, graag de reden)

☐ bezoekt geen school

		onvoldoende	zwak	voldoende	goed
	a. Taal of Nederlands	☐	☐	☐	☐
	b. Schrijven	☐	☐	☐	☐
	c. Rekenen of wiskunde	☐	☐	☐	☐
	d. Wereldoriëntatie of aardrijkskunde	☐	☐	☐	☐
Andere vakken, zoals: geschiedenis, natuurkunde, vreemde talen, biologie	e. _____	☐	☐	☐	☐
	f. _____	☐	☐	☐	☐
	g. _____	☐	☐	☐	☐
	h. _____	☐	☐	☐	☐
	i. _____	☐	☐	☐	☐

2. Volgt Uw kind buitengewoon (speciaal) onderwijs? ☐ Nee ☐ Ja - wat voor een school?

3. Is Uw kind wel eens blijven zitten? ☐ Nee ☐ Ja - welke klas - reden?

4. Heeft uw kind wel eens leer- en/of andere problemen (bijv. gedragsproblemen) op school gehad? ☐ Nee ☐ Ja - s.v.p. aangeven wat voor problemen

Wanneer zijn deze problemen begonnen?

Zijn deze problemen nu weer verdwenen? ☐ Nee ☐ Ja - sinds wanneer?

Heeft Uw kind een lichamelijke ziekte of (geestelijke) handicap?: ☐ Nee ☐ Ja - (geef aan):

Waarover maakt U zich het meest zorgen wat Uw kind betreft?

Waarover bent U het meest tevreden wat Uw kind betreft?
2

Appendix A (continued) Child Behavior Checklist for Children 4-16 years

VIII. Hier volgt een lijst met vragen die bepaalde gedragingen en eigenschappen van kinderen beschrijven. Bij iedere vraag die betrekking heeft op Uw kind zoals hij/zij nu is of **binnen de afgelopen zes maanden** is geweest, wordt U verzocht een cirkeltje te zetten om de ② als de beschrijving **duidelijk of vaak van toepassing** is op Uw kind. Een cirkeltje om de ① als de beschrijving **een beetje van toepassing** is op Uw kind. Wanneer de beschrijving **helemaal niet van toepassing** is op Uw kind, zet dan een cirkeltje om de ⓪.

0 = HELEMAAL NIET VAN TOEPASSING (voor zover U weet) **1 = EEN BEETJE OF SOMS VAN TOEPASSING** **2 = DUIDELIJK OF VAAK VAN TOEPASSING**

0 1 2 1. Gedraagt zich te jong voor zijn/haar leeftijd.
0 1 2 2. Allergisch (geef aan): _____
0 1 2 3. Spreekt veel tegen of maakt veel ruzie.
0 1 2 4. Asthma.
0 1 2 5. Gedraagt zich als een kind van het andere geslacht.
0 1 2 6. Doet ontlasting (poept) buiten de w.c. of in de broek.
0 1 2 7. Opscheppen, stoer doen.
0 1 2 8. Kan zich niet concentreren, kan niet lang de aandacht bij iets houden.
0 1 2 9. Kan bepaalde gedachten niet uit zijn/haar hoofd zetten; obsessies (geef aan): _____
0 1 2 10. Kan niet stil zitten, onrustig, of over-actief.
0 1 2 11. Klampt zich vast aan volwassenen of is te afhankelijk.
0 1 2 12. Klaagt over zich eenzaam of in de steek gelaten voelen.
0 1 2 13. In de war of chaotisch in het denken.
0 1 2 14. Huilt veel.
0 1 2 15. Wreed voor dieren.
0 1 2 16. Wreed, pesterig of gemeen voor anderen.
0 1 2 17. Dagdromen of gaat geheel op in zijn/haar gedachten.
0 1 2 18. Verwondt zichzelf opzettelijk of doet zelfmoord pogingen.
0 1 2 19. Eist veel aandacht op.
0 1 2 20. Vernielt eigen spullen.
0 1 2 21. Vernielt spullen van andere gezinsleden of van andere kinderen.
0 1 2 22. Is thuis ongehoorzaam.
0 1 2 23. Is ongehoorzaam op school.
0 1 2 24. Eet niet goed.
0 1 2 25. Kan niet goed opschieten met andere kinderen.
0 1 2 26. Lijkt zich **niet** schuldig te voelen na zich misdragen te hebben.
0 1 2 27. Snel jaloers.
0 1 2 28. Eet of drinkt dingen die eigenlijk niet eet- of drinkbaar zijn - geen snoep (geef aan): _____
0 1 2 29. Is bang voor bepaalde dieren, situaties, of plaatsen, uitgezonderd de school (geef aan): _____
0 1 2 30. Is bang om naar school te gaan.
0 1 2 31. Is bang dat hij/zij iets ondeugends of slechts zou kunnen doen of denken.
0 1 2 32. Vindt dat hij/zij perfect moet zijn.
0 1 2 33. Klaagt erover of heeft het gevoel dat niemand van hem/haar houdt.
0 1 2 34. Heeft het gevoel dat anderen het op hem/haar gemunt hebben.
0 1 2 35. Voelt zich waardeloos of minderwaardig.
0 1 2 36. Krijgt vaak ongelukken en/of verwondingen (geef aan): _____
0 1 2 37. Vecht veel.
0 1 2 38. Wordt veel geplaagd.
0 1 2 39. Gaat om met kinderen die in moeilijkheden verzeild raken.
0 1 2 40. Hoort geluiden of stemmen die er niet zijn (geef aan): _____
0 1 2 41. Impulsief of onnadenkend gedrag.
0 1 2 42. Vindt het fijn om alleen te zijn.
0 1 2 43. Liegen of bedriegen.
0 1 2 44. Nagelbijten.
0 1 2 45. Zenuwachtig, gespannen.
0 1 2 46. Zenuwachtige bewegingen of trekkingen (geef aan):
0 1 2 47. Nachtmerries.
0 1 2 48. Andere kinderen mogen hem/haar niet.
0 1 2 49. Obstipatie, houdt ontlasting op, last van verstopping.
0 1 2 50. Is te angstig of te bang.
0 1 2 51. Last van duizeligheid.
0 1 2 52. Te veel last van schuldgevoel.
0 1 2 53. Eet te veel.
0 1 2 54. Oververmoeid.
0 1 2 55. Te dik.
56. Lichamelijke klachten zonder duidelijke medische oorzaak:
0 1 2 a. pijnen
0 1 2 b. hoofdpijn
0 1 2 c. misselijkheid
0 1 2 d. moeilijkheden met zien (geef aan): _____
0 1 2 e. huiduitslag of andere huidaandoeningen
0 1 2 f. maagpijn, buikpijn of -krampen
0 1 2 g. overgeven
0 1 2 h. andere klachten (geef aan): _____

Appendix A (continued) Child Behavior Checklist for Children 4-16 years

0 = HELEMAAL NIET VAN TOEPASSING (voor zover U weet) 1 = EEN BEETJE OF SOMS VAN TOEPASSING 2 = DUIDELIJK OF VAAK VAN TOEPASSING

0 1 2 57. Valt anderen aan of valt anderen lastig.

0 1 2 58. Neuspeuteren, pulkt of trekt veel aan huid of andere lichaamsdelen (geef aan): _____

0 1 2 59. Speelt met eigen geslachtsdelen in het openbaar.
0 1 2 60. Speelt te veel met eigen geslachtsdelen.

0 1 2 61. Slechte schoolresultaten.
0 1 2 62. Onhandig, slechte coördinatie.

0 1 2 63. Speelt het liefst met oudere kinderen.
0 1 2 64. Speelt het liefst met jongere kinderen.

0 1 2 65. Weigert om te praten.
0 1 2 66. Herhaalt alsmaar bepaalde handelingen; dwanghandelingen (geef aan): _____

0 1 2 67. Loopt weg van huis.
0 1 2 68. Schreeuwt of gilt veel.

0 1 2 69. Gesloten, anderen weten niet goed wat er in hem/haar omgaat.
0 1 2 70. Ziet dingen die er niet zijn (geef aan): _____

0 1 2 71. Schaamt of geneert zich snel.
0 1 2 72. Brandstichten.

0 1 2 73. Sexuele problemen (geef aan welke): _____

0 1 2 74. Speelt de clown, doet raar of 'gek' om de aandacht te trekken.

0 1 2 75. Verlegen, schuchter.
0 1 2 76. Slaapt minder dan de meeste kinderen.

0 1 2 77. Slaapt meer dan de meeste kinderen overdag en/of 's nachts (geef aan): _____

0 1 2 78. Smeert of speelt met de ontlasting.

0 1 2 79. Spraakproblemen (geef aan welke): _____

0 1 2 80. Kijkt met een lege of 'wezenloze' blik.

0 1 2 81. Steelt van huis.
0 1 2 82. Steelt buitenshuis.

0 1 2 83. Verzamelt dingen die hij/zij niet nodig heeft (geef aan wat): _____

0 1 2 84. Vreemd gedrag, doet vreemd (geef aan): _____

0 1 2 85. Vreemde gedachten (geef aan): _____

0 1 2 86. Koppig, stuurs of prikkelbaar.

0 1 2 87. Verandert plotseling van stemming.
0 1 2 88. Mokken, pruilen.

0 1 2 89. Achterdochtig.
0 1 2 90. Vloeken, schuttingtaal.

