

## **3.2 FFPI-SCALES**

In this section of chapter 3 the results of the main personality study are presented and the developmentally relevant characteristics of the adapted version of the FFPI are discussed.

### **3.2.1 Subjects**

Those fifth grade students (W3, see Table 1, p. 41), who fully completed the FFPI, participated in this study (total number of subjects: 1100, 552 males, 493 females, 55 gender unknown; mean age 11.8 years old, SD: .71). The FFPI was filled out anonymously in a classroom setting.

### **3.2.2 Instrument**

Personality was assessed by means of the adapted 100-item version of the Five-Factor Personality Inventory (Hendriks et al., 1999). This adapted version included 81 original FFPI item formulations and 19 modified items, which were tested in the second pilot study (For means and SDs see Appendix A).

### **3.2.3 Procedure**

The FFPI was presented as the last part of the questionnaire booklet of the school-focused longitudinal Health Promotion Program. That means that the FFPI was part of a sequence of questionnaires containing personality, health and school-oriented scales like self-efficacy, social support, depression and coping skills (see Appendix E; Pieper et al, 1999).

The instructions were given both orally and written, with a special emphasis on the anonymity of the survey. The introduction time for the questionnaire lasted about 5-10 minutes and ended with an opportunity to ask questions.

### **3.2.4 Results**

In the following, the results are presented and discussed in three segments: First the adapted FFPI scales are checked for their reliability and some suggestions are given to be able to optimize survey conditions when young adolescents are asked to participate.

Second, the factor structure of the adapted FFPI is investigated and the discrepancies or overlaps with the adult structure are discussed. The factor structure is studied using three-, four- and five-factor solutions, which are thereupon related to each other. Third, the scale- and item-level results are compared to obtain a general picture of the applicability of the FFPI as a self-rating measure in adolescence.

#### **3.2.4.1 Internal consistencies of the adapted FFPI Scales**

To investigate the internal consistencies of the scales of the adapted FFPI, the scale-scores were corrected for acquiescence and calculated as described by Hendriks (1997). The calculation procedure was necessary to follow because of the specific constructional characteristics of the FFPI. It is to note that De Fruyt, McCrae, Szirmák and Nagy (2004) found that using raw scale scores of the FFPI was problematic and obtained more satisfying results with the calculated scale scores. Therefore, the following results of the adolescent FFPI all base on calculated scale scores.

The internal consistency of the Extraversion scale was .77, of Agreeableness .79, of Conscientiousness .73, of Emotional Stability .81 and of Autonomy .70. The internal consistencies of the scales are considered sufficient, even though they are lower than corresponding results in adult samples. The fact that the scales were part of a questionnaire booklet containing several measures might raise doubts concerning the concentration capacity of young adolescents. Some young adolescents may have difficulties thinking in general terms about behaviors and attitudes. They may also tend to drift away from the instructions if the instruction is not repeated in each question-sequence. Moreover, as the personality measure was presented as the last of a long sequence of scales, the students may have felt already tired and may not have been focused on the task as strongly as they would have been without such a strain.

Providing a detailed oral instruction together with the written one and moving a

scale to the first part of the questionnaire booklet might improve the reliability. Yet a drastic change is not expected, since similar reliability values were found in the health relevant domains of the school focused longitudinal health promotion study. Nevertheless, lower reliability of measures than in adult samples is a not uncommon phenomenon in developmental research.

