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Agreement between self- and proxy-reports on the Health-related Quality of Life of Primary School Children in Hamburg, Germany

Master Thesis

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ABSTRACT

Agreement between self- and proxy-reports on the health-related quality of life of primary school children in Hamburg, Germany

BACKGROUND There is an on-going debate about who is the most appropriate informant for rating children's health related quality of life (HRQOL) the children themselves or their parent-proxies. The aim of this work is to examinate if there are discrepancies between the children and the parents when both are asked for their perception in regards to the child's HRQOL.

METHOD The study was a cross-sectional survey by directly assessing primary school children and their parent-proxies. Participating were primary schools located in districts with good, normal and low social environment. The total sample consisted out of 395 primary school children (n = 199 from the third grade/ n = 196 from the fourth grade) ranging from 7 to 11 years and their parent proxy mainly the mothers. The assessment was performed with the KID-KINDL^R and the FAS for the children and the parents' version of KINDL^R for the proxies. The Intra-class correlation coefficient (ICC) and the Pearson's correlation coefficient, as well as a paired t-test were applied for the statistical analysis.

RESULTS The children rated their total HRQOL lower ($\bar{x}$: 75.41, SD ±11.95) than their parents ($\bar{x}$: 75.96, SD ±8.00). The proxies evaluated the total HRQOL score for girls ($\bar{x}$: 76.37, SD ±7.27) better than for boys ($\bar{x}$: 75.59, SD ±8.71). The self-ratings of the boys ($\bar{x}$: 76.86, SD ±12.19) showed better results compared to the girls ($\bar{x}$: 74.18, SD ±11.69). Well-being in the family revealed the most positive subdimension for the children and mental well-being for the parents. The total HRQOL of the child- and the proxy-ratings showed a moderate effect r = .328, p <.001 by measuring the Person's correlation coefficient. The ICC for the total HRQOL r = .30, p <.05 was categorized as poor to fair agreement. Considering the gender of the child, the boys showed a moderate agreement for the overall HRQOL whereby the girls had a small agreement with their parents.

DISSCUSION This survey could show that the agreement between the child self- and parent-proxy-reports differ with respect to the measured HRQOL single item. Through the differences in the outcome, it should be the standard that children rate their own perceived health. Nevertheless, the parent proxy-reports could be used as complementary secondary outcome measure.

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Abbreviations

ANOVA	Analysis of Variance
Chi^2	Chi-square Test
χ^2	Chi-square
CC	Correlation Coefficient
df	Degrees of Freedom
FAS	Family Affluence Scale
R^2	Goodness-of-fit
HRQOL	Health Related Quality of Life
ICC	Intra-class Correlation Coefficient
KIGGS	National Health Survey for Children and Adolescents in Germany
$\bar{x}$	Mean
$KINDL^R$	Children's Quality of Life Questionnaire (Revised Version)
n	Sample Size
OECD	Organisation for Economic Co-operation and Development
OR	Odds Ratio
p	Significance Value
r	Pearson's Correlation Coefficient
r_s	Spearman's Correlation Coefficient
SD	Standard Deviation
SE	Standard Error
SES	Socioeconomic Status
UNICEF	United Nations Children's Fund
vs.	Versus
WHO	World Health Organisation
WHOQOL	World Health Organisation Quality of Life

1 INTRODUCTION

Health-related quality of life (HRQOL) can be seen as central element of well-being and physical, social and psychological well-being and is of growing interest as health outcome in public health (Nutbeam 2000). Health-related attitudes and behaviour patterns are apparent already in childhood and adolescence which solidify in the course of life and afterwards difficult to influence (Child Public Health, 2011). Therefore, childhood can be seen as the time in which the fundamentals for a healthy life are set (Antonovsky 1987) and where children's well-being is a key dimension for sustainable development (European Foundation Centre, 2011).

In the past years child public health come more in the centre of public health and politics in Europe, as well as in Germany. In 2003 all federal states in Germany declared the health of children and adolescents to the focus of its health and social policy (German Federal Ministry of Health 2003).

The trend from objective measurements of children's health (e.g. survival, life expectancy morbidity and/ or mortality) has changed to *"subjective self-perceived health"* or the so-called *"health-related quality of life"* as a relevant health outcome. The measurement HRQOL in healthy children was under investigated for a long time in comparison to the assessment for HRQOL in healthy adults. Children's HRQOL has become of specific interest in public health research, as it is the basis for HRQOL in adulthood (Bisegger, Cloetta et al. 2005). The state of knowledge concerning children's HRQOL has improved in Germany, especially through the expansion of the *National Health Interview and Examination Survey for Children and Adolescents* (German acronym: KIGGS) on federal level. This health survey was the first thematically, comprehensive, provisional and population representative study with the focus on measuring physical, social and psychological well-being in these age groups (National Health Survey for Children and Adolescents in Germany 2008)

Why has the measurement HRQOL in children a relevance for public health? Evaluating the HRQOL in children can be seen as important component for health surveillance in monitoring internal experiences of health or distress during childhood. The understanding about trajectories of health and the development of illnesses during childhood can be enhanced. Moreover, measuring the HRQOL in children can be valuable to identify subgroups or individuals with a higher risk for health problems or to detect impairments of well-being or functioning in an early stage. Through the identification of subgroups or individuals with a higher risk for health problems, children can be strengthened by reducing their risks they are exposed during their development (Bertram & Kohl 2010 for UNICEF).

Additionally, the assessment of HRQOL in children can be helpful to determinate burdens related to specific child-related diseases, injuries or disabilities. The assessment of children's subjective health is especially relevant in observing the background of considerable changes from acute to chronic illnesses and from somatic to psychological symptoms, behaviour disturbances and psychosomatic illnesses (Ravens-Sieberer, Torsheim et al. 2009). If diseases or complaints exist, early care is indicated in order to counter undesirable developments or consequences. The earlier suitable measures

have been taken, the greater the prospect of success (Lampert et al. 2009). The HRQOL of children is necessary for planning and implementing effective interventions strategies or to contribute to health care policies. Moreover, the efficacy of treatments for children (e.g. with Diabetes Type 1 or Type 2) in clinical trials, health care and health care utilization can be evaluated by the HRQOL as well (Varni et al. 2003). In health economic studies HRQOL (and QOL) is combined with survival time the so-called *"quality-adjusted life years (QALYs)"* (Griebsch et al. 2005).

HRQOL is inherently more subjective than morbidity or mortality. Hence, it can be more difficult to measure when it comes to the assessment of children. A variety of generic instruments are available to assess children's HRQOL based on self-reports, as well as, proxy-reports from parents or both. In the recent literature there is an on-going debate who is the most appropriate informant for rating children's HRQOL the children themselves or their parents. Researchers argue that it is essential to assess how children perceive their own situation (Ravens-Sieberer 2000, Boehmer & Ravens-Sieberer 2005, Le Coq et al. 2000, Apajasalo et al. 1996, Theunissen et al. 1998). Whereby others state that parents rating should be only accepted in situations where the child is unable to complete a HRQOL instrument (e.g. age, cognitive impairment, illness or fatigue etc.) (Varni et al. 2007, Von Rueden 2007, Petersen-Ewert et al. 2011). In contrary some researchers state that both reports are important valid measures concerning a child's well-being (Flash Eurobarometer 2009, Mansour et al. 2003) or useful for understanding the influencing factors how parents perceive their child's health because parents have the primary impact on their children (Barreto et al. 2011).

The aim of this work is to evaluate the agreement between children self-reports and parents' proxy-reports on the HRQOL of primary school children in Hamburg, Germany. The main research question of this work is *"Are primary school children able to rate their health related quality of life? Are children rating their health related quality of life different than their parents or proxies?"*

The objective of this work is to evaluate if there are discrepancies in the self-perceived reporting HRQOL between the two sources children and their corresponding parents. If differences between the self- and proxy-reports could have been identified causalities for these differences are described additionally in this work.

In chapter 1 the work begins with a briefly introduction of HRQOL as general health outcome, the relevance for public health and the growing interest for HRQOL surveys in in public health research. The focus in chapter 2 is laid on the paradigm change from measuring objective indicators to self-perceived health or also called HRQOL. This section will also deal with the question what models essentially contributed to the maintenance and development of child's HRQOL in Germany and as well internationally. Moreover, definitions and concepts for the HRQOL in children are addressed. The different dimensions in the concept of child well-being will be closer exemplified. Afterwards, the development and understanding of children for health will be specified more in details by different theories. Then ability of children to understand the concept of health will be clarified in regards to the

literature. In addition, generic HRQOL instruments for measuring children's HRQOL will be shortly explained and illustrated.

Chapter 3, 4 and 5 is examinating studies national and internationally performed out of the children's view, the parents' perspective and the assessment of these two sources together.

Firstly, Chapter 3 presents studies and their findings out of the children's view conducted in Germany, as well internationally, their applied methodology for the assessment and the ability of primary school children to rate their HRQOL.

Chapter 4 addresses German and international studies focusing on children's HRQOL by assessing the parents' perspective and dealing with the issue if only the parents should be asked with respect to their children's HRQOL.

Chapter 5 mainly looks at the child's HRQOL assessed through child self- and proxy-reports. The first part of this chapter concentrates on studies performed in Germany and on surveys conducted internationally. The second part focuses on applied methodologies for assessing the child's HRQOL from two different sources and attention was paid to researchers' applied methodology and their consideration for potential influencing factors principally for the data collection. The third part specifically looks at the usefulness of proxy-reports and the arguments of researchers about assessing child self- and proxy-reports. The fourth part of this chapter focuses on factors which can potentially impact the parent-child agreement.

The objectives of this work are presented in chapter 6 and chapter 7 introduces the research question and the hypothesis.

The measuring instruments, the statistical analysis plan and the statistical methods are described in the methodology in chapter 8.

The results of this work are detailed described and illustrated with tables and figures in chapter 9.

The final chapter (chapter 10) summarizes the main findings of the statistical analysis and discusses the results in relation to other studies if there are particularly differences, deals with the strengths and weaknesses of the study, comment unanswered questions and will be rounded up with an outlook for the future.

2 THEORETICAL BACKGROUND

Monitoring the health of population groups is one of the main activities in public health research. Today self-perceived health can be seen as major self-reported outcome criterion in public health. The focus on objective biomedical measurements (e.g. survival, morbidity and/ or mortality etc.) has changed the perspectives to the assessment of self-perceived health or HRQOL of a person (Ravens-Sieberer & Bullinger 2000a). HRQOL research has made an enormous contribution to current thinking in the health care field and public health within the past years (Petersen-Ewert et al. 2011).

The paradigm shift can be explained by the progress reached, where quantitative measures lose their expressiveness or provide no further adequate indicators or criteria for accomplished results, development or constitute their equivalent (Radoschewski 2000). *Sullivan* describes the paradigm change as *"turn away"* from the scientific ideal of fully objective medical assessments of disease and health to the *"the new subjective medicine".* He pointed out that the most complete and meaningful assessment of health is to include the subjective perspective of a person (Sullivan 2003). Nevertheless, *Sullivan* beliefs that essentially classical indicators like morbidity and mortality will remain. According to *Spellerberg et al.* subjective factors have from the psychological view more importance than objective components (Spellerberg et al. 2007). *Radoschewski* criticises that the exclusion for outer criteria reduces QOL to *"a set of subjective indicators"* (Radoschewski 2000). The subjective perspective ignores the fact that QOL is a *"dynamic phenomenon"* according to *Allison*, influenced by a number of changes (e.g. attitudes from interviewed persons) (Allison et al. 1997: in Radoschewski 2000).

Independently what approach for the definition is favoured, *Radoschewski* points out the complexity as theoretical construct and criticises that it is only useful for gathering information, analysing and describing (Radoschewski 2000).

2.1 Definitions and Concepts

The development of QOL and HRQOL research, the various dimensions and the definitions for HRQOL, especially the child's HRQOL will be more detailed approached in the next chapter.

The development, dimensions and definitions of HRQOL

In Germany the evaluation of the subjective perspective as treatment outcome was primary applied in oncology through the comparison of the classical biomedical measurements survival and the patient's QOL loss (Buddeberg 2004: 435).

Even though QOL studies are implemented in today's research, no accepted or generally applicable definition for QOL is available. Several suggestions for defining QOL have been provided, ranging from operational to more philosophical approaches. The focus of the definition depends on the scientific discipline.

The definition of health plays in the historical context an important rule for developing the concept of HRQOL. The WHO defined in 1947 health as "*a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity"* (WHO 1946). Due to the lack of international agreed definition and universal instruments for assessing QOL, the WHO developed the concept WHOQOL in 1993. The definition had an interdisciplinary approach by integrating the main objectives of different scientific disciplines and defined QOL as *"individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"* (WHO QOL Group 1993). In 2000 the WHO additionally modified their definition of QOL *"as a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment"* (WHO 2000).

The *Quality of Life Assessment Group* takes into account three characteristics for the construct HRQOL (see in Figure 1)

I. HRQOL is a subjective category.

II. HRQOL includes different dimensions like:

- Physical constitution (e.g. physical complaints, functional endurance and energy, mobility),

- Mental condition (mental balance, anxiety, irritability etc.),

- Social aspects (type and number social contacts, interpersonal relations),

- Functional competence (that means the ability to manage role requirements, concentration, capability).

III. HRQOL includes positive and negative dimensions and therefore should take into account individual awareness

Figure 1 Characteristics for the construct HRQOL

(Source: Kurth & Ravens-Sieberer (2011) for the Federal Centre for Health Education (BZGA) :in the WHO Quality of Life Assessment Group 1995).

Some researchers apply QOL synonymous with HRQOL in the existing literature which makes is more difficult to differentiate between the QOL and HRQOL. Other researchers or authors consider HRQOL as *"subdomain of the global construct of QOL"* (Davis et al. 2007) by taking into account all aspects of the total QOL that can be clearly shown to *"affect health—either physical or mentally"* can be encompassed as HRQOL (Centres for Disease Control and Prevention 2011).

According to the WHO HRQOL refers to an "*individual's perception and subjective evaluation of their health and well-being within their unique cultural environment"* (The WHOQOL Group 1995). The definition of the WHO is an open definition and allows the integration of dimensions in an individuals' environment that *"affect or are affected by health"* (Evans 1994, in: Michel et al. 2009). HRQOL includes the person's emotional response to such problems and limitations (Vogels et al. 1999).

Diener wrote in *The Science of Well-Being* that subjective well-being refers to the fact that *"the person subjectively believes his or her life is desirable, pleasant and good regardless of how others see it"* (Diener 2009), furthermore *"to health and longevity"* (Diener and Chan 2011). *The Centres for Disease Control and Prevention* includes the presence of positive emotions and moods (e.g. contentment, happiness), the absence of negative emotions (e.g. depression, anxiety), satisfaction with life, fulfilment and positive functioning (Centres for Disease Control and Prevention 2011).

The development, dimensions and definitions of child's HRQOL

> *"The true measure of a nation's standing is how well it attends to its children – their health and safety, their material security, their education and socialization, and their sense of being loved, valued, and included in the families and societies into which they are born"* (UNICEF 2007).

In Europe as well as in Germany the development of QOL research in children occurred in three waves as described by *Ravens-Sieberer et al.* (2001). The *first* wave in the late eighties was concerned with how to assess QOL in children as theoretical concept in contrary to adults. The *second* phase in the early nineties was constructing and developing QOL measures for children. The *third* phase in the mid- nineties was the implementation of instruments in clinical and epidemiological studies (Ravens-Sieberer et al. 2001).

In the recent literature HRQOL is used synonymous for *"subjective health"*, *"experienced health",* "*self-administered-, self-perceived-, self-reported- and self-assessed health"*, "*child's well-being"* or *"subjective well-being". "Subjective well-being"* or *"well-being"* is used as well synonymous with the term "*quality of life"* in the current literature and as well for *"HRQOL".* The term *"paediatric HRQOL"* is originally coming from paediatrics and is applied mainly to measure the patient-related outcome of children with a chronically disease in clinical/ non-clinical settings. Hence, this term will not be further mentioned in this work. The term *"child's HRQOL"* will be mainly applied in this work and contains the HRQOL of children even though the singular term is applied.

Childhood can be seen as the time in which the fundamentals for a healthy life are set and the capability to deal with the demands of life is developed (Antonovsky 1987, UNICEF Innocenti Working Papers 2007). A requirement for a child's well-being is the correlation of different factors in a pleasant manner (like the balance between the family, learning at school, social contacts with school

colleagues, time for playing or sports etc.). *Jozefiak et al.* define child's QOL as *"the subjective reported well-being in regard to the child's physical and mental health, self-esteem and perception of own activities (playing/ having hobbies), perceived relationship to friends and family as well as to school"* (Jozefiak et al. 2008). *Jozefiak et al.* apply in their definition QOL for children the same dimensions which are taken into account in concept of child's HRQOL.

At present, differences in the quantity of included domains and dimensions lead to widely varying definitions of HRQOL. The HRQOL for children contains besides physical and mental health, social well-being or health connected to various *"settings"* of the child's social environment (like the family, school and peers). Most of the concepts have in common that they are considered as multi-dimensional construct by taking into account the complexity children's lives and relationships.

In regards to UNICEF child well-being includes six dimensions: material well-being, health and safety, education, peer and family relationships, behaviours and risks, and young people's own subjective sense of their own well-being Figure 2.

Bradshaw et al. described that well-being from a child's rights perspective can be defined *"as the realisation of children's rights and the fulfilment of the opportunity for every child to be all she or he can be."* Furthermore, they cited that *"the degree of realisation can be measured in terms of positive child outcomes, whereas negative outcomes and deprivation point to the denial of children's rights"* (Bradshaw et al. 2006).

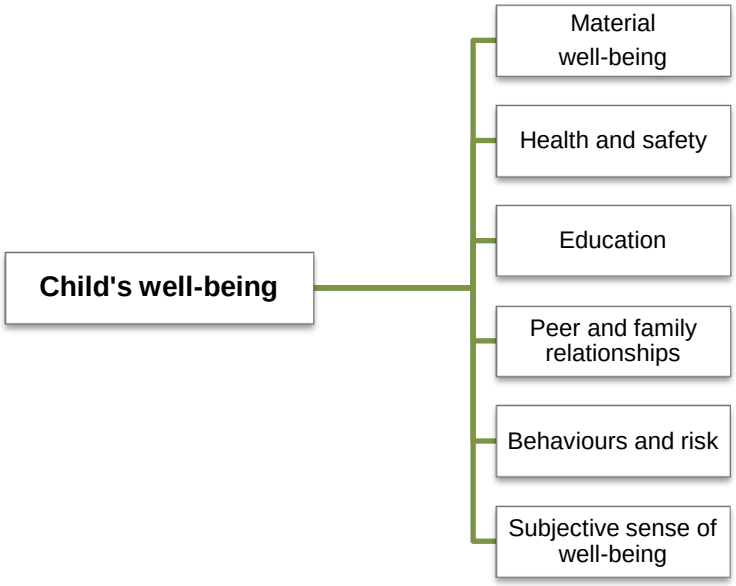


Figure 2 Dimensions for child's well-being

(Source: Own illustration adapted from Bradshaw et al. 2006)

The KIDSCREEN Project[1] included ten dimensions in their concept of HRQOL.

- **Physical well-being** reflects the level of the child's physical activity, energy and fitness. The extent to which he/ she feels unwell and complains of poor health is examined.
- **Psychological well-being** reveals positive feelings and emotions such as happiness, joy and cheerfulness.
- **Moods and emotions** cover how often the child experiences depressive moods and emotions and stressful feelings.
- **Self-perception** explores the extent to which the appearance of the individual's body is viewed positively.
- **Autonomy** examines the child's level of autonomy given to a child or to define his/ her leisure time.
- **Parent relations and home life** explores the quality of the interaction between the child and the parent or carer, including feelings of being loved, understood and supported by the parents.
- **Peers and social support** examines social relations with friends and peers and whether the child feels accepted and supported by them.
- **School environment** explores the child's perception of his/ her cognitive capacity for learning and concentration and his/her feelings about school, including the relationship with his/her teachers.
- **Social acceptance** investigates the feeling of being rejected by others, as well as anxiety caused by peers.
- **Financial resources** reflects whether the child feels that he/ she has enough financial resources to allow him/ her to live a lifestyle which is comparable to other children for having opportunity to do things with peers (KIDSCREEN 2007).

Ravens-Sieberer et al. considered the following six dimensions in the KINDL^R questionnaire[2]:

- **Physical well-being** (e.g. I do not have any pain in my body.)
- **Emotional well-being** (e.g. I do not feel guilty when I say my opinion or sad.)
- **Self-esteem** (e.g. I feel comfortable in my own body.)
- **Well-being in the family** (e.g. I can discuss problems with my parents.)
- **Well-being in terms of friends/ peers** (e.g. I have friends who are there when I need them.)
- **Well-being at school** (e.g. I get along with my teacher or I am integrated in the school class.) (Ravens-Sieberer et al. 2007).

The six dimension of the child's HRQOL preferred by *Ravens-Sieberer et al.* are applied in this work through the KINDL^R questionnaire. The KINDL^R instrument will be further described in chapter 8 within the methodology.

[1] The KIDSCREEN Project is a representative national and European health survey focusing on children and adolescents.
[2] The KINDL^R questionnaire is a standardised generic instrument for measuring HRQOL in children and adolescents, originally developed by *Bullinger et al.* (1994) and was revised by *Ravens-Sieberer & Bullinger* (1998).

Child's HRQOL and influencing factors

The assessment of self-perceived health with its different components can demonstrate how stress and protecting factors impact a person's well-being. What specific factors have an impact on the HRQOL of primary school children? The following section will deal with factors influencing the HRQOL of a child either in a negative or positive way.

Historically, *Antonovsky's* salutogenic approach raised firstly awareness for the individual's well-being and its influencing factors (Antonovsky 1987). In general, the impacting variables for children range, among others, from SES, gender, age, migration background, and personality traits to the coping with a chronic health condition (Ravens-Sieberer et al. 2008). Moreover, *Ravens-Sieberer* mentioned that a difficult climate within the family and a low SES are particularly noticeable as risk factors (Ravens-Sieberer 2008).

Stress-reactions in regards to psychosocial tensions can occur as somatic complaints (e.g. headache, abdominal pain, backache, feeling low etc.). Psychosomatic complaints are characterized with no obvious organic cause (Holler-Nowitzki 1994). Perceived abdominal pain in childhood has been associated with higher risk of both physical and mental disorders later in life (Hotopf et al. 1998). In regards to *Resch „nervousness, tension and concentration problems increase during primary school time, as well as nausea, abdominal pain and headache"* (Resch 2003 for the German Society for Children- and Adolescence-psychiatry und –psychotherapy)

Protective factors are resources that minimize the impact of a risk. The personal, familial and social resources of children are relevant as protective factors that are safeguarding mental and subjective health (Ravens-Sieberer 2008, Bengel et al. 2008). The environment plays a larger role for children in relation to the HRQOL than for adults because they have fewer resources to influence them in a positive direction. Children in their emotionally and psychological development are also through their outside world more influenceable and own fewer resources (Matza et al. 2004, Bradshaw et al. 2007). Receiving necessary help from teachers was associated with lower prevalence of abdominal pain in girls (Løhre et al. 2010). This shows that psychosomatic complaints can be reduced by support in the child's environment.

Why are some children are impacted by certain factors and others not? Some children are exposed to risk which is impacting their well-being whereby other children are experiencing the same without any negative influence. Researchers explain this ability by the term *"resilience".* Resilience can be seen as *"conceptual outcome of protective factors and is characterized as resource of a child to adapt successfully in the presence of risk or adversity"* (Fraser & Jenson 2011).

2.2 Children – Their development and understanding for the concept of health

The next chapter will briefly introduce the structure of German primary schools. Furthermore, it will focus on developmental competencies from children between eight and eleven years and their ability to understand health. At the end of this section HRQOL instruments for children will be presented to give an overview about the existing generic instruments.

Childhood starts with birth and ends when sexual maturity is reached. The *German Children and Youth Assistance Act* defines a child as one *"who is not yet 14 years of age"* (The German Federal Youth Organisation 1990).

In scientific research, subdivisions are made according to biological and psychological stages of development. Childhood is divided according to the scheme by *Erikson* into:

- Infancy (0 to 3 years)
- Pre-school (3 to 6 years)
- Primary school age (7 to 11 years)
  (Erikson 1988, in: Rothgang 2003).

Hurrelmann defines the age between eight and eleven years as middle childhood. The central development for this age group according to *Hurrelmann* is:

- ❖ Individual development of competencies: development of independence and self-awareness, coping with every day challenges, confidence in him-/ herself as individual
- ❖ Intellectual education: acquisition of elementary skills (e.g. cultural techniques), ability to complex formation
- ❖ Social development of competencies: beginning of separation from parents as primary socialization, peer competence, stable relationships (Hurrelmann 2007).

Even though Erikson defines the primary school age for children between 7 to 11 years, the German primary school, a four year school system, is obligatory for all children aged 6 to 10 years. These days the trend goes to the school enrolment of children under six years at the request of the parents or legal guardians if the children fulfil the mental, intellectual, physical and linguistic developmental requirements (The Administration for School and Education Hamburg 2012).

The sample for this work consists of primary school children ranging from the age 7 to 11 years, being either in the third or fourth grade. The characteristics of the children will be more detailed presented in chapter 9 within the results under the sample description.

Ability of children to understand the concept of health

The next part is dealing with the ability of primary school children to understand the concept of health and their realisation of causalities for illness. Different developmental theories like the *"cognitive-structural theory", "concrete operational stage" or "science-oriented content research approach"* will be considered to explore the children's understanding for health and to address the current state of research.

Erikson beliefs that the existence of humans depends on three organisational processes, the biological process for the hierarchical organisation of the organ system which constitutes the body (or soma), psychological process which organises the I-synthesis (mind) and the social process of the cultural organisation in the reciprocal dependency from persons. Development according to *Erikson* is the interaction of physical, psychological and social processes (Erikson 1988, in: Rothgang 2003: p.83).

Lohaus & Ball focus on the development of "*implicit concepts"* for children about health and disease. Implicit concepts are evolved in active dispute with children themselves and their environment (Lohaus & Ball 2006: p.13). More in details, they help the individual to structure and order its living, to define situations and to find orientation (Dann 1983, in: Lohaus & Ball 2006: p.13). In regards to health and disease implicit concepts deal with individual perceptions of health and maintaining health as well as disease and the impact of disease. *Lohaus & Ball* describe two theories for the child's development concerning health and diseases the *"cognitive-structural theory"* by *Piaget* and the *"science-oriented content research approach"*. Both approaches have a clear developmental psychological perspective (Lohaus & Ball 2006).

The concept of developing health- and disease-related issues depends on the cognitive development of a child. *Piaget* defines four qualitative stages of development. The age period between seven to eleven years is the *"concrete operational stage".* In this stage the children's thinking is connected to concrete experiences which can be seen in association with themselves as well. Children between seven to eleven years have the ability to see more than one fact and can realize temporal sequences between different facts like cause and effect relation. Being able to see different facts, children have the potentiality to separate between their own perspective in relation to certain circumstances and the perspective of another person. Through the availability of children to put themselves in another situation and perspective of somebody else, *Lohaus & Ball* verify that it is possible for children to understand appropriately other's intentions and experiences of health and disease. Therefore, they confirm that children between seven to eleven years are able to understand that somebody can be healthy although the appearance of discomfort (part-whole-relationship) (Lohaus & Ball 2006: p.14).

The "*science-oriented content approach"* focuses on the reconstruction of children's knowledge with the objective to analyse their knowledge and knowledge deficits. Compared to the *"cognitive-structural theory"* the *"science-oriented content approach"* it is based on continuous development and does not

proceed in stages. The theoretical fundament for the *"science-oriented content approach"* functions with information processing theoretical models. The different phases include information intake, to keep it in memory, handle it and prepare it for further process (Lohaus & Ball 2006).

In regards to health- and disease-related concepts the *"semantic mind"* takes an important position because it contains the components of knowledge. The *"semantic mind"* classifies health- and disease-related information and is organized in a semantic network which includes skilled action sequences for specific situations (e.g. being ill measuring the temperature) (Lohaus and Ball 2006: p.19). The network of information develops with increasing age. According to *Lohaus and Ball* the classification of new information seems to be simpler, as larger the semantic network is (Lohaus and Ball 2006: p.21).

One of the first studies with the focus of definition for health was performed by *Natapoff* in 1978. He conducted the study with two hundred sixty four children between six to twelve years. The children were asked about their meaning of health, their understanding for the word disease and their feeling when being ill or healthy. Furthermore, how they could realize that a family member is ill, if it was possible to be *"partially healthy"* and *"partially ill"*. The youngest were defining health mostly positive but increasingly with *"not be ill".* The reason for seeing health *"as not to be ill"* could be a sign that primary school children see health as changing reversible process. In regards to the definition and understanding of disease, primary school children provided a wider range of aspects compared to the definition of health. Seventy-four percent of the 9 year old children answered the question *"if you can be partially healthy and partially ill"* with *"yes"* and in the group of the 12 year old children 84 % said *"yes".* These results by *Natapoff* could show that primary school children have the ability to understand the state of health and disease independently and that one status does not exclude the other (Natopoff 1978, in: Lohaus and Ball 2006: p.29-53).

Millstein & Irwin highlight that subjective health would be developed with the confrontation of illness and therefore, children have a stronger association for health with disease (Millstein & Irwin 1987). *Bengel* thinks that children are able to differentiate between health and illness with the age of ten (Bengel 1992, in: Waller 2002: p.18). *Gerharz et al.* mentioned that a child's concept of health and illness depends also on the cultural background of a child (Gerharz et al. 2003).

Lohaus & Ball show that the concept for causalities of illness in primary school children becomes more specific and concrete. Older primary school children can classify between external causes and internal effects. Contamination is seen as cause from external persons, objects or activities. The harmful event can be inhaled through breathing or internalised with swallowing and causes the disease (Lohaus & Ball 2006: p.58). *Schmidt & Froehling* found out that primary school children see initiating factors for illness as well in the way of living like bad nutrition (Schmidt & Froehling 2000).

According to the examined developmental theories for children, it can be expected that primary school children have the ability to understand the state of health and disease independently and that one

status does not exclude the other. For that reason, it can be assumed that children are appropriate informants for their self-perceived health, except a child has developmental problems. The current state of research in regards to the ability of children to understand the concept of health will be integrated in the discussions about the authenticity of the ratings given by the children themselves.

2.3 Generic HRQOL instruments for measuring the HRQOL of children

In the last century the development of HRQOL measures for children and adolescence was rapidly growing. The next part will give a short overview about the existing generic HRQOL instruments.

Depending on the different objectives willing to cover for the assessment, HRQOL measures contrast in regards to their conceptualisation. HRQOL measures can be classified in three categories: type of report (self-report versus proxy-report), scores (single indicator, profile or battery approach) and population (generic versus condition-specific) (Gyatt et al. 1996, in: Petersen-Ewert et al. 2011). Generic instruments can be used in general populations to evaluate a range of domains concerning health, additionally conditions and diseases. A disadvantage of generic measures is that small changes in HRQOL might not be detected.

According to the review of *Solans et al.* thirty generic and sixty-four condition-specific HRQOL instruments for children and adolescence are available, fifty-one of them were published between 2001 and 2005. The instruments applicable for the target group between 8 to 12 years are illustrated in Table 1 (Solans et al. 2008, Patient-Reported and Quality of Life Instruments Database (PROQUOLID) 2011).

In regards to the WHO HRQOL instruments should be multidimensional, consisting at the minimum physical, psychological (including emotional and cognitive), and social health dimensions (WHO 1948, in: Varni et al. 2007). The instruments should be child-centred, have the priority in subjective self-reporting, related to age and developmental stage. Moreover, that these measurement have a generic core and specific modules. The outcomes should be cross-culturally comparable, as well as containing positive health-enhancing aspects (WHO Division of Mental Health 1993).

The short introduction about the HRQOL measures for children and adolescence is provided to get an overview of the variety of measures. The distribution for the HRQOL instruments makes it visible that more child-proxy assessment tools are available compared to questionnaires where only the child's view is assessed.

Table 1 Generic HRQOL instruments for measuring child's HRQOL

Child-Reporting Instruments with multi scores	Parent-Reporting Measures	Child/ Proxy Measures with multi scores
17-Dimensional Health-related Measure (17D) Age: 8 – 11 years Reliability: x, Validity: x (Apajasalo et al. 1996)	**N.A.**	**Child Health Questionnaire (CHQ)** Age: 5 - 18 years *(self-reporting with 10 years)* Reliability: x, Validity: x (Landgraf et al. 1996)
Pictured Child's Quality of Life Self Questionnaire - Autoquestionnaire Qualité de Vie-Enfant-Imagé (AUQUEI) Age: 4 – 12 years Reliability: no, Validity: x (Manificat & Dazord 1998)		**Child Health and Illness Profile Child Edition/ Parent (CHIP-CE)** Age: 6 - 11 years Reliability: x, Validity: x (Riley et al. 1994, 2004; Rebok et al. 2001; Starfield et al.1994, 1995)
Perceived Illness Experience Scale (PIE) Age: 8 – 25 years Reliability: no, Validity: x (Eiser et al. 1995; 1999)		**Child Health Rating Inventories (CHRIs)** Age: 5 – 12 years Reliability: no, Validity: no (Parsons et al. 1999)
Dutch Children TNO-AZL Quality of Life Questionnaire (TNO-AZL/ DUX-25) Age: 5 – 16 years Reliability: x, Validity: x (Verrips et al. 1999)		**Child Quality of Life Questionnaire (CQOL)** Age: 9 – 15 years Reliability: x, Validity: x (Graham et al.1997)
		How Are You? (HAY) Age: 6 – 12 years Reliability: x, Validity: x (Bruil et al. 1999)
		Inventory of Life Quality in Children and Adolescents (ILC) Age: 8 – 18 years Reliability: x, Validity: x (Mattejat & Remschmidt 1998; 2006)
Total score	**Total score**	
Pediatric Quality of Life Enjoyment Age: 6 – 11 years Reliability: x, Validity: no (Endicott et al. 2006)	**Children's Life Quality Index (CLQI)** Age: 5 – 16 years Reliability: no, Validity: x (Beattie & Lewis-Jones 2006)	**KIDSCREEN-52 / KIDSCREEN-27** Age: 8 – 18 years Reliability: x, Validity: x (Ravens-Sieberer et al. 2005; 2007, Robitaila et al. 2006, 2007)
Children's Health Rating Scale (CHRS) Age: 9 – 12 years Reliability: x, Validity: x (Maylath 1990)	**Functional Status II (R) (FSIIR)** Age: 0 – 16 years Reliability: x, Validity: x (Stein & Jessop 1990)	**Revised Children Quality of Life Questionnaire (KINDL®)** Age: 4 - 7 years Kiddy-KINDL ; Age: 8 - 12 years Kid-KINDL Age: 13 - 16 Kiddo-KINDL *(self-reporting with 4 years)* Reliability: x, Validity: x (Ravens-Sieberer & Bullinger 1998)
Exeter Health-Related Quality of Life Measure (EHRQL) Age: 6 – 11 years Reliability: no, Validity: x (Eiser et al. 1999; 2000)		**Nordic Quality of Life Questionnaire for Children (Nordic QOLQ)** Age: 2 – 18 years *(self-reporting with 12 years)* Reliability: no, Validity: x (Lindström et al. 1991, Lindström et al. 1993)
Generic Children's Quality of Life Measure (GCQ) Age: 6 - 16 years Reliability: x, Validity: x (Collier 1997; Collier et al. 2000)		**Pediatric Quality of Life InventoryTM (PedsQL)** Age: 2 -18 years *(self-reporting with 5 years)* Reliability: x, Validity: x (Varni et al. 1999; 2001; 2007)
		TNO AZL Children's QOL (TACQOL PF/ CF) Age: 6 – 15 years *(self-reporting with 5 years)* Reliability: x, Validity: x (Fekkes, Kamphuis, Koopman et al. 1998; Vogels et al. 1998; Theunissen et al. 1998)
		Total score
		KIDSCREEN-10 Index Age: 6 – 11 years Reliability: x, Validity: no (Ravens-Sieberer, Erhart , Rajmil et al. 2010)

(Source: Own illustration according to Solans et al. 2008, Patient-Reported and Quality of Life Instruments Database (PROQUOLID) 2011)

3 CHILD'S HRQOL – OUT OF THE CHILD'S PERSPECTIVE

Measuring the subjective well-being of children might cause additional challenges compared to adults. Dealing and providing adequate responses with multi-dimensional satisfaction scales require a certain cognitive development of the child and the ability to rate questions between *"very good"* to *"very bad".* The methodologies for the assessment of children's HRQOL differ in national and internationally studies. There is an on-going debate in the literature concerning who is the most appropriate informant for the HRQOL of children, the children themselves or their parents? According to the previous described developmental theories it can be assumed that primary school children have the ability to understand their state of health and disease independently. What is the reality in in the current literature about that aspect? The next section will also deal with the issues which might occur through

The purpose of this chapter is to address if primary school children are able to rate their HRQOL according their developmental understanding of health. The first part of this chapter will focus on studies performed in Germany and internationally. The focus lies on how the challenges in research with children were dealt with, what was the age of the youngest study participants, how was the children's age and the developmental stage was considered for the applied methodology and what were the main findings of the various studies. The second part will specifically focus on the ability of primary school children to rate their self-perceived health and the different views from child researchers.