0 1 2 91. Praat erover dat hij/zij zichzelf zou willen doden.
0 1 2 92. Slaapwandelen of hardop praten in de slaap (geef aan):

0 1 2 93. Praat te veel.
0 1 2 94. Plaagt veel.

0 1 2 95. Driftbuien of snel driftig.
0 1 2 96. Denkt te veel aan sex.

0 1 2 97. Bedreigt andere mensen.
0 1 2 98. Duimzuigen of zuigen op vingers.

0 1 2 99. Overdreven netjes of schoon.
0 1 2 100. Slaapmoeilijkheden (geef aan): _____

0 1 2 101. Spijbelen, schoolverzuim.
0 1 2 102. Traag, langzaam, te weinig 'energie'.

0 1 2 103. Ongelukkig, verdrietig, gedeprimeerd.
0 1 2 104. Is erg luidruchtig.

0 1 2 105. Gebruikt alcohol of drugs (geef aan): _____

0 1 2 106. Vandalisme, vernielen.

0 1 2 107. Broekplassen overdag.
0 1 2 108. Bedplassen.

0 1 2 109. Dreinerig, jengelig.
0 1 2 110. Wil liever van het andere geslacht zijn.

0 1 2 111. Teruggetrokken, komt niet tot contact met anderen.
0 1 2 112. Maakt zich zorgen.

113. Geeft U s.v.p. verder nog aan ieder ander probleem dat hierboven nog niet aan de orde is geweest.

0 1 2 _____
0 1 2 _____
0 1 2 _____
0 1 2 _____

4

N.B.: Wilt U s.v.p. controleren of U bij iedere vraag één cijfer hebt omcirkeld?

Appendix B. Youth Self-Report 11-18 years

ZELF IN TE VULLEN VRAGENLIJST VOOR MEISJES EN JONGENS VAN 11 TOT 18 JAAR

NAAM

GESLACHT ☐ Jongen ☐ Meisje | LEEFTIJD | Nationaliteit: Land van herkomst:

DATUM VAN INVULLEN: Dag ____ Maand ____ Jaar ____ | GEBOORTEDATUM: Dag ____ Maand ____ Jaar ____

Soort school of opleiding:

Welke klas:

SOORT WERK VAN JE OUDERS
(s.v.p. zo duidelijk mogelijk – bijvoorbeeld: automonteur, onderwijzer, metaalarbeider, schoenverkoper enz., ook al woon je niet bij je ouders)

SOORT WERK VAN VADER: ____

SOORT WERK VAN MOEDER: ____

EVENTUEEL: SOORT WERK VAN JEZELF: ____

S.v.p. aankruisen wat van toepassing is.

I. **Vermeld hier de sporten die je het liefst beoefent.**
Bijvoorbeeld: voetballen, zwemmen, fietsen, rolschaatsen, vissen, paardrijden, enz.

☐ geen

Vergeleken met leeftijdgenoten, hoeveel tijd besteed je aan elk van deze sporten?

	onbekend	minder dan gemiddeld	gemiddeld	meer dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

Vergeleken met leeftijdgenoten, hoe goed ben je in elk van deze sporten?

	onbekend	minder dan gemiddeld	gemiddeld	beter dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

II. **Vermeld hier je favoriete hobbies of bezigheden (behalve sport)**
Bijvoorbeeld: postzegels, poppen, boeken, handenarbeid, zingen enz. **uitgezonderd** radio en TV

☐ geen

Hoeveel tijd besteed je vergeleken met leeftijdgenoten aan elk van deze hobbies of bezigheden?

	onbekend	minder dan gemiddeld	gemiddeld	meer dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

Vergeleken met leeftijdgenoten, hoe goed ben je daarin?

	onbekend	minder dan gemiddeld	gemiddeld	beter dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

III. **Geef hier aan de clubs, verenigingen (of andere organisaties) waar je lid van bent of toe behoort**

☐ geen

Vergeleken met leeftijdgenoten, hoe aktief ben je in elk van deze clubs en/of verenigingen?

	onbekend	minder dan gemiddeld	gemiddeld	meer dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

IV. **Vermeld hier de eventuele baantjes (betaald of onbetaald) die je hebt; dit betreft ook huishoudelijke karweitjes of klusjes.**
Bijvoorbeeld: krantenwijk, baby-oppas, autowassen enz.

☐ geen

Vergeleken met leeftijdgenoten, hoe goed doe je dit werk?

	onbekend	minder dan gemiddeld	gemiddeld	beter dan gemiddeld
a. ____	☐	☐	☐	☐
b. ____	☐	☐	☐	☐
c. ____	☐	☐	☐	☐

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Appendix B (continued) Youth Self-Report 11-18 years

V. 1. Hoeveel "echte" vrienden en/of vriendinnen heb je? ☐ geen ☐ 1 ☐ 2 of 3 ☐ 4 of meer

2. Hoeveel keren per week trek je met hen op? ☐ minder dan 1 x ☐ 1 of 2 x ☐ 3 of meer x

VI. Vergeleken met leeftijdgenoten, hoe goed:

	minder goed	ongeveer hetzelfde	beter	
a. kan je opschieten met broers en/of zusters?	☐	☐	☐	☐ Ik heb geen broers/zusters
b. kan je opschieten met andere jongens en meisjes van je leeftijd?	☐	☐	☐	
c. kan je met je ouders opschieten?	☐	☐	☐	
d. kan je in je eentje bezig zijn met iets?	☐	☐	☐	

VII. Huidige schoolresultaten

☐ zit niet op school

		onvoldoende	zwak	voldoende	goed
	a. Nederlands/Taal	☐	☐	☐	☐
	b. Wiskunde/Rekenen	☐	☐	☐	☐
Andere vakken:	c. _____	☐	☐	☐	☐
	d. _____	☐	☐	☐	☐
	e. _____	☐	☐	☐	☐
	f. _____	☐	☐	☐	☐
	g. _____	☐	☐	☐	☐
	h. _____	☐	☐	☐	☐
	i. _____	☐	☐	☐	☐

Beschrijf hier je eventuele zorgen of problemen die je hebt wat betreft school:

Beschrijf hier eventuele andere zorgen die je hebt:

Beschrijf hier datgene van jezelf waarover je het meest tevreden bent:

Heb je een lichamelijke ziekte of handicap? ☐ nee ☐ ja (geef aan):

bladzijde 2

Appendix B (continued) Youth Self-Report 11-18 years

Hieronder staat een aantal vragen die slaan op hoe je nu bent of **in de afgelopen 6 maanden bent geweest.**
Wil je iedere vraag goed lezen en iedere vraag beantwoorden?
Wil je dan bij iedere vraag een rondje om een van de cijfers zetten en wel: om de (2) als je vindt dat de vraag **duidelijk of vaak** op jou van toepassing is, om de (1) als hij **een beetje of soms** van toepassing is of om de (0) als de vraag **helemaal niets** met je te maken heeft.

0 = helemaal niet van toepassing **1 = een beetje of soms van toepassing** **2 = duidelijk of vaak van toepassing**

0 1 2 1. Ik gedraag me te jong voor mijn leeftijd.
0 1 2 2. Ik ben allergisch (geef aan): _____
_____
0 1 2 3. Ik maak veel ruzie.
0 1 2 4. Ik heb asthma.
0 1 2 5. Ik gedraag me als iemand van het andere geslacht.
0 1 2 6. Ik houd van dieren.
0 1 2 7. Ik schep op (of doe stoer)
0 1 2 8. Ik heb moeite me te concentreren, of om lang mijn aandacht ergens bij te houden.
0 1 2 9. Ik kan bepaalde gedachten maar niet uit mijn hoofd zetten (geef aan): _____
_____
0 1 2 10. Ik heb moeite met stil zitten.
0 1 2 11. Ik ben te afhankelijk van volwassenen.
0 1 2 12. Ik voel me eenzaam.
0 1 2 13. Ik voel me in de war.
0 1 2 14. Ik huil veel.
0 1 2 15. Ik ben nogal eerlijk.
0 1 2 16. Ik ben gemeen voor anderen.
0 1 2 17. Ik dagdroom veel.
0 1 2 18. Ik probeer mijzelf opzettelijk te verwonden of doe zelfmoordpogingen.
0 1 2 19. Ik probeer veel aandacht te krijgen.
0 1 2 20. Ik maak mijn eigen spullen kapot.
0 1 2 21. Ik maak de spullen van anderen kapot.
0 1 2 22. Ik ben ongehoorzaam aan mijn ouders.
0 1 2 23. Ik ben ongehoorzaam op school (of werk).
0 1 2 24. Ik eet niet zo goed als zou moeten.
0 1 2 25. Ik kan niet goed met andere jongens en meisjes opschieten.
0 1 2 26. Ik voel mij **niet** schuldig als ik iets gedaan heb wat eigenlijk niet mag.
0 1 2 27. Ik ben jaloers op anderen.
0 1 2 28. Ik ben bereid anderen te helpen wanneer zij hulp nodig hebben.
0 1 2 29. Ik ben bang voor bepaalde situaties, dieren of plaatsen (behalve school) (geef aan): _____
_____
0 1 2 30. Ik ben bang voor school.
0 1 2 31. Ik ben bang dat ik misschien iets slechts zou kunnen doen of denken.
0 1 2 32. Ik vind dat ik perfect moet zijn.
0 1 2 33. Ik heb het gevoel dat niemand van mij houdt.
0 1 2 34. Ik heb het gevoel dat anderen het op mij gemunt hebben.
0 1 2 35. Ik voel me waardeloos, niks waard.
0 1 2 36. Ik raak vaak per ongeluk gewond.
0 1 2 37. Ik vecht veel.
0 1 2 38. Ik word veel gepest.
0 1 2 39. Ik ga om met jongens en meisjes die in moeilijkheden verzeild raken.
0 1 2 40. Ik hoor geluiden of stemmen die niemand anders schijnt te kunnen horen (geef aan): _____
_____
0 1 2 41. Ik doe zomaar iets zonder er bij na te denken.
0 1 2 42. Ik vind het fijn om alleen te zijn.
0 1 2 43. Ik lieg of bedrieg.
0 1 2 44. Ik bijt op mijn nagels.
0 1 2 45. Ik ben zenuwachtig of gespannen.
0 1 2 46. Ik heb last van zenuwachtige trekkingen of bewegingen (bijvoorbeeld in het gezicht) (geef aan): _____
_____
0 1 2 47. Ik heb nachtmerries.
0 1 2 48. Andere jongens/meisjes mogen mij niet.
0 1 2 49. Ik doe sommige dingen beter dan mijn leeftijdgenoten.
0 1 2 50. Ik ben te angstig of bang.
0 1 2 51. Ik heb last van duizeligheid.
0 1 2 52. Ik heb te veel last van schuldgevoel.
0 1 2 53. Ik eet te veel.
0 1 2 54. Ik voel me oververmoeid.
0 1 2 55. Ik ben te dik.
56. Lichamelijke klachten zonder duidelijke medische oorzaak:
0 1 2 a. pijnen
0 1 2 b. hoofdpijn
0 1 2 c. misselijkheid
0 1 2 d. moeilijkheden met zien (geef aan): _____
_____
0 1 2 e. huiduitslag of andere huidaandoeningen
0 1 2 f. maagpijn, buikpijn of buikkrampen
0 1 2 g. overgeven
0 1 2 h. andere klachten (geef aan): _____
_____
0 1 2 57. Ik val anderen lichamelijk aan.
0 1 2 58. Ik peuter veel in mijn neus, of pulk of trek veel aan mijn huid of aan andere lichaamsdelen (geef aan): _____
_____
0 1 2 59. Ik kan best aardig zijn.
0 1 2 60. Ik vind het leuk om nieuwe dingen te proberen.