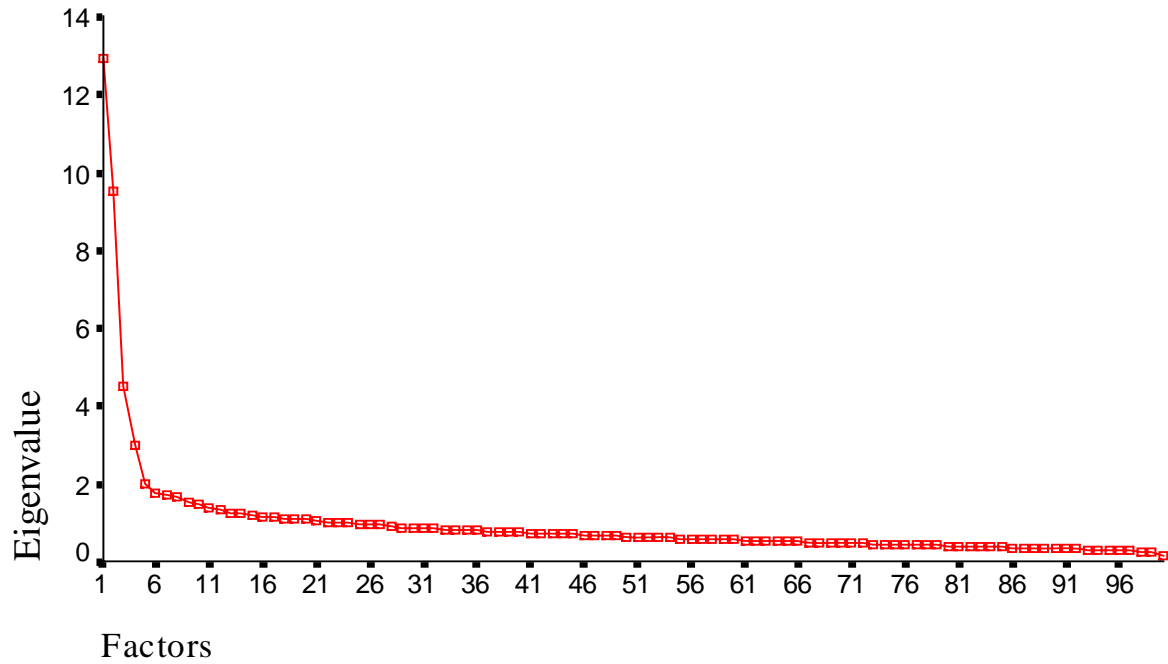
### 3.2.4.2 Intercorrelations between the FFPI scales

As shown in Table 4, some intercorrelations between the FFPI dimensions were observed in the adolescent sample. Nevertheless, these relations between the scales are low and fairly corresponding to the adult FFPI scale intercorrelations reported by Hendriks (1997). Also, because of the sufficient internal consistencies of the adolescent FFPI scales, these result were not interpreted in more detail.

**Table 4. Correlations between the FFPI scales.**

	<b>EXT.</b>	<b>AGR.</b>	<b>CON.</b>	<b>EM. ST.</b>	<b>AUT.</b>
<b>Extraversion (EXT.)</b>					
<b>Agreeableness (AGR.)</b>	<b>.20</b>				
<b>Conscientiousness (CON.)</b>	<b>.22</b>	<b>.11</b>			
<b>Emotional Stability (EM. ST.)</b>	<b>.20</b>	<b>.13</b>	<b>.32</b>		
<b>Autonomy (AUT.)</b>	.01	<b>.10</b>	-.09	.01	

Note: **bold** =  $p < .001$



**Figure 1. Factor scree-plot of the item-level factor analysis of the FFPI items.**

### 3.2.4.3 Factor-structure of the FFPI

To examine whether the adapted Five-Factor structure remains stable after factoring, an item-level factor analysis was conducted using Principal Component Analysis (PCA). The Eigenvalues are depicted in Figure 1. The first seven Eigenvalues were 12.72, 8.93, 4.47, 3.00, 2.00, 1.80 and 1.73. On the basis of the structure of the FFPI, five components were expected and confirmed by the results of the scree-test, thus, a five-factor solution was rotated according to the Varimax procedure. The five factors explained 31.1 percent of the total variance. Nevertheless, this result corresponded reasonably to the international adult findings where in a comparison between thirteen countries the amount of explained variance varied between 32.1 and 49.7 percent (Hendriks et al., 2003). In Table 5 the varimax-rotated five-factor solution of the item-level PCA of the 100 FFPI items with the five highest loading items for each factor and a comparison of the facet labels of the FFPI items with the observed first and secondary loadings in the explanatory analyses are presented (the full loadings matrix is added in Appendix A).