The number of studies with the goal to assess children's HRQOL has increased over the years. Although, a few surveys have examined their results by the children themselves. The studies performed in Germany will be reported chronologically in regards to the first date of performance, followed by international conducted studies.

3.1 Studies in Germany by assessing the child's view

The Children's Barometer

The Children's Barometer was performed with more than ten thousand children between nine to fourteen years in 611 schools in entire Germany in 2009. The study was focusing on the general well-being and factors influencing well-being. The authors justified that their study design and the comprehensive questionnaire had to be filled out by the children themselves and therefore did not enable them to limit the age for the study group. The applied questionnaire had already been tested in their previous studies and contains items with five step rating scales developed by *Rohrmann* and additionally open questions (Rohrmann 1978, in: Beisenkamp et al. 2009 for the LBS Children's Barometer Germany 2009). Furthermore, some conditions for well-being were visualized with seven different symbols for weather on a scale from 1- 7, thunder signalised very bad well-being and blue sky and sun indicated very good well-being which is illustrated in Figure 3. The children had to fill out

the questionnaire in their classrooms. At the end of the questionnaire children were ask additionally to fill out some question concerning their feelings and understanding in regards to the questionnaire.

Figure 3 A weather scale to measure children's satisfaction

(Source: Children's Barometer Germany 2009)

Beisenkamp et al. wanted to assess if the feelings of the children during the survey stood in relation to their responses. They found that the feeling during the survey stands in relation to the responses of the survey (r =.52). The better the children felt during the assessment the more positive the answers were made and the opposite. The comprehensibility of the questionnaire has additionally an impact on the positive well-being during the assessment (r =.21) (Beisenkamp et al. for the LBS Children's Barometer Germany 2009).

Most children participating in the *Children's Barometer* valued their well-being as *"rather good"* to *"good"*, 7 % felt *"generally"* but *"not good".* Children with migration background were ranking their well-being *"less well"* compared to children without migration background. The survey found that unemployment takes negative impact on the well-being in the family, at school and for friends. Children of single parents felt *"less good"* in their family and *"less good"* with their friends. Boys assessed to feel *"less well"* in school. Elder children sensed both in general and in other life settings with the exception for friends less well than younger children.

The *Children's barometer* could present that well-being is influenced mostly by family and school, whereby both life settings do not compensate each other. Concerning diseases and body feeling the survey could evaluate that nearly half of all respondents react in stressful situations with psychosomatic symptoms; more than a third gets headache and a little more than a fifth abdominal pain. Girls are more likely affected from psychosomatic symptoms than boys. *Beisenkamp et al.* evaluated that stress-related pain negatively correlates with all dimensions of child well-being, except for friends, and influence the children's perceived morbidity. Girls reported to feel supported by their friends (girls) in all areas. The support by friends showed positive correlation with the well-being with friends (Beisenkamp et al. for the LBS Children's Barometer Germany 2009).

The more children got supported by their siblings on educational problems, the higher their familial (r =.18), general (r =.14) and educational well-being (r =.11). The only requested school aspect without showing any relation to the child's well-being, whether children see themselves responsible for being able to do something. Concerning the well-being at school more than 20 % did not get along well at

school and was increasing with age. The children from Hamburg and Schleswig-Holstein reported to get rarely in trouble with their parents than children from other federal states. With increasing age children get more frequently in trouble with their parents whereby children with migration background reported to be more in anger in regards to bad grades than children without migration background (Beisenkamp et al. 2009 for the LBS Children's Barometer Germany).

By taken into account the factors influencing the general well-being of children *Beisenkamp et al.* examinated that well-being in the family and the well-being at school are substantially determined. Negative well-being at school correlates with *"bad"* well-being in the family or reversely (r =.34). This signifies that these two dimensions are not compensating each other. The more comfortable the children felt in the varying life-settings the higher rated was their well-being (general well-being: r =.28; well-being in the family: r =.17; well-being with friends: r =.18; well-being at school: r =.28) (Beisenkamp et al. 2009 for the LBS Children's Barometer Germany).

The World Vision Children's Study

The World Vision Children's Study was performed with 2,529 children between six to eleven years by covering besides well-being and self-efficacy other dimensions like family, parental affection, ethnical background, religion and belief, poverty and social inequality etc. The assessment was conducted through computer-assisted-personal-interviewing where the children were personally interviewed at home-verbally by trained interviewers where the children had to rank their answers through five smileys directly on a computer[3]. The five smileys were ranging from a completely downturned mouth to a completely upturned mouth (see in Figure 4).

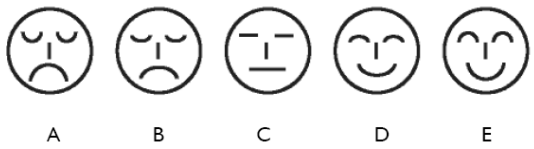


Figure 4 A smiley scale to measure children's satisfaction

(Source: Hurrelmann & Andresen for the World Vision Institute for Research and Innovation 2010)

In order to avoid stress for the children *Hurrelmann & Andresen* applied the same scale levels for their questions. Qualitative ratings were also supported by visual aids (see in Figure 5).

[3] The First *World Vision* Children's Study in 2007 applied instruments that were tested in other children surveys. Questions were taken from the *DJI*- Children's *Panel*, the *LBS- Children's Barometer* and the Children's Study *Dresden*.

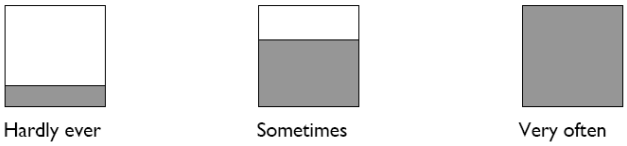


Figure 5 A visual scale to measure children's satisfaction

(Source: Hurrelmann & Andresen for the World Vision Institute for Research and Innovation 2010)

The instruments and the computer-assisted-personal-interviewing were evaluated for their suitability for target aged children in a pre-test. This form of assessment was very well handled compared to a written questionnaire. Hence, *Hurrelmann & Andresen* were lowering the age of the children in the most recent survey to 6 years.

Results for satisfaction could show that 44 % of the boys and 45 % of the girls rated their situation very positively and 37 % of the boys and 39 % of the girls positively. Fourteen percent of the boys and 11 % of the girls rated their satisfaction as neutral. A negative rating was given by 3 % of each gender, and a very negative rating by 2 % of both boys and girls. In regards to self-efficacy 11 % of the girls and 12 % of the boys reported a very high self-efficacy. Very high self-efficacy means that these children have very small doubts. The children who rated their self-efficacy as average were 37 % of girls and boys at 36 %. Seventeen percent of the girls and 16 % of the boys had a rather low self-efficacy. Children from lower class are more afraid of poor school grades and parental unemployment (Hurrelmann & Andresen for the World Vision Institute for Research and Innovation 2010).

A pilot study during regular school medical check-ups in Hamburg

A pilot study on the short version of the KINDL with twelve questions was completed by 1,501 pupils in the fourth and eighth grade during regular school medical check-ups in Hamburg, Germany. Additionally assessed were single subscales of the SF-36 Health survey[4], single questions concerning health behaviour like risk behaviour and resources. This work will only consider the results of the school children from the fourth grade. The fourth graders (n = 918) were in average 9.7 years old. The sample consisted of 48.3 % girls and 51.7 % boys. The parents were asked to provide information related to their own health by the SF-12[5].

The fourth graders of the pilot study reached an average HRQOL total score $\bar{x}$: 81.9, SD ±9.07. *Ravens-Sieberer et al.* explored that girls and boys showed the largest discrepancy for physical well-being (see in Table 2) (Ravens-Sieberer et al. 2000).

[4] The SF-36 is a generic short-form health survey with 36 questions. It yields an 8-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health summary measures and a preference-based health utility index (Ware et al. 1994).
[5] The SF-12 is also out of the family of the generic short-form health surveys developed by *Ware et al*. (1994) and contains 12 questions.

Table 2 Results of the school children from Hamburg, Germany

Subdimension(s)	Girls		Boys	
	Mean (x̄)	SD	Mean (x̄)	SD
KINDL^R - Total HRQOL Score	x̄: 76.83	±8.63	x̄: 76.67	±8.66
KINDL^R - Physical Well-being	x̄: 74.43	±14.19	x̄: 76.68	±13.03
KINDL^R - Mental Well-being	x̄: 83.11	±11.33	x̄: 82.89	±10.67
KINDL^R - Self-Esteem	x̄: 66.68	±17.83	x̄: 66.52	±18.95
KINDL^R - Family	x̄: 84.40	±12.85	x̄: 83.58	±13.14
KINDL^R - Friends	x̄: 78.10	±13.78	x̄: 78.21	±12.78
KINDL^R - School	x̄: 74.10	±12.29	x̄: 72.35	±12.88

(Source: Own illustration according to Ravens-Sieberer et al. 2000)

Children with an acute or chronically disease (this information was part of the questions answered by the parents) presented lower HRQOL values compared to the children without any disease. Children who perceived their general health as *"less good"* or *"bad"* achieved a lower total HRQOL score x̄: 69.29 (SD ±9.36) compared to the children who evaluated the question about their general health as *"very good"* or *"good"* with an average score x̄: 80.95 (SD ±9.18). *Ravens-Sieberer et al.* examinated as well that the children with *"high"* HRQOL versus *"low"* HRQOL rated the additional question in regards to their life satisfaction, vitality and stress experiences more positive than the children with *"low" HRQOL.* Children with less experienced stress displayed less risky behaviour and better resources in terms of their health behaviour (Ravens-Sieberer et al. 2000).

The data of this study is recommended *by Ravens-Sieberer & Bullinger* as reference data for the KINDL^R questionnaire and will be taken into account in the discussion even though the study was performed with the short KINDL with 12 questions (Ravens-Sieberer & Bullinger 2000).

The HBSC Study (in Germany)

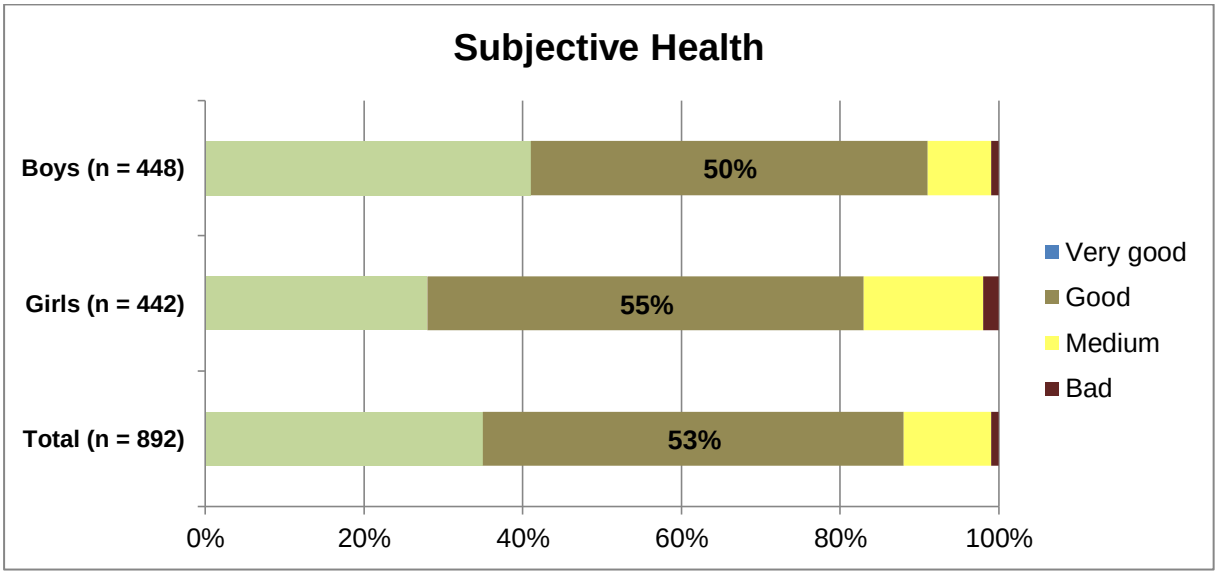
The *HBSC Study* is focusing on participants between eleven to fifteen years old in Germany. Through the inclusion of eleven years old children in this study, results of the *HBSC Study* are introduced in this section. The *HBSC Study* is performed every four years in over fourty participating countries. The most recent survey was conducted in Germany in 2010. For the time being no data or results have been published yet (Kolip 2010).

In 2005/ 2006 the *HBSC Study* was performed besides other cities in Germany, in Hamburg and Berlin. Two thousand nine hundred and fifty-five children (n = 1,717 in Berlin and n=1,238 in Hamburg) between eleven to fifteen years old visiting regular schools were participating. Sixty schools (n = 36 in Berlin and n = 24 in Hamburg) were selected by random-sampling. In order to identify influencing health related factors correlated to school, the children were selected by school class.

The European KIDSCREEN (in Germany)

The HRQOL was assessed by the KIDSCREEN 27[6] (The European KIDSCREEN Group 2006). The article by *Ravens-Sieberer et al.* could show that the vast majority rated their HRQOL as relatively *"good".* The most positive frequencies were reached for well-being with friends with 85 %, well being with parents 83 % and well-being at school with 81 %. Children and adolescents with low SES experienced their physical health often worse than those with a better SES background, although these are more affected by health reducing factors such as allergies or injuries. The study presented highly significant associations between mental health and life satisfaction. The higher the psychological well-being is the greater is the life satisfaction. Low self-efficacy was associated with reduced mental well-being and lower life satisfaction. Psychosomatic impairments are strongly associated with poor psychological well-being and associated decreased life satisfaction (Ravens-Sieberer et al. 2008).

Figure 6 Self-reported health in Hamburg (2006) classified by sex



(Source: Own illustration according to Ravens-Sieberer et al. 2008)

Girls were feeling "*less good"* than boys concerning their subjective well-being (see in Figure 6) and even increased with the age. Even though the *HBSC Study* has been performed since several years in Germany the question why girls rate their well-being less than the boys could not have been answered (Ravens-Sieberer et al. 2008).

The aim of this section was to address HRQOL surveys in Germany focusing on *"healthy"* primary school children where the children perceived their HRQOL on their own and to investigate if the results

[6] The KIDSCREEN 27 is out of the family of the KIDSCREEN instruments developed by *Ravens-Sieberer et al.* (2005) and is a shorter questionnaire than the KIDSCREEN 52.

of the study reflected the ability of the children to rate their HRQOL. The *Children's Barometer* was performed with children between nine and fourteen years; the *HBSC Study* set their age limit for the self-reporting children at eleven and the *World Vision Children's Study* was performed with children between six to eleven years. *Hurrelmann & Andresen* were lowering the age of the children in the most recent *World Vision Children's Study* to six years. The suitability for the instruments and the computer-assisted-personal-interviewing were evaluated with a pre-test. The *World Vision Children's Study* coordinated by *Hurrelmann & Andresen* were taken into account the current state of research by lowering the age of their study group and applying age appropriate assessment instruments.

3.2 International studies by assessing the child's view

> *"One of the most important factors in assessing whether a particular environment is conducive to children attaining their best potential is the perception of their own subjective sense of well-being"* (Children's Worlds - International Survey of Children's Well-Being 2011).

The previous section had the aim to address HRQOL surveys were the child's responses stood in the centre of the evaluation in Germany and the next section is focusing on international studies.

The HBSC Study

The International Coordinating Centre of the *HBSC Study* is the *Child and Adolescent Health Research Unit (CAHRU)* in the United Kingdom which at present involves 43 countries across Europe and North America. In regards to the large network *Ravens-Sieberer* called the international contribution of the *HBSC Study "a milestone"* in child public health research (Ravens-Sieberer 2009). The target population are children aged 11, 13 and 15 years are hence the *HBSC Study* is included in this chapter (Child and Adolescent Health Research Unit 2011).

The findings of the *HBSC Study* showed cross-national differences and 44 % of the school children were suffering either from subjective health complaints, *low* life-satisfaction, *poor* or only *fair* general health or a combination of these three indicators. *Ravens-Sieberer et al.* investigated that the older adolescents (OR: 1.1–1.6) reported more health problems than the eleven years old ones and the girls (OR: 1.2–1.4) also described more health complaints compared to the boys. The gender difference increased with the age (OR: 1.3–1.6). They also evaluated that a *low* SES was also associated with health problems (OR: 1.4–2.3) and presented considerable cross-national deviation in the frequencies and the impact of the above mentioned factors (Ravens-Sieberer et al. 2009). *Ravens-Sieberer* highlighted that the results reflect the significant number of children throughout Europe suffering from numerous health complaints. On individual level a *low* SES is related to health problems. At the macro-level social determinants provided evidence that health complaints in children increase significantly when the income inequality in the country rises (Ravens-Sieberer 2009).

Children's Subjective Health Study in Norway

Løhre et al. performed a study in five schools in Norway to identify school-related factors that may contribute to children's subjective health. The children were between 7 to 16 years and ranging from the 1st – 10th grade. The researchers decided instead of letting all children filing in the questionnaire by themselves, 180 children in grades 1st – 4th, 53 children in grades 5th - 7th, and three children in grades 8th – 10th were interviewed by trained school nurses. The other 183 children completed the questionnaires by themselves. *Løhre et al.* were aware of the influence by the nurses although the nurses were trained for interviewing.

Løhre et al. found that perceived loneliness was strongly associated with the prevalence of sadness, anxiety and headache. Additional analyses of boys and girls showed loneliness in boys was strongly associated with sadness, while for girls loneliness was equally strong for sadness, anxiety and headache (Løhre et al. 2010).

The Children's Worlds – International Study of Children's Well-being

The *Children's Worlds – International Study of Children's Well-being (ISCWeB)* focuses on children between seven to thirteen years and developed a survey by the *International Society of Child Indicators (ISCI)* a group of international child researchers and supported by experts from *OECD*, *UNICEF* and *World Vision*. For the moment no results of the study have been published yet.

The previously introduced studies applied different approaches for evaluating the child's self-perceived health and one study investigated that there is a relation between the feeling of the child during the survey and the responses.

3.3 Ability of primary school children to perceive their own HRQOL

Measuring the subjective well-being of children can cause additional challenges compared to adolescence. Dealing and giving adequate responses for instance on a five point Likert scale requires a certain cognitive development of the child and the ability to rate the questions from *"very good"* to *"very bad".* Further challenges might be encountered through a shorter attention span, linguistically problems of understanding, lack of the ability to read or to write, as well as the willingness of the child to give the *"right"* answer (Office for National Statistics (ONS) 2009).

The next paragraph would like to deal with the questions when are primary school children able to rate their HRQOL according to their understanding of health? Furthermore, which method is appropriately for primary school children according to the current state of research in the literature? How long are children capable to give retrospectively reliable responses to their own health?

Cremeens et al. state that there is increasing evidence that children below eight years are able to use rating scales, can use common response terms, can understand and interpret underlying concepts. Thus, *Cremeens et al.* conclude that children below eight years should be able to assess their own

HRQOL (Cremeens et al. 2006). *Upton et al.* belief as well that a child under eight years should be able to assess its own HRQOL (Upton et al. 2008). A similar conclusion was reached by *Riley* she argues that research demonstrates adequate understanding of child reports of their health even at age six, which increases after age seven in general populations (Riley 2004). The study team of the *World Vision Children's Study* was lowering the age of the children to six year olds (Hurrelmann, Andresen & Schneekloth 2010). Child researchers signify that primary school children in comparison to pre-school children are able to term objective visible signs and symptoms of a disease and to describe invisible signs and symptoms of a disease (Pidegon & Olson 1986, Schmidt & Froehling 2000, in: Lohaus and Ball 2006: p.55).

Matza et al. & Varni et al. highlight that with age- appropriate instruments, children with the age of five are able to rate their self-perceived health (Matza et al. 2004, Varni et al. 2007). Moreover, an age-appropriate instrument includes an adapted language and takes into account the reading competencies (Matza et al. 2004). *Stevens* mentions that there are also developmental differences in children's ability to understand and respond to items on a Likert scale. But he points out that eight year- old children can accurately use five or seven point scales to rate questions related to their health, whereas younger children tend to use more extreme responses (Stevens 2009). For instance *Rebok et al.* explored that 63.2 % of their sample from 5 to 11 year olds gave extreme responses, *"never"* and *"always"*, instead of *"sometimes"* and *"often".* The younger the children the more children provided extreme responses than children aged 7 or children between 8 to 11 years (Rebok et al. 2001). *Curtis et al.* assessed that the child-responses are similar in magnitude to those based on parent-responses. This implies that children are not just providing random answers (Curtis et al. 2002). *Brady* thinks that children have the same ability to be reliable and honest than adults. He points out that most of them respond as good they can, some report nonsensical or false, but the borderline is not between children and adults (Brady 1993, in: Joos 2001: 71).

With the help of illustrations and interview administration, *Solans et al.* believe the minimum age for self-reporting instruments lies between 5 to 6 years (Solans et al. 2009). On the other hand *Jozefiak et al.* signify that the rating of psychometric properties depends of the child's cognitive ability in the understanding of their meaning (Jozefiak et al. 2008) therefore the ability to rate mental well-being could may be not understandable for too young children like five years. Whereby *Schlarmann et al.* agree that children as young as eight and even at the age of six years, like *Solans et al.* believe, can reliably and validly perceive their HRQOL if the questionnaire is age- and cognitive-appropriate. Instruments for young children should always take into account, their writing and reading skills, by considering alternative assessment methods like smileys, and to avoid Likert-Scales in order to prevent extreme answers (Schlarmann et al. 2008).

Petersen-Ewert et al. highlight for measuring children's HRQOL it should be the standard that children rate their own perceived health. Exceptionally, in situations where the child is unable to complete a HRQOL instrument (because of age, cognitive impairment, illness or fatigue) (Petersen-Ewert et al.

2011). Other researchers argue that children should be the evaluator for their HRQOL by themselves. *Apajasalo et al.* conclude as well that the assessment of HRQOL of pre-adolescents can and should be based on data collected from the children themselves (Apajasalo et al. 1996). *Felder-Puig et al.* underline that the information needed should be directly obtained from the person concerned. But on the other hand *Felder-Puig et al.* state that self-reports in children are desirable but parents' perceptions of their child's HRQOL are also important because children are rarely in a position to refer themselves to health care services. Hence, *Felder-Puig et al.* mention that children are sometimes not able or willing to provide the necessary information, for developmental or other reasons (Felder-Puig et al. 2008). *Vogels et al.* indicate that children can willingly or unwillingly hide some of their thoughts and feelings for their parents (Vogels et al. 1999). *Lang* argues as well that the child's subjective judgement about its living situation is influenced by the child's caregiver (Lang 1985, in: Joos 2001: 71).

How are children able to report their HRQOL retrospectively? According to *Matza et al. & Varni et al.* children can rate questions in regards to their own health retrospectively after four weeks (Matza et al. 2004, Varni et al. 2007).

To conclude according to the current literature concerning the ability of children to perceive their own HRQOL, it can be concluded that eight year old children can accurately use five or seven point scales. Even children below eight years should be able to use rating scales, can use common response terms and can understand and interpret underlying concepts. Children can rate questions in regards to their own health retrospectively after four weeks.

Actually, children with the age of five are able to rate their perceived health, assuming that the assessing instrument is taking into account the children's development children's personal reporting provides valid information. The rating of psychometric properties on the other side depends on the child's cognitive ability in the understanding of their meaning therefore the ability to rate mental well-being could may be not understandable for too young children like five years.

The measures for young children should take into account their writing and reading skills, should consider alternative assessment methods like smileys, and avoid Likert-Scales in order to prevent extreme answers from young children.

Hence, rating the children's HRQOL should be the standard with the exception in situations where the child is unable to complete an instrument because of age, cognitive impairment, illness or fatigue. In regards to the literature the utilisation or the need for health care services for children should be reported by their parents. Children are rarely in a position to refer themselves to health care services. The current state of research concerning the ability of children to rate their HRQOL will be considered in the discussion of the results.

4 CHILD'S HRQOL- OUT OF THE PARENT-PROXY PERSPECTIVE

The aim of the next part is to address the studies were only the parents' perception of their child's HRQOL was focused on. The first part of this chapter will concentrate on studies accomplished in Germany and after internationally findings. The focus lies on the age within the target group where the parents were representing the children, the applied methodologies and their main findings.

The studies were only the parents' perspective of their child's HRQOL was assessed are very rare, in Germany and as well internationally. This is why this section will appear shorter than the other two sections focusing on HRQOL studies out of the children's and parents' view and studies considering only the child's perception.

4.1 Studies in Germany by assessing the parent proxy view

The National Health Interview and Examination Survey for Children and Adolescence (KIGGS)

In 2003 the *German Federal Ministry of Health* assigned the *Robert Koch Institute (RKI)*[7] to conduct a population representative study with the focused on children and adolescence in Germany (Kurth et al. 2008). The *National Health Interview and Examination Survey for Children and Adolescence (KIGGS)* determined the three dimensions of HRQOL (physical, social and psychological well-being) by covering various items. Additionally, physical examination and physical tests were conducted besides the questionnaires. Included in the study were 17,641 children (n = 8,985 boys/ n = 8,656 girls) from 167 different towns and places in Germany randomised through the register of residents. The parents of the children under eleven years (7 – 10 years: n = 4,148) were asked to fill out the parents' version of the KINDL^{R} questionnaire. Adolescences over eleven years old had to answer the questions themselves. Any comments about the reason why adolescences over eleven years old had to answer the questions themselves and children under eleven years were represented by their parents was not specifically explained (Ravens-Sieberer et al. 2003, Ravens-Sieberer & Bettge 2004, Lambert et al. 2009, Kolip 2011).

Through to the number of questions and tests covered by the KIGGS this work is only presenting the results related to the children between seven and ten years old. The total mean value for the HRQOL total score, reported by the parents, was $\bar{x}$: 76.30 (SD $\pm$1.1). The means for the HRQOL subdimensions were varying between $\bar{x}$: 68.80 to $\bar{x}$: 81.0. The total HRQOL score for the seven and ten year olds ranged from $\bar{x}$: 75.80 to $\bar{x}$: 79.4 (Ravens-Sieberer et al. 2008). The parents reported the HRQOL of the girls better until the teenage. *Kolip* identified that boys had more often accidental injuries, respiratory diseases and allergies this is why he beliefs this could be a reason why the parents rated the boys total HRQOL less good than the health of the girls (Kolip 2011). Moreover, *Ravens-Sieberer et al.* found that parents with small income and low school education rated their child's general health less often as *"very good"* compared to parents with higher income and higher

[7] The Robert Koch Institute (RKI) is the central federal institution in charge of disease control and prevention.

school education. Children with higher social status obtained higher total HRQOL scores than children with middle or low social status with a *"small"* effect. Children with migration background had lower HRQOL ratings from their parents than children without migration background (Ravens-Sieberer & Bettge 2004, Ravens-Sieberer et al. 2003).

The analyses data from the *BELLA*[8] study on mental health and subjective well-being showed personal, familial and additional social resources as well as personal autonomy as single predictors for better HRQOL. This was observed by *Ravens-Sieberer et al.* even if psychological problems were reported (Ravens-Sieberer et al. 2008).

The parents' ratings of the *KIGGS* are representative norm data for the KINDL^R in Germany (Ravens-Sieberer et al. 2008) and will be taken into account as reference data for the proxy-ratings in the discussion.

4.2 International studies by assessing the parent proxy view

The Flash Eurobarometer

In 2008 the *Flash Eurobarometer* was conducted to assess the HRQOL and general health condition in approximately 12,750 randomly selected parents (including step-parents/ guardians) of 6 to 17 year old children in for that moment the twenty-seven member states of the European Union (EU). The survey examined parents' perceptions of several aspects of HRQOL (e.g. physical well-being, moods and emotions, autonomy, peers and social support and the school environment) (Beisenkamp et al. 2009 in: Flash Eurobarometer 2009).

Child's HRQOL study in Brazil

Barreto et al. conducted a HRQOL study in eight metropolitan regions of Brazil. They could show evidence that parent's socio-economic and demographic factors are associated with child's less good HRQOL. The relationship between the proxy's report of the child's health and proxy's self-rated health is consistent across five income groups. The correlation between the proxy's five-point ratings of the child's health and their own health is r =.451 (Barreto et al. 2011).

Child's HRQOL studies in Iceland

Halldorsson et al. could investigate as well that parents with lower SES from Iceland rated their child's health and well-being worse than those with higher SES (Halldorsson et al.1999). Another Icelandic study was performed with the focus to compare parents' perception for healthy children and children with chronic diseases. *Svavarsdottir & Orlygsdottir* investigated no significance between mothers' and fathers' ratings on the total HRQOL score or the physical, emotional or social subscales. A significant difference was found between mothers' and fathers' perception for the subscale school. Mothers rated

[8] The BELLA survey is an additional component for mental health as part of *the "National Health Survey for Children and Adolescents in Germany"* conducted by the Robert Koch-Institute.

school functioning (x̄: 72.10) significantly higher than the fathers (x̄: 70.05). Parents with chronically ill children reported their child's HRQOL lower than parents with healthy children. Icelandic fathers rated their daughters' HRQOL significantly higher than their sons (Svavarsdottir & Orlygsdottir 2006a, 2006b)

Children's health and well-being in five Nordic countries

Reinhardt Pedersen & Madsen conducted a study in five Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). They could present that children with no parent employed in the past six months perceived lower well-being than children in families with at least one parent employed. Social class, family type, and parents' immigrant status were all associated with the health and well-being of children. The influence on children's health and well-being did not differ significantly between the five countries (Reinhardt Pedersen & Madsen 2002).

To conclude the income and school education of the parents has an influence on their child's HRQOL perception. Children with migration background had lower HRQOL ratings from their parents than children without migration background. Parents of girls were reporting the HRQOL better than for the boys. This could have been observed until the teenage.

4.3 Ability of parents to rate their child's HRQOL

What are the arguments for the usefulness of parent-proxy-reports and are parents able to rate their child's HRQOL? The arguments of child researchers about assessing proxy-reports differ.

Against proxy-reporting is besides other researchers *Ravens-Sieberer* who debated that foreign or proxy ratings are independent information and therefore no rough calculation values for the HRQOL of children (Ravens-Sieberer 2000, Boehmer & Ravens- Sieberer 2005). *Apajasalo et al.* concluded as well that the assessment of HRQOL should be based on data collected from the children themselves (Apajasalo et al. 1996) and is not suited for prospective data collection over extended time periods (Lundqvist et al. 2010). From a statistical view *Theunissen et al.* concluded that parent proxy-reports explain 10 – 25 % of the variance in child self-report HRQOL outcomes. Thus, the findings indicate that parent reports cannot be substituted for child reports (Theunissen et al. 1998). On the other hand *Barreto et al.* mentioned that it is essential to understand how parents perceive their child's health. It is important because the parents' own view has an impact on their subsequent actions and attitudes concerning their child's health and well-being (Barreto et al. 2011).

The agreement between the child- and the parent proxy-ratings will be further highlighted in the following section where as well impacting factors will be taken into account. The next section will also present results of studies focusing on the agreement between the child- and proxy-ratings.

5 CHILD'S HRQOL – OUT OF THE CHILD'S AND PARENTS' PERSPECTIVE

There is an on-going debate in the literature concerning who is the most appropriate informant for the HRQOL of children, the children themselves or their parents? The aim of this chapter is to explore the scientific point of view discussed in the recent literature and what were the findings related to the agreement between the children and their parent-proxies.

The first part of this chapter will focus on studies performed in Germany and after which surveys were conducted internationally. Moreover, this part will concentrate on the applied methodologies for assessing child's HRQOL through child self- and proxy-reports if researchers are considering potential influencing factors in their applied methodology. The third part will specifically face on the usefulness of proxy-reports and the arguments of researchers about assessing child self- and proxy-reports? Are there any researchers who see the proxy-ratings as essentially important? Are there any scientists who think that the proxy-reports could be useful as secondary outcome measure? What are the debates about scientists who are totally against child and proxy-reporting and their opinions? The fourth part of this chapter will focus on impacting factors explored through previous studies.

5.1 Studies in Germany by assessing the parent proxy and child's view

Studies with the purpose to evaluate child's HRQOL of *"healthy children"* by considering the parent-proxy and child responses are very rare in Germany.

The Children's Panel

The *Children's Panel* was conducted by the *German Institute for Youth* nationwide over three years. The survey was organized in three waves at intervals of approximately 1 ½ years from 2002 - 2005. The aim of the *Children's Panel* was to describe the complex situation of children and the influences of different living environments upon children's personal development by taking into account as well critical life events of children like the transition from kindergarten to primary school or the change to a secondary school. Therefore, the survey was including n = 1,148 five to six year-olds (children in kindergarten last year), n = 1,042 eight to nine year-olds (children in the third grade primary school) and their parents.

The *Children's Panel* was covering the assessment of the mother, the father and the child as presented in Table 3. The younger children from the first and second wave were represented their mother and optionally by the father. In the third wave of the study the younger study group of children started to give their own responses. The children from the third grade were separately assessed from their mothers by an interviewer at home. The fathers could give their ratings through a written questionnaire at home as well (Alt 2007).

The survey covered questions like personality traits, family constitution, behaviour in conflict situations, critical life events, child education, contacts to other children, interests and activities,

questions related to the support and care in kindergarten and at school etc. Furthermore, the parents were asked about health, socio-demography and the father additionally about the infrastructure of the living environments, the nature and equipment of accommodation.

Table 3 Methodological approach of the children's panel

Age of Child	1st Wave 4th Quarter 2002	2nd Wave 1st Quarter 2004	3rd Wave 1st Quarter 2005
11 -13 years			Mother Father Child
9 - 11 years		Mother Father Child	
8 - 9 years	Mother Father Child		Mother Father Child
6 - 8 years		Mother Father (~~Child~~ = Proxy)	
5 - 6 years	Mother Father (~~Child~~ = Proxy)		

(Source: Own adaptation from The German Institute for Youth 2003)

The German Institute for Youth reported that the parents saw their child in the positive self-image similar positive than the children perceived it on their own. This could be observed as well for younger children aged 5 to 6 years. Seventy-eight percent of the 8- to 9-year-olds admitted to be sometimes sad, 71 % answered sometimes to be afraid and 51 % felt sometimes alone. The results of the children's panel explored that internalisation of emotions or behaviour is less visible by the parents than externalization of emotions or behaviour. For instance parents rated motorical restlessness and anger more similar to the ratings of their children. Boys reported their externalisation of emotions and behaviour higher than girls. The girls tend more for internalizing emotions and behaviour (The German Institute for Youth 2009).

5.2 International studies by assessing the parent proxy and child's view

Compared to Germany the situation in regards to the availability of studies focusing and the parent-proxies' and child's perception are more common internationally. Through the more frequently occurrence of parent-child evaluations the following section is providing the main findings and the

results with respect to the parent-child-agreement. Through the number of studies in this section, each study is not headlined like in the other parts.

Davis et al. investigated a higher agreement for the girls than for the boys and for the adolescents than for children for all of the evaluated KIDSCREEN dimensions. Physical well-being and school well-being showed a moderate agreement. The girls' and boys' samples presented a moderate agreement between self-reports and proxies' reports for the dimensions: physical well-being, social support and peers, school environment, and financial resources. Further, an ICC >.40 was accomplished for psychological well-being, self-perception of the relation with the parents and home life only for the girls' population (Davis et al. 2007).

Robitail et al. found that age group and gender were related to the agreement for more than half of the KIDSCREEN dimensions. Age group was related to the agreement for all of the ten dimensions except autonomy and social support. The agreement for physical well-being with an ICC = .43 showed the highest agreement and was followed by cognitive & school functioning ICC = .42 (Robitail et al. 2007).

A Canadian study performed by *Curtis et al.* conducted the parental interviews with the proxy-parent directly or by telephone. The children filled out questionnaires in a private space with the guarantee that parents would never see their responses. In 31 % of the evaluated dimensions the proxy-parents' scores revealed higher scores and in 33 % of the child-ratings. An agreement was shown for disorders in 36 % of the cases. The study of *Curtis et al.* could find that questions concerning more observable behaviour had higher agreement between the parents and children. The strongest agreement could be evaluated for schooling performance, specifically to a fairly clear indicator the report cards. According to *Curtis et al*. findings parent-child agreement tended to be stronger for more readable observable domains (e.g. schooling performance based on report cards) and tended to be weaker for less observable domains (e.g. emotional disorders, indirect aggression etc.) (Curtis et al. 2002).