bladzijde 3

Appendix B (continued) Youth Self-Report 11-18 years

0 = helemaal niet van toepassing 1 = een beetje of soms van toepassing 2 = duidelijk of vaak van toepassing

0	1	2	61.	Mijn schoolresultaten zijn slecht.
0	1	2	62.	Ik ben onhandig of heb last van slechte coordinatie.
0	1	2	63.	Ik ben liever samen met **oudere** jongens of meisjes dan met leeftijdgenoten.
0	1	2	64.	Ik ben liever samen met **jongere** jongens of meisjes dan met leeftijdgenoten.
0	1	2	65.	Ik weiger om te praten.
0	1	2	66.	Ik herhaal alsmaar bepaalde handelingen; dwanghandelingen (geef aan): _____
0	1	2	67.	Ik loop van huis weg.
0	1	2	68.	Ik schreeuw en gil veel.
0	1	2	69.	Ik ben gesloten; anderen weten niet goed wat er in me omgaat.
0	1	2	70.	Ik zie dingen waarvan anderen denken dat ze er niet zijn (geef aan): _____
0	1	2	71.	Ik schaam me snel, voel me gauw opgelaten.
0	1	2	72.	Ik steek brandjes.
0	1	2	73.	Ik ben handig.
0	1	2	74.	Ik doe raar of "gek" om de aandacht te trekken, Ik speel de clown.
0	1	2	75.	Ik ben verlegen.
0	1	2	76.	Ik slaap minder dan mijn leeftijdgenoten.
0	1	2	77.	Ik slaap meer dan mijn leeftijdgenoten overdag en of 's nachts (geef aan): _____
0	1	2	78.	Ik heb een goede fantasie.
0	1	2	79.	Ik heb een spraakprobleem (geef aan): _____
0	1	2	80.	Ik kom op voor mijn rechten.
0	1	2	81.	Ik steel thuis.
0	1	2	82.	Ik steel buitenshuis.
0	1	2	83.	Ik verzamel dingen die ik eigenlijk niet nodig heb (geef aan): _____
0	1	2	84.	Ik doe dingen die andere mensen vreemd of "gek" zouden vinden (geef aan): _____
0	1	2	85.	Ik heb gedachten die andere mensen vreemd of "gek" zouden vinden (geef aan): _____
0	1	2	86.	Ik ben koppig.
0	1	2	87.	Mijn stemming of gevoelens kunnen plotseling veranderen.
0	1	2	88.	Ik vind het leuk om samen met anderen te zijn.
0	1	2	89.	Ik ben achterdochtig.
0	1	2	90.	Ik vloek of gebruik schuttingtaal.
0	1	2	91.	Ik denk er wel eens over een eind aan mijn leven te maken.
0	1	2	92.	Ik vind het leuk anderen aan het lachen te maken.
0	1	2	93.	Ik praat te veel.
0	1	2	94.	Ik plaag anderen veel.
0	1	2	95.	Ik ben snel aangebrand, of driftig.
0	1	2	96.	Ik denk te veel aan sex.
0	1	2	97.	Ik bedreig andere mensen.
0	1	2	98.	Ik vind het fijn anderen te helpen.
0	1	2	99.	Ik maak me zorgen over netjes of schoon te zijn.
0	1	2	100.	Ik heb problemen met slapen (geef aan): _____
0	1	2	101.	Ik spijbel.
0	1	2	102.	Ik heb weinig fut.
0	1	2	103.	Ik voel me ongelukkig, verdrietig of gedeprimeerd.
0	1	2	104.	Ik maak meer lawaai dan andere jongens of meisjes.
0	1	2	105.	Ik gebruik alcohol of drugs (geef aan wat en hoeveel): _____
0	1	2	106.	Ik probeer eerlijk te zijn tegenover anderen.
0	1	2	107.	Ik hou van een goede grap.
0	1	2	108.	Ik hou van een plezierig en makkelijk leven.
0	1	2	109.	Ik probeer andere mensen te helpen.
0	1	2	110.	Ik zou liever van het andere geslacht zijn.
0	1	2	111.	Ik probeer zo weinig mogelijk met andere mensen te maken te hebben.
0	1	2	112.	Ik pieker veel, maak me veel zorgen.

Schrijf hier alle andere zaken op die te maken hebben met je gevoelens, je gedrag, je manier van doen of je belangstelling.

KIJK NOG EENS GOED NA OF JE ALLE VRAGEN HEBT BEANTWOORD.

bladzijde 4

Appendix C. Tanner / van Wieringen rating criteria for secondary sex characteristics

MAMMAE (Girls)

CODE:	CRITERIA:
M1	Elevation above the skin of only the papilla. (Pre-adolescence.)
M2	Bud-like elevation of areola and papilla above the skin. On palpation a rather hard, disc- or cherry-shaped "button" can be felt. Areola-diameter has increased, and the surrounded area is slightly elevated.
M3	Shape of a small adult breast, with a continuous, round perimeter. Further elevation of the breast. Areola-diameter further enlarged.
M4	Increasing fat-deposits. Areola and papilla further enlarged. The areola forms a second mount on top of that of the breast. (This second mount apparently appears in about half of the girls, and may continue into adulthood).
M5	The areola has (most of the time) receded to the general surface of the breast. (Adult stage).

Note: 1. On breast a-symmetry, the *most developed* of the two is to be rated.
2. In case of doubt between two stages, the lowest (= *least advanced*) of the two is to be rated.

Appendix C (continued) Tanner / van Wieringen rating criteria for secondary sex characteristics

PUBIC HAIR (Girls)

CODE:	CRITERIA:
PH1	No pubic hair.
PH2	Some liightly pigmented hairs, usually straight or only slightly curled, mostly on the labia.
PH3	Still sparse, but clearly pigmented, curly hair on the labia; beginning spread on the mons.
PH4	Adult-type hair, but the area covered much smaller than in adult. No spread up to the inguinal fold yet.
PH5	Adult coverage in a reversed triangle, with the horizontal line on the mons, and lateral spread up to the inguinal fold.
PH6	Further spread sideways onto the thighs, upwards onto the abdominal wall, or scattered. (Found only in a minority of females, may be reached after adolescence.)

Note: In case of doubt between two stages, the lowest (= *least advanced)* of the two is to be rated.

Appendix C (continued) Tanner / van Wieringen rating criteria for secondary sex characteristics

GENITALS (Boys)

CODE:	CRITERIA:
G1	Absence of characteristics of stages 2 to 5. (Pre-puberty: Testes, scrotum and penis of same size and shape as in the younger child.)
G2	The scrotal skin becomes redder, thinner, and wrinkled. Enlargement of testes and scrotum. No or hardly any enlargement of the penis.
G3	Enlargement of the penis, especially in length. Lowering of the scrotum. Further enlargement of testes and scrotum.
G4	Continued enlargement of the penis and delineation of the glans. Further enlargement of testes and scrotum. The scrotal skin shows increased pigmentation. (This stage is "almost adult".)
G5	Penis and bottom of scrotum reach to about the same level. Ample scrotum. (External genitalia are of adult size and shape.)