**Table 5. The explorative five-factor structure of the FFPI.**

<b>Factor/FFPI item</b>	<b>FFPI Facet*</b>	<b>Observed Facet</b>	<b>Loading</b>
<b><u>I.</u></b>			
Ich erkundige mich nach dem Wohlbefinden anderer.	2+1+	1+	.57
Ich schwatze gerne.	1+	1+	.48
Ich mache gerne Dinge für andere.	2+1+	1+3+	.48
Ich strengte mich an für andere.	2+1+	1+5+	.47
Ich heitere Leute auf.	1+2+	1+5+	.45
<b><u>II.</u></b>			
Ich will die Führung haben.	2-1+	2-4-	.62
Ich stelle mich selbst immer in den Mittelpunkt.	2-1+	2-	.62
Ich kommandiere Leute herum.	2-	2-4-	.59
Ich benutze andere für meine Zwecke.	2-	2-4-	.54
Ich erzähle übertriebene Geschichten von mir selbst.	2-3-	2-4-	.48
<b><u>III.</u></b>			
Ich mache alles, wie es sich gehört.	3+5-	3+5+	.56
Ich liebe Ordnung und Regelmäßigkeit.	3+	3+	.53
Ich lasse meine Sachen herumliegen.	3-	3+4-	.48
Ich gehorche den Erwachsenen.	5-3+	3-2+	-.46
Ich folge gerne einem festen Tagesablauf.	3+	3+4+	.40
<b><u>IV.</u></b>			
Ich fürchte sofort das Schlimmste.	4-1-	4-	.63
Ich fühle mich beunruhigt.	1-4-	4-	.61
Ich fühle mich verzweifelt.	4-1-	4-	.60
Ich bin bange, etwas falsch zu machen.	4-1-	4-	.59
Ich sehe schwarz für die Zukunft.	4-1-	4-	.58
<b><u>V.</u></b>			
Ich reagiere schnell.	5+1+	5+	.58
Ich stehe mit beiden Beinen fest auf dem Boden.	4+5+	5+	.57
Ich weiß, was ich will.	5+4+	5+	.54
Ich möchte, dass alles perfekt klappt.	3+4-	5+	.54
Ich bereite mich gut vor.	3+5+	5+	.52

\*To the interpretation of the FFPI facets: 1+: Extraversion; 1-:Intraversion, 2+: Agreeableness, 2-:Non-agreeableness, 3+: Conscientiousness, 3-: Non-conscientiousness, 4+: Emotional Stability, 4-: Emotional Instability, 5+: Autonomy, 5- Non-autonomy. The combination of the factor loadings yields a specific facet. For example: I inquire about others' well being, 2+1+ : this item, has a first loading on Agreeableness and a second sufficient loading on Extraversion and belongs to a facet that is a blend between Agreeableness and Extraversion.

### **Factor I.**

With items like „I inquire about others’ well-being“ (.57), this factor appeared to express Sociability rather than Extraversion. This factor explained five percent of the total variance in the five-factor solution.

The item characteristics for this factor conveyed a strong interpersonal connotation that was also observed in other measures in the factors Extraversion and Openness to Experience. In the results of the PCA the highest loading terms were the ones that carry Agreeableness information, with the first and the third highest loading items originally belonging to the Agreeableness domain. Thus, Agreeableness contributed substantially to the meaning of this factor and was in charge of its social-bond connotation. This was not really new, since in personality and temperament research it was often reported that at a young age Extraversion is expressed mostly in terms of sociability or social approach (see Elphick, Halverson, & Marszal-Wisniewska, 1998). Buyst, De Fruyt, and Mervielde (1994), for example, supported the relative importance of sociability at a young age. John and colleagues (1994) argued that Extraversion is expressed through social contact ability and activity at a young age and becomes, through the developmental and life span changes, a factor known as Extraversion in adult research.

### **Factor II**

The highest loading items on this factor were on the negative pole of Agreeableness, such as “I want to be in charge“ [”Ich will die Führung haben”] (.62) and “I demand to be the center of attention” [”Ich stelle mich selbst immer in den Mittelpunkt”] (.62) and this emphasized Disagreeableness. This interpretation was also supported by the items “I order people around” [”Ich kommandiere Leute herum”] (.59) and “I use others for my own ends” [” Ich benutze andere für meine Zwecke”] (.54). The factor Disagreeableness explained 5.5 percent of the total variance in this five-factor solution.

It is generally assumed, that at a younger age, the negative pole of Agreeableness plays a more important role and expresses the power and importance children connect with themselves and also expresses some self-consciousness and assertivity. In contrast to this “self centered and evolutionary” aspect, the positive pole of Agreeableness gave a rather “civilized” or “socialized” picture, with items that resembled the most common rebuke by parents (“Just wait until its your turn!” or ”Do not quarrel!”).