According to the literature review conducted by *Upton et al.* included studies (from 1999 to 2006) which were applying reliable and validated instruments for assessing child's HRQOL by completing parallel the children's and their parents' perception. Through this review they found better agreement on physical health only where the child had a health problem (Upton et al. 2008).

Theunissen et al. performed a representative study on 1,105 Dutch children between 8 to 11 years old and their parents with the TACQOL[9]. They could show that the children reported their HRQOL significantly lower for physical complaints, motor functioning, autonomy, cognitive functioning and positive emotions than their parents. If the parent-proxy and the child rated a low HRQOL, the child reported the HRQOL relatively higher than the parent. The parent-child pairs who achieved high HRQOL ratings, conversely the child's HRQOL scores were comparatively lower. Both correlation methods by Pearson's and the intra-class correlation (ICC) were applied for analysing the parent-child

[9] The TNO AZL Child Quality Of Life (TACQOL) developed by *Vogels et al.* (1998) is a generic, multidimensional 56-item reliable and valid instrument for measuring HRQOL in children.

agreement. The Pearson's correlation coefficients were statistically significant ranging between r = .44 - .61 and the ICC statistically significant between ICC = .39 - .62 (Theunissen et al 1998).

Moreover, *Theunissen et al.* explored that the child's age was related to the parent-child agreement for autonomy and positive emotions. The children between 10 – 11 years old with low autonomy or positive emotion scores presented less agreement with their parents than the children between 8 – 9 years. In contrary better agreement was revealed for the children between 10 – 11 with high autonomy or positive emotion scores compared to the younger children (Theunissen et al 1998).

Laaksonen et al. assessed children (n = 1,346) between 9 –10 years from the 4th grade at primary schools and their parents (n = 999) with the PedsQL[10] in Finland in 2004. The highest average mean values were identified for physical functioning respectively physical well-being $\bar{x}$: 85 (SD ±10.95) and social well-being $\bar{x}$: 84.71 (SD ±14.28). They observed the lowest mean for mental well-being $\bar{x}$: 75.43 (SD ±15.67) which was significantly lower reported by the girls than the boys. Their statistical analysis between the child self- and parent-proxy-reports revealed to be lower for social functioning respectively social well-being ($t = -2.57$, $p < 0.001$) and functioning at school ($t = -3.44$, $p < 0.001$). Mental well-being ($t = 5.82$, $p < 0.001$) as well as physical functioning ($t = 4.79$, $P < 0.001$) was significantly higher for the proxy-ratings (Laaksonen et al. 2008)

In 2007 *Felder-Puig et al.* performed a study in Vienna (Austria) to identify child's HRQOL in 3rd and 4th grades of primary schools by child, parent and teacher reports. Their results indicated low to medium agreement between children and their parents. The only variable that was found explaining child-parent variance was the child's gender, with girls deviating more from their parents than boys (Felder-Puig, et al. 2008).

Cremeens et al. conducted as well research in the United Kingdom by using two different statistical methods. The Short-Form Health Survey (SF-36)[11] was included to measure the parents' own well-being. Participants were 149 primary school children (n = 67 girls/ n = 82 boys) between the ages of 5.5 and 8.5 years. *Cremeens et al.* could present the consistency was low between child and parent proxy-reports. The ICC was higher for the oldest age group ICC = .23 decreasing by younger age ICC = .06 for the 6.5 -7.5 years old and an ICC = .03 for the youngest children (5.5 – 6.5 years). Psychosocial health reached the highest ICC = .22 for the oldest age group and physical health presented the highest ICC = 0.21 in the youngest age group. The parents reported better HRQOL of the child than their children themselves (see in Table 4) (Cremeens et al. 2006).

[10] The Pediatric Quality of Life Inventory (PedsQL) is a generic reliable and valid questionnaire measuring children's HRQOL and was developed by *Varni et al.* in 1999.
[11] The SF-36 is a generic short-form health survey with 36 questions developed by *Ware et al.* (1994).

Table 4 Mean scores for the child-reports and parent proxy-reports

	Median (Mean)			
Scale	**Total sample (n = 103)**	**5.5 – 6.5 years (n = 29)**	**6.5 – 7.5 years (n = 34)**	**7.5 – 8.5 years (n = 40)**
PedsQL™				
Total Score				
Child	71.74 (71.77)	78.26 (77.60)	67.39 (67.34)	71.74 (71.58)
Parent	80.43*** (79.97)	84.24 (80.75)	80.43*** (80.34)	79.35** (70.10)
Physical Health				
Child	81.24 (76.42)	81.25 (79.88)	68.75 (71.81)	81.25 (78.18)
Parent	87.43*** (86.10)	87.50 (84.59)	87.50*** (87.41)	89.06** (86.09)
Psychosocial Health				
Child	66.67 (68.90)	78.33 (76.57)	63.33 (64.44)	66.67 (67.52)
Parent	78.33*** (76.72)	81.67 (78.69)	77.50*** (76.57)	75.00** (75.43)

Denotes statistically significant child/parent correlation at *** p < .001, ** p < .01, or * p < .05.

(Source: Cremeens et al. 2006)

Klatchoian et al. performed a study with 180 school children in São Paulo, Brazil. The parents rated their child's HRQOL higher compared to the children in all aspects (physical, emotional, social and school). For emotional aspects parents were rating their child's mental health lower than the children themselves. The mean scores for child self-report and parent proxy-report are presented in Table 5. *Klatchoian et al.* emphasized that this could reflect the ability of parents to observe better their children in relation to physical aspects compared to emotional and social issues (Klatchoian et al. 2010).

Table 5 Mean scores for the child self-report and parent proxy-report

Aspect	Items	n	Mean	SD
Child-report *				
Total score	23	180	88.90	7.35
Physical health	8	180	95.94	5.83
Emotional functioning	5	180	73.03	16.52
Social functioning	5	180	93.14	10.54
School functioning	5	173	89.31	11.80
Psychosocial health	15	180	85.03	9.66
Parent-report				
Total score	23	240	92.32	6.01
Physical health	8	240	97.86	4.31
Emotional functioning	5	240	80.52	12.59
Social functioning	5	240	96.38	8.89
School functioning	5	207	90.93	11.85
Psychosocial health	15	240	89.18	8.19

* PedsQL of children aged 5 to 18

(Source: Klatchoian et al. 2010)

Verrips et al. performed a study with 1,159 children between 8 to 11 years old. In this study they could find out that the children reported significantly more physically problems than their parents. The children reported more problems associated with negative emotions, on all scales except the social scale, than their parents (Verrips et al. 1998).

Jozefiak et al. wanted to investigate if HRQOL instruments influence the degree of discrepancy in a sample of Norwegian school children and their parents. Therefore, they applied two different HRQOL instruments: the Inventory of Life Quality (ILC) [12] and the KINDL. The results of the ratings of children and at least one parent (mainly mothers) showed, except for the family domain that the parental ratings of the child's HRQOL were significantly higher than the ones rated by the children themselves. Significantly fewer parents reported problems for the child on almost all life domains. Correlations between mother-child and father-child reports were low and almost identical on the KINDL and similar on the ILC (see also Table 6). No statistically significant differences between the four parent child pair combinations were found**.** The Pearson's correlations coefficients between the child- and parent-reports on the KINDL and the ILC were significant but low for all subjects (r = .31 and .28, respectively) (Jozefiak et al. 2007).

Table 6 Correlations between mother, father and child reports on the KINDL[R] and ILC

	Child	Daughter	Son	Mother	Father	At least one caregiver[3]
Child	-	-	-	**0.32**** N = 1180	**0.30**** N = 1175	**0.31**** n = 1743
Daughter	-	-	-	**0.39**** n = 589	**0.34**** n = 586	-
Son	-	-	-	**0.26**** n = 591	**0.26**** n = 589	-
Mother	0.30** n = 1197	0.31** n = 600	0.32** n = 597	-	**0.54**** N = 1169	-
Father	0.26** n = 1188	0.25** n = 594	0.29** n = 594	0.61** N = 1188	-	-
At least one caregiver[3]	0.28** n = 1777	-	-	-	-	-

[1] Pearsons product-moment correlations
[2] KINDL total QoL score correlations shown in **bold**; ILC LQ28 score correlations shown underlined.
[3] KINDL: Including 1657 mothers; ILC: Including 1689 mothers.
**p < 0.01.

(Source: Jozefiak et al. 2007)

The cross-sectional KIDSCREEN survey in different European countries showed that material indicators (familial wealth) are better predictors of subjective outcomes like HRQOL than educational indicators (Von Rueden et al. 2006).

Parents and children (from 8 to 16 years) participating in the survey conducted by *Varni et al.* filled out the questionnaire on their own. Whereby the children between 5 to 7 years old or in situations in which the child was unable to read or to write either because of physical or cognitive impairment the survey

[12] The Inventory of Life Quality in Children and Adolescents (ILC) was developed in Germany by *Mattejat et al.* (1998) is a 15 items assessment tool for children and adolescents.

was administered per interview. *Varni et al.* found in their HRQOL study in the United States of America (USA), the largest differences for the correlation between the dimensions of self-esteem and family well-being, as well as for the correlation between the dimensions of self-esteem and psychological well-being. They selected the ICC between child self-report and parent proxy-report agreement as ≤ .40 *poor* to *fair* agreement, .41– .60 *moderate* agreement, .61–.80 *good* agreement, and .81–1.00 *excellent* agreement which will be the classification for the results of this work as well. They found *moderate* to *good* agreement across most of the PedsQL scales and summary scores. The average ICCs across the individual age subgroups from 5 to 16 years for the PedsQL are presented in the Table 7 below (Varni et al. 2007).

Table 7 Intra-class correlations coefficients between child- and proxy-reports by age

Age	n	Total Score	Physical Health	Psychosocial Health	Emotional Functioning	Social Functioning	School Functioning
5 yrs	558	0.46*	0.25*	0.56*	0.68*	0.43*	0.46*
6 yrs	703	0.43*	0.24*	0.53*	0.67*	0.40*	0.44*
7 yrs	635	0.42*	0.21*	0.54*	0.66*	0.40*	0.43*
8 yrs	575	0.55*	0.40*	0.62*	0.72*	0.51*	0.46*
9 yrs	553	0.57*	0.37*	0.64*	0.70*	0.56*	0.55*
10 yrs	533	0.68*	0.50*	0.73*	0.80*	0.64*	0.61*

Note: Intra-class Correlation Coefficients (ICC) are designated as ≤ .40 poor to fair agreement, .41–.60 moderate agreement, .61–.80 good agreement, and .81–1.00 excellent agreement.

(Source: Varni et al. 2007)

Another study performed in the USA by *Mansour et al.* with 2nd, 3rd and 5th grade school children from urban areas and their parents. The PedsQL was self-administered by 5th graders. The 2nd and 3rd graders were administered by an interviewer through lower reading capabilities. In parallel the parents were asked to rate their child's health and to report their own health with the SF-36. *Mansour et al.* evaluated that the parent's perception of the child's total health was only correlated with the physical subscale of the child's self-report and not with the total HRQOL or psychosocial scores (Mansour et al. 2003).

Scientific statements concerning the child's HRQOL assessment by the children and parents

After presenting the results of previously conducted studies what are researchers' argumentation in regards to assessing the parents and the children's perspective? The scientific perceptions concerning parent-child agreement in Germany and internationally varies.

Le Coq et al. criticize that studies performed with the objective to compare data obtained from parents with data obtained from children have mainly been cross- sectional and have focused on the level of agreement, rather than comparing other issues (e.g. reproducibility, validity, responsiveness of both

data sets, requiring repeated measurements) (Le Coq et al. 2000). *Hays et al.* mention that HRQOL is focussing specifically on the impact of health on an individual's well-being and preferably assessed by self-report (Hays et al. 1994, in: Upton et al. 2008). Joos highlights the problematic in research with children that often adults try to take the role of a proxy and can influence their child's view and responses. Therefore, she emphasises the importance of the children's view including their interests and needs (Joos 2001: p.78).

The authors of the *Flash Eurobarometer* point out that parent proxy-reports and children's own reports are not necessarily the same but both reports are valid, and constitute important information concerning a child's well-being (Flash Eurobarometer 2009). *Mansour et al.* advocate for the usage of both measures when possible, with the argumentation that children are more likely to accurately represent internal measures of health than parents, but reasoned that parents' perception of health is often what leads to health-seeking behaviour or health care usage (Mansour et al. 2003).

A neutral view for child and proxy-reporting is stated besides other researcher by *Felder-Puig et al.* They underlie that the information should be directly obtained from the person concerned in this case the children. But on the other hand *Felder-Puig et al.* argue that self-reports from children are desirable but parents' perceptions of their child's HRQOL are also important because children are rarely in a position to refer themselves to health care services which is also mentioned by *Mansour et al.* (2003). Furthermore, *Felder-Puig et al.* emphasize that children are sometimes not able or willing to provide the necessary information, for developmental or other reasons. The parents usually decide whether and which kind of health care is necessary for their child and define what they believe to be the best treatment option (Felder-Puig et al. 2008)**.***Varni et al.* point out that parent proxy-report could be included to complement self-reports as a secondary outcome measure and should only be the primary outcome measure when the child is too young or ill or otherwise unable to self-report because of cognitive deficiencies (Varni et al. 2007).*Von Rueden* state as well that proxy interviews should be taken into account, if child-self-reports could not be assessed by themselves (Von Rueden 2007). *Petersen-Ewert et al.* highlightthat it should be the standard that children rate their own perceived health. Exceptionally, in situations where the child is unable to complete a HRQOL instrument (because of age, cognitive impairment, illness or fatigue) (Petersen-Ewert et al. 2011).

5.3 **Factors which can have an impact on the parent-child agreement**

No consistent findings have been reported regarding the influence of potential determinants of parent-child agreement. Nevertheless, the level of agreement between proxy-reports and child self-reports was found to vary between the different aspects (e.g. methodological issues, measured domains of HRQOL or parents' own health or health education etc.). The next section will focus on impacting factors explored through previous studies and is arranged by child-related, parent-related, parent-

child-related and methodological-related factors. This chapter will end with an illustration of all the influencing elements.

Child-related factors

Robitail et al. could assess that the agreement is higher for the girls than for the boys. Especially, physical well-being, psychological well-being, moods and emotions, self-perception, autonomy, and social acceptance were varying with gender (Robitail et al. 2007).

Does the child's age have an influence on the degree parents-child agreement? *Robitail et al.* could show that age group was related to the agreement for all of the ten HRQOL dimensions measured in the KIDSCREEN pilot study. Within the child parent sample only two dimensions, physical well-Being and school environment, showed a moderate agreement. While seven out of ten dimensions between adolescence and parents were reported as moderate agreement (Robitail et al. 2007).

Older children have less agreement with their parents than younger children? *Cremeens et al.* showed that self and proxy-report had higher differences in the older age groups (6.5 to 7.5 years and 7.5 to 8.5 years) than the youngest age group (5.5 to 6.5 years). The largest differences were found in the middle age group (6.5 to 7.5 years) (Cremeens et al. 2006).

The following results contradict findings from other studies where researchers have shown agreement increasing with child age. *Jozefiak et al.* observed that correlations between child (8 to 12 years) and parent ratings were lower than between adolescents and their parents (Jozefiak et al. 2008). *Chang & Yeh* reported greater agreement between younger children (up to 12 years) versus older children in both self and parental ratings (Chang & Yeh 2005, in: Jozefiak et al. 2008). *Theunissen et al.* found also that parent-child agreement was related to child's age and their positive emotions ratings. Specifically, older children (10 to 11 years) with low positive emotion scores agreed less with their parents than younger children (8 to 9 years), and older children with high positive emotion scores agreed more with their parents (Theunissen et al 1998).

Vogel et al. mention that children may, willingly or unwillingly, hide some of their thoughts and feelings for their parents. With increasing age, their child will make experiences which their parents may have not experienced by themselves and therefore not recognised (Vogels et al. 1999). *Le Coq et al.* state that parents' reports might become less accurate as the child gets older and becomes more independent. The child's own report will tend to be more accurate (Le Coq et al. 2000). In contrast *Eiser & Morse* cite the insufficiency of available studies determining how far child age affected parent–child agreement (Eiser & Morse 2001).

Parent-related factors

If HRQOL research is based besides the children on parent reports, the mother is usually the prime informant for their children (Robitail et al. 2007, Davis et al. 2007). Does the gender of the proxy

influence the responses and are there differences in the ratings of the mothers and the fathers? *Jozefiak et al.* argue that both parents are able to rate their child's HRQOL with small discrepancies to their child's rating. Hence, they did not observe significant differences between correlations of mother-daughter/son and father-daughter/ son pairs and hypothesized that the impact of parent and child gender in relation to agreement in ratings of the child's HRQOL would be small. The results of *Jozefiak et al.* could relate to high father participation in the study or through the fact that the fathers are more engaged in their children's care. Parental rating depends on the gender role structure in the country of the investigated sample. For example like in Scandinavian countries where an equal status of both gender is well established and where most of the mothers work outside their homes, both parents are involved in their children's care (Jozefiak et al. 2008).

Parent-related variables, including the parents' own health and well-being may also be relevant. *Lang* states that the child's subjective judgement about its living situation is influenced by the child's caregiver (Lang 1985, in: Joos 2001: 71). *Eiser & Morse* investigated that mothers with a poor rating of their own well-being rated their child's HRQOL as well as poor (Eiser & Morse 2001). *Barreto et al.* could show as well that parents who rate their own health as bad/ very bad are also more likely to evaluate the health of their children as poor (Barreto et al. 2010). *Cremeens et al*. found in their study as statistically significant correlations between parents' ratings of their own HRQOL on the SF-36 measure and their ratings of the child's HRQOL on the PedsQL. Their most statistically significant correlations between parent HRQOL and parent proxy-rated child HRQOL were found for the middle age group (6.5 to 7.5 years). Child's health can also influence the parents' health and the contrary. *Evans et al.* stated that children with chronic pain very often have parents with chronic pain, and parents with chronic pain often have children with chronic pain (Evans et al. 2008 in: Barreto et al. 2011). *Curtis et al.* think as well that one reason why parents rate child outcomes differently than their children is parental health status. Specifically, one effect of parental depression may be to perceive more problems in one's children than would a non-depressed parent with similar children. Of course, parental depression may also have real effects on children via both behavioural (less attentive parenting) and biological (genetic endowment) pathways (Curtis et al. 2002).

In contrary *Mansour et al.* found no relationship between parental health status as measured by the mental summary score or the physical summary score of the SF-12, and the child's perception of HRQOL (Mansour et al. 2003).

Theunissen et al. found no correlation between the parent's educational status and the parent-child agreement (Theunissen et al. 1998)

Parent-child-related factors

In general parents may assume to be well informed about their children's feelings and physical health. *Vogel et al.* discussed that their perception may be biased by their own feelings and worries. Their child or children will make experiences with increasing age, which their parents may have not

experienced by themselves and therefore not recognise. That is why children may differ in the degree to which they share their experiences and emotions with their parents and parents will differ in the degree to which they are open to their children's experiences (Vogels et al. 1999). The judgment is also influenced by the way parents perceive and process information (Barreto et al. 2010). This means more detailed their memory, emotion, information processing and motivation to respond accurately influence parents and proxy views on his/ her child's health. *Davis et al* could show that parents and children were interpreting items differently in regards to their meaning or were using different response styles. For example in regards to the question *"Has your child felt that his/her parents have treated them fairly"*, a parent responded *"I think she gets treated very fairly very often...she's got boundaries but she doesn't have a lot of rules."* Her child responded "*Always, because my mum's been buying me stuff that I really wanted to get".* This example by *Davis et al.* reflects clearly that items are being interpreted differently or that parents and children are using different response styles. *Davis et al.* could observe that children provided extreme scores (e.g. never or always) but not the parents. This was explained that children tend to base their response on one single example whereas parents tended to take into account several examples (Davis et al. 2007).

The parents answer can be influenced as well, by other children they know or observe their expectations and hope they have on their own child, additional through stress and the mental health (Gerharz et al. 2003). *Davis et al.* also assed that some parents tend to respond to questions from the child's perspective, rather than on their own perceptions. If parents and children are providing completely different reasoning for their answers like *Davis et al.* could present, it might be argued that it is simply coincidence that they are reporting similar scores (Davis et al. 2007).

Eiser & Morse showed evidence of higher agreement between parents and chronically sick children compared to parents with *healthy* children (Eiser & Morse 2001). Evidence-proofed studies exist that parents of chronically ill children tend to underestimate their child's HRQOL compared to the children's own ratings (Dale et al. 2011, Pinhas-Hamiel et al. 2006, Speyer et al. 2009, Svavarsdottir & Orlygsdottir 2006a, 2006b, Vrijmoet-Wiersma et al. 2009) and parents with healthy children tend to overestimate their child's HRQOL (Theunissen et al 1998).

Methodological-related factors

Researchers described differing influencing factors related to the methodology of the assessment which could have an impact on the parent-child agreement as well. *Joos* points out that research with children can claim problems for example when adults influence their child's perspective and responses (Joos 2001: p.78) or when children willingly or unwillingly hide some of their thoughts and feelings for their parents (Vogels et al. 1999). Therefore, the place of the assessment can influence the child's responses. *Eiser et al.* specifically included the place of completion in their analyses and found no significant differences between those who filled out the survey at home and in the clinic (Eiser et al. 2003). *Beisenkamp et al*. investigated that the feeling during the survey stands in relation to the

responses of the survey. The better the children felt during the assessment the more positive the answers and the opposite. The comprehensibility of the questionnaire has an impact on the positive well-being during the assessment (Beisenkamp et al. 2009 for the LBS Children's Barometer Germany).

Differences in parent and child versions of the same questionnaire can also be influencing. *Upton et al.* emphasized that parent and child versions of the same questionnaire are not always truly parallel. For example, although the parent and children's forms of the Child Health Questionnaire (CHQ)[13] are similar, there can be differences in item wording, scale length and subscale domains. Furthermore, *Upton et al.* highlight this could contribute to the pattern of differences in reports between parents and children, as well as adolescents (Upton et al. 2008). *Eiser & Morse* stated that the differences were dependent as well on the specific measure used (Eiser & Morse 2001).

Varni et al. highlights that testing for statistically significant differences in Cronbach's alpha coefficients or validity coefficients, is an important question to study. In epidemiological studies, low reliability and validity of HRQOL measures could lead according to *Varni et al.* to underestimating the impact of certain risk factors on the HRQOL of children, which could lead to overseeing significant health care and prevention needs (Varni et al. 2007).

Eiser & Morse concluded that the agreement depends on the domain measured. Even though they found limited evidence for the assumption that agreement was greater for more observable physical than non-observable emotional or social domains (Eiser & Morse 2001). *Curties et al.* also could show that questions concerning more observable behaviour had higher agreement between the parents and children (Curties et al. 2002). *Sundblad et al.* also reported that parents tend to underreport conditions and underrate subjective complaints from their children, especially when estimating their emotional state and symptoms of depression (Sundblad et al. 2006). Equally, *Klatchoian et al.* observed that parents were rating their child's mental health lower. This could reflect the ability of parents to observe better their children in relation to physical aspects compared to emotional and social issues (Klatchoian et al. 2010). *Mansour et al.* found that the parent's perception of the child's total health was only correlated with the physical subscale of the child's self-report of HRQOL and not with the total or psychosocial scores (Mansour et al. 2003).

Cremeens et al. found that psychosocial health scores showed the largest median difference between self and proxy-report. Their results revealed that the domain and the age differences in correlational consistency between the child- and parent-ratings. *Cremeens et al.* observed higher agreement for younger age on physical health, compared to higher agreement for older age on psychosocial aspects of health (Cremeens et al. 2006).

[13] The Child Health Questionnaire (CHQ) is a family of generic quality of life instruments that have been designed and normed for children 5-to-18 years of age and their parents by *Landgraf et al.* (1996).

Can the parent-child agreement of the physical versus psychological measure also depend on the applied instrument? Therefore, *Upton et al.* investigated parent–child agreement as well for specific subscales in their literature review in 2008. They reported higher parent–child agreement with the PedsQL for concrete, observable characteristics such as physical health but identified as well other papers using the same measure with higher levels for psychosocial domains such as social and emotional functioning. For studies applying the Child Health Ratings Inventory (CHRIs)[14] parent-child agreement was higher reported for subscales such as energy and disease-specific hassles, than for emotional and role functioning. The parent–child agreement on the Child Health Questionnaire (CHQ) and on another self-report quality of life instrument, the LQ-KID[15], had tendency higher for psychosocial domains (such as behaviour, self-esteem, psychological well-being and family cohesion) than for physical functioning domains (Upton et al. 2008).

Robitail et al. could discover that the level of agreement can also be influenced by the country which was realized in the KIDSCREEN pilot study in seven European countries (Austria, France, Germany, Spain, Switzerland, the Netherlands and the United Kingdom). A country effect was assessed on the agreement for all of the 10 dimensions. The highest levels of agreement could be evaluated for the sample of the Netherlands whereby no significant agreement in the sample of the United Kingdom was presented. The country effects for the other five countries were mixed (Robitail et al. 2007).

Cremeens et al. point out that the differences in parent-child agreement across previously reported studies may be either an artefact of statistical methods applied or affected by the different ages of children in their sample populations which was already explained in the paragraph concerning the child's age (Cremeens et al. 2006).

What are the most applied statistical methods for measuring the parent-child agreement? *Upton et al.* found that studies dealing with parent–child agreement were using either Pearson's or Spearman's correlation coefficients or intra-class correlation coefficients (ICC). Ninety percent of the papers were either using Pearson's or Spearman's correlation coefficients (Upton et al. 2008). According to *Eiser & Morse* the most frequently used statistic for examining agreement between child and parent reports has been the Pearson product-moment correlation coefficient (Eiser & Morse 2001). *Cremeens et al.* have the opinion that more appropriate for examining agreement between raters is the ICC. The ICC values provide an index that reflects the ratio between subject variability and total variability (Cremeens et al. 2006).

According to the factors impacting parent-child agreement the proxy ratings should be considered carefully as a potential substitute for self-report ratings. Discrepancies between self- and proxy-reports might not be an indication of inaccuracy or bias in either data source. The number of influencing factors can vary which is illustrated in Figure 7 on the next page.

[14] The Child Health Rating Inventories (CHRIs) is a general health questionnaire including 20-questions to assess the child's status over the week created by *Parsons et al.* (1999).
[15] The LQ-KID is a quality of life measure developed by *Goldbeck & Braun* (2003) and a computer-assisted self-evaluation instrument measuring HRQOL of children and adolescents with chronic health conditions.

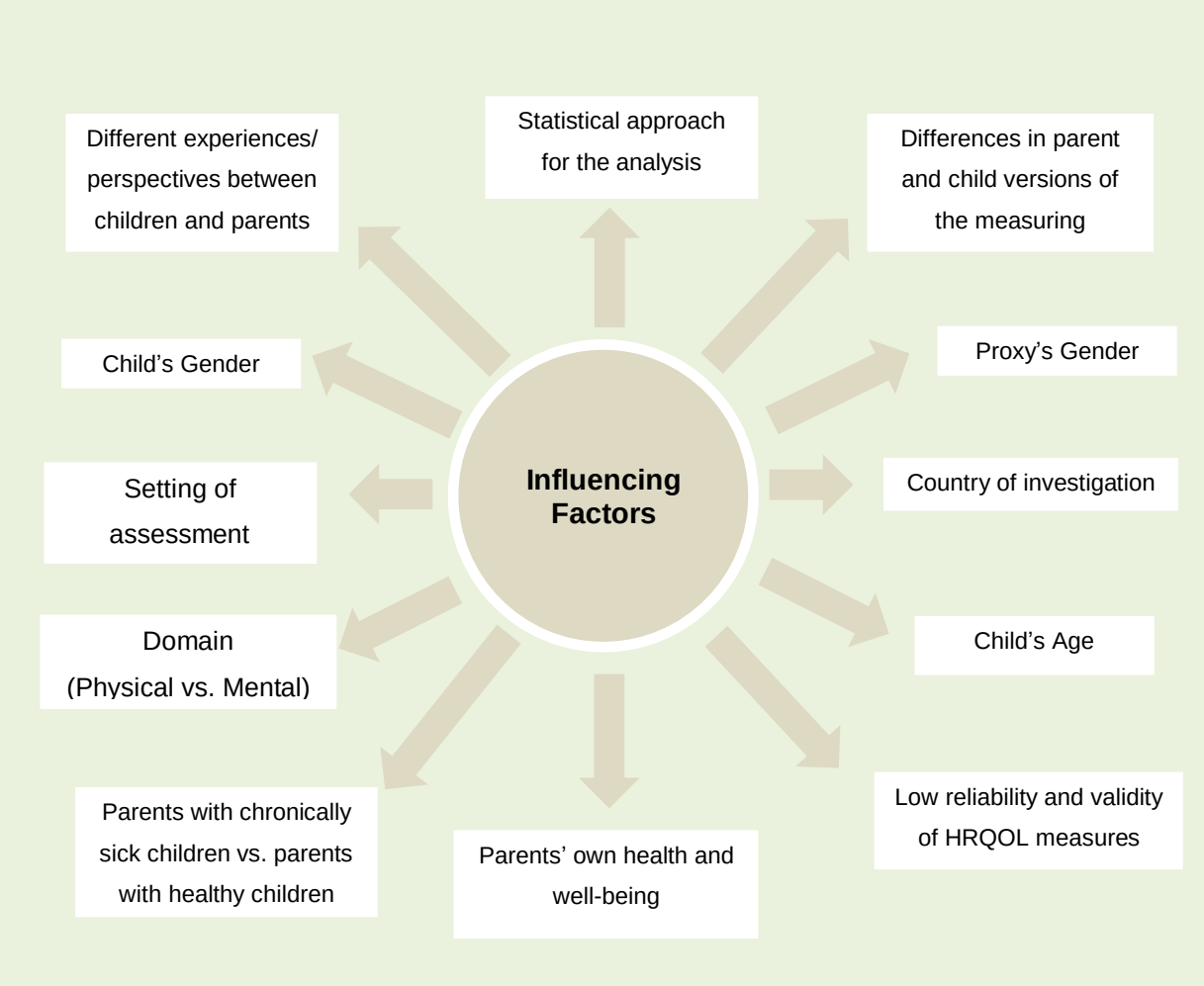


Figure 7 Factors which can impact the parent-child agreement

6 OBJECTIVES

In the recent literature there is an on-going debate about who is the most appropriate informant for rating children's health related quality of life the children themselves or their parent-proxies.

The aim of this work is to examinate if there are discrepancies between the children and the parents' responses when both are asked for their perception in regards to the child's HRQOL. Are there any differences between the children and their proxies by taken into account the gender of the child?

Furthermore, the purpose of this work is the exploration if there are differences between the children who are speaking German at home and the children who are speaking not German at home, respectively, have a migration background.

Another purpose of this work is the presentation of correlations between the genders of the child, the age of the child and the language spoken at home, respectively, migration background and the parent-child-agreement. Moreover, the intention is as well to investigate if there are dissimilarities for the results in regards to the statistical approach either for the intra-class correlation or Pearson's correlation coefficient.

7 RESEARCH QUESTION AND HYPOTHESIS

In regards to the theoretical background and on-going debates who the most appropriate informant for rating children's health related quality of life is.

The main research question of this work is *"Are primary school children rating their HRQOL differently than their parent-proxies?"*

The null hypothesis (H_0) is that primary school children rate their HRQOL *similar* to the ratings of their parent-proxies.

The alternative hypothesis (H_1) is that primary school children rate their HRQOL *differently* in comparison to their parent-proxies.

- Are both genders presenting a similar agreement for their HRQOL with their proxies?

- Are there any differences in regards to the statistical approach either for the intra-class correlation or Pearson's correlation coefficient?

- Which factors might have an influence on the parent-child agreement? Is there an impact on the gender, age and language spoken at home, respectively, migration background and the parent-child agreement?

8 METHODOLOGY

The next section will introduce the applied methodological approach. The methodology was already planned, organised and conducted by *Schillmoeller* within the frame of her promotion. Further information concerning the methodology and ethical circumstances are descripted more detailed in the dissertation by *Schillmoeller* (Schillmoeller 2009).

The study design was a cross-sectional survey by directly assessing primary school children in the third and fourth grade in order to assess a representative sample of primary school children in the third and fourth grade in Hamburg. The survey was scheduled in November 2005 in seventeen different primary schools in Hamburg.

The study participants were voluntary primary school children between eight to eleven years old visiting the third and fourth grade in different primary schools in Hamburg, Germany (Schillmoeller

2009). The children were only included in the study if the school and the parents gave their agreement for it. A representative sample of school children from Hamburg was chosen by respecting the relationship between boys and girls, the employment status of parents and nationality. Third and fourth grader of public schools in Hamburg of the school year 2003/ 2004 were potentially study participants under, except school children from private, religious or from schools for children with learning difficulties.

For the sample size calculation an estimation of fifty-six classes was computed by *Schillmoeller* with fourteen classes located in districts with higher social position and fourty-two classes in districts with normal or lower conditions (Schillmoeller 2009).

Measuring instruments for the survey

In order to evaluate the children's subjective health the KID-KINDL^R questionnaire was applied which is especially for children aged 8 to 12 years old. The KID-KINDL^R belongs to the KINDL^R questionnaire is a generic instrument for measuring HRQOL in children and adolescents, originally developed by *Bullinger et al.* in 1994 and was revised by *Ravens-Sieberer & Bullinger* four years after in 1998. The KINDL^R is a reliable and valid questionnaire (Ravens-Sieberer 2001). It is covering six dimensions through 24 items (referring to the past week): physical well-being (e.g. felt sick), emotional well-being (e.g. felt fearful or insecure), self-esteem (e.g. was happy with myself), well-being in the family (e.g. felt comfortable at home), well-being related to friends/ peers (e.g. got along with friends), and school-related well-being (e.g. was afraid of getting bad grades). Each item provides five answer categories: *never*, *seldom*, *sometimes*, *often* and *always* (Ravens-Sieberer & Bullinger 1998, 2000). The KINDL^R is validated in German and as well in English (Wee et al. 2005).

To assess the parents view, the parents' version of the KINDL^R was applied. The internal consistency reliability of the KINDL^R-instrument for the parents was Cronbach's alpha α = .86 for the total scale and between a = .64 - .74 for the subscales. The scale fit for all subscales was 90 % (Ravens-Sieberer & Bullinger 1998, 2000, Ravens-Sieberer, Erhart et al. 2008).

Family Affluence Scale (FAS) for children

The FAS was applied to measure the family prosperity in regards to the number of cars, if the child had an own unshared bedroom, how many family vacations were undertaken per year and the number of available computer in the house were taken into account as well. It is well known that the socioeconomic status (SES) has an impact on the health. Health inequalities can be seen as one of the most challenging concerns for public health (Mackenbach et al. 2008). Assessing the familial SES can create complications for primary school children. In general, school children have difficulties in giving appropriate information concerning their parental or familial SES. According to *Curie et al.* the FAS provides a reliable and valid complementary or alternative indicator of family SES, child SES and as well as parental SES compared to conventional measures for adults (Curie, Elton et al. 1997). The

FAS was recoded into 3 groups for the analysis (low = 0 – 3, intermediate = 4 – 5, and high = 6 – 7 FAS level).

Background information

Furthermore, the children were asked to provide background information in regards to their gender, age, and family constitution, number of siblings, the language spoken at home, and the employment status of their parents. The question focusing on the languages spoken at home is supposed to indicate if the child comes from a family with migration background. More details of the questions and scales included in the survey are provided at the end in the annex.

The data collection was realized through questionnaires previously described which had to be filled out independently and anonymous by the children at school. A professional interviewer was explaining the children the anonymity, the aim and reason of the survey and was giving advice related to the questionnaire. To ensure that children in the third grade did not have difficulties (through reading or understanding problems) in responding the questions, a professional interviewer was reading the questions collectively to the children and answered by the children themselves.

Each questionnaire was coded by the initials of the primary school and the initials of the respondent's name. The parents' questionnaires were coded by the initials of the primary school and the initials of their child to be able to compare the answers. The data of the children's and parents' responses were brought together by their identification codes (IDs).

The reasons for missing values according to *Cleff* vary from response refusal to the absence of an opinion or information (Cleff 2008). In regards to primary school children missing values can occur through the missing information, absence of competence for qualified responses, response refusal, indecisions or a lacking opinion concerning certain subjects. Whereby other researchers stated that children might be afraid to give correct answers or want to hide some information from their parents (Vogel et al. 1999). In this study the number of missing values were tried to reduce by letting the children fill out the questionnaires in a private space with the guarantee that parents would never see their responses. In order to avoid reading difficulties a qualified professional was reading the questions the children from the third grade. The procedure how the missing values for the FAS and the KINDL^{R} questionnaire were dealt with is clearly described in the dissertation by *Schillmoeller* in 2009 (Schillmoeller 2009).