Note: In case of doubt between two stage, the lowest (= *least advanced)* of the two is to be rated.

TESTIS VOLUME
[Testis volume is determined if the examined boy is rated as G1.]

Examination preferably lying down. Stretch the scrotum, isolate *right* testis with one hand; take the orchidometer in the other hand, and choose the bead closest to that of the *right* testis including the (stretched out) scrotal skin.

Note: 1. In case of doubt between two orchidometer beads, the *lowest* volume is to be noted.
2. Pay attention to left/right - avoid transposition.

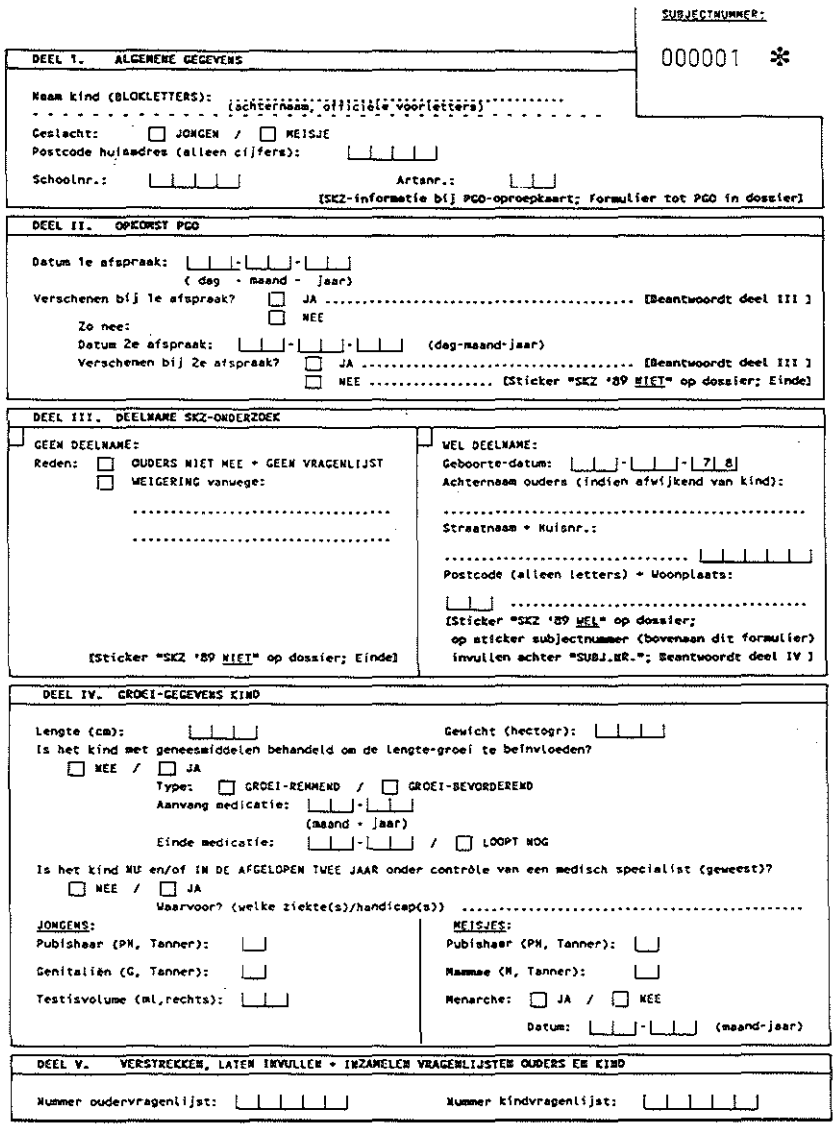
Appendix C (continued) Tanner / van Wieringen rating criteria for secondary sex characteristics

PUBIC HAIR (Boys)

CODE:	CRITERIA:
PH1	No pubic hair. Possibly some fine hairs on the pubes as it appears on the rest of the abdomen. (Pre-adolescence.)
PH2	Some lightly pigmented, longer, straight hair, often still downy; usually at the base of the penis, sometimes on the scrotum.
PH3	Still sparse, but clearly pigmented, cruder and more curly hair around the base of the penis.
PH4	Adult-type hair, but the area covered still much smaller dan in adult. No coverage beyond the inguinal fold.
PH5	Adult-type quantity and type. Spread to medial thigh surface, but *not* above the linea alba.
PH6	Further lateral spread and spread above the linea alba. (Occurs in majority of adult men; may be reached after adolescence.)

Note: In case of doubt between two stages, the lowest (= *least advanced*) of the two is to be rated.

Appendix D. School physicians' recording sheet



SUBJECTNUMMER:

000001 *

DEEL I. ALGEMENE GEGEVENS

Naam kind (BLOKLETTERS): ..... (achternaam, officiële voorletters) .....

Geslacht: ☐ JONGEN / ☐ MEISJE

Postcode huisadres (alleen cijfers): |_|_|_|_|

Schoolnr.: |_|_|_|_| Artsnr.: |_|_|

[SKZ-informatie bij PGO-oproepkaart; formulier tot PGO in dossier]

DEEL II. OPKOMST PGO

Datum 1e afspraak: |_|_|-|_|_|-|_|_|
(dag - maand - jaar)

Verschenen bij 1e afspraak? ☐ JA ..... [Beantwoordt deel III]
☐ NEE

Zo nee:
Datum 2e afspraak: |_|_|-|_|_|-|_|_| (dag-maand-jaar)
Verschenen bij 2e afspraak? ☐ JA ..... [Beantwoordt deel III]
☐ NEE ..... [Sticker "SKZ '89 NIET" op dossier; Einde]

DEEL III. DEELNAME SKZ-ONDERZOEK

GEEN DEELNAME:
Reden: ☐ OUDERS NIET MEE + GEEN VRAGENLIJST
☐ WEIGERING vanwege:
.....
.....

[Sticker "SKZ '89 NIET" op dossier; Einde]

WEL DEELNAME:
Geboorte-datum: |_|_|-|_|_|-|7|8|
Achternaam ouders (indien afwijkend van kind):
.....
Straatnaam + Huisnr.:
..... |_|_|_|_|_|
Postcode (alleen letters) + Woonplaats:
|_|_| .....
[Sticker "SKZ '89 WEL" op dossier;
op sticker subjectnummer (bovenaan dit formulier)
invullen achter "SUBJ.NR."; Beantwoordt deel IV]

DEEL IV. GROEI-GEGEVENS KIND

Lengte (cm): |_|_|_| Gewicht (hectogr): |_|_|_|
Is het kind met geneesmiddelen behandeld om de lengte-groei te beïnvloeden?
☐ NEE / ☐ JA
Type: ☐ GROEI-REMMEND / ☐ GROEI-BEVORDEREND
Aanvang medicatie: |_|_|-|_|_|
(maand + jaar)
Einde medicatie: |_|_|-|_|_| / ☐ LOOPT NOG

Is het kind NU en/of IN DE AFGELOPEN TWEE JAAR onder controle van een medisch specialist (geweest)?
☐ NEE / ☐ JA
Waarvoor? (welke ziekte(s)/handicap(s)) .....

JONGENS:
Pubishaar (PH, Tanner): |_|
Genitaliën (G, Tanner): |_|
Testisvolume (ml,rechts): |_|_|

MEISJES:
Pubishaar (PH, Tanner): |_|
Mammae (M, Tanner): |_|
Menarche: ☐ JA / ☐ NEE
Datum: |_|_|-|_|_| (maand-jaar)

DEEL V. VERSTREKKEN, LATEN INVULLEN + INZAMELEN VRAGENLIJSTEN OUDERS EN KIND

Nummer oudervragenlijst: |_|_|_|_|_| Nummer kindvragenlijst: |_|_|_|_|_|

Appendix E. Distribution of participants by Rotterdam neighborhood

CBS-NO.	Neighborhood per district (a)	Number of participants			Neighborh. disadv. score (b)
		Boys	Girls	Total	
10	Stadsdrieh.	3	4	7	0.21
12	Cool	3	1	4	-0.49
13	CS Kwartier	1	-	1	0.24
18	Nieuwe Werk	-	-	-	-0.61
19	Dijkzigt	-	-	-	-0.15
Total district A		7	5	12	
11	**Oude Westen**	10	10	20	-1.68
24	**Nwe Westen**	20	10	30	-1.19
25	*Middelland*	9	19	28	-1.38
Total district B		39	39	78	
20	*Delfshaven*	4	13	17	-0.81
21	*Bospolder*	13	6	19	-1.30
22	Tussendijken	6	9	15	-1.15
23	**Spangen**	14	11	25	-1.37
27	Oud-Mathen.	5	4	9	0.19
28	Witte Dorp	1	1	2	-1.12
29	Schiemond	6	5	11	-1.23
Total district C		49	49	98	
51	**Kleinpolder**	13	14	27	0.21
52	Noord-Kethel	-	-	-	0.19
54	Schieveen	2	1	3	1.94
55	Zestienhoven	2	4	6	-0.10
56	**Overschie**	29	28	57	0.91
57	Landzicht	-	1	1	-0.11
Total district D (Overschie)		46	48	94	
15	Agniesebuurt	2	3	5	-1.23
16	Proven.-wijk	2	3	5	-0.97
31	*Bergpolder*	3	12	15	-0.28
32	**Blijdorp**	20	17	37	0.74
34	*Liskwartier*	8	10	18	-0.52
35	**Oude Noorden**	11	10	21	-1.40
58	Bl. Polder	-	-	-	1.98
Total district E (Noord)		46	55	101	