### **Factor III**

Factor III was the last appearing factor in the five-factor solution and explained 3.7 percent of the total variance. Though this third factor carried high loading items like “I do things by the book“ [”Ich mache alles, wie es sich gehört”] (.56) and left no doubt for the interpretation, they all expressed Conscientiousness. The negative pole of Conscientiousness (for example “I leave my belongings around [”Ich lasse meine Sachen herumliegen”], .48) surprisingly contained positive loadings.

Taking a closer look at the item characteristics of this factor, this contradiction became understandable: Items, loading positive on the factor, all conveyed aspects of self-consciousness as a sign of internal assurance about conscientious behavior and acting (“I do things by the book” [”Ich mache alles, wie es sich gehört”]), as opposed to uncritical adaptation to the rules and submissive behavior (“I do as I am told” [“Ich gehorche den Erwachsenen”] and “I leave my belongings around” [“Ich lasse meine Sachen herumliegen”]).

The question is whether this interpretation of conscientiousness describes a developmental characteristic of young adolescents, and whether it expresses a positive interpretation of internalization of well-accepted cultural and social rules and self-induced conscientious behavior.

It seems plausible to believe that conscientious behavior is understood in positive

terms in early adolescence and that it is probably the most important developmental task to be completed for the age group.

The development of conscientiousness is also facilitated through the highly rewarding behavior toward conscientious acting by adults (parents, teachers, etc.), who still play an important role in the life of ten/eleven-years olds. To question the rules, to stress individual aspects, and to rebel against society come some years later in puberty. Thus, it can well be that this different character of Conscientiousness is no more and no less than an initial developmental stage on the way to adult conscientiousness.

However, as the Conscientiousness scale in the adolescent FFPI showed an acceptable level of reliability, in the present study no further attempt was made to investigate these findings. Nevertheless, the low amount of explained variance of the Conscientiousness factor draws the attention to more caution in the interpretation of the present results.

In a detailed overview of the factorial studies on conscientiousness in personality and temperament research in childhood and adolescence, Kohnstamm, Zhang, Slotboom and Elphick (1998) summarized results corresponding to the above findings. They referred to Mervielde and De Fruyt's (1992) and Mervielde, Buyst and De Fruyt's (1995) report on data that supported a blend of two dimensions: conscientiousness and the fifth dimension (in their case named Openness to Experience and Intellect), that emerged in teachers' ratings and in peer ratings of schoolchildren as well. Although the fifth scale in the FFPI was named Autonomy, it has indeed, aspects characteristic to Intellect.

In addition, two non-pure factor items may be mentioned which both had a secondary loading on the negative pole of Factor V ("I do things by the book" and "I do as I am told"). It seemed that conscientiousness presumed a less autonomous or individualistic behavior (e.g., to "do things by the book") and did not leave much room for creativity or initiative.



This aspect was already suggested through the original FFPI item structure where quite a few items were blends between Factor III and V.

#### **Factor IV**

The factor explaining the highest amount of variance in this study was Factor IV (9.4 %), of which the items referred to Emotional Stability in the Big Five tradition. This domain is considered one of the basic and most important dimensions in personality and is rather frequently a subject of research in adulthood (see De Raad, 2000) and in personality development (Angleitner, Kohnstamm, Slotboom & Besevegis, 1998).

In the present study, Emotional Stability was represented by items like “I fear the worst” [”Ich fürchte sofort das Schlimmste”] (.63) and “I feel uncomfortable” [”Ich fühle mich beunruhigt”] (.61). As the highest loading items all belonged to the negative pole of the traditional factor domain, it seemed more apt to interpret this factor as Neuroticism instead of Emotional Stability. This way of interpretation is also in accordance with the developmental and temperamental nomenclature where negatively formulated terms dominate the emotional domain.

All four Introversion pure scale items of the FFPI also loaded on this factor after the item level PCA. These items added further aspects of social withdrawal or social reservation to the emotional instable domain in the developmental setting.

It may well be, that, because of the central role of developmental changes in emotional perception and control in early adolescence, emotional discomfort becomes the most personality relevant perception of the self and may give rise to a relatively strong and robust emotionality domain.