Statistical Methods

In general, the statistical analysis was performed for the self and proxy-rated *"HRQOL total score",* the *"HRQOL subdimensions"* which are constructing the total HRQOL and *"HRQOL subscales"* which are building the subdimensions. The corresponding dichotomous variables for the *"total HRQOL"* and the *"HRQOL subdimensions"* were taken into account for the statistical analysis as well, except for the single items.

The statistical analysis was started with the descriptives for the reported total HRQOL scores. The reported HRQOL was transformed into a value scale from 1 to 100. The closer the total HRQOL score reached to 100 the better the reported HRQOL. The total HRQOL mean scores were additionally classified by background information (e.g. gender, age of the child, by the school class, by the person or persons who filled out the questionnaire, by the language spoken at home, by the district of the primary school, by the family wealth etc.). Afterwards the descriptives for the HRQOL subdimensions HRQOL were calculated. The HRQOL subdimensions were furthermore stratified by gender in order to explore if there are any significant discrepancies. Before presenting the single items of each subdimension, the dichotomous total HRQOL (good/ or bad HRQOL) and the subdimensions were compared with additionally classifications by gender. To investigate variables in relation with the HRQOL ratings of the children and the parents, bi- and multivariate tests were conducted. The correlation between the child- and the proxy-ratings were assessed by Pearson's and intra-class correlation coefficient. According to the hypothesis potential influencing factors (like the gender, age of the child and the language spoken at home as indication for migration background) on the parent-child agreement were considered in the analysis with new variables *"HRQOL-difference"* and *"HRQOL-level of agreement".* The analysis plan is shown in the figure below (Figure 8).

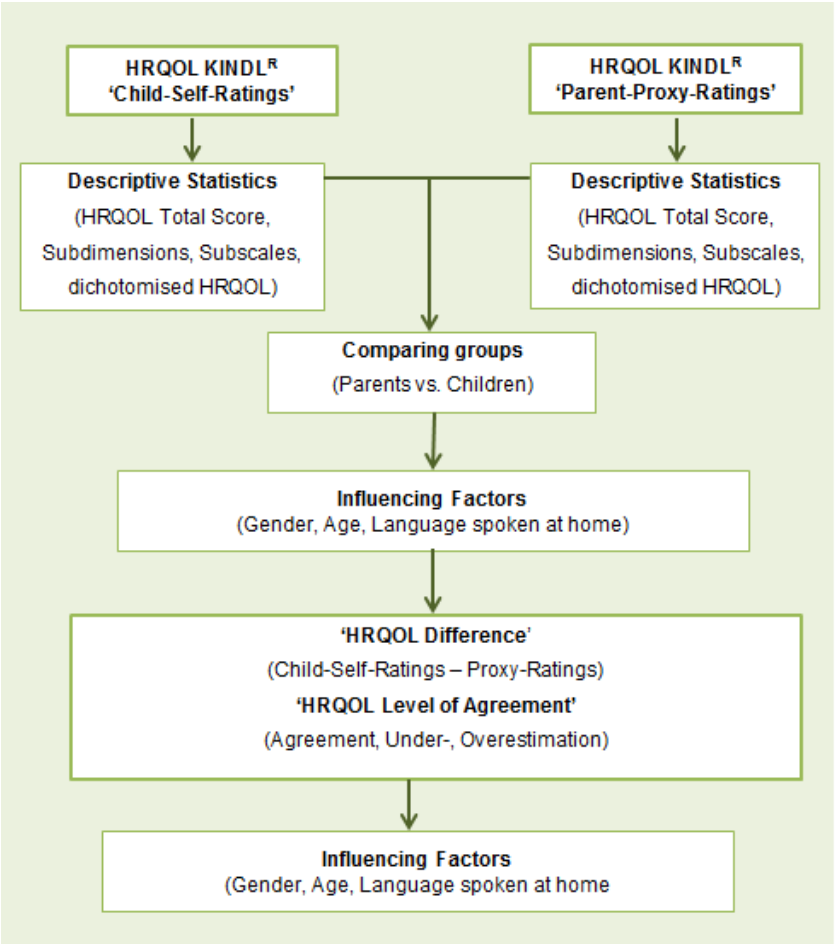


Figure 8 The statistical analysis plan

First, *explorative statistics* were applied to check for errors or to identify outliers. For example, the correlation coefficient is very sensible for outliers which reduces the ability for interpretation (Cleff 2008:110). Furthermore, *Kolmogorov-Smirnov statistics* were conducted to analyse the distribution for continuous variables (e.g. HRQOL total and subdimensions scores) normal distribution for continuous variables is often an assumption for further parametric statistical analysis. Nevertheless, according to *Upton et al.* many tests that rely on normality are in fact robust to violations of normality, if the sample size is large enough (Upton et al. 2008). With respect to *Pallant* the violation of this assumption does not produce any harm with a sample size over 30 (Pallant 2007: p.238). Considering the recommendations by *Upton et al.* and *Pallant* parametric tests were performed even tough normality was not provided for all of the dimensions (Pallant 2007, Upton et al. 2008).

In addition, descriptive statistics were performed for continuous variables (e.g. HRQOL total score, subdimensions, age) and frequencies for categorical variables which had either a nominal (e.g. dichotomous HRQOL, gender) or an ordinal level of measurement (e.g. FAS, HRQOL difference).

Exploring bivariate correlations

A possible relationship between two variables was conducted by taking into account the level of measurement for the variables. The *Chi-Square test for independence* (Chi^2 or χ^2) was applied to discover if there is a relation between a nominal and a dichotomous nominal variable or two nominal variables. To exanimate the strength of such relationships measures such as the *contingency coefficient (C)* or *Cramer's V* were applied. If the *C* or *Cramer's V* was larger than zero it indicated an effect whereby zero indicated no effect.

The correlation of two metric variables was measured with the *Pearson product-moment correlation*. The *Pearson's correlation coefficient (r)* can range from -1 to +1. A correlation coefficient r =-1 shows a linear and negative correlation whereby r =+1 represents a linear and positive correlation. The more the r gets closer to zero, the more the values deviate from each other (Cleff 2008:106). Zero indicates that there is no relation between two metric variables. According to *Cohen* Pearson's correlation coefficient can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0 (Cohen 1988 in Pallant 2007:132).

The *Spearman Rank Order Correlation (rho or r_s)* was performed to measure the strength and direction of association between two ordinal variables (Cleff 2008:112). The ordinal variables provided three or more categories (e.g. FAS into low, medium or high or HRQOL level of agreement into total agreement, under- or overestimation).

The relation of two variables with different levels of measurement was calculated by different methods. The *point-serial correlation (r_{ps})* was applied to evaluate the relationship between a metric and a discrete dichotomous nominal variable (e.g. girl or boy), whereas the *biserial correlation (r_b)* was selected when the variable was continuous but measured discretely as two values dichotomous (good/

bad HRQOL) (Field 2005:132). A positive correlation indicates that one group has larger values than the other group. A negative correlation shows that one group has smaller values than the other. If no relationship between two variables is given a value close zero is calculated. *Cramer's V* and *C* were chosen for nominal and metric variables. For dichotomous nominal variables and ordinal variables *Spearman's Rho* was applied. The dichotomous variable had to be coded for instance with 0 for the boys and 1 for the girls (Cleff 2008:127). The relationship between metric and ordinal variables was investigated by *Spearman's Rho* or *Kendalls Tau* (Cleff 2008:80).

Exploring partial correlations

To reduce the effect for another third continuous variable or potential confounder while controlling the relationship between two continuous variables, partial correlation was applied.

Multiple linear regression models

The amount of variance in the dependent variable was explained by the set of selected independent variables by conducting a multiple linear regression. The dependent variable had to be continuous and the independent variables were continuous and/ or categorical variables. *Multicollinearity* and *singularity* for the independent variables were checked. *Multicollinearity* occurs when there is a high correlation (r <.9) between the independent variables. *Singularity* happens when independent variables are created out of several subscales (like the total HRQOL and the six subdimensions). The *Durbin–Watson statistic* was applied to detect autocorrelation. Further assumptions were considered during the multiple regression analysis.

As multiple regressions are very sensitive to outliers, firstly each regression analysis was calculated once with the whole data set. Afterwards a second run was performed without outliers. As recommended by *Tabachnick & Fidell* (2007) all outliers with *Mahalanobis distances* over the reference values according to the number of independent variables were removed from the data set. The *normality* was controlled by the residuals in the scatterplot. The *linearity* was determined by the F-test and the R^2. *Homoscedasticity* was given if the variance of the residuals about predicted dependent variable score were the same for all predicted scores. The *tolerance* is presenting how much variability is not explained between the selected independent variables in the model. The tolerance was calculated by $1-R^2$ for each variable. If the value for the tolerance was smaller than .10, it showed that the multiple correlations with the other independent variables are high. The *variance inflation factor (VIF)* was indicating *multicollinearity* if the VIF was larger than 10 (Pallant 2007:156).

Exploring the relationship between the child- and proxy-reports

The *intra-class correlation coefficient (ICC)* and *Pearson's correlation coefficient (PCC)* were both applied to compare the agreement between child- and proxy-reports. A two-way mixed effect model (absolute agreement and single measure) was selected for the ICC. The single measure is an index for the reliability of the ratings for one typical single rater. The agreement with the ICC is interpreted as

follows: <.40, poor to fair, .41 to .60, moderate, and >.61, good to excellent according to the literature (Snijders & Bosker 1999 in: Robitail et al. 2007). According to *Cohen* PCC can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0 (Cohen 1988 in Pallant 2007:132).

Comparing the means between the child - and proxy-reports

The level of agreement and magnitude of discrepancies between the child-and proxy-ratings was calculated for the whole sample by applying a *paired t-test* and *Cohen's effect size*. The *paired-samples t-test* was chosen to assess the extent to which children or proxies score lower or higher on the KINDL^R scales by calculating the differences between the child mean scores and the parent mean scores for the total HRQOL, the subdimensions and sub items by considering additionally age, gender and language spoken at home. If the assumption for normality was violated it was tolerated, according to *Pallant* it does not produce any harm with a sample size over 30 (Pallant 2007: p.238). Mean differences were classified as *overestimated* (respectively, *underestimated*) by proxies, if *d* was greater than +.2 (respectively, smaller than -.2) (Robitail et al. 2007). The effects size was calculated by the following formula: Eta squared (Eta^2) = t2/ t2 + N -1. The effect size was interpreted according to Cohen as: .01 small effect, .06 moderate effect and .14 as large effect (Cohen 1988 in: Pallant 2007: 240).

Bivariate analysis of variance

In order to compare a metric variable as dependent variable with ordinal variables with more than three categories (high, average and low FAS) as independent variable a *one-way ANOVA (between-groups)* was conducted if all requirements for a *one-way ANOVA* were met. As non-parametric alternative, the *Kruskall Wallis Test (KW)* was chosen, if the requirements for a *one-way ANOVA* were not fulfilled.

Two-way analysis of variance

A two-way analysis of variance (between groups) was conducted to explore for instance if there was a difference in the HRQOL ratings for boys and girls, who were speaking German at home or were either bilingual or not speaking German in their families.

Multivariate analysis of variance (MANOVA)

A *multivariate analysis of variance* was applied to assess if there was a difference between boys and girls, through the different child's age groups, in regards to their ratings on the different subdimensions (mental well-being, self-esteem, well-being with friends). Two or more related continuous dependent variables (physical and mental well-being) were selected with one or more categorical independent variables (gender, language spoken at home or age).

Multivariate logistic regression analysis

A *multivariate logistic regression analysis* was conducted with dichotomous variables for instance the total HRQOL (good/ bad) as well as the six subdimensions separately as dependent variable to explain how well the set of the independent variables either categorical or continuous could predict the model.

Assessment of the new variable "HRQOL difference" and "HRQOL level of agreement"

In order to assess the scoring differences for the HRQOL total score and the subdimensions on individual level a new variable *"HRQOL difference"* was created by subtracting each individual child's score with the corresponding parent-proxy score. The deviations were going either in the negative (proxy-rating was lower) or positive way (proxy-rating was higher) or remaining equal without any discrepancies. The variable *"HRQOL difference"* was coded into a new variable *"HRQOL level of agreement"* with 0 = underestimated, 1 = overestimated and 2 = total agreement.

Moreover, a *logistic regression* was conducted to assess the impact for the variables gender, age, the language spoken at home as independent variables on the variable *"HRQOL level of agreement"*. The same analysis was performed separately with the agreement in the six subdimensions as dependent variables and as independent variables gender, age and the language spoken at home.

According to *Cohen* it is generally accepted that for larger sample sizes, moderate violations of assumptions for parametric tests have little or no effect on outcomes (Cohen 1969 in Upton et al. 2005) therefore moderate violations were accepted otherwise non-parametric test were chosen.

9 RESULTS

The first part of this chapter starts with the description of the sample. Secondly, the section for the comparison of the descriptives for the total HRQOL scores (proxy- and self-rated) follows. Furthermore, the total HRQOL means will be stratified by background variables (like the gender, class, age, language spoken at home, FAS etc.). The mean scores of the subdimensions will be analysed after these will be also stratified by gender. To receive a better overview of the classifications for the HRQOL scores, the dichotomous total HRQOL and the dichotomous subdimensions are also part of this section. The frequencies for the dichotomous HRQOL and dichotomous subdimensions are categorized by gender. At the end of the descriptive the single subscales are presented.

The third part of this chapter focuses on the bivariate correlations with the Total HRQOL ratings, the subdimensions and the single subscales. In order to find out how well the total HRQOL, separately for the self- and proxy-ratings, is correlating with each single subdimension this analysis was conducted in this section in addition. The fourth part has the aim to identify influencing factors for the total HRQOL (child- and proxy-rated).

The main research question of this work is *"Are primary school children rating their HRQOL differently than their parents?"* Therefore, the purpose of the fifth subdivision is the assessment of the *"parent-child agreement".* This will be considered by analysing the correlations between the child- and proxy-ratings for the total HRQOL, the subdimensions and the single subscales. Furthermore, the mean differences between the self- and proxy-ratings are examinated. In the last part two new variables *"HRQOL difference"* and "HRQOL level of agreement" are created and involved in further analyses.

9.1 Description of the sample

The description of the sample includes the primary schools, the participating children and their parent-proxies.

9.1.1 Description of the primary schools

In total 17 primary schools distributed in different districts of Hamburg were participating in the study. Responding the KINDL^{R} questionnaire were 1154 children and 641 parents. The parent-child pairs were assigned by their identification code which was created by the initials of the school, the initials of the child and the corresponding class. A sample of 395 parent-child pairs was allocated from fifteen different schools for the statistical analysis.

The evaluated primary schools were distributed in all seven main districts in Hamburg: Bergedorf, Hamburg-North, Altona, Eimsbuettel, Hamburg-Center, Harburg and Wandsbek.

- **Altona:** Altona-North, Osdorf
- **Eimsbüttel:** Hoheluft-West, Niendorf
- **Hamburg-North:** Langenhorn, Winterhude
- **Wandsbek:** Farmsen-Berne, Tonndorf, Wellingsbuettel,
- **Bergedorf:** Neuallermoehe,
- **Hamburg-Center:** Billbrook, Billstedt, Finkenwerder
- **Harburg:** Heimfeld, Roenneburg (Ministry of Statistics North 2011).

Three primary schools in a district with a good social environment, nine primary schools with a normal social environment and six primary schools in a district with a low social environment were participating. The participation of the children and their corresponding parents varied in the districts from 0.3 % to15.2 % which is illustrated in Figure 9.

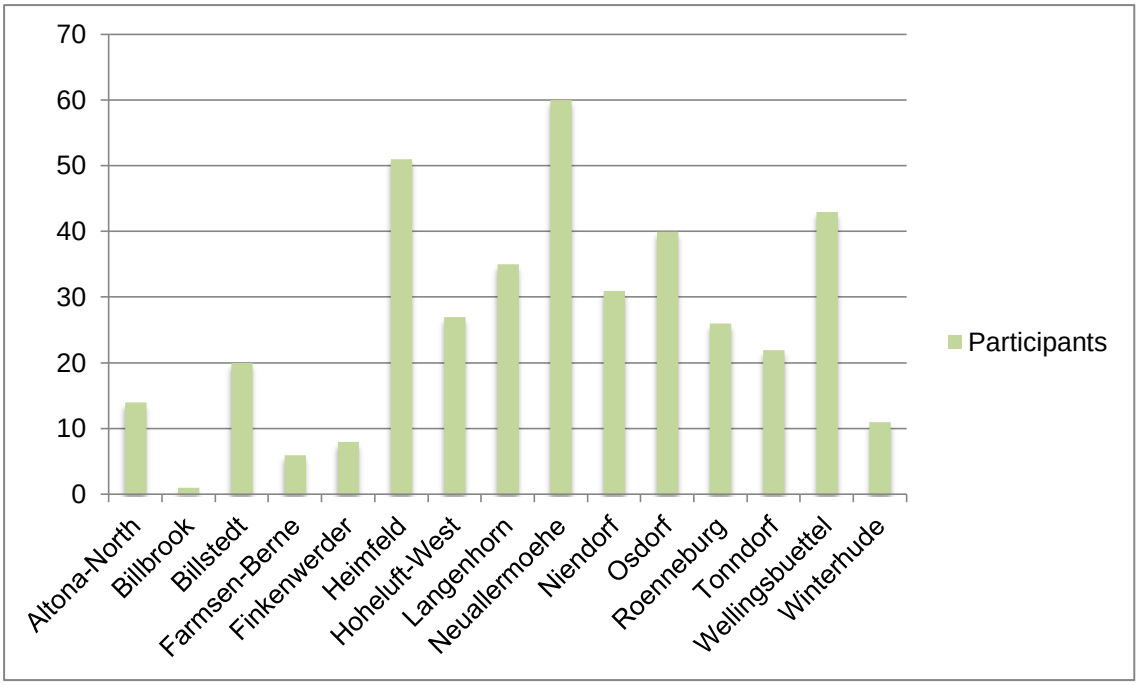


Figure 9 Number of participants in regards to the district of the school

9.1.2 **Description of the children**

The sample of the children consists out of 395 primary school children (n = 199 from the third grade/ n = 196 from the fourth grade) ranging in age from 7 to 11 years ($\bar{x}$: 8.87 SD ±0.76). The mean age of the boys is $\bar{x}$: 8.91 and for the girls $\bar{x}$: 8.84. The average age of the children going in the third grade was $\bar{x}$: 8.35 and for the children from the fourth grade $\bar{x}$: 9.39.

Considering the background information almost every eight child out of ten has married parents. Every eight child has divorced parents or lives with a single parent. The only child in the family was presented for 15.5 % of the children. Almost 50 % of the children have one sibling, 22.3 % with two siblings, 6.8 % with three siblings and four or more siblings was answered by 6.1 % of the sample. More than 80 % of the children were either living with their mother and father or with a parental proxy which is more detailed illustrated in Table 10. According to the child self-reports in terms of their language spoken at home, 71.1 % of the children speak German at home and 26.8 % have grown up bilingual or were not communicating in German at all in their family.

Table 8 Characteristics of the children

Variable(s)	Total		Girls		Boys	
	N	%	N	%	N	%
Sample Size	395	(100 %)	209	(52.9 %)	186	(47.1 %)
Class						
3rd grade	199	(5.4 %)	99	(47.4 %)	100	(53.8 %)
4th grade	196	(49.6 %)	110	(52.6 %)	86	(46.2 %)
Age						
7 years	2	(0.5 %)	2	(1.0 %)	0	(0 %)
8 years	129	(32.7 %)	67	(32.1 %)	62	(33.3 %)
9 years	187	(47.3 %)	106	(5.7 %)	81	(43.5 %)
10 years	71	(18.0 %)	31	(14.8 %)	40	(21.5 %)
11 years	6	(1.5 %)	3	(1.4 %)	3	(1.6 %)
FAS						
Low	101	(25.6 %)	57	(27.3 %)	44	(23.7 %)
Moderate	180	(45.6 %)	96	(45.9 %)	84	(45.2 %)
High	97	(24.6 %)	48	(23.0 %)	49	(26.3 %)

The FAS as an indicator for the SES in the family, the children rated their familial affluence to 25.6 % as low, 45.6 % as moderate and 24.6 % reported the FAS as high which is shown in the Table 9 underneath.

Table 9 Family Affluence Scale (FAS) by district

District(s)	FAS		
	low	average	high
Altona	27	17	3
Bergedorf	23	23	11
Hamburg Centre	6	16	6
Eimsbuettel	9	31	18
Hamburg North	9	20	16
Harburg	21	40	13
Wandsbek	6	33	30
Total	**101**	**180**	**97**

9.1.3 **Description of the parents**

Parent-reported questionnaires were available for 395 of the cases. In 89.6 % of cases, the first respondent was the mother and in 9.1 % the father. In 2.3 % (n = 9) of all cases a second respondent was participating in the survey as well. The second respondent was either the father or the stepfather. The other 97.3 % of the sample did not have a second respondent. Eighty-six point six percent of the reporting parents were German and 9.1 % had a migration background, whereby ten people were not giving their answer. The partners of the respondents were to 75.9 % speaking German at home and to 14.4 % were either bilingual or not speaking German. The majority of the responding parents with 78.5

% were married, 8.1% were divorced, 7.8 % were singles, 4.1 % divorced and 0.8 % were widowed. All the frequencies for the characteristics of the parents are presented in Table 10.

Table 10 Frequencies for the characteristics of the parents

Variable(s)	Percentage (%)
1st Respondent	
Mother	91.2 %
Father	9.1 %
2nd Respondent	
Father/ Stepfather	2.3 %
Spoken Language at Home	
Reporting person	
German	86.6 %
Not German	1.6 %
Partner	
German	75.9 %
Not German	14.4 %
Family Status	
Single	7.8 %
Married	78.5 %
Divorced	8.1 %
Separated	4.1 %
Widowed	0.8 %
Family Status/ Persons at Home	
Mother and Father	79.5 %
Mother and Stepfather	2.8 %
Father, Mother and Stepmother	0.3 %
Mother and Grandparents	0.5 %
Parents and Grandmother	0.5 %
Mother, Father, Stepfather	0.3 %

Most of the parents have Abitur, 39.2 % of the respondents and 38.0 % of the other parent. A higher education entrance level is reached by 13.2 % of the respondents and 9.4 % of the other second parent. Middle graduation has 32.2 % of the respondents and 23.3 % of the other parent. The lowest graduation is given in 11.6 % of the respondents and in 15.9 % of the other parents. Less than one percent of the respondents and 2.3 % of the parental partner have no graduation. Other kind of educations is given by 1.8 % of the respondents and 0.5 % of the other parent.

The majority of the parents are working as employee, 47.6 % of the respondents and 41.3 % of the other parent. More details for the professional position of the parents are provided in Table 10. In regards to employment status of the parents in 62.5 % of the cases both parents are working. Only one parent is working in 24.3 % and in 7.3 % of the sample both parents are unemployed.

Table 11 Frequencies of the school education and the professional position of the parents

Variable(s)	Frequencies	
	Respondent	Other Parent
School education		
No Graduation	0.8 %	2.3 %
Lowest Graduation	11.6 %	15.9 %
Middle Graduation	32.2 %	23.3 %
Higher Education Entrance Level	13.2 %	9.4 %
Abitur	39.2 %	38.0 %
others	1.8 %	0.5 %
Professional position		
Worker	11.6 %	15.4 %
Employee	47.6 %	41.3 %
Officials	5.3 %	7.8 %
Self-employed	7.1 %	1.1 %
Academic freelancer	3.3 %	5.8 %

9.2 Comparison of the descriptives (child- and proxy-rated)

9.2.1 The total HRQOL

The comparison of the descriptives for the total HRQOL scores, indicate that the mean of the total HRQOL score was higher scored by the parents ($\bar{x}$: 75.96, SD ±8.00) than the child self-ratings ($\bar{x}$: 75.41, SD ±11.95). Table 12 demonstrates more detailed the descriptive statistics for the total HRQOL scores.

Table 12 Descriptives for the total HRQOL scores (proxy- and self-rated)

Descriptives	Proxy-ratings	Child-ratings
Mean	75.96	75.41
CI (95%)	(75.16 - 76.75)	(74.23 - 76.6)
Median	77.08	77.08
Variance	63.95	142.75
SE	0.4	0.6
SD±	±8.00	±11.95
Minimum	51	38
Maximum	96	100
Range	45	63
Skewness	-0.68	-0.51
Kurtosis	0.52	-0.06

After testing the distribution for normality with the **Kolmogorov-Smirnov Test** both total HRQOL scores (parents and children) were violated which is important for further statistical analysis.

Moreover, by splitting for gender the total HRQOL scores were also not normally distributed (see in Figure 10).

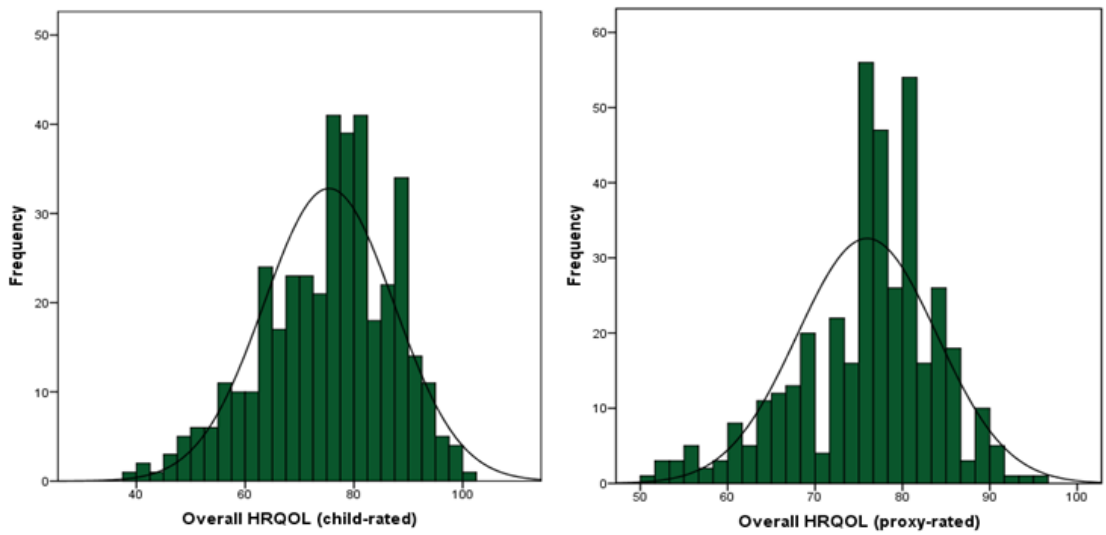


Figure 10 Distribution of the total HRQOL scores (child- and proxy- rated)

Stratification with background variables (gender, age, language spoken at home)

The proxies evaluated the total HRQOL score for girls (x̄: 76.37, SD ±7.27) better than for boys (x̄: 75.59, SD ±8.71). The self-ratings of the boys (x̄: 76.86, SD ±12.19) showed better results compared to the girls (x̄: 74.18, SD ±11.69). The distributions of the total HRQOL scores classified by gender are presented in Figure 11.

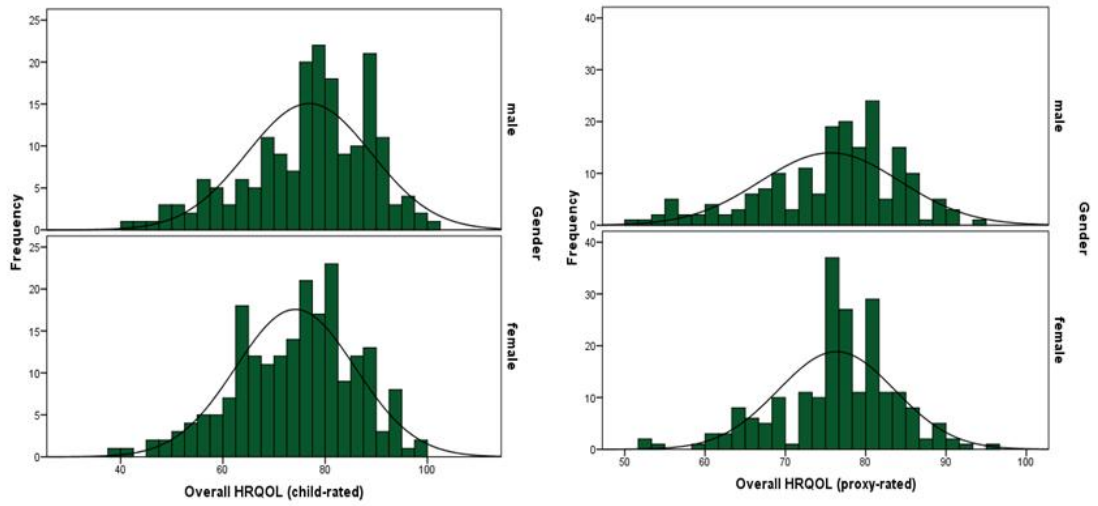


Figure 11 Histogram of total HRQOL (child- and proxy- rated) stratified by gender

The lowest proxy-rated mean score x̄: 65.97 (SD ±12.05) was investigated for the eleven year old children (n = 6) and reached a mean score for the self-ratings x̄: 75.52 (SD ±15.12). The youngest children who were seven year old (n = 2) provided a lower proxy-rated mean score (x̄: 73.44, SD ±2.21) than their self-ratings (x̄: 75.52, SD ±21.36). The other age groups presented a higher mean score for the proxy-ratings than for the self-ratings by the children, eight year old children (n = 128) (x̄: 75.57, SD ±7.45) versus (x̄: 75.41, SD ±12.48), the nine year old children (x̄: 76.64, SD ±7.62) versus (x̄: 75.60, SD ± 12.03) and the ten year old children (x̄: 75.59, SD ±9.34) versus (x̄: 74.89, SD ±1.46).

Does the language spoken at home respectively the migration background stand in relationship to the HRQOL mean scores? As described before the language spoken at home, was taken into account to find out if the child was belonging to a family with migration background. Two hundred eighty children (72.8 %) were coming from German speaking families and 106 children (27.2 %) were growing up in families where they were either bilingual or not speaking German at home. The parents from German speaking families rated their child's HRQOL in average better x̄: 76.22 (SD ±8.22) than parents who were bilingual or not speaking German at home x̄: 75.32 (SD ±7.39).The children growing up bilingual reported their HRQOL better x̄: 75.54 (SD ±12.52) compared to children from German speaking families x̄: 75.37 (SD ±11.81).

The first proxy, who filled out the questionnaire was in 89.6 % of the cases the mother and in 9.1 % the father. The mothers rated their child's HRQOL in average lower x̄: 75.82 (SD ±8.12) than the fathers x̄: 76.89 (SD ±6.75). The fathers as first respondent in the survey appeared with less than 10 % in comparison to the mothers with almost 90 %. A second respondent, only males, was available for 2.3 % (n=9) of all participants. The other 97.3 % did not have a second respondent.

Are the total HRQOL ratings of the parents and children varying between the districts in Hamburg? Eimsbuettel reached the highest mean scores for the proxy ratings x̄: 77.25 (SD ±6.99). The highest mean scores for children were assessed also in Eimsbuettel x̄: 76.42 (SD ±12.97) and in Hamburg North x̄: 76.42 (SD ±1.42). The second highest mean score from the proxy-ratings was presented in Wandsbek x̄: 77.10 (SD ±6.39) which was the district with the lowest mean score for the children x̄: 73.05 (SD ±11.70). The other districts (Altona, Bergedorf, Hamburg Centre, Hamburg North and Harburg) were ranging for the children between x̄: 76.79 - 73.75 and for the parents from x̄: 76.68 - 75.52.

How is the family wealth influencing the HRQOL mean scores? The FAS was classified in three categories (low, average and high) as previously defined. An average FAS was measured for 47.6 % (n = 180) of the sample, a low FAS for 26.7 % (n = 101) and a high FAS for 25.7 % (n = 97). High wealthy parents reached the greatest total HRQOL score x̄: 77.01 (SD ±8.29) whereby the children presented a lower average score x̄: 75.50 (SD ±12.92). The highest HRQOL mean score x̄: 75.86 (SD ±11.48) revealed children with an average FAS and their proxy respondent were assessed with x̄: 75.99 (SD ±7.85). The lowest average scores showed the children x̄: 74.54 (SD ±12.31) and the

parents x̄: 74.82 (SD ±8.05) with a low FAS. The mean scores classified by background variables are shown in Table 13.

Table 13 Total HRQOL mean scores stratified by background variables

Variable(s)	Total HRQOL scores			
	Child-Ratings		Proxy-Ratings	
	Mean (x̄)	± SD	Mean (x̄)	± SD
Total Sample	x̄: 75.41	±11.95	x̄: 75.96	±8.00
Gender				
Girls	x̄: 74.18	±11.69	x̄: 76.37	±7.27
Boys	x̄: 76.86	±12.19	x̄: 75.59	±8.71
Class				
3rd grade	x̄: 75.22	±12.92	x̄: 75.37	±7.63
4th grade	x̄: 75.61	±10.91	x̄: 76.55	±8.33
Age				
7 years	x̄: 75.52	±21.36	x̄: 73.44	±2.21
8 years	x̄: 75.41	±12.48	x̄: 75.57	±7.45
9 years	x̄: 75.60	±12.03	x̄: 76.64	±7.62
10 years	x̄: 74.89	±1.46	x̄: 75.59	±9.34
11 years	x̄: 75.52	±15.12	x̄: 65.97	±12.05
Language spoken at home				
German	x̄: 75.37	±11.81	x̄: 76.22	±8.22
Not German	x̄: 75.54	±12.52	x̄: 75.32	±7.39
FAS				
Low	x̄: 74.54	±12.31	x̄: 74.82	±8.05
Moderate	x̄: 75.86	±11.48	x̄: 75.99	±7.85
High	x̄: 75.50	±12.92	x̄: 77.01	±8.29
District(s)				
Altona	x̄: 72.52	±9.19	x̄: 73.75	±10.99
Bergedorf	x̄: 76.67	±8.18	x̄: 75.78	±13.69
Centre	x̄: 76.68	±8.59	x̄: 76.23	±13.41
Eimsbuettel	x̄: 77.25	±6.99	x̄: 76.42	±12.97
North	x̄: 75.12	±7.87	x̄: 76.42	±10.42
Harburg	x̄: 76.04	±8.38	x̄: 76.79	±10.79
Wandsbek	x̄: 77.10	±6.39	x̄: 73.05	±11.69

9.2.2 **The HRQOL Subdimensions**

The mean scores of the HRQOL subdimensions assessed by the children and their parents are presented in Table 14. The highest mean including all subdimension either rated by the children or the proxies was reached for *"well-being in the family"* assessed by the children x̄: 84.30 (SD ±15.10). The most positive proxy-rated subdimension was *"mental well-being"* x̄: 82.27 (SD ±11.86) and the most

negatively mean score was found for the *"well-being with friends"* x̄: 60.29 (SD ±11.83). *"Self-esteem"* was scored with the lowest mean x̄: 59.10 (SD ±22.73) from the children.

Table 14 Mean scores for the HRQOL subdimensions

Subdimension(s)	Proxy-Ratings		Child-Ratings	
	Mean (x̄)	SD	Mean (x̄)	SD
Physical Well-being	x̄: 80.49	±14.13	x̄: 74.46	±18.13
Mental Well-being	x̄: 82.27	±11.86	x̄: 82.64	±14.80
Self-Esteem	x̄: 73.30	±12.48	x̄: 59.10	±22.73
Familial Well-being	x̄: 79.53	±12.86	x̄: 84.30	±15.10
Well-being with Friends	x̄: 60.29	±11.83	x̄: 75.83	±17.04
Well-being at School	x̄: 79.87	±15.27	x̄: 75.23	±19.41

The HRQOL subdimensions (child- and proxy-ratings) were not normally distributed which will be considered later for additional statistical analysis. The mean scores for the HRQOL subdimensions are illustrated in Figure 12.