- continued -

CBS-NO.	Neighborhood per district (a)	Number of participants			Neighborh. disadv. score (b)
		Boys	Girls	Total	
10	Stadsdrieh.	3	4	7	0.21
60	**Schiebroek**	31	26	57	1.10
61	**H'berg-Zuid**	16	23	39	0.81
62	*H'berg-Noord*	7	14	21	1.03
64	Terbregge	1	1	2	1.30
65	**Molenlaankw.**	19	32	51	1.86
Total district F (H'berg/Schiebroek)		74	96	170	
14	*Rubroek*	9	10	19	0.08
36	Nw-Crooswijk	3	3	6	-1.17
37	*Oud-Croosw.*	5	11	16	-1.45
41	**Kralingen-W.**	22	28	50	-0.52
42	**Kralingen-O.**	22	20	42	0.45
43	Kral. Bos	1	-	1	0.23
45	De Esch	2	-	2	-0.26
47	Struisenburg	8	5	13	0.15
Total district H (Kralingen)		72	77	149	
44	'sGravenInd	2	3	5	1.42
46	Kral. veer	7	3	10	1.06
48	**Prinsenland**	11	12	23	0.40
49	**Lage Land**	14	11	25	1.16
63	**Ommoord**	76	66	142	1.41
66	**Zevenkamp**	64	63	127	0.48
67	**Oosterflank**	35	29	64	0.52
Total district J (Pr. Alexander)		209	187	396	
85	Katendrecht	3	7	10	-1.08
86	Afrik.-wijk	9	9	18	-1.40
87	Feijenoord	9	9	18	-1.69
88	Noord.eiland	4	2	6	-0.67
Total district K		25	27	52	
81	**Bloemhof**	22	23	55	-1.05
82	*Hillesluis*	9	14	23	-1.41
Total district L		31	37	68	
80	**Vreewijk** (= district M)	20	24	44	0.40
83	Oud IJsselm.	9	6	15	0.88
84	**Lombardijen**	13	22	35	0.77
89	**Gr. IJsselm.**	54	42	96	1.01
90	**Beverwaard**	49	51	100	-0.53
Total district N (IJsselmonde)		125	121	246	

- continued -

CBS-NO.	Neighborhood per district (a)	Number of participants			Neighborh. disadv. score (b)
		Boys	Girls	Total	
10	Stadsdrieh.	3	4	7	0.21
71	**Tarwewijk**	13	11	24	-0.72
72	**Carnisse**	15	14	29	-0.02
73	**Zuidwijk**	28	26	54	0.73
74	**Oud-Charlois**	26	17	43	-0.21
75	Wielewaal	1	2	3	1.20
76	Zuidplein	-	-	-	0.22
77	**Pendrecht**	23	10	33	0.80
78	Zuiderpark	1	-	1	0.96
Total district P (Charlois)		107	80	187	
91	**Pernis**	16	16	32	1.01
93	Heijplaat	3	5	8	1.22
Total district R		19	21	40	
92	**H'vliet-Nrd**	16	31	47	-0.21
99	**H'vliet-Zuid**	49	59	108	0.71
Total district S (Hoogvliet)		65	90	155	
01	HvH-Strnd	3	3	6	1.17
02	**HvH-Dorp**	30	29	59	1.18
03	HvH-Rijnprt	-	-	-	0.48
Total district T (Hoek van Holland)		33	32	65	
Total missing		31	33	64	

Notes: a) Name of neighborhood/district typed in:
- fat: both boys and girls ≥ 10 participants
- italics: either boys or girls < 10 participants
- plain: both boys and girls < 10 participants

b) source: G.B.O.S., 1988

Appendix F. Items defining the cross-informant syndrome constructs, plus items specific to the CBCL and YSR Syndrome Scales

Attention Problems

1. Acts too young
8. Can't concentrate
10. Can't sit still
13. Confused
17. Daydreams
41. Impulsive
45. Nervous, tense
61. Poor school work
62. Clumsy

CBCL only:

46. Twitches
80. Stares blankly

Aggressive

3. Argues
7. Brags
16. Mean to others
19. Demands attention
20. Destroys own things
21. Destroys others' things
23. Disobedient at school
27. Jealous
37. Fights
57. Attacks people
68. Screams
74. Shows off
86. Stubborn, irritable
87. Sudden mood changes
93. Talks too much
94. Teases
95. Temper tantrums
97. Threatens
104. Loud

CBCL only:

22. Disobedient at home

Anxious/Depressed

12. Lonely
14. Cries a lot
31. Fears impulses
32. Needs to be perfect
33. Feels unloved
34. Feels persecuted
35. Feels worthless
45. Nervous, tense
50. Fearful, anxious
52. Feels too guilty
71. Self-conscious
89. Suspicious
103. Unhappy, sad, depressed
112. Worries

YSR only:

18. Harms self
91. Thinks about suicide

Delinquent

26. Lacks guilt
39. Bad companions
43. Lies
63. Prefers older kids
67. Runs away from home
72. Sets fires
81. Steals at home
82. Steals outside home
90. Swearing, obscenity
101. Truancy
105. Alcohol, drugs

CBCL only:

96. Thinks about sex too much
106. Vandalism

Social Problems

1. Acts too young
11. Too dependent
25. Doesn't get along w. peers
38. Gets teased
48. Not like by peers
62. Clumsy
64. Prefers younger kids

CBCL only:

55. Overweight

YSR only:

111. Withdrawn

Somatic Complaints

51. Feels dizzy
54. Overtired
56a. Aches, pains
56b. Headaches
56c. Nausea
56d. Eye problems
56e. Rashes, skin problems
56f. Stomachaches
56g. Vomiting

Thought Problems

9. Can't get mind off thoughts
40. Hears things
66. Repeats acts
70. Sees things
84. Strange behavior
85. Strange ideas

CBCL only:

80. Stares blankly

Withdrawn

42. Would rather be alone
65. Refuses to talk
69. Secretive
75. Shy, timid
102. Underactive
103. Unhappy, sad, depressed
111. Withdrawn

CBCL only:

80. Stares blankly
88. Sulks

Appendices G1 to G4 Mean scale scores per socio-economic group

Appendix G1 Mean CBCL scale score and standard deviation per level of parental occupation

Scale	Unskilled	Skilled labor	Lower employee	Self-Employed	Middle Employee	Higher Profession
ADD	3.5 (3.4)	3.3 (2.9)	3.0 (3.1)	2.6 (2.7)	2.6 (2.7)	2.7 (2.6)
AGG	7.6 (6.5)	6.5 (5.8)	5.5 (5.2)	5.4 (5.2)	4.7 (4.7)	4.4 (4.6)
AXD	3.2 (2.8)	2.8 (3.2)	2.5 (3.2)	2.0 (3.0)	2.6 (3.4)	2.5 (3.2)
DEL	1.4 (1.5)	1.2 (1.5)	1.0 (1.4)	1.0 (1.4)	0.7 (1.2)	0.9 (1.5)
SOC	1.8 (1.9)	1.6 (2.0)	1.5 (2.0)	1.3 (1.6)	1.2 (1.9)	1.3 (1.9)
SOM	1.4 (1.8)	1.2 (1.7)	1.3 (1.8)	1.1 (1.6)	1.0 (1.6)	0.9 (1.4)
THT	0.1 (0.3)	0.1 (0.4)	0.1 (0.5)	0.2 (0.7)	0.2 (0.6)	0.1 (0.3)
WTH	2.1 (1.8)	2.1 (2.1)	1.8 (2.0)	1.6 (1.9)	1.9 (2.1)	1.7 (1.8)
EXT	9.0 (7.7)	7.7 (7.0)	6.5 (6.2)	6.3 (6.3)	5.5 (5.5)	5.3 (5.7)
INT	6.7 (4.6)	6.0 (5.7)	5.5 (5.8)	4.7 (5.3)	5.4 (5.6)	4.9 (4.5)
TBP	24.2 (15.5)	21.1 (15.8)	18.7 (15.6)	17.2 (14.0)	16.6 (14.3)	16.0 (12.8)

Appendix G2 Mean YSR scale score and standard deviation per level of parental occupation

Scale	Unskilled	Skilled labor	Lower employee	Self-Employed	Middle Employee	Higher Profession
ADD	2.8 (2.6)	3.3 (2.6)	2.9 (2.6)	2.7 (2.3)	2.6 (2.4)	2.3 (2.1)
AGG	5.6 (4.8)	5.7 (4.8)	5.2 (4.3)	4.6 (4.1)	4.7 (4.1)	4.3 (4.2)
AXD	3.1 (3.6)	3.6 (3.5)	3.2 (3.5)	2.5 (3.1)	3.0 (3.4)	2.7 (3.1)
DEL	1.5 (1.5)	1.7 (1.7)	1.7 (1.8)	1.7 (1.8)	1.5 (1.7)	1.7 (1.5)
SOC	1.8 (2.2)	2.3 (2.2)	1.9 (2.1)	1.8 (1.9)	1.6 (1.9)	1.5 (1.8)
SOM	2.5 (2.5)	2.0 (2.1)	2.1 (2.2)	1.8 (2.3)	1.7 (2.1)	1.6 (1.9)
THT	0.5 (1.0)	0.6 (1.2)	0.6 (1.2)	0.5 (1.0)	0.6 (1.3)	0.6 (1.2)
WTH	1.9 (1.8)	2.1 (1.7)	2.0 (1.7)	1.8 (1.7)	1.8 (1.8)	1.6 (1.5)
EXT	7.0 (5.7)	7.5 (6.0)	7.0 (5.4)	6.3 (5.4)	6.2 (5.4)	6.0 (5.2)
INT	7.4 (6.7)	7.6 (6.1)	7.1 (6.0)	6.1 (6.2)	6.4 (6.2)	5.8 (5.3)
TBP	22.3 (16.9)	24.8 (16.8)	23.0 (16.4)	20.8 (15.9)	20.5 (16.9)	19.1 (14.0)