## **Factor V**

The fifth factor was represented by items like “I react quickly” [”Ich reagiere schnell”] (.58) and “I am sure of my ground” [”Ich stehe mit beiden Beinen fest auf dem Boden”] (.57), and explained 7.5 percent of the total variance. It is rather difficult to provide an explicit interpretation, as in the FFPI there are no factor pure terms for the positive pole of the Autonomy scale.

When picturing the items, this factor expressed self-assurance that well fitted in the scale domain of both Autonomy, and Emotional Stability. Although, under the five highest loading items only two belong to the Autonomy scale in the adult FFPI, the other three items have a substantial secondary loading on Autonomy in the adult structure.

However, the positive pole of Emotional Stability with some features of self-control or emotional control appeared here also fairly evident, it seemed more apt to name this factor Autonomy. Autonomy is not what is usually expected from children; they live in a world guided by adults and their main task is to adapt to this adult world. It sounds plausible, that to be able to act in an autonomous way, a great demand of self-assurance and emotional stability is needed in childhood.

When looking for the new positioning of those FFPI scale items that are supposed to express blends of Emotional Stability and Autonomy, we found three of the four items of the adult version under the highest loading items on the explorative adolescent Autonomy factor (two 4+5+ items load .57 and .48, and one 5+4+ item loads .54).

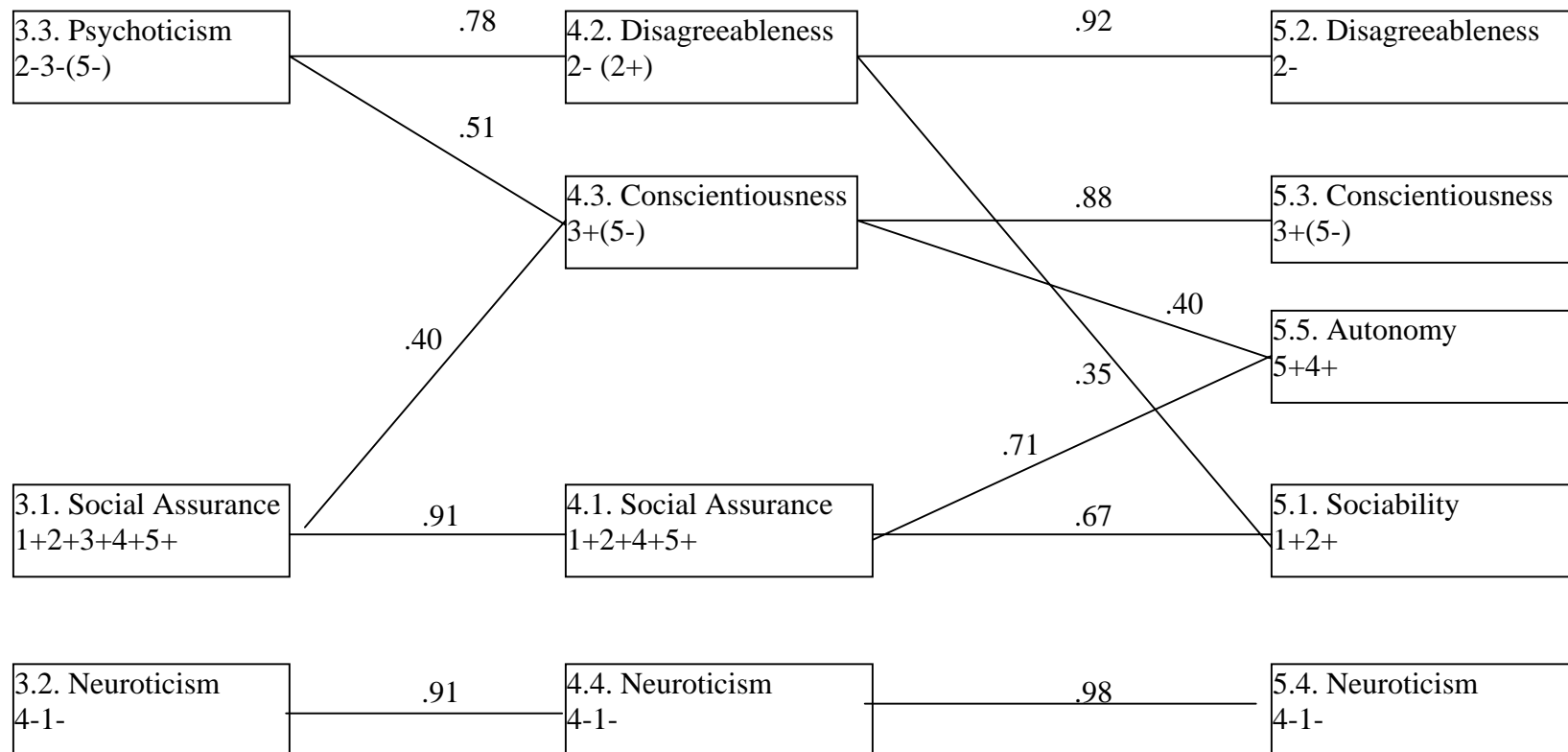
It can be concluded, that this factor, though it kept the core meaning of the original Autonomy scale domain, comprised also the positive pole of the Emotional Stability scale.