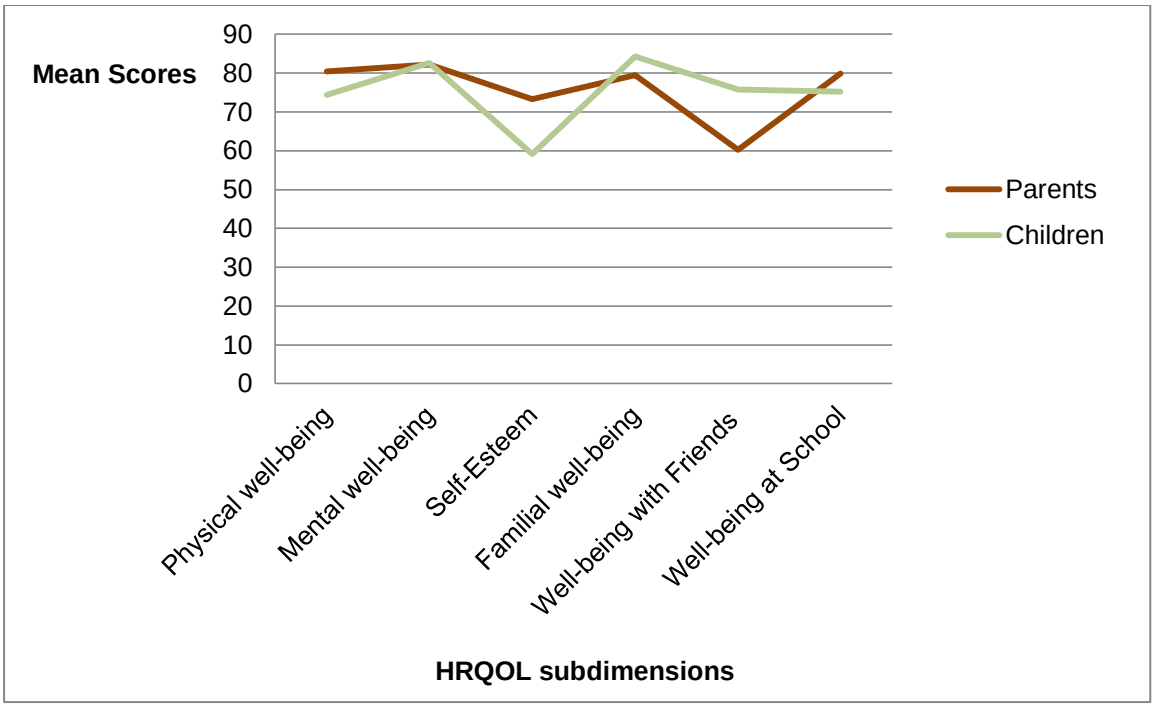


Figure 12 Mean scores of the HRQOL subdimensions rated by parents and children

In order to identify how different boys and girls or respectively their parents are scoring the single subdimensions, the data set was stratified by gender. The results are illustrated in Figure 13. The subdimension with the highest mean score (x̄: 85.56, SD ±12.98) self-reported by the girls was well-

being in the family. In contrary to self-esteem which was the variable with the lowest mean score (x̄: 55.89, SD ±22.42) for the girls and as well for the boys (x̄: 62.48, SD ±22.64). For the boys mental well-being reached the highest mean score (x̄: 83.44, SD ±14.65) and was closely to the mean score for well-being in the family (x̄: 83.07, SD ±16.96). The parents on the other side showed the lowest mean score for both genders for well-being with friends for the girls (x̄: 61.07, SD ±12.59) and the boys (x̄: 59.42, SD ±1.99).

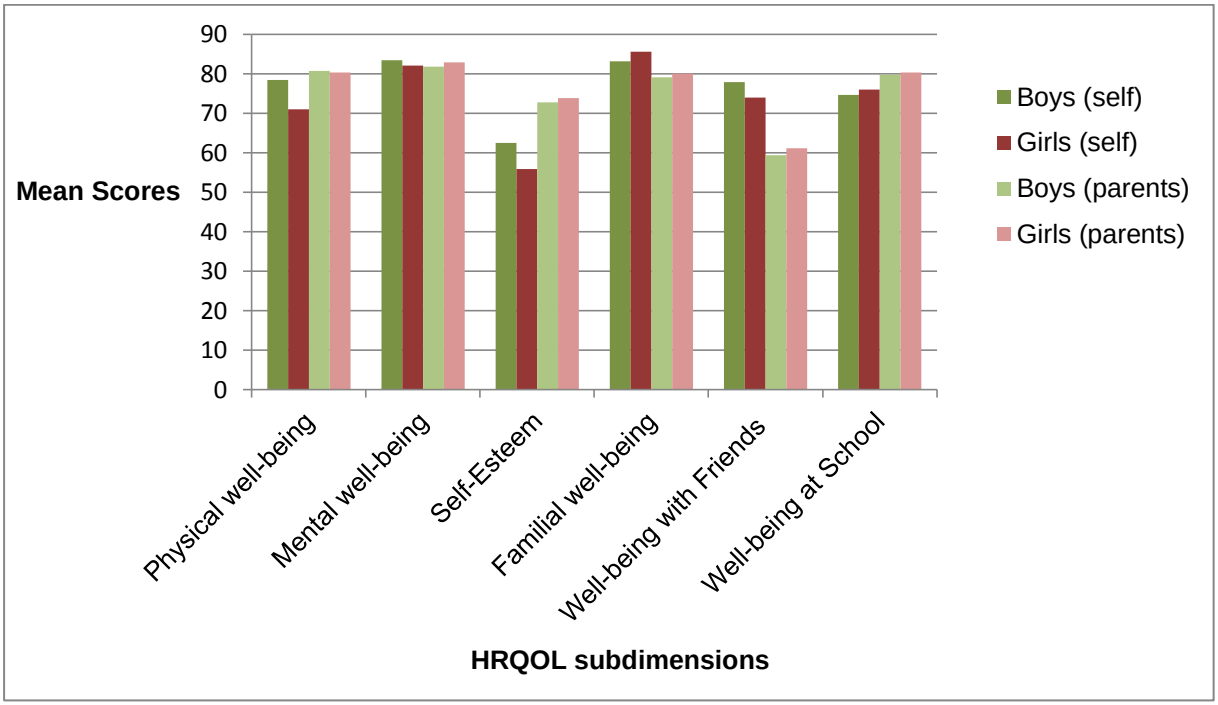


Figure 13 Mean scores of HRQOL subdimensions rated by parents and children

The highest proxy-rated mean score was presented for mental well-being for both genders, for the girls (x̄: 82.82, SD ±11.63).and the boys (x̄: 81.74, SD ±12.11). These results are graphically illustrated in Figure 13 and Table 15.

Table 15 Mean scores of HRQOL subdimensions stratified by gender

	Proxy-Ratings				Child-Ratings			
	Girls		Boys		Girls		Boys	
Subdimension(s)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Well-Being	80.28	±13.65	80.65	±14.71	70.98	±17.79	78.44	±17.73
Mental Well-Being	82.82	±11.63	81.74	±12.11	82.08	±14.97	83.44	±14.65
Self-Esteem	73.84	±11.78	72.73	±13.16	55.89	±22.42	62.48	±22.64
Familial Well-being	80.02	±12.25	79.09	±13.57	85.56	±12.98	83.07	±16.96
Well-Being with Friends	61.07	±12.59	59.42	±10.99	73.88	±17.13	77.86	±16.82
Well-Being at School	80.28	±15.19	79.69	±15.14	76.01	±18.42	74.67	±2.47

9.2.3 **The dichotomous Total HRQOL and Subdimensions**

The total scores for the HRQOL and the subdimensions were dichotomised into *"good"* and *"bad"* HRQOL. "*Good"* HRQOL was defined according to *Ravens-Sieberer et al*. for girls with a total HRQOL score > 68.20 and for boys > 68.1. For the arrangement of the dichotomised subdimensions physical well-being, it was defined as *"good"* when the total score of physical well-being for girls was > 60.24 and for boys > 63.75. Mental well-being was categorized for girls > 71.81 and for boys > 72.22, self-esteem > 48.85 for the girls and > 47.57 for the boys, well-being in the family > 71.55 for the girls and > 70.44 for the boys, well-being with friends > 64.32 for the girls and > 65.43 for the boys and well-being at school for the girls > 61.81 and for the boys > 59.47 (Ravens-Sieberer et al. 2003).

Table 16 Frequencies for the dichotomous HRQOL and the dichotomous subdimensions

Variable(s)	Respondent	Good HRQOL		Bad HRQOL	
		N	%	N	%
Total HRQOL	Children	292	73.9 %	101	25.6 %
	Parents	326	82.5 %	66	16.7 %
Physical Well-being	Children	280	70.9 %	112	28.4 %
	Parents	333	84.3 %	57	14.4 %
Mental Well-being	Children	321	81.3 %	72	18.2 %
	Parents	325	82.3 %	67	17.0 %
Self-esteem	Children	279	70.6 %	113	28.6 %
	Parents	382	96.7 %	9	2.3 %
Familial Well-being	Children	320	81.0 %	73	18.5 %
	Parents	303	76.7 %	89	22.5 %
Well-being with Friends	Children	303	76.7 %	91	23.0 %
	Parents	109	27.6 %	283	71.6 %
Well-being at School	Children	306	77.5 %	86	21.8 %
	Parents	348	88.1 %	44	11.1 %

The frequencies for the dichotomous HRQOL and the dichotomous subdimensions are given above in Table 16. The majority of the parents 82.5 % (n = 326) reported their child's total HRQOL as *"good"* in comparison to 73.9 % (n = 292) of the children. More children rated their total HRQOL as *"bad"* 25.6 % (n = 101) whereby 16.7 % (n = 66) of the parents assumed their child's total HRQOL as *"bad".*

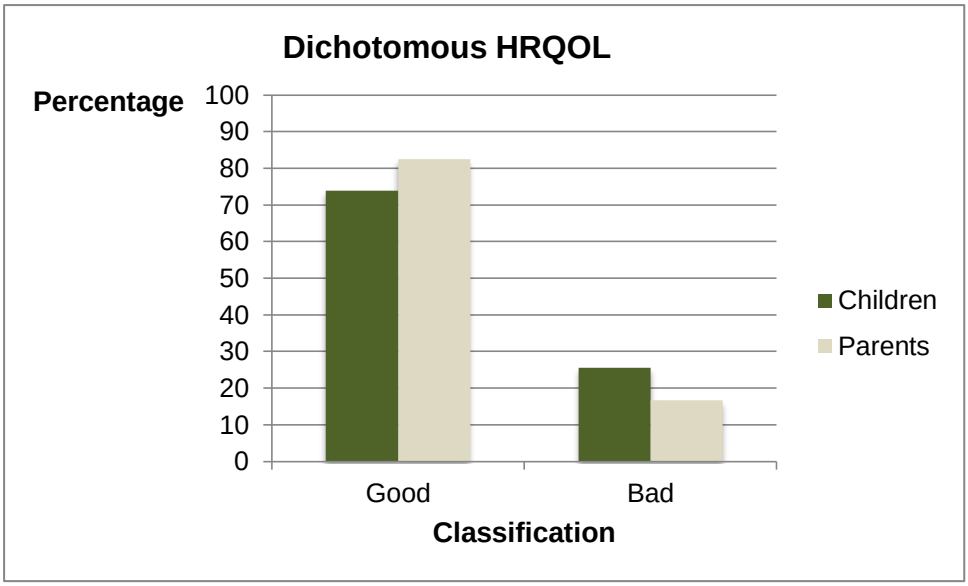


Figure 14 Dichotomous HRQOL rated by parents and children

More proxy-rating scores reached a "*good"* physical well-being 84.3 % (n = 333) than the self-ratings of the children with 70.9 % (n = 280). Therefore, a higher percentage of the children 28.4 % (n = 112) had a "*bad"* physical well-being in comparison to the proxy-ratings with 14.4 % (n = 57).

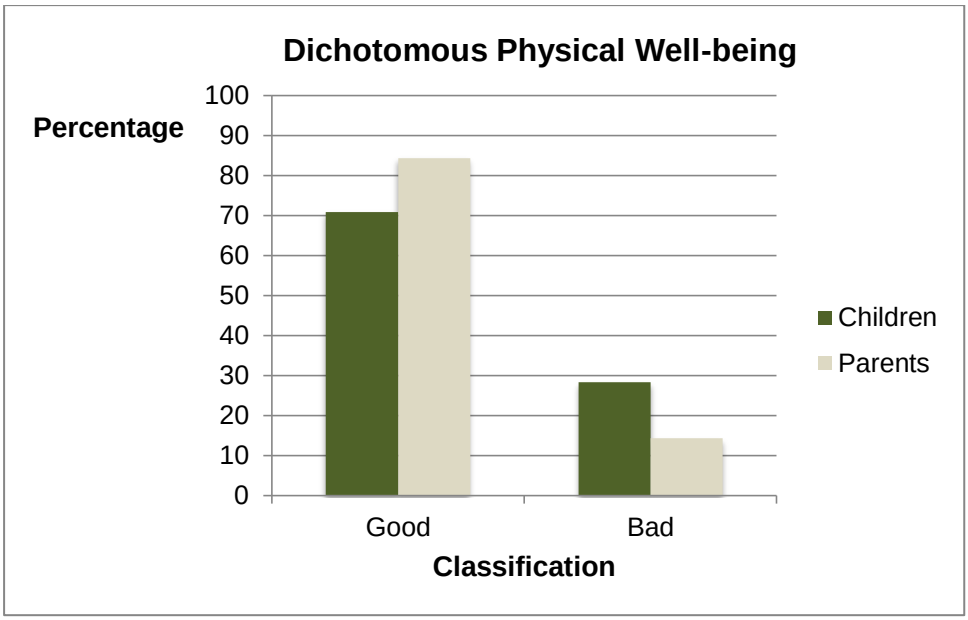


Figure 15 Dichotomous physical well-being rated by parents and children

The dichotomous variable mental well-being was the only subdimension were the frequencies for the child (81.3 %) and the parent-ratings (82.3 %) were almost equal for *"good"* mental well-being and displayed as well an equal distribution for *"bad"* mental well-being for the children (18.2 %) and parents (17.0 %).

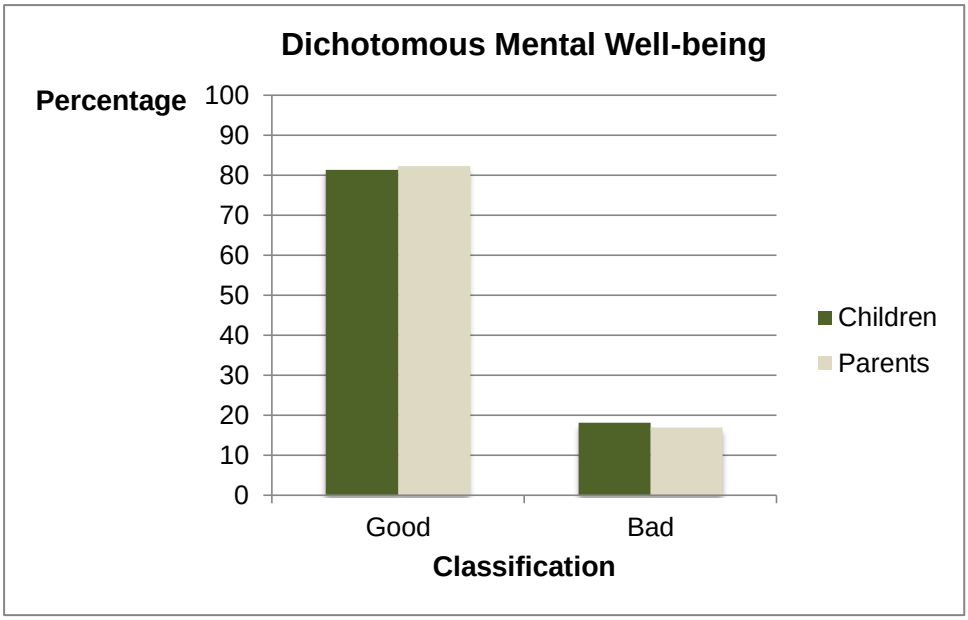


Figure 16 Dichotomous mental well-being rated by parents and children

The majority of the proxies obtained a good self-esteem 96.7 % (n = 382) in contrary to the self-ratings by the children. Seventy point six percent of the children approached a positive self-esteem. The opposite; a *"bad"* self-esteem; was presented for 28.6 % (n = 113) which was the case for 2.3 % (n = 9) for the parents.

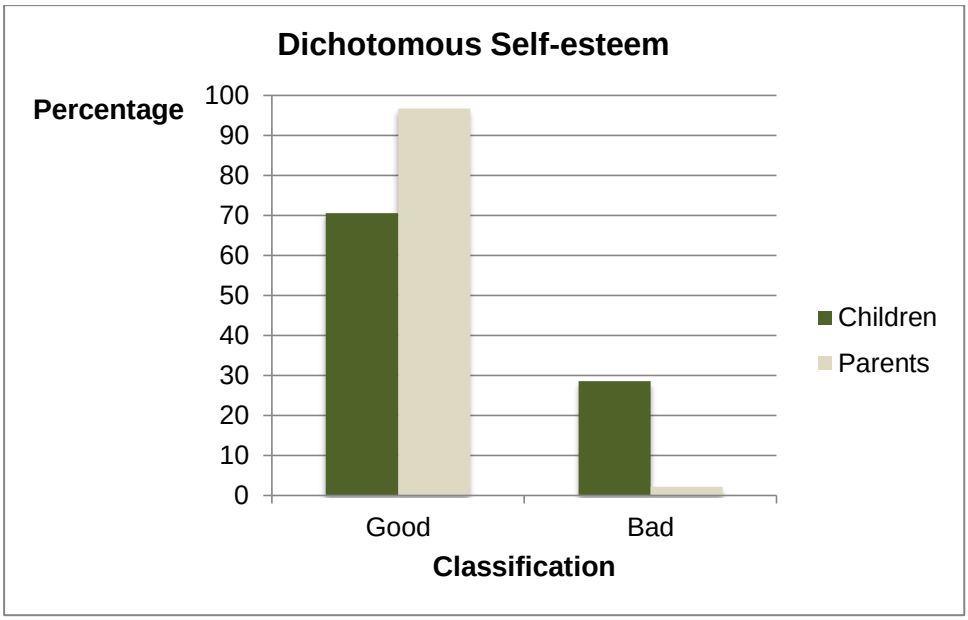


Figure 17 Dichotomous self-esteem rated by parents and children

Dichotomous well-being in the family displayed more positive frequencies for the children 81.0 % (n = 320) and 76.7 % (n = 303) for the proxy-ratings. Consequently, more parents 22.5% (n = 89) presented a *"bad"* well-being in the family than their children 18.5 % (n = 73).

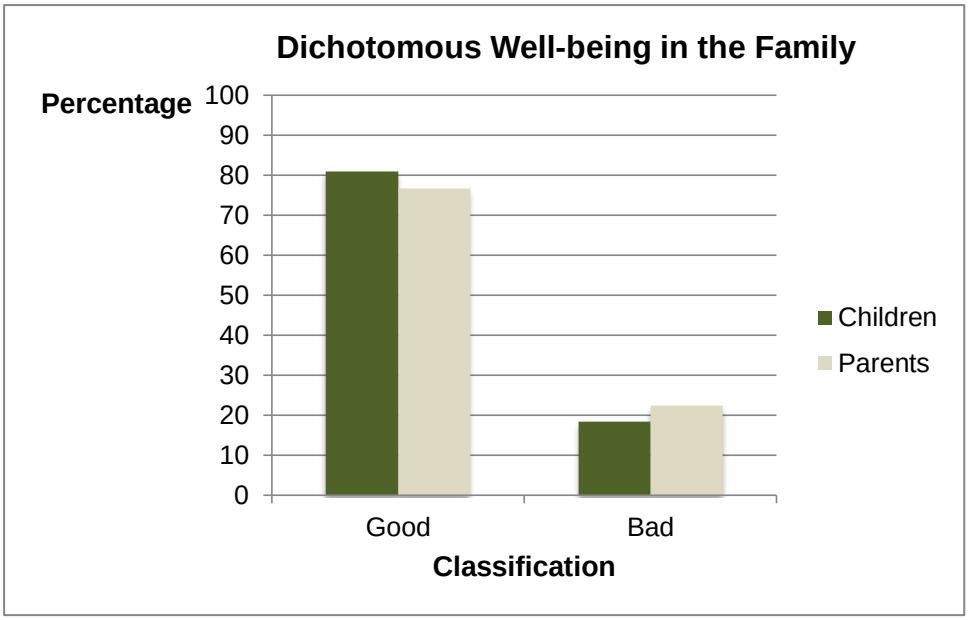


Figure 18 Dichotomous well-being in the family rated by parents and children

Dichotomous well-being with friends/ peers was the subdimension with the largest discrepancies rated by parents and children. Three hundred and three self-ratings (76.7 %) reached a positive well-being with friends/ peers. Whereby 27.6 % (n = 109) of the parents achieved a positive well-being with friends. The majority of the parents (71.6 %) signified a negative result for the well-being of their child and the relation to its friends, only 23.0 % of the children (n = 91) shared these results.

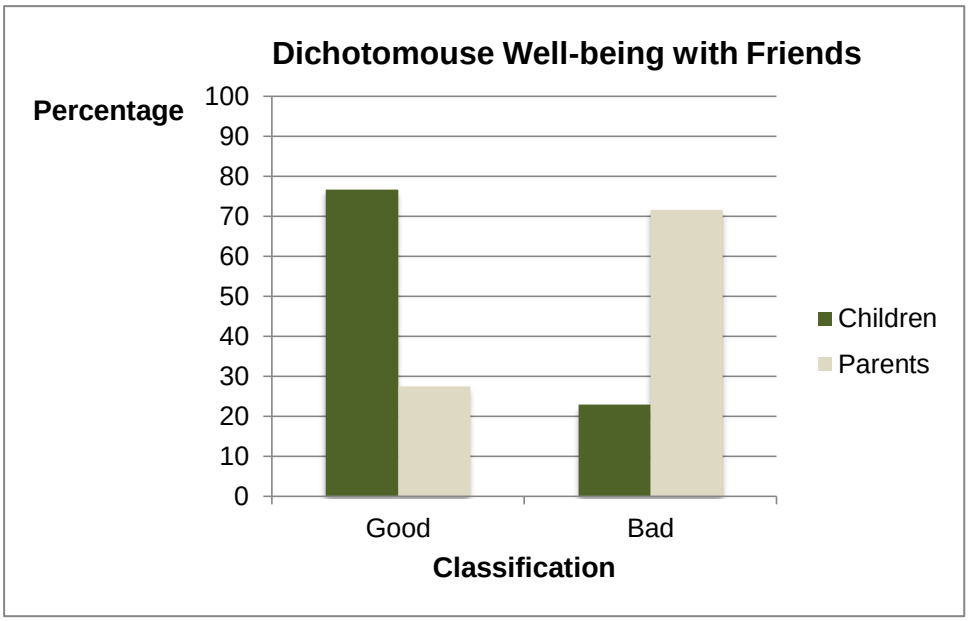


Figure 19 Dichotomous well-being with friends rated by parents and children

For the dichotomous well-being with friends it could be observed that the child-ratings were much better than the proxy-ratings. The majority of the children 76.7% (n = 303) presented a *"good"* well-

being with friends whereby only 27.6 % (n = 109) of the parents. Most of the parents 71.6 % (n = 283) reported their child's well-being with friends as *"bad"* which was only the case for 23 % (n = 91) of the children.

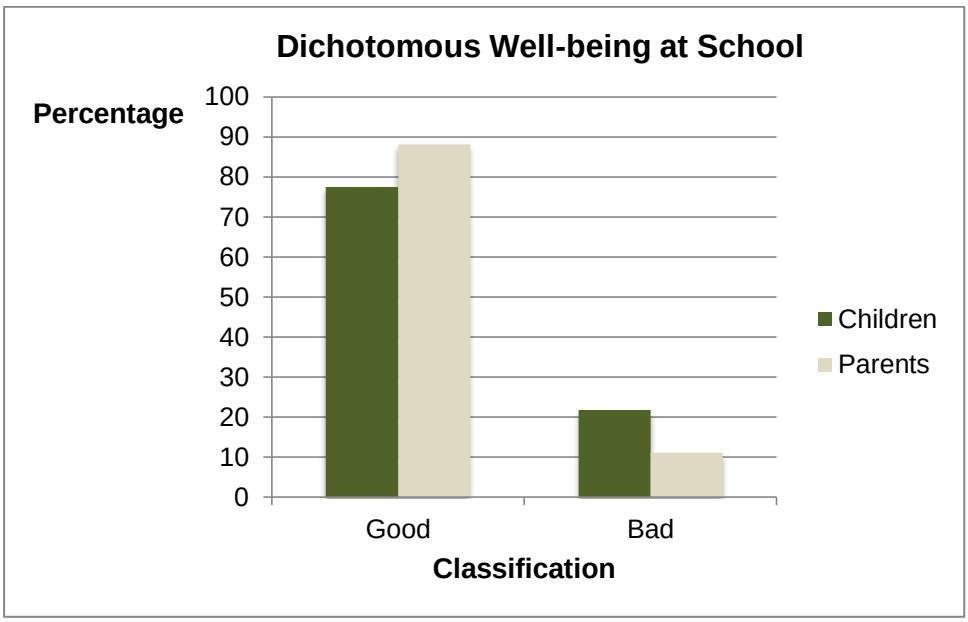


Figure 20 Dichotomous well-being at school rated by parents and children

In regards to the well-being at school more parents perceived their child's well-being at school more positive 88.1 % (n = 348) than their child itself 77.5 % (n = 306). Twenty one point eight percent (n = 86) felt in the category where they were seeing the well-being at school as *"bad"* that was for 11.1 % (n = 44) of the parents the case.

Table 17 Frequencies for the dichotomous HRQOL and dichotomous subdimensions by gender

Variable(s)	Gender	Good HRQOL				Bad HRQOL			
		Proxies		Children		Proxies		Children	
		N	%	N	%	N	%	N	%
HRQOL Total	Boys	148	80.9 %	146	79.3 %	35	19.1 %	38	20.7 %
	Girls	177	85.9 %	143	69.4 %	29	14.1 %	63	30.6 %
Physical Well-being	Boys	152	83.1 %	146	79.3 %	31	16.9 %	38	20.7 %
	Girls	179	87.3 %	133	64.9 %	26	12.7 %	72	35.1 %
Mental Well-being	Boys	147	80.3 %	156	84.8 %	36	19.7 %	28	15.2 %
	Girls	176	85.4 %	163	79.1 %	30	14.6 %	43	20.9 %
Self-esteem	Boys	176	96.2 %	140	76.1 %	7	3.8 %	44	23.9 %
	Girls	203	99.0 %	137	66.8 %	2	1.0%	68	33.2 %
Familial Well-being	Boys	136	73.9 %	144	78.3 %	48	26.1 %	40	21.7 %
	Girls	166	81.0 %	175	85.0 %	39	19 %	31	15.0 %

(Part II of Table 17)

Variable(s)	Gender	Good HRQOL				Bad HRQOL			
		Proxies		Children		Proxies		Children	
		N	%	N	%	N	%	N	%
Well-being with Friends	Boys	50	27.2 %	147	79.9 %	134	72.8 %	37	20.1 %
	Girls	59	28.8 %	153	73.9 %	146	71.2 %	54	26.1 %
Well-being at School	Boys	161	88.0 %	141	77.5 %	22	12.0%	41	22.5 %
	Girls	185	89.8 %	164	79.2 %	21	10.2 %	43	20.8 %

9.2.4 **The single subscales**

The next section will present the single items of the subdimensions reported by the parents and the children directly on the questionnaire.

Almost 2 % of the children *"felt always ill"* and 1 % were always suffering under *"headache or abdominal pain"* during the last week. Thirteen percent of the children felt either *"always"* (3.6 %) or *"often tired and worn-out"* (9 %). In contrary 3 % of the parents rated that their child *"felt always tired and worn out"* last week and 1.3 % of the parents gave the answer that their child *"felt often tired and worn-out"*. The children who *"felt never strong and full of energy"* last week answered 6.2 % whereby 1 % of the parents rated this for their child.

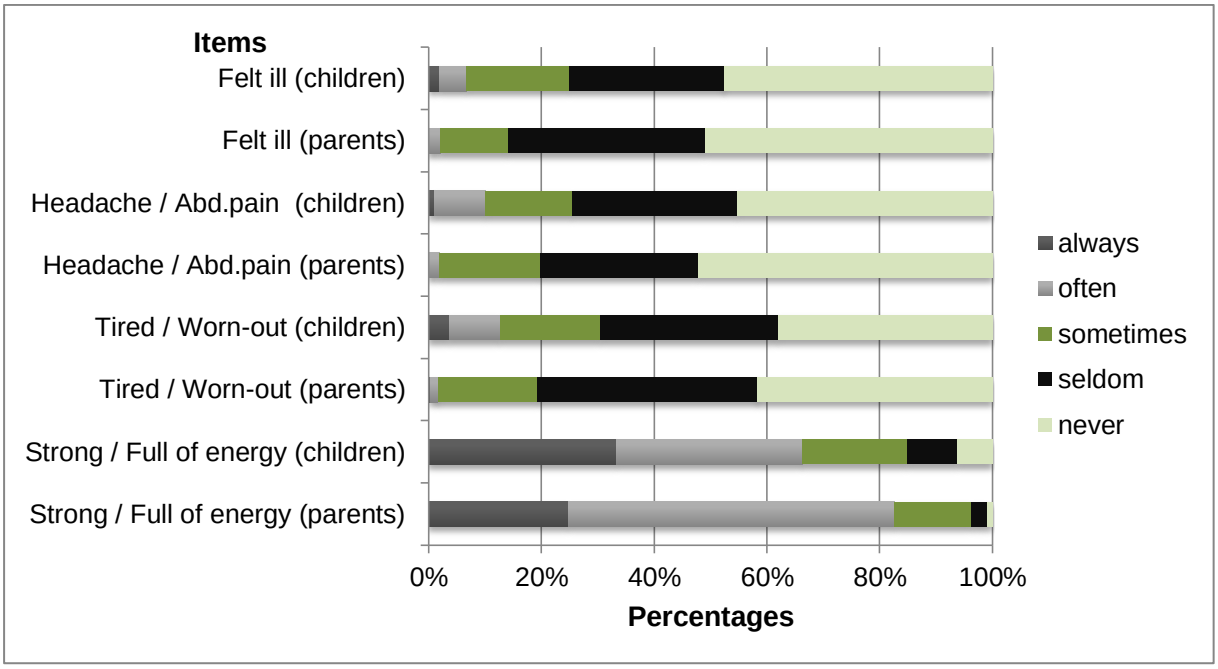


Figure 21 Physical well-being rated by parents and children

During the past week almost 40 % of the children answered that they *"always had fun and laughed a lot"* and 16.3 % of the parents, as *"often"* 71.8 % of the parents and 27.4 % of the children. Three percent of the parents had the opinion that their child *"felt always lonely"* during the last week whereby this was responded by 1.5 % of the children.

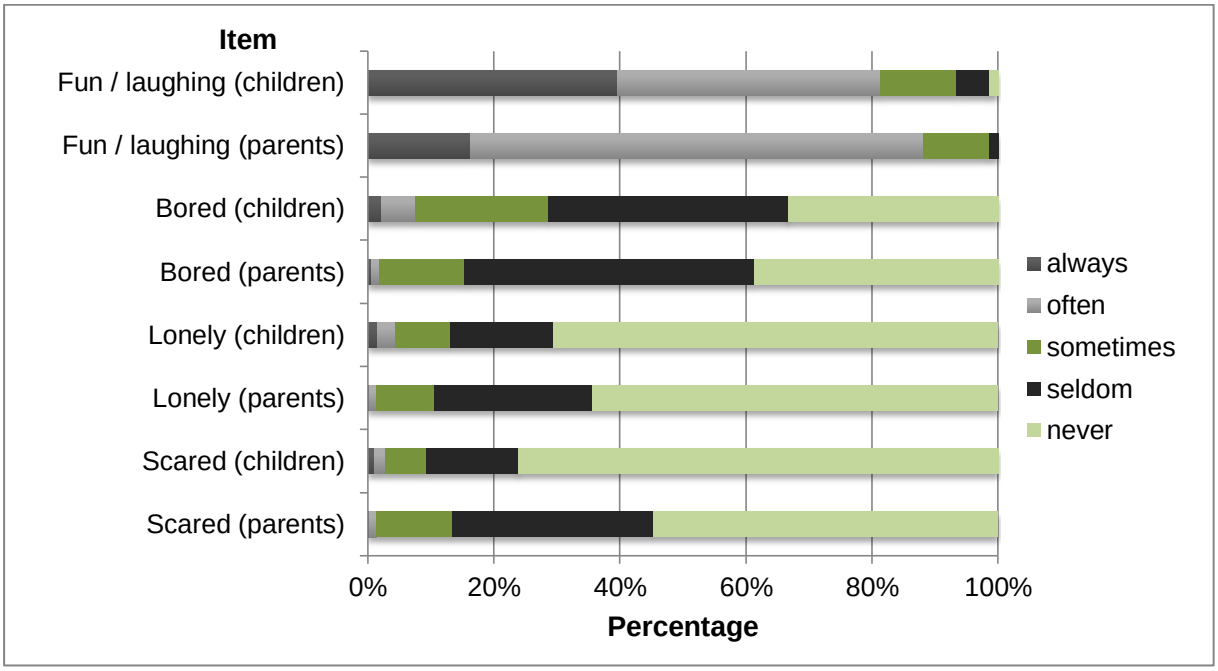


Figure 22 Mental well-being rated by parents and children

Nearly 10 % were *"never proud of themselves"* during the last week which was not seen by the parents. More than 16.1 % of the children reported to be *"seldom proud of themselves"* and 5.4 % by the parents. Twenty percent of the children reported that they *"always felt on top of the world"* during the last week and 31.5 % of the parents, as *"often"* 57.8 % of the parents and 24.9 % of the children, as *"sometimes"* 8.2 % of the parents and 3.5 % of the children more than a third compared to the parents. Almost 10 % of the children said that they *"never were pleased with themselves"* during the last week which was rated by 3.6 % of the parents. Nearly 7 % of the children reported that *"had never good ideas"* during the last week which was thought by 0.5 % of the parents.

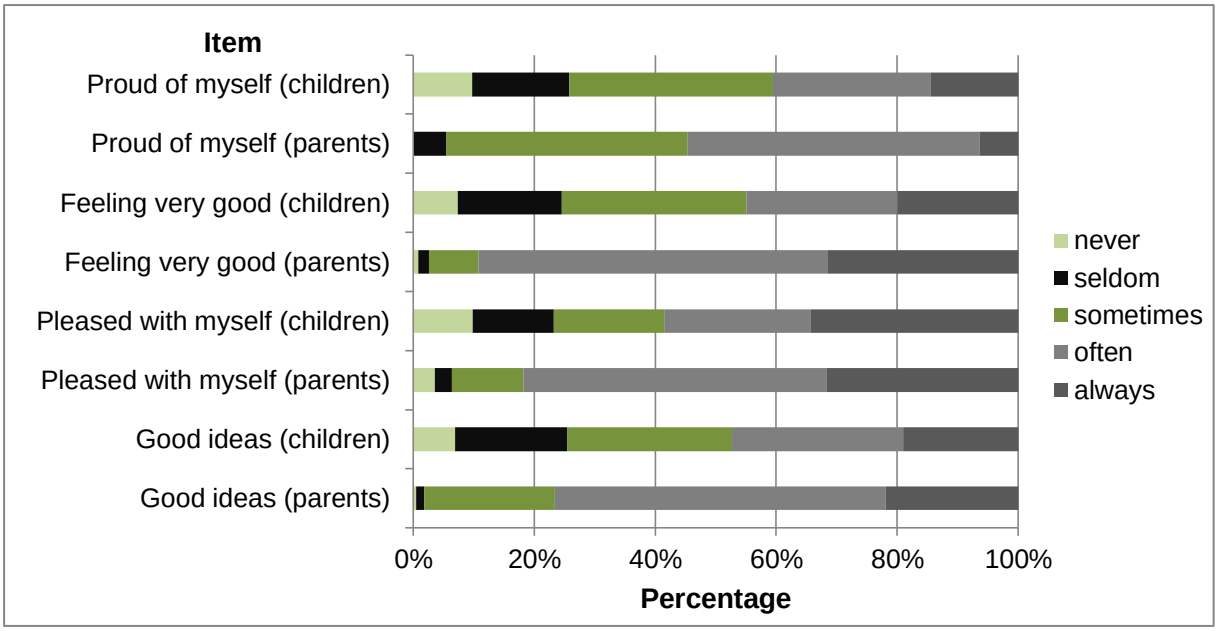


Figure 23 Self-esteem rated by parents and children

Almost 70 % of the children thought that they *"got on well often with their parents"* during the last week compared to the parents with 31.6 %. No child believed *"never to get along with their parents"* in contrary to 0.5 % of the parents.

Seventy five point five per cent *"felt always fine at home"* during the last week which was assumed by 6.9 % of the parents and 35.8 % answered that their child would *"often feel fine at home"* 17.3 %. More than 4 % of the children reported to *"feel sometimes fine at home"* and 2.8 % of the proxies. *"Feeling seldom fine at home"* was shown by 0.3 % of the parents and 2.6 % of the children and 0.5 % of the children *"felt never fine at home"* which was almost equal to the reports of the parents with 0.3 %.