Appendices G1 to G4 (continued) Mean scale scores per socio-economic group

Appendix G3 Mean CBCL scale score and standard deviation per neighborhood disadvantage group

Scale	Relative disadvantage	Average	Relative advantage
ADD	3.2 (3.0)	3.1 (3.0)	2.9 (2.7)
AGG	6.4 (5.7)	5.9 (5.7)	5.1 (5.0)
AXD	3.1 (3.3)	2.7 (3.3)	2.5 (3.2)
DEL	1.1 (1.4)	1.1 (1.5)	0.9 (1.4)
SOC	2.0 (2.2)	1.6 (2.0)	1.3 (1.8)
SOM	1.4 (1.9)	1.2 (1.7)	1.0 (1.6)
THT	0.2 (0.6)	0.2 (0.2)	0.1 (0.3)
WTH	2.0 (1.8)	2.0 (2.1)	1.7 (2.0)
EXT	7.5 (6.7)	5.0 (6.8)	6.0 (6.0)
INT	6.3 (5.5)	5.7 (5.6)	5.1 (5.4)
TBP	21.7 (16.3)	19.7 (16.1)	17.4 (14.4)

Appendix G4 Mean YSR scale score and standard deviation per neighborhood disadvantage group

Scale	Relative disadvantage	Average	Relative advantage
ADD	3.0 (2.5)	3.0 (2.6)	2.7(2.2)
AGG	5.8 (4.7)	5.4 (4.6)	4.8 (4.1)
AXD	3.6 (3.5)	3.4 (3.7)	2.8 (3.1)
DEL	1.8 (1.7)	1.8 (1.8)	1.5 (1.5)
SOC	2.2 (2.1)	2.1 (2.2)	1.6 (1.9)
SOM	2.1 (2.1)	2.1 (2.3)	1.8 (2.0)
THT	0.6 (1.2)	0.6 (1.2)	0.6 (1.2)
WTH	2.2 (1.7)	2.0 (1.8)	1.8 (1.6)
EXT	7.7 (5.8)	7.2 (5.9)	6.3 (5.1)
INT	7.8 (6.0)	7.4 (6.5)	6.3 (5.4)
TBP	25.0 (16.3)	23.7 (17.7)	20.6 (14.3)

Appendices H1 to H5. Pearson *r* correlation coefficients of narrow- and broad-band scale scores

Appendix H1 Pearson *r* correlation coefficients between narrow-band scale scores - CBCL boys

	ADD	AGG	AXD	DEL	SOC	SOM	THT	WTH
Parental Occupation	-.11**	-.17	n.s.	-.13	-.07**	n.s.	n.s.	n.s.
Neighborh. Disadv.	n.s.	-.11	-.07*	-.09**	-.10**	n.s.	-.12	n.s.
ADD	-	.61	.56	.42	.64	.30	.34	.44
AGG	.61	-	.56	.66	.50	.28	.25	.38
AXD	.57	.56	-	.38	.55	.28	.33	.58
DEL	.42	.66	.39	-	.35	.24	.21	.28
SOC	.64	.50	.55	.34	-	.26	.24	.46
SOM	.30	.27	.28	.24	.26	-	.18	.31
THT	.35	.25	.33	.20	.24	.18	-	.29
WTH	.44	.37	.58	.28	.46	.31	.29	-

Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

Appendix H2 Pearson *r* correlation coefficients between narrow-band scale scores - YSR boys

	ADD	AGG	AXD	DEL	SOC	SOM	THT	WTH
Parental Occupation	-.14	-.11	n.s.	n.s.	-.11	-.07*	n.s.	-.07*
Neighborh. Disadv.	-.07*	-.09*	-.11	-.08*	-.11**	-.09**	n.s.	-.10**
ADD	-	.65	.60	.43	.63	.43	.31	.46
AGG	.65	-	.62	.59	.53	.52	.35	.50
AXD	.59	.62	-	.49	.64	.58	.41	.65
DEL	.43	.59	.49	-	.38	.40	.31	.42
SOC	.63	.52	.64	.37	-	.43	.29	.60
SOM	.43	.51	.57	.40	.42	-	.33	.44
THT	.32	.35	.41	.31	.29	.33	-	.31
WTH	.45	.50	.64	.42	.59	.43	.30	-

Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

Appendix H3 Pearson *r* correlation coefficients between narrow-band scale scores - CBCL girls

	ADD	AGG	AXD	DEL	SOC	SOM	THT	WTH
Parental Occupation	n.s.	-.12	-.09*	-.11**	-.08*	-.11	n.s.	-.08**
Neighborh. Disadv.	n.s.	-.11**	n.s.	-.08**	-.09**	n.s.	n.s.	n.s.
ADD	-	.66	.60	.49	.59	.34	.36	.44
AGG	.66	-	.62	.62	.52	.37	.30	.43
AXD	.60	.61	-	.50	.60	.46	.43	.64
DEL	.49	.61	.45	-	.39	.38	.22	.36
SOC	.59	.51	.59	.39	-	.37	.32	.50
SOM	.33	.36	.46	.37	.37	-	.26	.38
THT	.36	.30	.43	.22	.32	.26	-	.39
WTH	.44	.42	.64	.35	.50	.37	.39	-

Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

Appendix H4 Pearson *r* correlation coefficients between narrow-band scale scores - YSR girls

	ADD	AGG	AXD	DEL	SOC	SOM	THT	WTH
Parental Occupation	-.10**	-.11**	-.08*	n.s.	-.14	-.09*	n.s.	-.09**
Neighborh. Disadv.	n.s.	-.10**	n.s.	-.10**	-.08*	n.s.	n.s.	-.07*
ADD	-	.64	.66	.43	.59	.48	.43	.48
AGG	.64	-	.61	.53	.50	.44	.40	.47
AXD	.66	.61	-	.46	.63	.53	.43	.66
DEL	.43	.53	.46	-	.34	.37	.30	.37
SOC	.58	.49	.63	.34	-	.41	.29	.58
SOM	.47	.43	.52	.37	.40	-	.33	.42
THT	.43	.41	.44	.30	.30	.34	-	.33
WTH	.47	.47	.66	.37	.48	.41	.33	-

Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

Appendix H5 Pearson *r* correlations of broad-band scale scores

	Boys				Girls			
	CBCL		YSR		CBCL		YSR	
	INT	EXT	INT	EXT	INT	EXT	INT	EXT
Parental Occupation	n.s.	-.17	-.08*	-.09**	-.11	-.12	-.10**	-.10**
Neighborh. Disadv.	-.08*	-.11	-.12	-.09**	n.s.	-.11**	n.s.	-.11
INT	-	.55	-	.69	-	.62	-	.66
EXT	.55	-	.68	-	.62	-	.65	-

Above diagonal: zero-order correlations
Below diagonal: correlations with parental occupation and neighborhood disadvantage score partialled out
All mentioned correlation coefficients significant at $p<.001$, except:
* $p<.05$
** $p<.01$

SUMMARY

The objective of the study reported in this thesis was to examine how variations in behavioral/emotional problems are related to variations in physical characteristics of puberty in early adolescence. Several authors have reported changes in prevalence rates and sex ratios of psychopathology with age, in particular during adolescence. The "age of puberty", or in other words, the period of early adolescence, is seen as *the* major period for changes in the psychopathology distribution to take place. Early adolescence is a period of relatively rapid change in a number of areas, of which puberty with its associated physical changes occupy a prominent position. The examination of children's differences in behavioral/emotional problems in relation to differences in their physical development was expected to confirm hypotheses of an influence of puberty on the changes in prevalence rates and sex ratios of psychopathology across adolescence, and to generate hypotheses on the causal mechanisms involved.

In Chapter 1, a number of studies were reviewed that were considered relevant to the issue of a relation between pubertal development and psychopathology. This review pointed out the need for a study that employed a large general population sample, with instruments that measured a wide range of behavioral/emotional problems and various characteristics of physical development, and that included both parents and youth themselves as sources of information on behavioral/emotional problems. Sub-objectives were defined as the examination of differences in the relations between pubertal status and psychopathology for boys versus girls, for parent-reported versus self-reported behavioral/emotional problems, and for internalizing versus externalizing types of problems.

In Chapter 2, the study design was introduced, and in Chapter 3, characteristics of the population studied were described. Target population was the 1978 birth cohort attending schools in the larger Rotterdam area at the start of the project in the fall of 1989. Physical measures included height, weight, and ratings of the developmental status of secondary sex characteristics. Behavioral/emotional problems were measured with a checklist containing a large number of problem items, with parallel versions for parents (Child Behavior Checklist for Children 4-16 years) and youth (Youth Self-report 11-18 years). School physicians of the Rotterdam City Department of Health, Youth Division, examined the physical developmental status of the subjects during a routine health check. The school physicians also handed out and collected the problem checklists.