#### **3.2.4.4 The different factor solutions**

Why did the different poles of the FFPI scales contribute to different factors in the item level PCA solution? To investigate this, relations were studied between the different factor solutions of the data that could help trace back the antecedents of the five-factor structure in the four- or three-factor solutions (Figure 2). The percentages of explained variance for each factor of the different factor solutions are presented in Table 6.

The correlations between the factors were computed on factor-score results. To assist further interpretation, the AB5C Model coding of the Big Five domains is presented through all factor solutions (the factor loadings matrices are presented for the three-, four-, and five-factor solutions in full length in Appendix A).

**Figure 2. Correlations between the three-, four- and five-factor solutions of the item level PCA of the FFPI, with the indication of the facet characteristics\*.**



\* To the interpretation of the FFPI facets: 1+: Extraversion; 1-:Intraversion, 2+: Agreeableness, 2-:Non-agreeableness, 3+: Conscientiousness, 3-: Non-conscientiousness, 4+: Emotional Stability, 4-: Emotional Instability, 5+: Autonomy, 5- Non-autonomy. The combination of the factor loadings yields a specific facet. For example: I inquire about others' well being, 2+1+ : this item has a first loading on Agreeableness and a second sufficient loading on Extraversion, and belongs to a facet that is a blend between Agreeableness and Extraversion

### *The three-factor solution*

The three-factor structure showed some resemblance to the personality dimensions P-E-N of Eysenck, with special emphasis on Psychoticism (Eysenck, 1992a, 1992b).

The first appearing factor, with items covering all the positive poles of the Big-Five domains, could be called Social Assurance, a factor that expressed social oriented, extraverted characteristics of a person. The second factor was a clear Neuroticism–Social Withdrawal factor, with items belonging to the 4- and 1- cells in the AB5C model. The third factor collected terms that belonged to the 2- and 3- domains, and swallowed some items related to the Autonomy scale.

It was clearly a blend of the dimensions Non-agreeableness and Non-conscientiousness of the Big Five. Goldberg and Rosolack (1994) also demonstrated that Eysenck's P appears only as a blend of Agreeableness and Conscientiousness. The same conclusion was drawn by De Raad and Szirmák (1994) in the study of the Hungarian personality taxonomy: they reported correlations between Psychoticism on the one hand, and Agreeableness and Conscientiousness on the other. The three factorial structure also showed resemblance to the findings by Mervielde and De Fruyt (2000). They reported the ability to recover only three robust factors (Extraversion-Emotional Stability, Agreeableness and Intellect-Conscientiousness) in their developmental study with 9 to 10 year old children.

### *The four-factor solution*

Turning to the four-factor solution, three domains of the Big-Five Model appeared distinctly immediately. The Social Assurance domain is still present in this solution and the separate Conscientiousness components from the first and third factors form together a Conscientiousness-Orderliness domain that seems to remain stable further on.

### *The five-factor solution*

In the five-factor solution the major changes in the structure are the emergences of Sociability and Autonomy. This happens not only through the split of the Social Assurance factor into Sociability and Autonomy, but also through the contribution of Agreeableness and Conscientiousness in the four-factor solution to the new Autonomy and Sociability factors in the five-factor solution.