Over 60 % of the children had *"never"* and 21.5 % *"seldom fights at home"* during the last week. More than fifty percent of the proxies reported *"never to have discrepancies at home"* and 36.4 % of the parents answered this item with *"seldom"*.

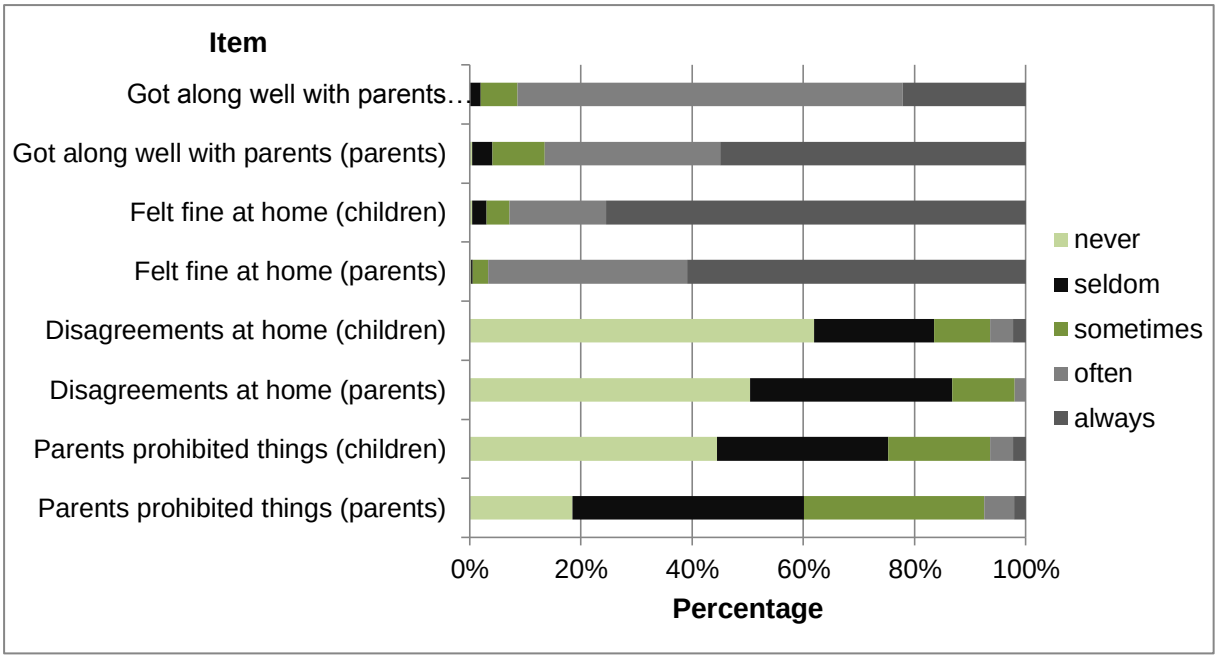


Figure 24 Well-being in the family rated by parents and children

The greatest difference between the children and the parents was signified for the question if *"the child felt different than other children".* Almost the half of the children (46.5 %) reported that they *"never felt different from other children"* last week whereby this was only rated by 2.3 % of the parents. The majority of the parents (55.1 %) thought that *"their child would be different than other children".*

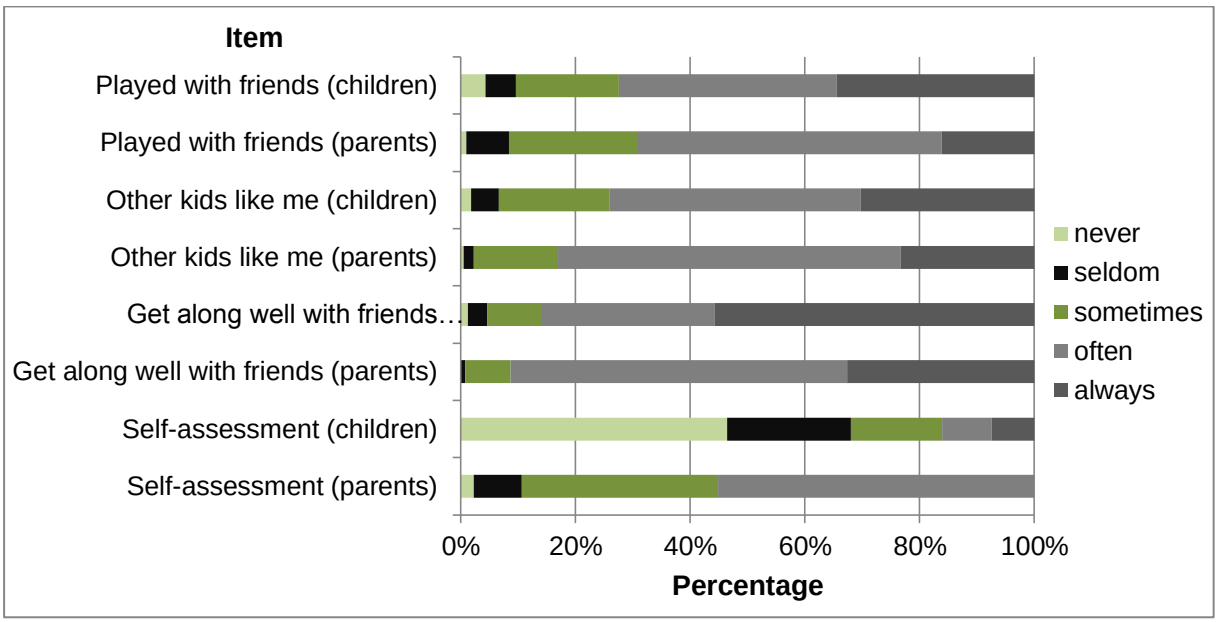


Figure 25 Well-being with friends/ peers items rated by parents and children

More parents (55.1 %) believed that *"their child's schoolwork was always easy"* compared to their child's opinion (49.9 %). None of the parents reported that *"their child's schoolwork was never easy"* and that they *"never enjoyed their lessons"* whereby 1.3 % thought that *"their schoolwork was never easy"* and that they *"never enjoyed their lessons"* last week. Fewer children (49.5 %) were *"worried about their future"* compared to the parents' ratings (56.5 %). Children (6.7 %) were thinking more negatively about their future than the parents (1.8 %) imagined than their child would do. A higher number of children (12.3 %) were *"always worried about bad grades"* than the parents believed (5.4 %).

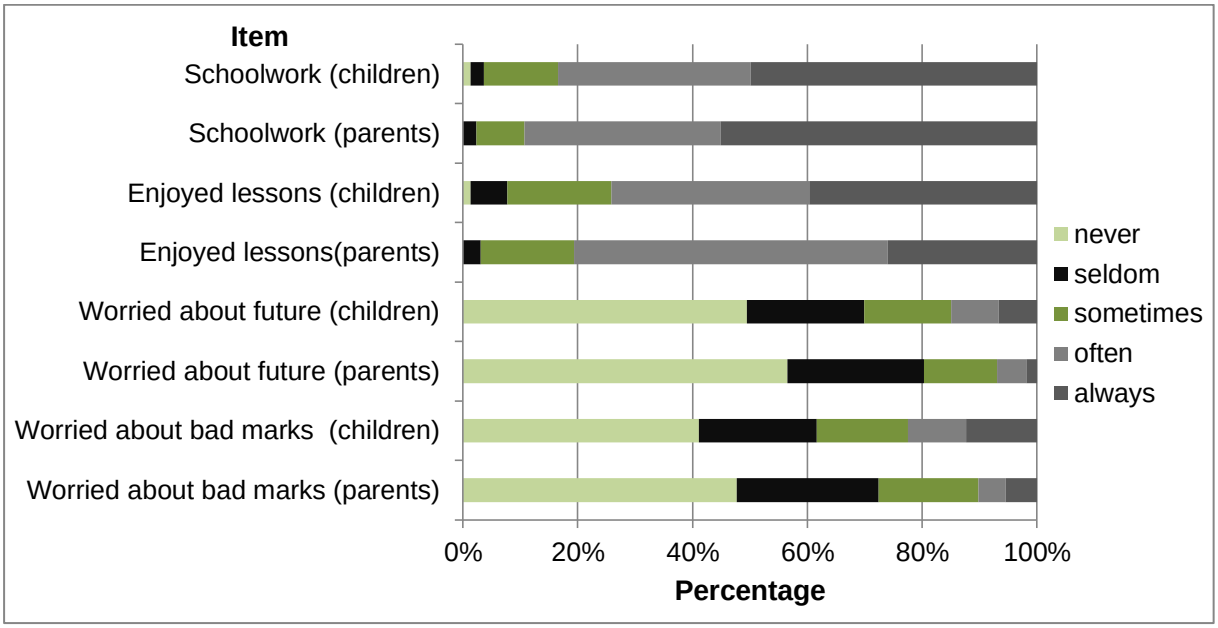


Figure 26 Well-being at school items rated by parents and children

After showing and comparing the frequencies for each single item rated by the children and the proxies, the aim of the following part is to present the descriptives for the single items on the five point Likert scale. The more positive the ratings, the higher are the mean scores. In order to identify if there are mean deviations between the boys and girls, the data set was split by gender (see in Table 20).

The highest mean scores were observed for the item *"the child felt fine at home"*. The children felt in average more positive at home $\bar{x}$: 4.65 (SD $\pm$ 0.73) than their parents thought $\bar{x}$: 4.57 (SD $\pm$ 0.56). The highest mean for the girls was achieved for the proxy-ratings and for the self-ratings for the same item *"felt fine at home"* for the proxy-rated girls $\bar{x}$: 4.60 (SD $\pm$ 0.53) and the self-ratings $\bar{x}$: 4.67 (SD $\pm$ 0.73). The boys reached the highest self-rated mean for the item *"felt scared"* $\bar{x}$: 4.69 (SD $\pm$ 0.68) and the proxy-rated boys accomplished the highest mean for this item as same as the proxy-rated girls *"felt fine at home"* $\bar{x}$: 4.54 (SD $\pm$ 0.60).

The lowest mean score for the parents was calculated for the item *"self-attitude versus other children"* $\bar{x}$: 1.57 (SD $\pm$ 0.74) which was also the case for the proxy-rated boys $\bar{x}$: 1.60 (SD $\pm$ 0.75) and girls 1.55

(SD ± 0.74). The lowest mean score for the self-ratings was assessed for the item *"felt proud of me"* x̄: 3.19 (SD ± 1.17). After stratifying for gender both gender revealed the lowest mean for the item *"felt proud of me"*, the boys with a mean x̄:3.36 (SD ± 1.19) and the girls x̄:3.05 (SD ± 1.13).

The most meaningful difference was displayed for the means of the item *"self-attitude versus other children".* The parents' impression of their child in comparison to other children was significantly deviating than their children's perception. The average score for the parent-proxies revealed x̄: 1.57 (SD ±0.74) and for the child-ratings x̄: 3.91 (SD ±1.28).

Table 18 Means of the single items (self- and proxy-rated) and stratified by gender

	Item(s)	Statistics	Proxy-Ratings			Child-Ratings		
			Total	Boys	Girls	Total	Boys	Girls
Physical Well-being	Felt ill	Mean	**4.35**	4.31	4.39	**4.13**	4.23	4.04
		SD±	±0.77	±0.82	±0.72	±1.00	±1.01	±0.98
	Headache/ Abdominal Pain	Mean	**4.31**	4.37	4.26	**4.08**	4.17	4.00
		SD±	±0.82	±0.81	±0.83	±1.03	±1.03	±1.03
	Tired and Worn out	Mean	**4.21**	4.18	4.23	**3.91**	4.01	3.81
		SD±	±0.79	±0.82	±0.78	±1.12	±1.21	±1.02
	Strong and full of energy	Mean	**4.03**	4.05	4.00	**3.78**	4.03	3.57
		SD±	±0.77	±0.78	±0.76	±1.17	±1.09	±1.19
Mental Well-being	Fun and laughing	Mean	**4.03**	4.01	4.04	**4.15**	4.10	4.19
		SD±	±0.57	±0.57	±0.58	±0.91	±0.93	±0.88
	Bored	Mean	**4.21**	4.09	4.32	**3.95**	3.90	4.01
		SD±	±0.76	±0.81	±0.69	±0.97	±1.06	±0.87
	Lonely	Mean	**4.52**	4.52	4.52	**4.52**	4.59	4.45
		SD±	±0.72	±0.76	±0.69	±0.89	±0.80	±0.96
	Scared	Mean	**4.40**	4.44	4.37	**4.64**	4.69	4.59
		SD±	±0.76	±0.74	±0.77	±0.77	±0.68	±0.83
Self-Esteem	Proud of myself	Mean	**3.56**	3.55	3.56	**3.19**	3.36	3.05
		SD±	±0.70	±0.69	±0.71	±1.17	±1.19	±1.13
	Feeling very good	Mean	**4.17**	4.09	4.24	**3.33**	3.44	3.23
		SD±	±0.71	±0.78	±0.64	±1.19	±1.23	±1.15
	Pleased with myself	Mean	**4.04**	4.08	4.00	**3.61**	3.78	3.46
		SD±	±0.93	±0.86	±0.99	±1.34	±1.32	±1.34
	Lots of good ideas	Mean	**3.96**	3.89	4.03	**3.33**	3.38	3.29
		SD±	±0.73	±0.72	±0.73	±1.19	±1.21	±1.17
Familial Well-being	Getting along	Mean	4.12	4.12	4.12	**4.36**	4.32	4.39
		SD±	±0.58	±0.60	±0.57	±0.84	±0.88	±0.81
	Feel fine at home	Mean	**4.57**	4.54	4.60	**4.65**	4.62	4.67
		SD±	±0.56	±0.60	±0.53	±0.73	±0.74	±0.72
	Disagreements	Mean	**4.36**	4.23	4.46	**4.38**	4.22	4.52
		SD±	±0.76	±0.78	±0.72	±0.97	±1.10	±0.81
	Parents prohibited	Mean	**3.69**	3.62	3.75	**4.11**	4.06	4.16
		SD±	±0.91	±0.91	±0.90	±1.00	±1.09	±0.91

(Part II of Table 18)

	Item(s)	Statistics	Proxy-Ratings			Child-Ratings		
			Total	Boys	Girls	Total	Boys	Girls
Well-being w. Friends	Played with friends	Mean	**3.76**	3.74	3.78	**3.94**	3.94	3.93
		SD±	±0.85	±0.83	±0.87	±1.06	±1.09	±1.03
	Other kids like me	Mean	**4.04**	4.02	4.06	**3.96**	4.01	3.92
		SD±	±0.70	±0.74	±0.66	±0.93	±0.86	±0.98
	Getting along	Mean	**4.23**	4.21	4.25	**4.37**	4.49	4.26
		SD±	±0.62	±0.66	±0.59	±0.87	±0.80	±0.92
	Self-attitude vs. Others	Mean	**1.57**	1.60	1.55	**3.91**	4.05	3.80
		SD±	±0.74	±0.75	±0.74	±1.28	±1.33	±1.22
Well-being at School	Schoolwork	Mean	**4.43**	4.41	4.44	**4.28**	4.22	4.34
		SD±	±0.74	±0.75	±0.74	±0.87	±0.88	±0.85
	Enjoyed school lessons	Mean	**4.04**	3.98	4.09	**4.04**	3.95	4.11
		SD±	±0.74	±0.76	±0.72	±0.98	±1.04	±0.93
	Worried about the future	Mean	**4.29**	4.27	4.32	**3.96**	3.89	4.03
		SD±	±0.98	±1.04	±0.94	±1.25	±1.32	±1.19
	Worried about bad grades	Mean	**4.05**	4.06	4.05	**3.69**	3.77	3.64
		SD±	±1.16	±1.18	±1.14	±1.41	±1.45	±1.37

9.3 Bivariate Correlations

9.3.1 Bivariate correlations with the Total HRQOL

The gender for the child-ratings showed a statistically significant p = .027 small negative correlation r_{ps} = -.11. The proxy-rated HRQOL demonstrated a very small positive relationship r_{ps} = .049 nevertheless it was not significant. The age showed a very small negative relationship for both total HRQOL scores (r = -.028, p = .583) for the proxies and (r = -.010, p = .845) for the children (see Table 17).

Table 19 Bivariate correlations with the total HRQOL (self- and proxy-rated)

Variable(s)	Gender	Age	Language
Total HRQOL			
Self-ratings	(r_{ps} = -.11*, p = .03)	(r = -.010, p = .845)	(r_{ps} =- .001, p = .91)
Proxy-ratings	(r_{ps} = .049 , p = .34)	(r = -.028, p = .583)	(r_{ps} = -.05, p = .33)

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Additionally variables like the language spoken at home showed almost no correlation (r = .001, n = 388, p =.91) for the children and a very small negative correlation r = -.05 for the parents which was not significant. The wealth of a family measured by the FAS showed small positive correlation to the total HRQOL ratings for the parents (r_s = .11, p = .033) and their children (r_s = .28, p = .58) whereby the

result of the children was not significant. After controlling the correlation with a third variable language spoken at home the correlation for the children increased (r_s = .33, p = .53). There was a strong correlation between the parent's scores and the language spoken at home (r_s = .93, p = .75). The FAS and the district of the school showed a significant positive correlation (C = .362, p < .001). The districts showed a positive correlation for the children C: .78 and C: .72 for the proxies but were not significantly.

9.3.2 Bivariate correlations with the HRQOL subdimensions

The gender of the child did not stand significantly in relation with the proxy-rated subdimensions. The self-perceived physical well-being r = -.21, the self-esteem r = -.15 as well as the well-being with friends r = -.11 was significantly influenced by the gender of the child which is highlighted in Table 18.

The age on the other hand did not point out any significant relations with the subdimensions perceived by the children. A small significantly relationship was calculated for the proxy-ratings for well-being at school r = -.11. The other five subdimensions did not show any significant results for the proxy responder. The language spoken at home showed small statistically significant outcome for well-being at school for the child-reports r = -.16 and for the proxy-reports r = -.19.

Table 20 Bivariate correlations for the subdimensions (self- and proxy-rated)

Variable(s)	Gender	Age	Language
Physical Well-being			
Self-ratings	**r_{ps} = -.21*, p < .001**	r = .06, p = .25	r_{ps} = -.02, p = .65
Proxy-ratings	r_{ps} = -.013, p = .80	r = -.03, p = .53	r_{ps} = -.05, p = .34
Mental Well-being			
Self-ratings	r_{ps} = -.05, p = .37	r = -.02, p = .72	r_{ps} =- .05, p = .36
Proxy-ratings	r_{ps} = .045, p = .37	r = -.03, p = .59	r_{ps} =- .05, p = .37
Self-Esteem			
Self-ratings	**r_{ps} = -.15*, p = .004**	r = -.03, p = .56	**r_{ps} =- .10*, p = .04**
Proxy-ratings	r_{ps} = .044, p = .38	r = -.044, p = .39	r_{ps} = .06, p = .26
Familial Well-being			
Self-ratings	r_{ps} = -.08, p = .103	r = .03, p = .58	r_{ps} =- .001, p = .98
Proxy-ratings	r_{ps} = .036, p = .48	r = -.024, p = .63	r_{ps} r = .09, p = .10
Well-being with Friends			
Self-ratings	**r_{ps} = -.11*, p = .03**	r = -.05, p = .32	r_{ps} =- .046, p = .37
Proxy-ratings	r_{ps} = .055, p = .28	r = -.024, p = .64	r_{ps} = .05, p = .31
Well-being at School			
Self-ratings	r_{ps} = .03, p = .07	r = -.04, p = .45	**r_{ps} =- .16**, p = .002**
Proxy-ratings	r_{ps} = .019, p = .70	**r = -.11*, p = .03**	**r_{ps} = -.19**, p < .001**

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

9.3.3 **Bivariate correlations between the single HRQOL subdimensions**

How are the total HRQOL and the subdimensions (by self-and proxy-ratings) correlating with each other? Mental well-being is correlating for both groups very strong and equally (r = .73) with the total HRQOL. Well-being with friends for the proxies signifies the smallest correlation (r = .33) with the total HRQOL. The proxy-rated physical well-being and well-being with friends has almost no relationship (r = 0.04) to each other. Well-being with friends for the proxies and well-being at school present a very small negative relation (r = -0.07). To conclude, the bivariate correlation between the single subdimensions could denote how much they are in relation to each other. Moreover, it could be presented that well-being with friends (for the proxies) is almost showing no relationship with two other subdimensions (see in Table 19).

Table 21 Bivariate correlations between the total HRQOL and subdimensions

Variable(s)	HRQOL	PW	MW	SE	FW	FrW	SW
Total HRQOL							
Self-ratings							
Proxy-ratings							
Physical Well-being							
Self-ratings	r = .66**						
Proxy-ratings	r = .64**						
Mental Well-being							
Self-ratings	r = .73**	r = .51**					
Proxy-ratings	r = .73**	r = .39**					
Self-Esteem							
Self-ratings	r = .68**	r = .38**	r = .40**				
Proxy-ratings	r = .68**	r = .28**	r = .45**				
Fam. Well-being							
Self-ratings	r = .57**	r = .20**	r = .36**	r = .18**			
Proxy-ratings	r = .64**	r = .27**	r = .37**	r = .35**			
Well-being (Friends)							
Self-ratings	r = .67**	r = .27**	r = .39**	r = .37**	r = .37**		
Proxy-ratings	r = .33**	**r = 0.04**	r = .16**	r = .16**	r = .11**		
Well-being (School)							
Self-ratings	r = .65**	r = .29**	r = .37**	r = .23**	r = .34**	r = .35**	
Proxy-ratings	r = .63**	r = .31**	r = .37**	r = .30**	r = .24**	**r = -0.07**	

** Correlation is significant at the 0.01 level (2-tailed).

9.3.4 **Bivariate correlations with the single subscales**

In order to assess if the items (self-and proxy-rated) are relating to the background variables (gender, age and the language spoken at home) bivariate correlations for each single item were performed. The three variables showed small effects for some items which are illustrated in Table 22. The items

answered by the children revealed more statistically significant results with the background variable gender while the proxy-ratings presented more significant outcomes for the variable language spoke at home. The gender of the child correlated at least one of the items (self-and proxy-rated) in each subdimension, except for the well-being at school. The age of the child did not show any significant correlations for the answers of the parents. In contrary for the view of the children, anxiety (or felt scared) presented a small effect for the age of the child. Which means more specific that the answer if a child "felt scared last week" was little influenced by the age of the responding child.

Having disagreements at home was strongly significant for both respondents r_s = .16 for the proxies and r_s = .14 for the children. Furthermore, the gender of the child had small significantly negative effects for the following items rated by the children: *"tired and worn out"* r_s = -.14, *"strong at full of energy"* r_s = -.21, *"proud of me"* r_s = -.15, *"pleased with me"* r_s = -.12, *"felt very well"* r_s = -.11, *"getting along well with friends"* r_s = -.12 and the *"self-attitude versus other children"* where the child were asked if it thought to be different than others r_s = -.14. The parents or proxies became visible with other significant items, like *"had lots of good ideas"* r_s = .11 and if the child *"felt bored"* r_s = .05.

The variable *"language spoken at home"* (German or another language than German) was correlating with more proxy-rated items than with the self-perceived items from the children. The item *"worried about bad marks"* was strongly significant and negatively in relation with the language spoken at home, for the proxy r_s = -.24 and as well for the child-ratings r_s = -.25. The view children or parents have in regards to school marks is affected by the language spoken at home. If or how a child felt *"tired and worn out"* and *"full of energy"* was also significantly correlating with the language spoken at home. When the child-ratings for *"self-esteem"* were analysed, it could be observed that the language spoken at home stood in relation how a child rated *"to be proud of itself"* r_s = .15 or if the child *"was feeling well"* r_s = .21. Moreover, the language was detected as small influencing factor how parents responded to the well-being of the child in the family (*"got along well with the parents",* how it *"felt at home"* and *"had disagreements at home"*). The perception of the parents if their child was "*worried about the future"* last week and how it was *"liked by other kids"* was affected by the language spoken at home.

Table 22 Bivariate correlations with the single items (self- and proxy-rated)

	Item(s)	Respondent	Gender	Age	Language
Physical Well-being	Felt ill	Self-ratings	**r_s = -.12*, p = .02**	r_s = .05, p = .364	r_s = .02, p = .72
		Proxy-ratings	r_s = .02, p = .638	r_s = -.05, p = .336	r_s = -.04, p = .414
	Headache/ Abdominal Pain	Self-ratings	r_s = -.09, p = .08	r_s = .04, p = .422	r_s = .04, p = .487
		Proxy-ratings	r_s = -.07, p = .194	r_s = -.06, p = .218	r_s = -.09, p = .064
	Tired and Worn out	Self-ratings	**r_s = -.14**, p < .005**	r_s = .04, p = .403	**r_s = .056*, p = .005**
		Proxy-ratings	r_s = .03 p = .547	r_s = -.08, p = .125	r_s = -.03 p = .561
	Strong and full of energy	Self-ratings	**r_s = -.21**, p < .001**	r_s = -.004, p = .94	**r_s = -.07**, p < .001**
		Proxy-ratings	r_s = -.03, p = .55	r_s = -.022, p = .668	r_s = -.01, p = .778

(Part II of Table 22)

	Item(s)	Respondent	Gender	Age	Language
Physical Well-being	Felt ill	Self-ratings	**r_s = -.12*, p = .02**	r_s = .05, p = .364	r_s = .02, p = .72
		Proxy-ratings	r_s = .02, p = .638	r_s = -.05, p = .336	r_s = -.04, p = .414
	Headache/ Abdominal Pain	Self-ratings	r_s = -.09, p = .08	r_s = .04, p = .422	r_s = .04, p = .487
		Proxy-ratings	r_s = -.07, p = .194	r_s = -.06, p = .218	r_s = -.09, p = .064
	Tired and Worn out	Self-ratings	**r_s = -.14**, p < .005**	r_s = .04, p = .403	**r_s = .056*, p = .005**
		Proxy-ratings	r_s = .03 p = .547	r_s = -.08, p = .125	r_s = -.03 p = .561
	Strong and full of energy	Self-ratings	**r_s = -.21**, p < .001**	r_s = -.004, p = .94	**r_s = -.07**, p < .001**
		Proxy-ratings	r_s = -.03, p = .55	r_s = -.022, p = .668	r_s = -.01, p = .778
Mental Well-being	Fun and laughing	Self-ratings	r_s = .06, p = .241	r_s = -.10, p = .051	r_s = .11, p = .241
		Proxy-ratings	r_s = .019, p = .702	r_s = -.02, p = .710	r_s = .04, p = .436
	Bored	Self-ratings	r_s = .08, p = .592	r_s = -.04 p = .447	r_s = .07, p = .592
		Proxy-ratings	**r_s = .05**, p = .003**	r_s = -.02, p = .748	**r_s = -.13*, p = .011**
	Lonely	Self-ratings	r_s = -.08, p = .135	r_s = .04, p = .452	r_s = -.02, p = .135
		Proxy-ratings	r_s = -.02, p = .70	r_s = .08, p = .150	r_s = .03, p = .607
	Scared	Self-ratings	r_s = -.07, p = .188	**r_s = .11*, p = .026**	r_s = .04, p = .188
		Proxy-ratings	r_s = -.05, p = .355	r_s = -.10, p = .055	r_s = .01, p = .909
Self-Esteem	Proud of me	Self-ratings	**r_s = -.15**, p = .004**	r_s = -.015, p = .774	**r_s = .15*, p = .004**
		Proxy-ratings	r_s = .01, p = .814	r_s = -.06, p = .276	**r_s = .21**, p < .001**
	Feeling very good	Self-ratings	**r_s = -.11*, p = .036**	r_s = .04, p = .460	**r_s = .21**, p < .001**
		Proxy-ratings	r_s = .08, p = .105	r_s = -.09, p = .087	r_s = .13, p = .014
	Pleased with me	Self-ratings	**r_s = -.12*, p = .02**	r_s = -.01, p = .790	r_s = .03, p = .573
		Proxy-ratings	r_s = -.02, p = .659	r_s = -.09, p = .065	r_s = .02, p = .748
	Lots of good ideas	Self-ratings	r_s = -.05, p = .346	r_s = -.09, p = .095	r_s = .04, p = .407
		Proxy-ratings	**r_s = .11*, p = .033**	r_s = -.025, p = .628	r_s = -.01, p = .883
Familial Well-being	Getting along well with parents	Self-ratings	r_s = .02, p = .634	r_s = <-.001, p = .997	r_s = .08, p = .112
		Proxy-ratings	r_s = -.02, p = .634	r_s = .04, p = .444	**r_s = .12*, p = .024**
	Feel fine at home	Self-ratings	r_s = .03, p = .539	r_s = .08, p = .130	r_s = -.07, p = .188
		Proxy-ratings	r_s = .04, p = .457	r_s = -.04, p = .385	**r_s = .11*, p = .031**
	Disagreements	Self-ratings	**r_s = .14**, p = .007**	r_s = .06, p = .219	r_s = -.01, p = .897
		Proxy-ratings	**r_s = .16**, p = .001**	r_s = .02, p = .761	**r_s = .1*, p = .049**
	Parents prohibited things	Self-ratings	r_s = .01, p = .898	r_s = -.06, p = .219	r_s = .001, p = .987
		Proxy-ratings	r_s = .08, p = .124	r_s = -.01, p = .882	r_s = -.01, p = .819
Well-being w. Friends	Played with friends	Self-ratings	r_s = -.0001, p = .991	r_s = -.06, p = .250	r_s = .06, p = .235
		Proxy-ratings	r_s = .05, p = .344	r_s = -.03, p = .497	r_s = -.01, p = .793
	Other kids liked me	Self-ratings	r_s = -.02, p = .698	r_s = .004, p = .930	r_s = .07, p = .155
		Proxy-ratings	r_s =.02, p = .665	r_s = .02, p = .668	**r_s =.12*, p = .021**
	Getting along well with friends	Self-ratings	**r_s = -.124* p = .014**	r_s = -.02, p = .669	r_s = -.015 p = .768
		Proxy-ratings	r_s = .02, p = .668	r_s = -.01, p = .910	r_s = .05, p = .323
	Self-attitude vs. others	Self-ratings	**r_s = -.144**, p = .004**	r_s = -.01, p = .841	r_s = .05, p = .326
		Proxy-ratings	r_s = -.03, p = .486	r_s = -.03, p = .506	r_s = .08, p = .133

(Part III of Table 22)

	Item(s)	Respondent	Gender	Age	Language
Well-being at School	Schoolwork	Self-ratings	r_s = .06, p = .267	r_s = -.01, p = .804	r_s = -.04, p = .414
		Proxy-ratings	r_s = .03, p = .486	r_s = .03, p = .506	r_s = .08, p = .133
	Enjoyed school lessons	Self-ratings	r_s = .07, p = .18	r_s = -.05, p = .371	r_s = .05, p = .332
		Proxy-ratings	r_s = .08, p = .122	r_s = -.09, p = .071	r_s = .021, p = .684
	Worried about the future	Self-ratings	r_s = .06, p = .252	r_s = -.04, p = .437	r_s = -.05, p = .290
		Proxy-ratings	r_s = .02, p = .664	r_s = -.05, p = .357	**r_s = .15**, p = .003**
	Worried about bad grades	Self-ratings	r_s = -.07, p = .188	r_s = -.08, p = .113	**r_s = -.25**, p < .001**
		Proxy-ratings	r_s = -.01, p = .885	r_s = -.05, p = .302	**r_s = -.24**, p < .001**

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Analysis of variance for the total HRQOL with the six subdimensions

In order to explore how much variance in the total HRQOL is explained by each subdimension and which one makes the strongest contribution a *multiple linear regression* was performed for the child-ratings and for the proxy-ratings.

The *dependent* variable was total HRQOL (proxy-reported) and the *independent* variables were the six subdimensions. The correlation between these variables ranging from r = -0.07 - .73. The tolerances for the variables were ranging from .67 - .93 and the VIF were varying from 1.078 – 1.49. All outliers with a Mahalanobis distance < 22.46 were removed from the data set as recommended by *Tabachnick & Fidell* (1996). The total HRQOL (proxy) is explained by 98.7% of the variance in the six subdimensions, F (6, 375) = 4507.78, p < .001. The largest contribution to the total HRQOL score was statistically significant displayed for the subdimension well-being at school with a beta value = 0.33 which is followed by physical well-being with beta value = 0.31 which is more detailed shown in Table 23.

Afterwards, the same procedure was chosen for the total HRQOL self-reported by the children as dependent variable and the six subdimensions as predictors. The correlation between these variables ranging from r = -0.20 - .73. The tolerances for the predictor variables were ranging from .61 - .77 and the VIF were varying from 1.3 – 1.63. Outlying cases were cleared from the data set if the Mahalanobis distance was over 22.46. The six subdimensions described 99.4 % of the variance for the total HRQOL (child-rated) and showed a significant model F (6, 372) = 5088.69, p < .0005. The subdimension with the strongest contribution to the total HRQOL child-reported score was self-esteem which obtained a beta value = 0.32 and the second subdimension was well-being at school with a beta value = 0.28 (see in Table 23).

Table 23 Standardized (*beta*) coefficients for the total HRQOL (self- and proxy-reported)

Variable(s)	Standardized Coefficients	
	Beta	
	Children	Parents
Physical Well-being	b = .24*	b = .31*
Mental Well-being	b = .20*	b = .24*
Self-Esteem	b = .32*	b = .25*
Well-being in the Family	b = .20*	b = .25*
Well-being with Friends	b = .23*	b = .23*
Well-being at School	b = .28*	b = .33*

* Correlation is significant at the 0.05 level (2-tailed).

9.4 Influencing factors for the total HRQOL (child- and proxy-rated)

With the intention to examinate if there is an impact of the FAS on the total HRQOL either from the child-ratings or the proxy-ratings a *one-way between groups analysis of variance* (*one-way ANOVA)* was chosen. Firstly, the *dependent* variable was the total HRQOL rated by the children and as *independent* variable the FAS. Afterwards, the same procedure was performed with the total HRQOL rated by the parents as *dependent* variable. The assumptions for a *one-way ANOVA* were fulfilled, except the normality for the *dependent* variable. The *one-way ANOVA* with the total HRQOL (child-rated) was not significant for the three different FAS categories F (2, 374) = .39, p = .677. The post-hoc comparison presented no significantly differences for the three FAS groups as well. The eta^2 was < .00 which has no effect in regards to Cohen's classification. He recommended that the resulting eta^2.1, .25, and .4 represent *small*, *medium*, and *large effect* sizes respectively (Cohen 1988 in Pallant 2007: 247). The total HRQOL (proxy-rated) is not significant for the three different FAS groups (2, 374) = 1.84, p = .16. The eta^2 value .00 showed likewise no effect.

Additionally, a *two-way between groups analysis of variance* was performed to assess the influence of the language spoken at home on the FAS and the total HRQOL for the self- and proxy-ratings. This method was conducted by considering the assumptions. The *homogeneity of variance* (one assumption besides others) was violated for the different groups. The interaction effect between the FAS and the language spoken at home was not significant F (2, 365) = .02, p = .98. This indicates that there is no significant difference in the effect of the FAS on the HRQOL rated by the parents for children living in German and bilingual or non-German speaking families. The HRQOL reported by the children did not reach any statistically significant interaction effect between the FAS and the language spoken as well F (2, 367) = .687, p = .504. The *post-hoc Tukey HSD* presented no significantly differences for the different groups as well.

Nevertheless, the created figures displayed that the HRQOL of a child (proxy-rated) was increasing with the wealth of the family, which could be observed for both language groups (see Figure 27). The two graphs for the child-rated HRQOL showed a difference. Not German or bilingual speaking children with *low* FAS reported their HRQOL in average more positive than German speaking children. Children from not German speaking (or bilingual) families with *average* FAS reported their HRQOL better than the children with *low* FAS and *high* FAS. German speaking children with *average* FAS had in a higher mean score than the German speaking children with *low* FAS. The average mean score for the German speaking children with *high* FAS decreased, whereby the mean score for none German speaking children presented a steeper decrease. Why are none German speaking children with high FAS displayed with the lowest mean score? This point will be further elaborated in the discussion.