A total of 2587 parents and their 11-year-old children agreed to participate, a response rate of 71 percent. Complete information was available on 2019 subjects. Proportions of boys and girls were about equal. Subjects came from 68 neighborhoods, representing all 16 districts of the municipality of Rotterdam. Examination of differences between subjects on whom information was complete versus those on whom information was incomplete revealed lower cognitive level, lower SES, and higher problem scores for the incomplete group. This

means that the complete sample was positively biased and their results may not be fully generalizable to the population of origin.

In Chapter 4, the distributions of physical attributes in the study population were described. For each sex, the developmental stage of two secondary sex characteristics was assessed on a five-point scale. Examination of the distribution of these characteristics revealed almost total correspondence. Therefore, in further analyses only one measure of pubertal stage (most developed of the two characteristics) was used. The two other physical attributes used were standing height and weight-for-height as expressed by the Body Mass Index (BMI).

The majority of boys (about 90 %) was either pre-pubertal, or in the first stage of puberty. The distribution of girls over the developmental stages of puberty was more even, with about 60 percent in the pre-pubertal or beginning pubertal stages. The three physical attributes (pubertal status, height, and weight-for-height) used were positively related to each other. Thus the more mature the early adolescent, the taller and heavier he/she was. Girls were slightly but significantly taller and heavier than boys. The more advanced maturation, (slightly) greater height, and greater weight-for-height, of girls as compared to boys were in agreement with national and international growth norms. Some small-sized associations of pubertal stage and weight-for-height with socio-economic status were found: There was a tendency for lower socio-economic status to be associated with greater weight-for-height and more advanced sexual maturation.

In Chapter 5, the distributions of behavioral/emotional problems in the study population were described. Eleven problem scale scores were used: A Total Problems score, indicative of general psychopathology, two so-called broad-band groupings of problems (Internalizing and Externalizing), representing problems predominantly in the emotional versus the behavioral realm, and eight so-called narrow-band syndrome constructs (Attention Problems, Aggressive, Anxious/Depressed, Delinquent, Social Problems, Somatic Complaints, Thought Problems, and Withdrawn), representing specific behavioral/emotional syndromes. As was to be expected in a general population sample, the majority of subjects had low problem scores. Scores on the Thought Problems scale (both parent-reported and self-reported, for boys as well as for girls) showed particularly little variation. In addition, parent-reported Delinquent scores for girls and Somatic Complaints scores for boys were generally low. It was expected that no puberty-psychopathology association would be found for these (informant-gender combinations of) scales.

Agreement on subject ranking between parent- and self-reported problem levels was generally moderate. This corresponds with findings by other authors. Correlation coefficients of scale scores of girls and their parents were higher than those of boys and their parents. The fact that agreement generally was only moderate points out the relevance of gathering information on behavioral/emotional problems from more than one source. Mean Total Problems scores were not significantly different from Dutch norms. Total Problems level of boys was significantly higher than that of girls, and boys had higher mean scores on all Externalizing type of problems (both broad- and narrow-band). Girls had higher mean scores than boys only on parent-reported Somatic Complaints. Like for the physical attributes, some

small-sized associations of problem scale scores with socio-economic status were found: There was a tendency for lower socio-economic status to be associated with higher problem levels.

In Chapter 6, associations between physical attributes and problem scores were examined for each of the four gender-by-informant combinations. To do justice to the inter-relatedness of narrow-band scale scores, the narrow-band scales were treated as a set. Set scores expressed the relative contribution of each narrow-band scale to the common variance. For pubertal status, no associations with the problem level of any problem scale/set were found. For height, weak associations with problem level were found: Parent-reported Internalizing scores and self-reported Externalizing scores tended to be higher the taller the girl, and self-reported Internalizing scores tended to be higher the more deviant from average the girl's height. Except for girls' parent-reported Externalizing scores, for weight-for-height weak trends were found for all gender-by-informant combinations of Total Problems, broad-band problems, and narrow-band sets: problem scores tended to be higher the heavier or the more deviant from average weight-for-height the subject. In analyses on the effect of combination categories of physical attributes (for example: mature, small, heavy adolescents) a small overall effect was found on parent-reported Total Problems and Internalizing scores of girls. The overall effects could not be ascribed to any specific combination of physical attributes, however.

In general, the small size of the associations found meant that it was not possible to differentiate among subjects' problem scores on the basis of their physical attributes. In addition, no systematic differences in the relations between physical attributes and psychopathology scores appeared to exist for boys versus girls, and for parent- versus self-reported problems.

In Chapter 7, the meaning of these results was discussed. It had been expected that the distribution of problem scores would be related to the pubertal status of the young adolescent, and that these associations would be different for boys from girls, and for parent-reported from self-reported problems. From the general lack of substantial associations in a study on a large sample of early adolescents, with a design that was considered to be methodologically sound, it was concluded that the physical attributes associated with puberty do not play a major role in the distribution of psychopathology in early adolescence. Alternative prospects for some role of puberty were sought in the possibilities of a delayed effect, which would only show at a later age than those of the subjects in the present study, or of a constitutionally determined vulnerability triggered by puberty, which would only exist in some individuals, and thus would require a specific study design to be determined.

The present study used a uni-factorial approach, focusing on physical effects. In recent years several authors have advocated the used of a multi-factorial, interactive approach for the study of causal mechanisms in early adolescent psychopathology, involving biological as well as social, cognitive and emotional information. This latter approach is attractive, but demands even greater efforts than the present study.

SAMENVATTING

Het doel van het in deze dissertatie vermeld onderzoek was om na te gaan hoe verschillen in gedrags- en emotionele problemen samenhangen met verschillen in de fysieke kenmerken van de puberteit bij jonge adolescenten. Meerdere auteurs hebben veranderingen in prevalentie en in de geslachts-verhouding van psychopathologie met het toenemen van de leeftijd, en met name gedurende de adolescentie-periode, gemeld. De "puberteits-periode" ofwel de periode van de vroege adolescentie, wordt beschouwd als DE voornaamste periode waarin wijzigingen in de psychopathologie-verdeling plaatsvinden. De vroege adolescentie is een periode van relatief snelle veranderingen op een aantal gebieden, waarvan de puberteit met haar fysieke veranderingen een belangrijke plaats inneemt. Het was de verwachting dat het onderzoek naar de relatie tussen verschillen in gedrags- en emotionele problemen tussen jongeren en verschillen in hun fysieke ontwikkeling hypotheses over een invloed van puberteit op de wijzigingen in prevalentie en geslachts-verhoudingen van psychopathologie gedurende de adolescentie zou bevestigen, en dat hier hypotheses over de betrokken causale mechanismen uit voort zouden vloeien.

In Hoofdstuk 1 werd een aantal onderzoeken besproken die verband hielden met het onderwerp van een relatie tussen puberteits-ontwikkelingen en psychopathologie. Deze bespreking gaf aan dat er behoefte was aan een onderzoek waarbij een grote steekproef uit de algemene bevolking werd gehanteerd, met meetinstrumenten die een grote verscheidenheid aan gedrags- en emotionele problemen en meerdere kenmerken van fysieke ontwikkeling meten, en waarbij zowel ouders als jongeren zelf als bron van informatie over gedrags- en emotionele problemen werden gehanteerd. Deelvraagstellingen van het onderzoek waren het nagaan van verschillen in de puberteits-psychopathologie relatie tussen jongens en meisjes, tussen door ouders versus zelf-gerapporteerde problemen, en tussen problemen van internalizerende versus problemen van externalizerende aard.

In Hoofdstuk 2 werd het onderzoeks-ontwerp besproken, en in Hoofdstuk 3 werd een beschrijving van de onderzochte steekproef gegeven. Het onderzoek richtte zich op jongeren geboren in 1978 die bij de start van het project in najaar 1989 in groot-Rotterdam naar school gingen. Fysieke maten die gehanteerd werden, waren lengte, gewicht, en beoordelingen van de ontwikkeling van de secundaire geslachtskenmerken. Gedrags- en emotionele problemen wereden gemeten met een vragenlijst die vragen over een groot aantal probleem-gedragingen en -gevoelens bevatte, met parallele versies voor ouders (de Gedragsvragenlijst voor kinderen 4-16) en jongeren (de Gedragsvragenlijst voor jongeren 11-18). Schoolartsen die in dienst waren bij de afdeling Jeugdzorg van de GGD te Rotterdam verrichten het onderzoek naar de lichamelijke ontwikkelings-toestand van de onderzoeksgroep gedurende een Periodiek Gezondheids Onderzoek. De schoolartsen verzorgden ook de uitdeling en inzameling van de gedragsvragenlijsten.

In totaal gaven 2587 ouders en hun 11-jarige kinderen toestemming om mee te werken, wat een respons-percentage van 71 procent betekende. Voor 2019 kinderen was alle

informatie volledig. De verhouding jongens-meisjes was nagenoeg gelijk. De kinderen waren afkomstig uit 68 wijken, waarbij alle 16 districten van de gemeente Rotterdam vertegenwoordigd waren. Bestudering van verschillen tussen kinderen waarvan de informatie volledig was met die waarvan de gegevens niet kompleet waren, toonde aan dat gemiddeld genoemen het cognitieve niveau en de sociaal-economische status van de onvolledige groep lager waren en hun probleemscores hoger. Dit betekent dat resultaten van de groep waarvoor informatie volledig was misschien niet geheel op de oorspronkelijke doelgroep van toepassing zijn.