**Table 6. Percentage of explained variance of the factors in the five-, four-, and three-factor solution.**

<b>Nr.</b>		<b>expl. Variance in percentages</b>
<b><u>Five-factor solution</u></b>		
5.1	Sociability	5.01
5.2	Disagreeableness	5.55
5.3	Conscientiousness	3.67
5.4	Neuroticism	9.39
5.5	Autonomy	7.50
	<b>Total amount of expl. Var.</b>	<b>31.12</b>
<b><u>Four-factor solution</u></b>		
4.1	Social Assurance	9.60
4.2	Diasagreeableness	5.46
4.3	Conscientiousness	4.42
4.4	Neuroticism	9.63
	<b>Total amount of expl. Var.</b>	<b>29.11</b>
<b><u>Three-factor solution</u></b>		
3.1	Social Assurance	10.40
3.2	Neuroticism	9.22
3.3	Psychoticism	6.50
	<b>Total amount of expl. Var.</b>	<b>26.12</b>

#### **3.2.4.5 Relations between the factors and scales**

As appears in Table 5, there are some discrepancies between the five factors emerged from the exploratory analysis and the original adult scales of the FFPI. Table 7 gives a specific overview of these discrepancies and presents the correlations between the item level PCA factors and the FFPI scale scores.

**Table 7. The correlation matrix between the FFPI scales and varimax rotated item level PCA factors.**

	<u>PCA Factors</u>				
	<b>I.</b>	<b>II.</b>	<b>III.</b>	<b>IV.</b>	<b>V.</b>
<b><u>FFPI Scales</u></b>					
<b>I. Extraversion</b>	<b>.53</b>	<b>-.11</b>	.06	<b>.58</b>	<b>.12</b>
<b>II. Agreeableness</b>	<b>.52</b>	<b>.75</b>	.01	<b>.18</b>	<b>.12</b>
<b>III. Conscientiousness</b>	-.05	<b>.20</b>	<b>.72</b>	<b>.18</b>	<b>.41</b>
<b>IV. Emotional Stability</b>	-.05	.02	<b>.26</b>	<b>.57</b>	<b>.48</b>
<b>V. Autonomy</b>	.04	<b>-.10</b>	<b>-.52</b>	<b>.25</b>	<b>.45</b>

Note: **bold** numbers =  $p < .001$ ;

Factor I = Sociability, II = Disagreeableness, III = Conscientiousness, IV = Neuroticism, V = Autonomy.

In Table 7, a relative scattered picture of the relations between factor scores and scale values is observed: all scales show two important correlations to the factors that resulted from the item level factoring. Extraversion correlates with Factor I (.53) and Factor IV (.58). Although Agreeableness correlates the best with Factor II (.75), it also shows a moderate correlation to Factor I (.52). Conscientiousness shares most of its variance with Factor III (.72), but also with Factor V (.41) to a certain extent. Emotional Stability correlates moderately with two of the five factors: with Factor IV (.57) and Factor V (.48). In the case of Autonomy, a negative correlation to Factor III (-.52) appears. To Factor V (.45) a moderate correlation is observed. It is to be concluded, that the FFPI scales share substantial information with the explorative factors. Even when the correlations did not appear in an expected manner, the robustness of the five domains is indisputable.

### **3.2.5 Conclusions**

This part of the work aimed to provide personality relevant self-ratings in adolescence and to test the applicability of the Big Five model in a developmental setting. A lexical approach oriented personality measure, the FFPI, was used for these purposes and analyzed

for developmental characteristics of the Big-Five domains.

The results generally supported the relevance and importance of the five-factorial personality research in adolescence and demonstrated its applicability to younger age groups.

However, more attention should be paid to the changes in the structure of the FFPI, to the consequent splitting of the scales. This effect is probably caused by the fact that a majority of items in the FFPI have secondary loadings, thus express blends of factor meanings (see Hendriks, 1997).

The deviating results from an adult factor structure correspond to temperamental and developmental findings. No corresponding results were found in developmental literature for the here observed blending of the positive pole of the Autonomy scale and Emotional Stability.

It is interesting to note, how reliable young adolescents were in filling out a personality measure. Apparently, young adolescents were able to provide reliable data on their own personality characteristics.