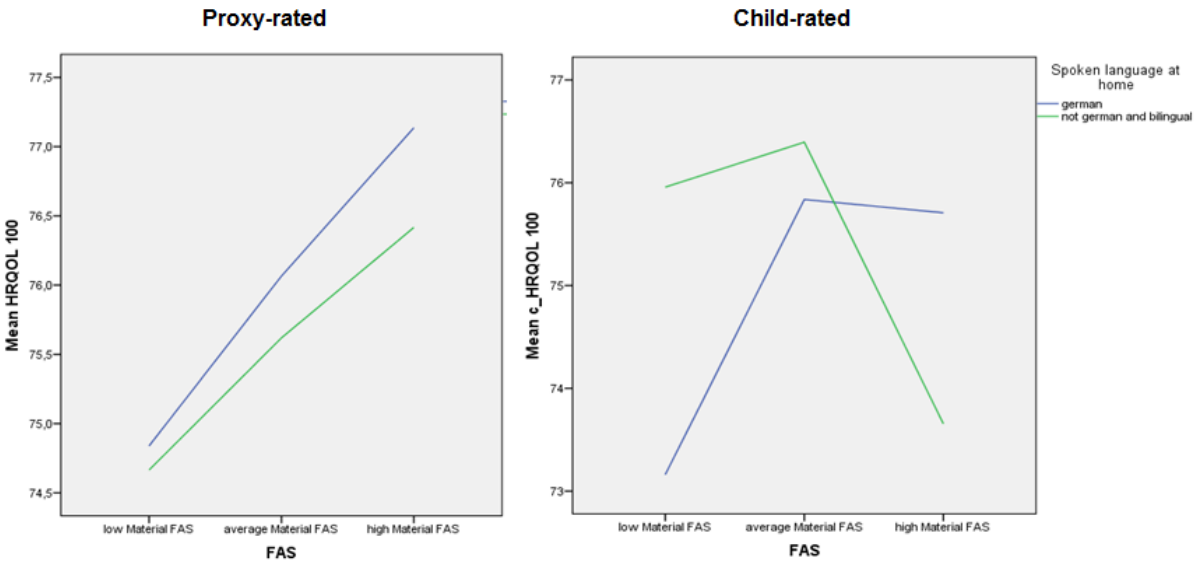


Figure 27 Total HRQOL means (proxy- and self-rated) by spoken language at home and FAS

With the aim of investigating the effect of the gender on the age and the total HRQOL the two-way between groups analysis of variance was performed. The child self-reported HRQOL did not show any statistically significant interaction effect between the age and the gender F (3, 381) = .591, p = .621. After calculating the proxy-rated HRQOL the effect of the gender on the age of the child F (3, 381) = 2.11, p = .098 was non-significant as well. The eta^2 values presented no effects for the different groups. The *post-hoc Tukey HSD* was p = .087 for the parents-rated HRQOL and p = 1.00 for the self-rated HRQOL.

To conclude shortly the main findings of the previous part, the total HRQOL scores achieved higher means scored for the proxy-rating than the child-reports. The maximum mean for the subdimensions was reached for well-being in the family assessed by the children .The highest mean for the proxy-rated subdimensions was evaluated for mental well-being. The most negatively average score was found for well-being with friends for the proxy-ratings and self-esteem was scored with the lowest from the children.

9.5 Parent-child Agreement

The main research question of this work is *"Are primary school children rating their HRQOL differently than their parents or proxies?"* Therefore, the aim of this section is to calculate the bivariate correlations between the child- and proxy-ratings for the total HRQOL, the subdimensions and the single subscales. Firstly, the parent-child agreement calculated by Pearson's correlation coefficient. Afterwards, two statistical approaches the correlation coefficients by Pearson and the intra-class correlation coefficient are confronted in order to identify possible differences in the correlations.

9.5.1 Parent-child agreement for the total HRQOL and the subdimensions

The total HRQOL of the child- and the proxy-ratings show a high statistically significant *moderate* effect r = .328; p <.001 by Pearson. Physical well-being (r = .370, n = 390, p <.05) and well-being at school (r = .348, n = 392, p <.01) showed both *moderate* significant associations for the agreement. Mental well-being (r = .189, n = 390, p <.01), self-esteem (r = .197, n=391, p <.01), well-being in the family (r = .224, n = 391, p <.01), well-being with friends/ peers (r = .162, n = 392, p = .01) could present *small* correlations. Well-being with friends was the only subdimensions without a significant result.

Parent-child agreement for the total HRQOL and the subdimensions stratified by gender

After stratifying the sample for the gender of the child, the parent-child agreement for the total HRQOL score for the boys revealed a significantly better Pearson's correlation coefficient with their parents r = .395 than the girls r = .272. The boys reached a *moderate* agreement with their proxies compared to the girls who presented a *small* agreement. The parent-child agreement for the subdimensions is illustrated in the table below (Table 24).

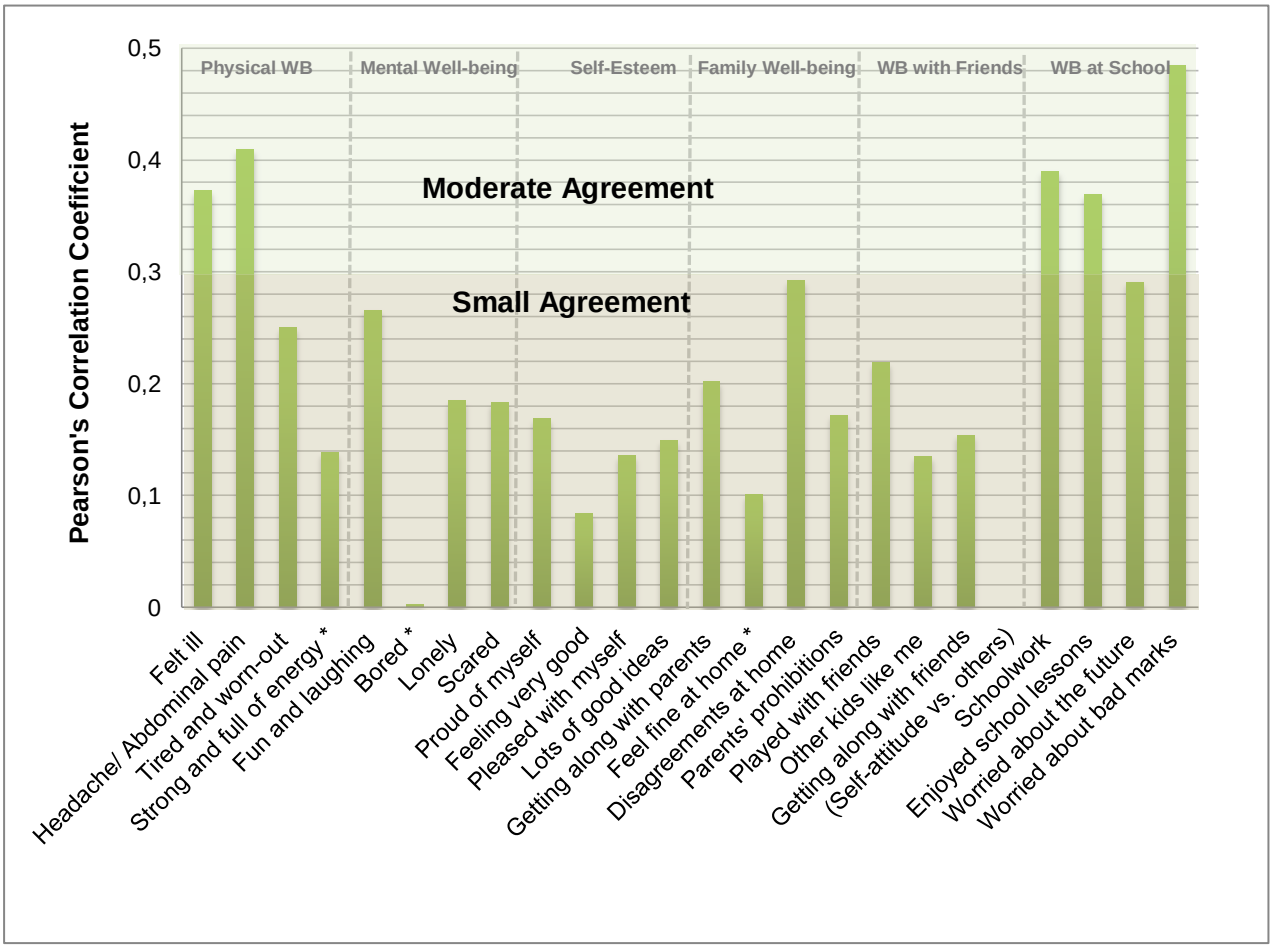
Table 24 Parent-child agreement for the total HRQOL and subdimensions stratified by gender

	Boys		Girls	
Subdimension(s)	**Pearson's CC**	**Sig.**	**Pearson's CC**	**Sig.**
Physical Well-Being	r = .374	p < .001*	r = .380	p < .001*
Mental Well-Being	r = .201	p = .006*	r = .184	p = .008*
Self-Esteem	r = .222	p = .003*	r = .205	p = .003*
Familial Well-being	r = .291	p < .001*	r = .122	p < .001*
Well-Being with Friends	r = .276	p < .001*	**r = .069**	**p = .329**
Well-Being at School	r = .350	p < .001*	r = .399	p < .001*

* Correlation is significant at the 0.05 level (2-tailed). The Pearson's correlation coefficient can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0.

9.5.2 **Parent-child agreement for the single items**

The highest correlations were observed for observable items (e.g. felt ill, headache or abdominal pain, schoolwork and worries about bad marks) which presented moderate agreement which is illustrated in the Figure 28. Non-observable items (e.g. loneliness, anxiety, having lots of good ideas etc.) were identified as items with very small or small correlation. The items marked with a little star (*) were statistically not significant. The variable *"self-attitude compared to others"* was the only variable with negative correlation. The Pearson's CC for every single item is presented in Table 25.

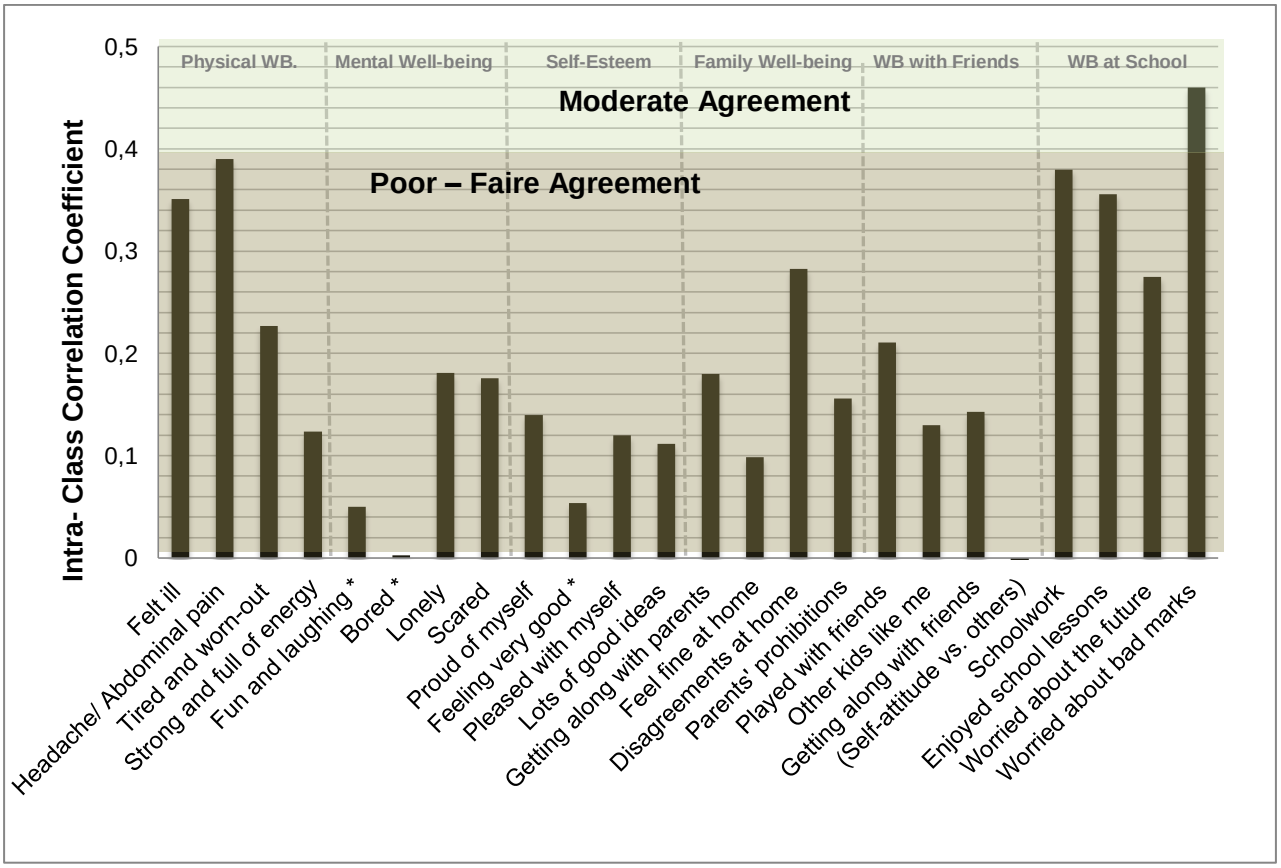


*Not significant. (Self-attitude vs. others) = r: -.13 is not shown on this Figure. The Pearson's correlation coefficient can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0.

Figure 28 Pearson's correlation coefficient of the single items between self- and proxy-ratings

Parent-child agreement for the single items with the intra-class correlation coefficient

Furthermore, the correlation between the self-and proxy-ratings was assessed with an ICC by using a two-way mixed effect model (absolute agreement, single measure). As recommended by *Varni et al.* the ICC was labelled as r ≤.40 poor to fair agreement, r = .41 – .60 moderate agreement, r = .61 – .80 good agreement and r = .81 – 1.00 excellent agreement (Varni et al. 2007). The parent-child agreement for the total HRQOL r = .30 and the subdimensions r = .09 to .38 were categorized as poor to fair agreement.



***** Not significant. (Self-attitude vs. others) = r: -.03 is not shown on this Figure. The ICC is designated as r ≤.40 poor to fair agreement, .41 – .60 moderate agreement, .61 – .80 good agreement and .81 – 1.00 excellent agreement.

Figure 29 ICC for the single items between self- and proxy-ratings

Figure 29 illustrates the ICC for the HRQOL items between the child- and parent-reports. The items marked with a little star (*) were not significant. The grey background indicates a *poor* to *fair* agreement between them with an ICC ≤ .04 and the light green background present moderate agreement with an ICC between .41 – .60. Every single ICC for each item is more detailed shown in the Table 25 below.

Table 25 Pearson's CC and the ICC for the subdimensions and the single items

Dimension(s)/ Item(s)	Pearson's CC	Intra-Class CC
Physical Well-being	**(r = .37, p <.001)**	**(r = .38, p < .001)**
Felt ill	(r = .37, p <.001)	(r = .35, p < .001)
Headache or Abdominal pain	(r = .40, p < .001)	(r = .39, p < .001)
Tired and worn-out	(r = .25, p < .001)	(r = .23, p < .001)
Strong and full of energy	(r = .14, p = .06)	(r = .12, p <.01)
Mental Well-being	**(r = .19, p < .001)**	**(r = .19, p < .001)**
Fun and laughing	(r = .27, p < .001)	(r = .05, p = .159)
Bored	(r = .00, p = .946)	(r = .00, p = .474)
Lonely	(r = .19, p < .001)	(r = .18, p < .001)
Scared	(r = .18, p < .001)	(r = .18, p < .001)
Self-Esteem	**(r = .20, p < .001)**	**(r = .13, p < .001)**
Proud of myself	(r = .17, p = .001)	(r = .14, p < .001)
Feeling very good	(r = .08, p = .101)	(r = .05, p =.075)
Pleased with myself	(r = .17, p < .001)	(r = .12, p < .001)
Lots of good ideas	(r = .15, p < .001)	(r = .11, p < .001)
Familial Well-being	**(r = .22, p <.001)**	**(r =.21, p < .001)**
Getting along with parents	(r = .20, p < .001)	(r =.18, p < .001)
Feel fine at home	(r = .10*, p = .048)	(r =.10, p < .001)
Disagreements at home	(r = .29, p < .001)	(r =.28, p < .001)
Parents prohibited certain things	(r = .17, p = .001)	(r =.16, p < .001)
Well-being with friends	**(r = .16, p < .001)**	**(r =.09, p < .001)**
Played with friends	(r = .22, p < .001)	(r =.21, p < .001)
Other kids like me	(r = .14, p < .001)	(r =.13, p < .001)
Getting along with friends	(r = .15, p < .001)	(r =.14, p < .001)
Self-attitude vs. others	(r = -.13, p < .001)	(r =-.03, p =.984)
Well-being at school	**(r =.35, p < .001)**	**(r =.36, p < .001)**
Schoolwork	(r =.39, p < .001)	(r =.38, p < .001)
Enjoyed school lessons	(r =.37, p < .001)	(r =.36, p < .001)
Worried about the future	(r =.29, p < .001)	(r =.28, p < .001)
Worried about bad marks	(r =.49, p < .001)	(r =.46, p < .001)

***** Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed).

The ICC is categorized as poor to fair agreement r ≤.4, moderate agreement r = .41–.6, good agreement r = .61–.80 and excellent agreement r = .81–1.0. Pearson's correlation coefficient can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0.

The Pearson's CC and the ICC were performed to explore if there are any differences in regards to the statistical approach either for the ICC or Pearson's CC? The correlation coefficients for both statistical approaches presented nearly equally results nevertheless the classifications for the two tests differ. The Pearson's CC is defined as moderate with r = .30 to .49 whereby the ICC is categorized as moderate agreement with r = .41 –.6. For instance the item *"schoolwork"* reached a

correlation coefficient with r =.39 which would be according to the interpretation for the PCC as recommended by *Cohen* a moderate agreement (Cohen 1988 in Pallant 2007:132) in comparison to the interpretation of the ICC by *Varni et al.* were the same result would be defined as poor to fair agreement (Varni et al. 2007).

Parent-child agreement for the subscales stratified by gender

In order to see the agreement differences with respect to the gender the following table (Table 26) presents the single subscales classified by boys and girls.

Table 26 Parent-child agreement for the subscales stratified by gender

	Boys		**Girls**	
Subscale(s)	**Pearson's CC**	**Sig.**	**Pearson's CC**	**Sig.**
Physical Well-being				
Felt ill	r = .404	p < .001**	r = .354	p < .001**
Headache or Abdominal pain	r = .434	p < .001**	r = .383	p < .001**
Tired and worn-out	r = .322	p < .001**	r = .179	p = .01*
Strong and full of energy	**r = .154**	**p = .038***	**r = .121**	**p = .085**
Mental Well-being				
Fun and laughing	**r = .048**	**p = .517**	**r = .062**	**p = .373**
Bored	**r = -.040**	**p = .595**	**r = .039**	**p = .595**
Lonely	r = .288	p < .001**	**r = .103**	**p = .142**
Scared	r = .223	p = .002**	r = .151	p = .031*
Self-Esteem				
Proud of myself	r = .305	p < .001**	**r = .048**	**p = .491**
Feeling very good	**r = .047**	**p = .529**	r = .146	p = .036*
Pleased with myself	r = .153	p = .042*	**r = .117**	**p = .095**
Lots of good ideas	**r = .138**	**p = .061**	r = .170	p = .016*
Familial Well-being				
Getting along with parents	r = .211	p = .004**	r = .211	p = .004**
Feel fine at home	r = .199	p = .007**	**r = -.002**	**p = .976**
Disagreements at home	r = .279	p < .001**	r = .268	p < .001**
Parents prohibited certain things	r = .240	p < .001**	**r = .096**	**p = .177**
Well-being with friends				
Played with friends	r = .273	p < .001**	r = .170	p = .014*
Other kids like me	r = .206	p = .006**	**r = .077**	**p = .277**
Getting along with friends	r = .273	p < .001**	**r = .058**	**p = .411**
Self-assessment vs. others	**r = -.097**	**p = .194**	r = -.159	p = .022*
Well-being at school				
Schoolwork	r = .421	p < .001**	r = .361	p < .001**
Enjoyed school lessons	r = .383	p < .001**	r = .077	p < .001**
Worried about the future	r = .387	p < .001**	r = .198	p = .004*
Worried about bad marks	r = .445	p < .001**	r = .524	p < .001**

(Note belongs to Table 26)

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

The Pearson's correlation coefficient can be interpreted as: small r = .10 to .29, moderate r = .30 to .49 and good r = .50 to 1.0.

9.5.3 **The mean differences for the total HRQOL and the subdimensions**

The main research question of this work is "*Are primary school children rating their HRQOL differently than their parents?"* Therefore, the aim of this section is to assess what are the mean differences between the child- and proxy-ratings and are these mean differences significant?

To measure the extent to which the children mean scores significantly differ on the KINDL^R questionnaire, the discrepancies between the children and the parent mean scores for the total HRQOL and the subdimensions were calculated by a *paired-samples t-test*. The assumption for normality was not met but according to *Pallant* the violation of this assumption does not produce any harm with a sample size over 30 (Pallant 2007: p.238).

If the primary school children rated their HRQOL significantly similar to the ratings of their proxies the null hypothesis will be accepted and the alternative hypothesis will be rejected. If the opposite is explored that the children perceived their HRQOL significantly different compared to their parents the null hypothesis will be rejected and the alternative hypothesis will be accepted.

The total HRQOL (d = -.65) was explored as non-significantly *overestimated* by the proxy-respondents. Furthermore, classified as *overestimated* were the subdimension self-esteem (d = -14.08), physical well-being (d = -5.93) and well-being at school (d = -4.64). Widely *underestimated* by the proxies was well-being with friends (d = 16.03). Additionally, *underestimated* were well-being in the family (d = 4.84) and mental well-being (d = .22). Nevertheless, mental well-being was examined as the subdimension with the smallest mean difference. Except for the total HRQOL and mental well-being, the other subdimensions showed all p-values under $p < .05$.

The null hypothesis that primary school children rated their HRQOL *similar* to the ratings of their parent-proxies was rejected, except for the total HRQOL and the mental well-being. Therefore, the alternative hypothesis that primary school children rated their HRQOL *differently* in comparison to their parent-proxies was accepted for the other five subdimensions. The magnitude of the intervention's effect for the total HRQOL and mental well-being did not have any effect ($Eta^2 = .00$). The largest effects were assessed for well-being with friends/ peers ($Eta^2 = .43$) and self-esteem ($Eta^2 = .26$). Well-being at school had a small effect ($Eta^2 = .05$) and physical well-being and well-being in the family presented moderate effects ($Eta^2 = .09$) and ($Eta^2 = .07$).

Table 27 Mean differences for the total HRQOL and the subdimensions (child - parent mean)

Variable(s)	Mean Diff.	SD	SE	CI (95%)		t	df	Sig.	Eta^2
				Lower	Upper				
Total HRQOL	-.65	11.99	.61	-1.84	.54	-1.07	389	**.29**	.00
Physical Well-being	-5.93	18.45	.94	-7.78	-4.09	-6.33	386	< .001*	.09
Mental Well-being	.22	17.12	.87	-1.49	1.92	.25	389	**.80**	.00
Self-Esteem	-14.08	23.67	1.20	-16.44	-11.72	-11.72	387	< .001*	.26
Well-being in the family	4.84	17.48	.89	3.10	6.58	5.47	389	< .001*	.07
Well-being with friends	16.03	18.39	.93	14.20	17.86	17.24	390	< .001*	.43
Well-being at school	-4.64	19.29	.98	-6.56	-2.72	-4.74	388	< .001*	.05

*Significance level (p <.05).

Interpretation for Eta^2: .01 small effect, .06 moderate effect and .14 as large effect.

Mean differences (d) were defined as overestimated (respectively, underestimated) by proxies, if *d* was smaller than -.2 (respectively, larger than +.2)

Table 28 Mean differences for the total HRQOL and the subdimensions by gender

	Variable(s)	Mean	SD	SE	CI (95%)		t	df	Sig.	Eta^2
					Lower	Upper				
Boys	**Total HRQOL**	1.06	11.83	0.88	-0.67	2.79	1.21	181	**.23**	.01
	Physical Well-being	-1.85	18.3	1.36	-4.53	0.82	-1.37	181	**.17**	.01
	Mental Well-being	1.48	17.01	1.26	-1.01	3.96	1.17	181	**.24**	.01
	Self-Esteem	-10.23	23.44	1.74	-13.66	-6.8	-5.89	181	<.001*	.16
	Well-being in Family	3.92	18.4	1.36	1.23	6.6	2.88	182	<.001*	.04
	Well-being w. Friends	18.51	17.39	1.29	15.97	21.05	14.4	182	<.001*	.53
	Well-being at School	-5.04	20.16	1.5	-8	-2.07	-3.35	179	<.001*	.06
Girls	**Total HRQOL**	-2.2	11.99	0.84	-3.85	-0.55	-2.62	204	.01*	.03
	Physical Well-being	-9.49	17.87	1.25	-11.97	-7.02	-7.57	202	<.001*	.22
	Mental Well-being	-0.83	17.21	1.2	-3.2	1.54	-0.69	204	**.49**	.001
	Self-Esteem	-17.74	23.07	1.62	-20.93	-14.54	-10.95	202	<.001*	.37
	Well-being in Family	5.74	16.63	1.16	3.44	8.03	4.93	203	<.001*	.11
	Well-being w. Friends	13.69	19.07	1.33	11.06	16.31	10.28	204	<.001*	.34
	Well-being at School	-4.27	18.65	1.3	-6.83	-1.71	-3.29	205	<.001*	.05

*Significance level (p <.05).

(Note belonging to Table 28)

Interpretation for Eta^2: .01 small effect, .06 moderate effect and .14 as large effect.

Mean differences (d) were defined as overestimated (respectively, underestimated) by proxies, if *d* was smaller than -.2 (respectively, larger than +.2)

To conclude the null hypothesis was rejected for well-being with friends (Eta^2 = .43), self-esteem (Eta^2 = .26), physical well-being (Eta^2 = .09), well-being in the family (Eta^2 = .07) and well-being at school (Eta^2 = .05). The total HRQOL (Eta^2 = .00) and mental well-being (Eta^2 = .00) did not show any significant results, even though the *d* for the total HRQOL was classified as *overestimated* and the mental well-being as *underestimated*. Consequently, all subdimensions rejected the null hypothesis that the ratings would be similar, except mental-well-being and the total HRQOL.

After stratifying for the gender of the children the girls reflected their total HRQOL less good than their proxies who were significantly *overestimating* their children's HRQOL by showing out a small effect (Eta^2 = .03). The opposite was displayed for the boys who were *underestimated* (Eta^2 = .01) by their proxy-respondents with a small none significantly effect (see in Table 28).

Well-being with friends showed the major *underestimated* value for the boys and achieved out a very large significant effect (Eta^2 = .53). The girls were *underestimated* by their proxies as well, nevertheless the girls revealed also a very large effect (Eta^2 = .34). Self-esteem for the girls signified a very large effect (Eta^2 = .37) although the effect for the boys was less strong they provided a large effect for self-esteem (Eta^2 = .16).

The physical well-being for the boys (Eta^2 = .01) as well for the girls (Eta^2 = .22) was *overestimated* by their parental counterparts. For the girls physical well-being achieved a large effect whereby the boys had a small effect.

The girls were likely to show more significantly mean differences compared to the boys. The girls presented more significantly *overestimations* by their proxy-raters than the boys. The total HRQOL was significantly *overestimated* for the girls but in contrary non- significantly *underestimated* for the boys. The leading eta² effect for the boys was revealed for well-being with friends and the biggest effect for the girls was achieved for self-esteem (Eta^2 = .37).

Furthermore, classified as *overestimated* for both gender were the subdimensions self-esteem, physical well-being and well-being at school. As *underestimated* by the proxies for both genders were well-being with friends and well-being in the family. Mental well-being was *overestimated* for the girls but *underestimated* for the boys.

To sum up the null hypothesis for the girls was rejected for the total HRQOL and the subdimensions with the exception for mental well-being. Therefore, the alternative hypothesis that girls rate their HRQOL differently in comparison to their proxies was approved, except for mental well-being. The boys accepted the null hypothesis for the total HRQOL, physical and mental well-being. The other four subdimensions self-esteem, well-being in the family, with friends and at school rejected the null hypothesis.

9.5.4 **The mean differences for the self- and proxy-rated subscales**

For the magnitude of the intervention's effect concerning the subscales showed the largest effects for the item *"self-attitude versus other children"* (Eta^2=.69) and *"feeling very good"* (Eta^2=.29). Well-being at school had a *small* effect (Eta^2=.05). Physical well-being and well-being in the family presented *moderate* effects (Eta^2=.09) and (Eta^2=.07).

Table 29 Mean differences of the subscales (child - parent mean)

Variable(s)		Mean (d)	SD	SE	CI (95%)		t	df	Sig.	Eta^2
					Lower	Upper				
Physical	Felt ill	-.21	1.01	.05	-.31	-.11	-4.11	390	< .001*	.04
	Headache or Abdominal pain	-.22	1.02	.05	-.32	-.11	-4.14	384	< .001*	.04
	Tired and worn-out	-.29	1.19	.06	-.41	-.17	-4.78	385	< .001*	.06
	Strong and full of energy	-.24	1.32	.07	-.37	-.11	-3.60	384	< .001*	.03
Mental	Fun and laughing	.10	1.06	.05	-.01	.20	1.82	391	**.07**	.01
	Felt bored	-.26	1.24	.06	-.38	-.14	-4.12	385	< .001*	.04
	Felt lonely	-.02	1.04	.05	-.12	.09	-.34	384	**.73**	.00
	Felt scared	.23	.98	.05	.13	.33	4.57	385	< .001*	.05
Self-Esteem	Proud of myself	-.35	1.25	.06	-.48	-.23	-5.54	386	< .001*	.07
	Feeling very good	-.85	1.33	.07	-.98	-.71	-12.48	385	< .001*	.29
	Pleased with myself	-.42	1.52	.08	-.57	-.27	-5.39	381	< .001*	.07
	Lots of good ideas	-.62	1.29	.07	-.74	-.49	-9.36	386	< .001*	.18
Family	Got along well with my parents	.25	.93	.05	.16	.35	5.41	390	< .001*	.07
	Felt fine at home	.09	.88	.05	.00	.18	1.98	383	.048*	.01
	Disagreements at home	.01	1.05	.05	-.10	.11	.15	383	**.89**	.00
	Parents prohibited things	.43	1.23	.06	.31	.56	6.76	371	< .001*	.11
Friends	Played with friends	.17	1.20	.06	.05	.29	2.77	392	.01*	.02
	Other kids liked me	-.07	1.08	.06	-.18	.04	-1.32	380	**.19**	.00
	Got along well with my friends	.13	1.00	.05	.03	.23	2.54	389	.01*	.02
	Self-attitude versus others	2.33	1.56	.08	2.17	2.48	29.42	387	< .001*	.69
School	Schoolwork	-.14	.90	.05	-.23	-.06	-3.17	387	< .001*	.03
	Enjoyed school lessons	.01	.99	.05	-.09	.11	.26	386	**.80**	.00
	Worries about future	-.31	1.35	.07	-.45	-.18	-4.53	383	< .001*	.05
	Worried about bad marks	-.35	1.32	.07	-.49	-.21	-5.04	361	< .001*	.07

***** Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed).

Interpretation for Eta^2: .01 small effect, .06 moderate effect and .14 as large effect.

Mean differences *(d)* were defined as overestimated (respectively, underestimated) by proxies, if *d* was smaller than -.2 (respectively, larger than +.2)

9.5.5 *"HRQOL difference"* between the self- and proxy-reports

A new variable *"HRQOL difference"* was created by subtracting the children scores from the proxy scores to further investigate the rating differences on individual level for every child and its corresponding proxy-respondent. The descriptives of the score differences for the means are equal with the table for the *paired t-test* (see in Table 27). The total HRQOL score difference showed a normally distribution in contrary to the subdimensions which violated the assumption for normality.

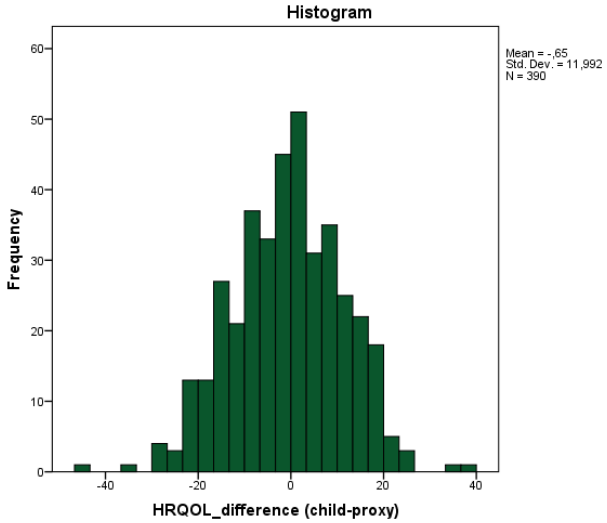


Figure 30 Distribution for the HRQOL score difference

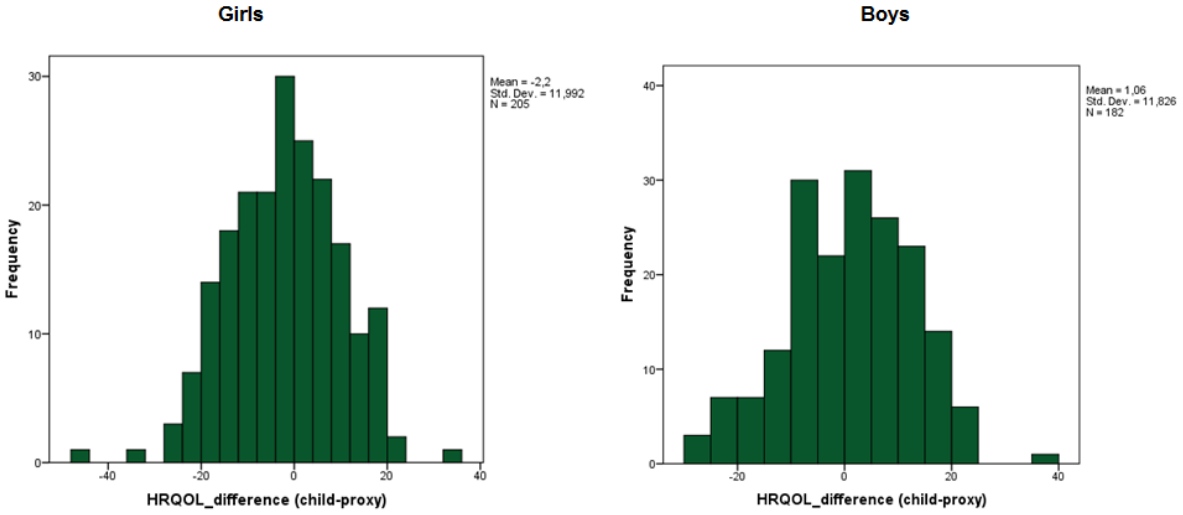


Figure 31 Distribution for the HRQOL score difference categorized by gender

The HRQOL score differences were coded into a new variable *"HRQOL level of agreement"* with three categories (0 = underestimation, 1 = overestimation, 2 = total agreement). The frequencies demonstrated 2.8 % (n = 11) total agreement of the total sample (n = 390), an underestimation for 46.7 % (n = 182) and an overestimation for 50.5 % (n = 198). The level of agreement for the subdimensions is illustrated in Figure 32. The subdimensions well-being at school (17 %) and physical well-being (16.5 %) revealed the highest prevalence for total agreement. Well-being with friends was detected as the subdimension with the majority of underestimations (77.7 %) and self-esteem the contrary with the most overestimations (69.3 %).

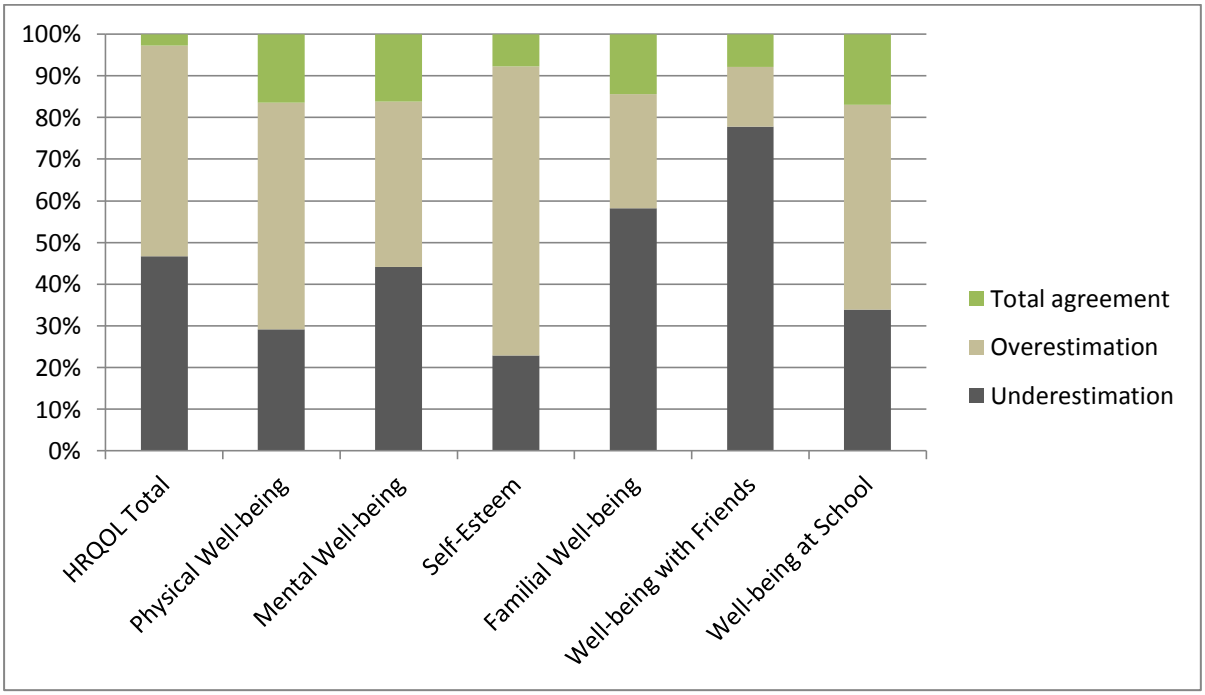


Figure 32 Frequencies for the variable *"Level of agreement"*

How much were the three agreement groups (*underestimated*, *overestimated* and the *totally agreement*) differing from each other? The majority of the girls were examinated as *overestimated* by their proxies with 56.6 % (n = 116). The boys on the other hand showed the highest prevalence with 52.8 % (96) in the group of the *underestimated*. A *totally agreement* was analysed almost equally for both gender with 3.3 % (n = 6) of the boys and 2.4 % (n = 5) of the girls. The distributions for the other background variables are illustrated in the Table 30 on the next page.