In Hoofdstuk 4 werd de verdeling van fysieke kenmerken in de onderzoeksgroep beschreven. Voor zowel jongens als meisjes werd het ontwikkelings-stadium van twee secundaire geslachtskenmerken op een vijf-punts schaal. gemeten. De verdeling van deze twee kenmerken bleek nagenoeg gelijk. Daarom werd in verdere analyses slechts één maat voor het puberteits-stadium, namelijk het meest gevorderde stadium van de twee, meegenomen. De andere twee fysieke kenmerken die werden gebruikt waren lengte en gewicht-naar-lengte, uitgedrukt in de Quetelet-index.

De meerderheid van de jongens (ongeveer 90%) bevond zich ofwel nog in de pre-puberteit, of in het beginstadium van de puberteit. Meisjes waren meer gelijk over de puberteits-stadia verdeeld, met ongeveer 60% in de pre-puberteit of het beginstadium van de puberteit. De drie fysieke kenmerken (puberteits-stadium, lengte, en gewicht-naar-lengte) vertoonden een positief verband. Hoe meer ontwikkeld wat betreft secundaire geslachtskenmerken, hoe langer, en hoe zwaarder het kind was. Meisjes waren gemiddeld in geringe, maar significante, mate langer en zwaarder dan jongens. De gevonden ontwikkelingsverschillen tussen jongens en meisjes kwamen overeen met landelijke en internationale groei-gegevens. Uit de analyses bleek ook een gering verband van puberteits-stadium en gewicht-naar-lengte met sociaal-economische status: er was een tendens dat lagere sociaal-economische status met hoger gewicht-naar-lengte en verder gevorderde puberteit gepaard ging.

In Hoofdstuk 5 werd de verdeling van gedrags- en emotionele problemen in de onderzoeksgroep beschreven. Er werden elf probleemschalen gebruikt: een Totale Probleemscore, die algemene psychopathologie aangeeft, twee zogenaamde brede-band probleem-groeperingen (Internalizeren en Externalizeren), die respectievelijk problemen in de emotionele en in de gedrags-sfeer aangeven, en acht zogenaamde smalle-band constructen (Aandachtsproblemen, Aggressief, Angstig/Depressief, Delinkwent, Sociale Problemen, Somatische Klachten, Denkstoornissen, en Teruggetrokken), die specifieke gedrags- en emotionele syndromen weergeven. Zoals was te verwachten bij een onderzoeksgroep uit de algemene bevolking, had de meerderheid van de onderzochte personen lage probleemscores. Met name op de Denkstoornissen-schaal was de spreiding in scores gering, zowel voor door ouders als zelf-gerapporteerde problemen en voor jongens zowel als voor meisjes. Ook de spreiding in door ouders gerapporteerd Delinkwent gedrag van meisjes, en van door jongens zelf gerapporteerde Somatische Klachten, was gering. Voor deze informant-sexe combinaties

van probleemschalen werd dan ook verwacht dat er geen verband tussen puberteit en psychopathologie gevonden zou worden.

Overeenstemming over de rangorde van subjecten tussen door ouders en zelf-gerapporteerde problemen was over het algemeen gematigd. Dit komt overeen met bevindingen van andere onderzoekers. Correlatie-coëfficiënten waren hoger voor probleemscores van meisjes en hun ouders dan voor probleemscores van jongens en hun ouders. Uit het feit dat er slechts gematigde overeenstemming tussen ouders en hun kinderen was, blijkt het nut van het verzamelen van informatie bij meerdere informanten. De gemiddelde Totale Probleemscores verschilden niet significant van nationale normen. Gemiddelde Totale Probleemscores van jongens waren significant hoger dan die van meisjes, en dit gold eveneens voor alle probleemscores van externalizerende aard (zowel voor brede- als voor smalle-band schalen). Gemiddelde probleemscores van meisjes waren alleen hoger voor door ouders gerapporteerde Somatische Klachten. Evenals voor de fysieke kenmerken werd een gering verband tussen probleemscores en sociaal-economische status gevonden: er was een tendens dat lagere sociaal-economische status met hogere probleemscores gepaard ging.

In Hoofdstuk 6 werd voor elk van de vier informant-sexe combinaties onderzocht of er verband tussen fysieke kenmerken en probleemscores was. Om de onderlinge gerelateerdheid van de smalle-band schalen recht te doen, werden deze schalen als een set behandeld. De gebruikte set-scores gaven de relative bijdrage van elke smalle-band schaal aan de gezamenlijke variantie weer. Puberteits-status vertoonde geen enkel verband met probleemhoogte voor welke probleemschaal dan ook. Voor lengte werden enkele verbanden van geringe grootte aangetroffen: gemiddelde door ouders gerapporteerde Internalizeringsscores en zelf-gerapporteerde Externalizeringsscores waren hoger naarmate meisjes langer waren, en zelf-gerapporteerde Internalizeringsscores waren hoger naarmate de lengte van meisjes meer van het gemiddelde afweek. Met uitzondering van door ouders gerapporteerde Externalizeringsscores van meisjes, werden voor gewicht-naar-lengte verbanden van geringe grootte aangetroffen voor alle informant-sexe combinaties van Totale Probleemscore, brede-band scores, en smalle-band set-scores: probleemscores waren hoger naarmate het kind zwaarder was, of naarmate zijn/haar gewicht-naar-lengte meer afweek van het gemiddelde. In analyzes naar het effect van combinatie-categorieën van fysieke kenmerken (bijvoorbeeld: jongeren die klein, zwaar, en gevorderd wat betreft puberteits-stadium zijn) werd kleine algemene effecten gevonden voor door ouders gerapporteerde Totale Probleemscores en Internalizeringsscores van meisjes. Deze algemene effecten konden niet nader aan een specifieke fysieke combinatie-categorie worden toegeschreven.

Samenvattend betekende de geringe grootte van de gevonden verbanden dat het niet mogelijk bleek onderscheid te maken tussen subjecten wat betreft hun probleemscores op basis van hun fysieke kenmerken. Ook werden geen systematische verschillen in de relaties tussen fysieke kenmerken en psychopathologie aangetroffen voor jongens versus meisjes, en voor door ouders versus zelf-gerapporteerde problemen.

In Hoofdstuk 7 werd de betekenis van deze resultaten bediskussieerd. Vooraf aan het onderzoek bestond de verwachting dat de verdeling van probleemscores verband zou houden met de puberteits-status van de jonge adolescent, en dat dit verband verschillen zou zijn voor jongens ten opzichte van meisjes, en voor door ouders ten opzichte van zelf-gerapporteerde problemen. Uit het algemene gebrek aan verbanden van aanzienlijke omvang, aangetroffen in een onderzoek onder een grote groep vroeg-adolescenten, waarbij een onderzoeks-ontwerp was gebruikt dat als methodologisch degelijk werd beschouwd, moest geconcludeerd worden dat de fysieke kenmerken die samenhangen met de puberteit geen belangrijke rol in de verdeling van psychopathologie in de vroege adolescentie spelen. Alternatieve ideeën over een eventuele rol van puberteit werden gezocht in de mogelijkheden van een vertraagd effekt van puberteit op probleemgedrag, of van een constitutioneel bepaalde gevoeligheid voor probleemgedrag die door de puberteits-ontwikkelingen zou worden geaktiveerd. De eerste mogelijkheid zou betekenen dat verbanden pas op een hogere leeftijd dan die van de onderzochte groep aangetroffen zouden kunnen worden. De tweede mogelijkheid zou tot gevolg hebben dat deze gevoeligheid niet in alle individuen aanwezig is, en dat het aantonen van dergelijke invloed van puberteit een geheel ander onderzoeks-design zou vergen.

In het hier besproken onderzoek is een enkelvoudige benadering, met een focus op fysieke effekten, gehanteerd. Recentelijk hebben een aantal auteurs het gebruik van een meervoudige, interactieve benadering, met gebruikmaking van zowel biologische, als sociale, cognitieve en emotionele informatie, voor het bestuderen van causale mechanismen in vroeg-adolescente psychopathologie benadrukt. Dit lijkt een aantrekkelijke, zij het nóg bewerkelijkere, benadering.

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CURRICULUM VITAE

De auteur van dit proefschrift is geboren in 1959 te Wassenaar. Na drie jaar verblijf in respektievelijk Frankrijk en de Verenigde Staten, behaalde zij in 1978 het diploma Gymnasium β aan het Rijnlands Lyceum te Wassenaar. In maart 1987 legde zij het doctoraalexamen in de psychologie af aan de Rijks Universiteit Groningen, met als afstudeerrichting Ontwikkelingspsychologie en als bijvak Onderwijskunde.
Na voor korte tijd bij de vakgroep Ontwikkelingspsychologie van de Rijks Universiteit Leiden werkzaam te zijn geweest, kwam zij in maart 1988 als junior wetenschappelijk medewerker in dienst bij de Erasmus Universiteit Rotterdam, afdeling Kinderpsychiatrie. Dit dienstverband, dat gesubsidieerd werd vanuit het Stimuleringsprogramma Gezondheids Onderzoek, heeft geduurd tot maart 1993. Binnen het kader van deze funktie hebben het in dit proefschrift beschreven onderzoek, en een follow-up onderzoek bij dezelfde populatie, plaatsgevonden.