Table 30 Frequencies for the variable *"Level of agreement"* and background variables

Variable(s)	Underestimation		Overestimation		Agreement	
Gender (n = 387)						
Boys	96	(52.8 %)	80	(44.0 %)	6	(3.3 %)
Girls	84	(41.0 %)	116	(56.6 %)	5	(2.4 %)
Age (n = 390)						
7 years	1	(50.0 %)	1	(50.0 %)		
8 years	64	(35.2 %)	59	(32.4 %)	5	(2.8 %)
9 years	87	(46.3 %)	98	(52.1 %)	3	(1.6 %)
10 years	26	(38.8 %)	38	(56.7 %)	3	(4.5 %)
11 years	4	(50.0 %)	1	(50.0 %)		
Language (n = 385)						
German	126	(45.0 %)	145	(51.8 %)	9	(3.2 %)
Not German	54	(51.4 %)	49	(46.7 %)	2	(1.9 %)
FAS (n = 374)						
low	49	(48.5 %)	50	(49.5 %)	2	(2.0 %)
moderate	82	(46.3 %)	87	(49.1 %)	8	(4.5 %)
high	46	(47.9 %)	49	(51.0 %)	1	(1.0 %)

Bivariate correlations with the variable HRQOL difference and the subdimensions

While analysing the relationship with the gender and the age of child as well as the language spoken at home in the family with the HRQOL score difference, it was observed that the gender was significantly correlating with HRQOL-difference r_{ps}= -.136 and for the differences of the subdimensions physical well-being r_{ps} = .207, self-esteem r_{ps} = -.16 and well-being with friends r_{ps} = -.13. The age of the child and the language spoken at home in the family did not reveal any statistically significant relationship with the HRQOL score difference. Table 31 gives all correlation coefficients for these variables.

Table 31 Bivariate correlations with gender, age and language spoken at home

Variable (s)	Gender	Age	Language
HRQOL Difference	**r_{ps} = -.14****	r = .01	r_{ps} = .04
Physical Well-being Difference	**r_{ps}= -.21****	r = .03	r_{ps} = .02
Mental Well-being Difference	r_{ps} = -.07	r = -.01	r_{ps} = .07
Self-Esteem Difference	**r_{ps} = -.16****	r = -.05	r_{ps} = .07
Familial Well-being Difference	r_{ps} = .05	r = .04	r_{ps} = -.05
Well-being with Friends Difference	**r_{ps} = -.13****	r = -.03	r_{ps} = .01
Well-being at School Difference	r_{ps} = .02	r = .04	r_{ps} = .00

** Correlation is significant at the 0.01 level (2-tailed).

In order to investigate if there is an impact through the age and the gender on the HRQOL scores difference, a *two-way ANOVA* was performed. The *Levene's test of equality of error variances* was not statistically significant F (8, 378) = .495, p = .86. Age and gender showed a significant interaction effect F (3, 378) = 2.64, p=.049. The effect size partial Eta^2 .021 showed a *small* effect. The main effect for age F (4, 378) = 2.19, p=.7, as well for gender F (1, 378) = 2.02, p = .156 was not statistically significant. The post-hoc comparison applying *Tukey HSD* showed that the mean scores of the different groups did not significantly differ from each other. The results of the *two-way ANOVA* indicated that there is a significant difference in the effect.

Is there an impact with the gender, age and language spoken at home on the HRQOL difference? A *multivariate linear regression* was conducted with the *dependent* variable HRQOL difference and gender, age and the language spoken at home as *independent* variables. The correlation with the HRQOL difference and these three variables were very small and varying from r = -.14 for gender till r = .042 to the language. The gender of the child was the only variable showing a significant relationship with the HRQOL difference. The *collinearity statistics* for all three variables were almost equal. The *tolerance* were ranging from .85 - .99 and the *VIF* were varying from 1.009 - 1.015. The *Mahalanobis distance* showed a maximum value of 11.77 for the residuals which is under the critical value for three independent variables according to *Tabachnick & Fidell* (Tabachnick & Fidell 1996, in: Pallant 2007:157). The R^2 was .021 that indicated that 2.1% of the variance in the dependent variable HRQOL difference was explained by the model. The smaller the value of significance and the larger the t-value the greater is the contribution of the predictor (Field 2005: 193). Gender (t (387) = -2.77, p = .006), age (t (390) = -.112, p = .911), language spoken at home (t (385) = 1.082, p = .280) are all predictors for HRQOL, whereas gender is the only significant predictor. The strongest unique contribution explaining the variance of the dependent variable was the gender with a beta coefficient = -.14 and t = -2.77 which reached statistically significance p = .006. The beta value of the other two independent variables showed less contribution, age (beta = -.01, p = .91) and language spoken at home (beta = .06, p = .28). These two variables contributed no statistically significant results, as well as the model (F (3, 381) = 2.78, p = .41).

10 DISCUSSION AND CONCLUSION

The aim of this work was to evaluate the agreement on the HRQOL of primary school children by collecting independently the children's self-experience and the parents' perception.

Summary of the results

The parent-proxies reached a higher total HRQOL score than the self-ratings of the children. The majority of the proxy- and child- ratings reached *"good"* HRQOL. More children than proxies encountered *"bad"* HRQOL. The girls were detected as the gender which was in average better rated by their proxy-raters than the boys. The contrary was observed for the self- reports of the children. By considering the child's age the parents rated their child's HRQOL better than the children themselves except for the eleven and seven year old children. The mothers rated their child's HRQOL in average lower than the fathers whereby the large majority of the proxy-respondent were the mothers.

By taking into account background variables, German speaking parents rated their child's HRQOL in average better than parents who were bilingual or not speaking German at home, controversially to the child self-ratings. The highest total HRQOL score was reached by *very wealthy* parents and the highest HRQOL mean score was revealed for children with *average* FAS. The lowest average scores showed the children and the parents with *low* wealth. Taken into account the FAS and the language spoken at home, the proxy-rated HRQOL score was increasing with the wealth of the family. Not German (or bilingual) speaking children reported their HRQOL in average more positive than German speaking children, except for children with *high* FAS.

Considering the HRQOL subdimensions the *"well-being in the family"* was the most positive self-rated subdimension and *"self-esteem"* presented the lowest mean score. *"Mental well-being"* was revealed as most positive proxy-rated subdimension and the lowest proxy-reported mean score was found for the *"well-being with friends".*

The *"total HRQOL"* for the child- and proxy-ratings showed a *moderate* agreement. This was revealed as well for the subdimensions *"physical well-being"* and *"well-being at school".* The child-ratings were in *small* accordance with *"mental well-being", "self-esteem", "well-being in the family"* and *"well-being with friends". "Well-being with friends"* was the only subdimensions without a significant result. The ICC for the parent-child agreement was categorized as *poor* to *fair* agreement for the total HRQOL and the single subdimensions.

The highest conformity by Pearson's correlation was detected for more observable items (e.g. felt ill, headache or abdominal pain, schoolwork and worries about bad marks). Non-observable items (e.g. loneliness, anxiety, having lots of good ideas etc.) were identified as items with *very small* or *small agreement*. The *"self-attitude compared to others"* was revealed as the variable with the only negative

correlation. After stratifying for the gender of the child the item *"worried about bad marks"* revealed the most significant result with a *good* agreement for the girls and a *moderate* correlation for the boys.

The *"total HRQOL"* was explored as *overestimated* by the proxy-respondents. Furthermore, classified as *overestimated* were the subdimensions *"self-esteem"*, "*physical well-being"* and *"well-being at school".* Widely *underestimated* by the proxies was *"well-being with friends".* Moreover, *underestimated* were *"well-being in the family"* and *"mental well-being".*

The null hypothesis that primary school children rate their HRQOL *similar* to the ratings of their parent-proxies was rejected, except for the *"total HRQOL"* and *"mental well-being".* However, the alternative hypothesis that primary school children rate their HRQOL *differently* in comparison to their parent-proxies was accepted.

With respect to the gender of the child the results displayed some differences compared to the total sample. The *"total HRQOL"* was *overestimated* by their proxy-evaluators for the girls but in contrary *underestimated* for the boys. *"Well-being with friends"* showed the major *underestimated* value for the boys and was *underestimated* for the girls as well. *"Mental well-being"* was overestimated for the girls but *underestimated* for the boys. *"Self-esteem"*, *"physical well-being"* and *"well-being at school"* were *overestimated* by the parents for both genders.

The reference data the pilot study by *Ravens-Sieberer et al.* showed a quite similar picture for the subdimensions in comparison to the findings of this survey, except for the mean scores for *"total HRQOL"* for the boys and girls. The girls reported their *"total HRQOL"* in average lower than the self-ratings of the boys (Ravens-Sieberer et al. 2000). The parents' ratings of the *KIGGS* are representative norm data for the KINDL^R in Germany. The *"total HRQOL"* reported by the parents for the children between seven and ten years old were in average higher presented in the *KIGGS in* contrast to the results of this work. The means for the subdimensions were varying nearly similar to the results of this survey. The parents reported the HRQOL of the girls better until the teenage boys (Ravens-Sieberer et al. 2008). Even though the parents' data of the KIGGS is recommended *by Ravens-Sieberer & Bullinger* as reference data for the KINDL^R questionnaire, one remark is that they performed the analysis with the data set of the short KINDL with 12 questions.

With the focus on the subdimensions *"mental well-being"*, as well as *"physical functioning"* was significantly *overestimated* by the proxy-ratings by *Laaksonen et al.* (Laaksonen et al. 2008), controversially for the child's mental health in the study by *Klatchoian et al.* where the parents their child's emotional perception lower than the children themselves (Klatchoian et al. 2010). Children reported physical complaints, motor functioning, autonomy, cognitive functioning and positive emotions significantly *lower* than their parents (Theunissen et al 1998).

In comparison with published studies dealing with the parent-child agreement on the child's HRQOL of general healthy children in non-clinical settings (like at school or at home), the parents reported *higher* HRQOL than the children themselves (Cremeens et al. 2006, Jozefiak et al. 2007, Klatchoian et al. 2010). Whereas parents from chronically ill children in clinical paediatric settings rated the HRQOL generally *lower* than their children themselves (Dale et al. 2011, Speyer et al. 2009, Pinhas-Hamiel et al. 2006, Vrijmoet-Wiersma et al. 2009).

The extent of agreement really varies which makes the comparison difficult. The concordance for the child- and parent-reports in other studies was varying from *poor* to *good* (Cremeens et al. 2006, Felder-Puig, et al. 2008, Theunissen et al 1998, Erhart, Ellert et al. 2009, Theunissen et al 1998, Varni et al. 2007, Jozefiak et al. 2007). The level of agreement between child self- and proxy-reports was ranging between the HRQOL subdimensions as well. In the majority of studies the parent-child agreement for the HRQOL subdimensions ranged from *poor* to *moderate* (Erhart et al. 2009, Cremeens et al. 2006), from *moderate* to *good* (Varni et al. 2007) and from *poor* to *good* agreement (Upton, Lawford et al. 2008). Some studies report *good* agreement for psychosocial domains, while others publish *good* concordance for physical domains. Generally, more observable behaviour is investigated with higher agreement between the parents and children. This can be explained by the fact that the internalisation of emotions or behaviour is less visible for the parents than externalization of reactions or feelings and therefore more difficult to perceive. In addition, the extent of agreement may perhaps depend on the different instruments and their single items on the specific measure. The subdimensions are consisting of single items which are differing in regards to the assessing instrument.
With respect to the gender of the child *Robitail et al.* and *Davis et al.* assessed that the agreement was *higher* for the girls than for the boys (Robitail et al. 2007, Davis et al. 2007). In opposite to the findings of *Robitail et al.* and *Davis et al.* this work could investigate for the total HRQOL a significantly *moderate* correlation for the boys than the parent-child agreement for the girls. Controversially, the girls presented only a *small* agreement with their proxy-respondents. The item *"worried about bad marks"* revealed a *good* agreement for the girls and a *moderate* correlation for the boys. The other single items and subdimensions are more detailed described in the results in chapter 9.5.

Strengths and weaknesses of the study

Strengths

An intention of this work, besides others, was the investigation of dissimilarities for the results in regards to the statistical approach either for the intra-class correlation or Pearson's correlation coefficient. The correlation coefficients for both statistical approaches presented nearly equally results nevertheless the classifications for these two tests have not the same margin. The Pearson's CC is defined as *moderate* agreement with r = .30 to .49 whereby the ICC is categorized as *moderate* with r = .41–.6. For example the item *"schoolwork"* revealed r =.39 (by Pearson) and r =.38 (calculated by

ICC). The interpretation for the PCC as recommended by *Cohen* would be a moderate agreement (Cohen 1988 in Pallant 2007:132) in comparison to the classification for the ICC by *Varni et al.* were the same result would be defined as *poor* to *fair* agreement (Varni et al. 2007). With the analysis of these two different statistical approaches it is possible to compare the results of this survey with additional other studies.

A further strength of this work is the statistical assessment of the parent–child agreement on individual and group level. For assessing the parent–child agreement on individual level for each single parent-child pair a new variable *"HRQOL difference"* was created and included in the analysis.

Weaknesses

Compared to the total sample of participating children (n=1154) and parents (n=641), the number of children with a corresponding parent-proxy was much smaller (n=395). By taking into account the social environment of the districts, the participation of children and their corresponding parent-proxy varied in the different districts from 0.3 % to15.2 %. Participating in the study was on voluntary base; therefore *selection bias* might have occurred.

Whereby the information and the informed consent form for the participation was available in different languages, except the questionnaires. Language barriers might have occurred for some parents in regards to filling out the KINDL^R and might have excluded participants who are not fluent in speaking and writing the German language.

The parent-child pairs were assigned by their identification code which was created by the initials of the school, the initials of the child and the corresponding class. If parent-child pairs were not clearly assignable, due to not identifiable or not correctly written initials, the filled out questionnaires were not taken into account in order to reduce the number of false parent-child assignments. Another important limitation might have rooted in the assessment strategy. The children or the parents did might not write identifiable or not correctly the initials. Even though the survey was anonymous some parents might have been scared that the participation would lead to an identification of the child-parent pairs and reported problems publicly appear.

The KINDL^R questionnaire is a valid and reliable multi-dimensional instrument (Ravens-Sieberer & Bullinger 2000). The item *"felt different from other children"* was differentiating the most between the child and the parent-proxy responses. The children possibly understand the question not the same as their parents. *Ravens-Sieberer et al.* in a previous study that the most positive frequencies were reached for well-being with friends with 85 % (*Ravens-Sieberer et al. 2008).* This is why it can be assumed that the parents understood the question differently than their children.

Some limitations have to be considered related to the statistical analysis. The statistical analysis was mainly performed with parametric analytical methods that assume normality and constant variance. Normal distribution was provided not for all of the variables. Nevertheless, according to *Upton et al.*

tests that rely on normality are in fact robust to violations of normality, but only if the sample size is large enough relative to the departure from normality (Upton et al. 2008). With respect to *Pallant* the violation of this assumption does not produce any harm with a sample size over 30 (Pallant 2007: p.238). Considering the recommendations by *Upton et al.* and *Pallant* parametric test were performed even tough normality was not provided for some dimensions ((Pallant 2007, Upton et al. 2008).

The randomisation of the primary schools was realised through considering the social proportion of the districts were the primary schools were located. The *"Department of Labour, Social Affairs and Health"* classified the districts, originally from the census in 1987, in regards to their social position in *"low"*, *"normal"* and *"high"* (Schillmoeller 2006). The social status of some districts might have changed over the years, like for instance Neuallermoehe[16] which is situated in the main district Bergedorf (The District Office Bergedorf 2011).

In regards to the chosen study design, with cross-sectional studies it is only possible to identify correlations but not causalities (Centre for Evidence-Based Medicine 2009).

The vide variations in the correlations for the parent-child agreement in other studies may occur through certain influencing factors which were previously described in chapter 5.3 (e.g. differences in the samples, unequal sample sizes, not the same measuring instruments, the statistical analysis etc.)

Upton et al. mentions *low* correlations may indicate one data set is less reliable but on the other would neglect the possibility that parents and their children contribute differently nonetheless are valid information. But it can occur also that some instruments may be more suited to certain samples (Upton et al. 2008)

In comparison to other publications this survey found that none German speaking children with *high* FAS displayed the *lowest* HRQOL mean score. Commonly, lower HRQOL and lower SES (or lower FAS) could be observed by other surveys (Erhart et al. 2009, Petersen-Ewert et al. 2011). Researchers like *Bradley & Corwyn* explain this proportional distribution by dissimilarities in the access to resources (material and social) or to reactions caused by stress-related circumstances *(Bradley & Corwyn* 2000). To further investigate these contrary findings it would be necessary to perform additional statistical analysis.

Considering the question *"with what age children are able to give reliable and valid responses?"* According to the current literature it can be assumed that eight year old children can accurately use

[16] Since 1st Januar 2011 Neuallermoehe – West and Neuallermoehe – East changed to an own district Neuallermoehe. The density of inhabitants with migration background is especially high in this district. In the social area of Neuallermoehe-East (44 %) and Neuallermoehe –West (60 %) the distribution of inhabitants with migration background is higher than the percentage in the main district Bergedorf (29 %) and in Hamburg (28 %) (The District Office Bergedorf 2011).

five or seven point scales. Even children below eight years have the ability to use rating scales. In regards to the argumentation of researchers children below eight years can use common response terms, can understand and interpret underlying concepts. Moreover, they can rate questions concerning their own health retrospectively after four weeks.

Actually, children with the age of five are able to perceive their health; if the assessing instrument is taking into account the children's development. The ability of younger children to rate mental well-being could may be not understandable for too young children like five years. In general, the assessing measures for young children should take into account their writing and reading skills, should consider alternative assessment methods like smileys, and avoid Likert-Scales in order to prevent extreme answers from young children.

The self-ratings rating the children's HRQOL should be the standard, exceptionally in circumstances where the child is unable to complete an instrument because of age, cognitive impairment, illness or fatigue. With respect to the literature the utilisation or the need for health care services for children is necessary to be reported by their parents.

Possible implications for clinicians or policymakers

Childhood can be seen as the time in which the fundamentals for a healthy life are established. Health-related attitudes and behaviour patterns are already apparent in childhood these get solidified later in life and affected throughout the rest of their lives by certain avoidable conditions and diseases.

Evaluating children's HRQOL is of particularly importance because it is valuable for identifying children with a higher risk for health problems or for detecting impairments of well-being or functioning in early childhood. Through the identification of subgroups or individuals with a higher risk for health problems, children can be strengthened by reducing their risks they are exposed during their development.

Limitations in the HRQOL during childhood can affect children in three ways. Firstly, it can have an impact on their central development (like the individual development of competencies, intellectual education, and social development of competencies). Secondly, it can affect them during the school years by influencing their capacity to learn. Therefore, reduced HRQOL during childhood may have long term effects which influence them later in life. Hence, well-being in children is a key dimension for sustainable development.

The assessment of children's HRQOL is especially relevant also for observing the background of considerable changes from acute to chronic illnesses and from somatic to psychological symptoms, behaviour disturbances, and psychosomatic illnesses. If diseases or complaints in childhood exist, early attention and care is indicated, in order to counter unwanted progresses or consequences. The earlier suitable measures have been taken, the greater the prospect of success.

The HRQOL of children is necessary for planning and implementing effective interventions strategies (e.g. to improof children's self-esteem or to reduce the imbalance of low HRQOL and low SES, frequently high HRQOL and high SES), as well as the contribution to health care policies.

Regularly frequent health surveillance and the monitoring of self-perceived health or distress during childhood can enhance the understanding about trajectories of health and the development of illnesses during childhood. The assessment of cross-national differences in children's HRQOL is essentially for evaluating the scope for European and international public health priorities. Hence, the monitoring of cross-national differences in subjective health becomes increasingly important.

Unanswered questions and future research

If child's HRQOL research with the two sources child- and parent-reports is preferred additional research is needed to investigate more specifically the item-response behaviour of children and their parents. Moreover, future studies could assess additionally information on the objective health status and subjective health of the parents in order to investigate more detailed their life situation. This could help to identify more influencing factors. Differences in agreement depending on whether the mother or the father was the proxy rater are not explored in any of the studies included in this review. It would be interesting to have a larger proportion of fathers as respondents and to evaluate the parents independently from each other.

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Statutory declaration

This is to declare that I have prepared this master thesis entirely by myself using only the sources and aids mentioned. Quotations or borrowings from other works have been indicated as such. This master thesis – or any variation thereof - has never been submitted to any examination authority.

Toulouse, 29th February 2012

Manuela Rueter

ANNEXES

Table 32 Dichotomous total HRQOL and (self-and proxy-rated) and the correlation with gender, age and language spoken at home

Variable (s)	Gender	Age	Language
Dichot. Total HRQOL			
Self-ratings	**x̄: 4.99*, p = .025, C: .11**	r_b = -.02, p = .716	x̄: .75, p = .387, C: .04
Proxy-ratings	x̄: 1.80, p = .180, C: .07	r_b = .08, p = .099	x̄: .50, p = .479, C: .04
Dichot. Physical Well-being			
Self-ratings	**x̄: 10.01*, p = .002, C: .16**	r_b = -.02, p = .642	x̄: .86, p = .355, C: .05
Proxy-ratings	x̄: 1.40, p = .237, C: .06	r_b = .04, p = .455	x̄: .74, p = .786, C: .01
Dichot. Mental Well-being			
Self-ratings	x̄: 2.09, p = .148, C: .07	r_b = -.02, p = .692	x̄: .03, p = .859, C: .01
Proxy-ratings	x̄: 1.80, p = .180, C: .07	r_b = .002, p = .967	x̄: 1.51, p = .219, C: .06
Dichot. Self-Esteem			
Self-ratings	**x̄: 4.05*, p = .044, C: .10**	r_b = -.02, p = .658	x̄: .010, p = .922, C: .01
Proxy-ratings	x̄: 3.47, p = .063, C: .09	r_b = .05, p = .311	x̄: 0.17, p = .680, C: .02
Dichot. Fam. Well-being			
Self-ratings	x̄: 2.92, p = .087, C: .09	r_b = -.03, p = .587	x̄: .47, p = .495, C: .04
Proxy-ratings	x̄: 2.79, p = .095, C: .08	r_b = .02, p = .688	x̄: 3.13, p = .770, C: .09
Dichot. Well-being w. Friends			
Self-ratings	x̄: 1.95, p = .163, C: .07	r_b = -.014, p = .780	x̄: 2.23, p = .136, C: .08
Proxy-ratings	x̄: 2.24, p = .725, C: .02	r_b = -.03, p = .688	x̄: 0.14, p = .712, C: .02
Dichot. Well-being at School			
Self-ratings	x̄: 1.76, p = .675, C: .02	r_b = -.02, p = .727	**x̄: 4.52*, p = .034, C: .11**
Proxy-ratings	x̄: .33, p = .566, C: .03	**r_b = .120*, p = .017**	x̄: 3.72, p = .054, C: .10

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 33 Mean differences for the single items stratified by gender (child - parent mean)

Gender	Variable	Mean	SD	t	df	Eta^2	Sig.
male	Felt ill	-0.07	1.01	-0.95	183	.00	.34
	Headache or Abdominal pain	-0.19	0.99	-2.54	182	.03	.01
	Tired and worn-out	-0.16	1.22	-1.76	181	.02	.08
	Strong and full of energy	-0.03	1.25	-0.36	181	.00	.72
female	Felt ill	-0.33	1.00	-4.82	206	.10	.00
	Headache or Abdominal pain	-0.24	1.05	-3.27	201	.05	.00
	Tired and worn-out	-0.41	1.16	-5.03	203	.11	.00
	Strong and full of energy	-0.43	1.35	-4.53	202	.09	.00
male	Fun and laughing	0.05	1.09	0.61	184	.00	.54
	Felt bored	-0.19	1.38	-1.87	182	.02	.06
	Felt lonely	0.06	0.94	0.80	180	.00	.43
	Felt scared	0.25	0.89	3.82	181	.07	.00*
female	Fun and laughing	0.14	1.03	1.96	206	.02	.05
	Felt bored	-0.32	1.09	-4.20	202	.08	.00
	Felt lonely	-0.08	1.12	-1.07	203	.01	.29
	Felt scared	0.21	1.05	2.79	203	.04	.01*
male	Proud of myself	-0.20	1.17	-2.28	181	.03	.02*
	Feeling very good	-0.65	1.41	-6.19	180	.18	.00*
	Pleased with myself	-0.31	1.46	-2.86	178	.04	.01*
	Lots of good ideas	-0.48	1.31	-5.01	183	.12	.00*
female	Proud of myself	-0.49	1.30	-5.37	204	.12	.00*
	Feeling very good	-1.02	1.24	-11.81	204	.41	.00*
	Pleased with myself	-0.51	1.57	-4.66	202	.10	.00*
	Lots of good ideas	-0.73	1.27	-8.24	202	.25	.00*
male	Got along well with my parents	0.21	0.95	2.94	183	.05	.00*
	Felt fine at home	0.08	0.86	1.30	180	.01	.19
	Disagreements at home	-0.03	1.18	-0.32	180	.00	.75
	Parents prohibited things	0.46	1.24	4.90	173	.12	.00*
female	Got along well with my parents	0.30	0.90	4.71	206	.10	.00*
	Felt fine at home	0.09	0.89	1.49	202	.01	.14
	Disagreements at home	0.04	0.93	0.60	202	.00	.55
	Parents prohibited things	0.40	1.22	4.66	197	.10	.00*

(Part II of Table 33)

Gender	Variable	Mean	SD	t	df	Eta^2	Sig.
male	Got along well with my parents	0.21	0.95	2.94	183	.05	.00*
	Felt fine at home	0.08	0.86	1.30	180	.01	.19
	Disagreements at home	-0.03	1.18	-0.32	180	.00	.75
	Parents prohibited things	0.46	1.24	4.90	173	.12	.00*
female	Got along well with my parents	0.30	0.90	4.71	206	.10	.00*
	Felt fine at home	0.09	0.89	1.49	202	.01	.14
	Disagreements at home	0.04	0.93	0.60	202	.00	.55
	Parents prohibited things	0.40	1.22	4.66	197	.10	.00*
male	Played with friends	0.19	1.18	2.18	184	.03	.03*
	Other kids liked me	-0.01	1.03	-0.07	178	.00	.94
	Got along well with my friends	0.25	0.90	3.77	183	.07	.00*
	Self-assessment versus others	2.44	1.58	20.81	180	.71	.00*
female	Played with friends	0.15	1.23	1.76	207	.01	.08
	Other kids liked me	-0.13	1.13	-1.68	201	.01	.10*
	Got along well with my friends	0.02	1.06	0.26	205	.00	.79
	Self-assessment versus others	2.23	1.54	20.85	206	.68	.00*

*Correlation is significant at the 0.05 level (2-tailed).

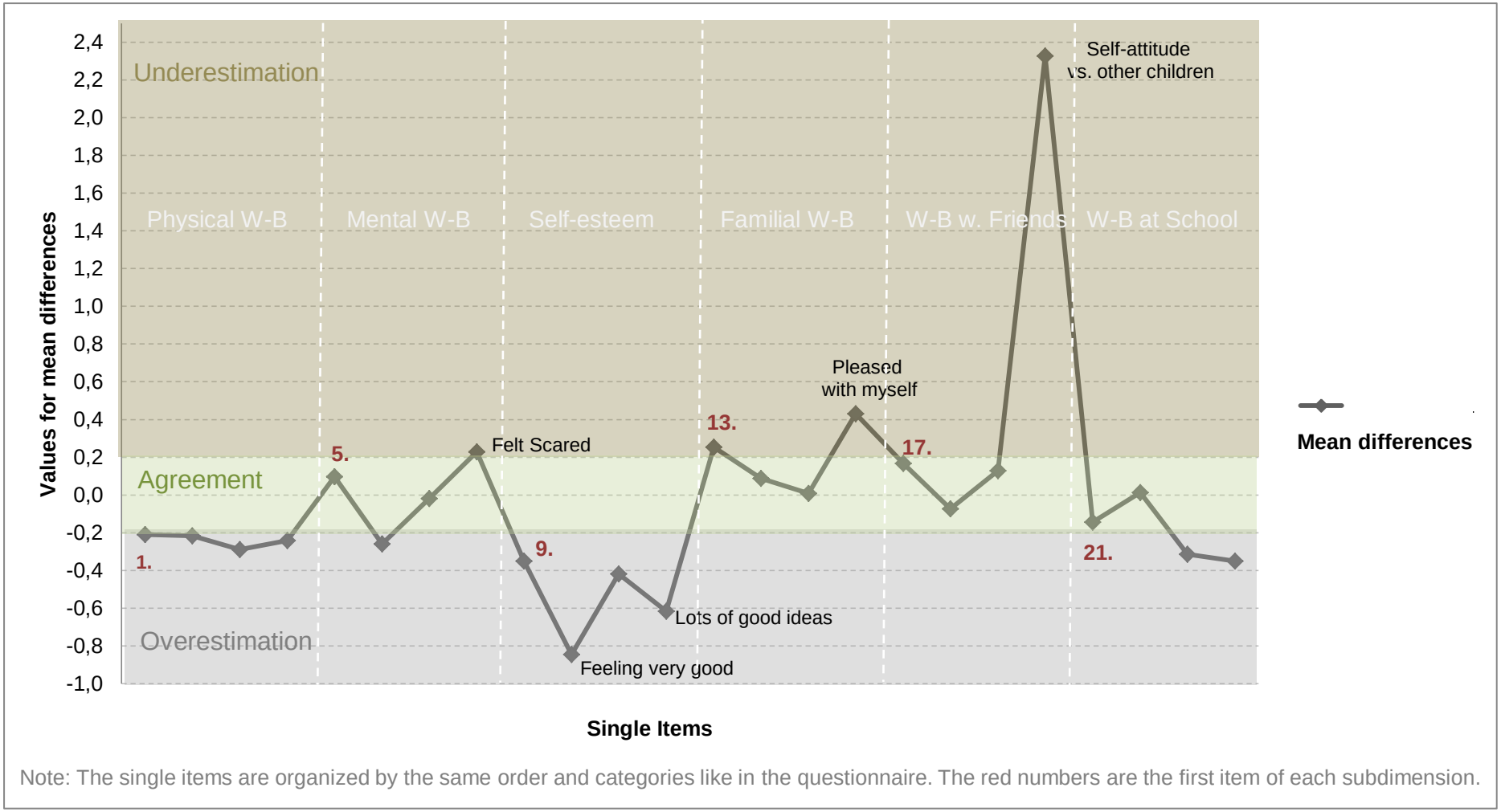

Figure 33 Mean differences for the single items (child - parent mean) classified as overestimation, agreement and underestimation

1. First of all, we would like to know something about your physical health...

During the past week...	never	seldom	some-times	often	all the time
1. ... I felt ill	☐	☐	☐	☐	☐
2. ... I had a headache or tummy-ache	☐	☐	☐	☐	☐
3. ... I was tired and worn-out	☐	☐	☐	☐	☐
4. ... I felt strong and full of energy	☐	☐	☐	☐	☐

2. ... then something about how you've been feeling in general...

During the past week...	never	seldom	some-times	often	all the time
1. ... I had fun and laughed a lot	☐	☐	☐	☐	☐
2. ... I was bored	☐	☐	☐	☐	☐
3. ... I felt alone	☐	☐	☐	☐	☐
4. ... I was scared	☐	☐	☐	☐	☐

3. ... and how you have been feeling about yourself.

During the past week...	never	seldom	some-times	often	all the time
1. ... I was proud of myself	☐	☐	☐	☐	☐
2. ... I felt on top of the world	☐	☐	☐	☐	☐
3. ... I felt pleased with myself	☐	☐	☐	☐	☐
4. ... I had lots of good ideas	☐	☐	☐	☐	☐

4. The next questions are about your family ...

During the past week...	never	seldom	some-times	often	all the time
1. ... I got on well with my parents	☐	☐	☐	☐	☐
2. ... I felt fine at home	☐	☐	☐	☐	☐
3. ... We quarrelled at home	☐	☐	☐	☐	☐
4. ... My parents stopped me from doing certain things	☐	☐	☐	☐	☐

5. ... and then about friends.

During the past week...	never	seldom	some-times	often	all the time
1. ... I played with friends	☐	☐	☐	☐	☐
2. ... Other kids liked me	☐	☐	☐	☐	☐
3. ... I got along well with my friends	☐	☐	☐	☐	☐
4. ... I felt different from other children	☐	☐	☐	☐	☐

6. Last of all, we would like to know something about school.

During the last week in which I was at school...	never	seldom	some-times	often	all the time
1. ... doing my schoolwork was easy	☐	☐	☐	☐	☐
2. ... I enjoyed my lessons	☐	☐	☐	☐	☐
3. ... I worried about my future	☐	☐	☐	☐	☐
4. ... I worried about bad marks or grades	☐	☐	☐	☐	☐

Figure 34 Children's Questionnaire Kid-KINDL^{R}

(Source: Ravens-Sieberer & Bullinger 2000)

1. Physical Well-being

During the past week ...	never	seldom	some-times	often	all the time
1. ... my child felt ill	☐	☐	☐	☐	☐
2. ... my child had a headache or tummy-ache	☐	☐	☐	☐	☐
3. ... my child was tired and worn-out	☐	☐	☐	☐	☐
4. ... my child felt strong and full of energy	☐	☐	☐	☐	☐

2. Emotional Well-being

During the past week ...	never	seldom	some-times	often	all the time
1. ... my child had fun and laughed a lot	☐	☐	☐	☐	☐
2. ... my child didn't feel much like doing anything	☐	☐	☐	☐	☐
3. ... my child felt alone	☐	☐	☐	☐	☐
4. ... my child felt scared or unsure of him-/ herself	☐	☐	☐	☐	☐

3. Self-esteem

During the past week ...	never	seldom	some-times	often	all the time
1. ... my child was proud of him-/herself	☐	☐	☐	☐	☐
2. ... my child felt on top of the world	☐	☐	☐	☐	☐
3. ... my child felt pleased with him-/ herself	☐	☐	☐	☐	☐
4. ... my child had lots of good ideas	☐	☐	☐	☐	☐

4. Family

During the past week ...	never	seldom	some-times	often	all the time
1. ... my child got on well with us as parents	☐	☐	☐	☐	☐
2. ... my child felt fine at home	☐	☐	☐	☐	☐
3. ... we quarrelled at home	☐	☐	☐	☐	☐
4. ... my child felt that I was bossing him/ her around	☐	☐	☐	☐	☐

5. Social Contacts

During the past week ...	never	seldom	some-times	often	all the time
1. ... my child did things together with friends	☐	☐	☐	☐	☐
2. ... my child was liked by other kids	☐	☐	☐	☐	☐
3. ... my child got along well with his/ her friends	☐	☐	☐	☐	☐
4. ... my child felt different from other children	☐	☐	☐	☐	☐

6. School

During the last week in which my child was at school ...	never	seldom	some-times	often	all the time
1. ... my child easily coped with schoolwork	☐	☐	☐	☐	☐
2. ... my child enjoyed the school lessons	☐	☐	☐	☐	☐
3. ... my child worried about his/her future	☐	☐	☐	☐	☐
4. ... my child was afraid of bad marks or grades	☐	☐	☐	☐	☐

Figure 35 Parents' Questionnaire Kid KINDL^{R}

(Source: Ravens-Sieberer & Bullinger 2000)d