3.3 PERSONALITY AND PSYCHOSOMATIC SYMPTOMS

The major goal of this section of chapter 3 is to investigate the relationship between the Big Five personality factors and psychosomatic complaints at adolescent age with special focus on the role of Emotional Stability. In order to develop adequate prevention methods and to provide favorable conditions for further personality development, it is necessary to learn more about the role of personality traits in health already at an early age.

3.3.1 Introduction

The question as to what extent personality characteristics relate to disease susceptibility and the development of illness was even asked in ancient history; it goes back at least as far as the ancient Greek time, where philosophers discussed the problem. The search for a linkage between psychological dispositions and disease susceptibility was almost permanently present in the history of psychology. The presumed way of interaction was accompanied by philosophical problems concerning the body-mind relationship. At the end of the eighteenth century, the movement toward a holistic approach to illness appeared and the role of psychological factors to physical ailments obtained more emphasis (Gatchel, Baum & Krantz, 1989).

A “major stimulus” (Prokop, Bradley, Burish, Anderson & Fox, 1991) in the study of mind-body interactions in modern time was done by Freud (1955), who did not explicitly focus on psychosomatic disorders, but drew attention to the unconscious and repressed emotions and their effect on mental and physical health. He interpreted the duality problem between mind and body as duality of drives (Aisenstein, 2002). His first patients were women with hysterical paralysis, and during treatment he always searched for the psychological factors behind the development of the paralysis.

Psychosomatic medicine, in which the relationship between physical illness and psychological phenomena was investigated, emerged from this psychodynamic way of thinking in the 1930s and 1940s with the investigation of the role of personality factors in the

development of disease. Two major figures in psychosomatic medicine were Dunbar (1943) and Alexander (1950). They both concentrated on personality characteristics of people suffering from different diseases, such as cardiovascular diseases, ulcer, cancer and rheumatoid arthritis. They were particularly interested in whether psychological dispositions and states could make someone sick or could play a deterring role in the development and progress of illness. Alexander (1950) investigated the specific unconscious emotional conflicts in the background of certain diseases (see Friedman, 1990). He also emphasized the importance of multidimensional approaches to illness (see Kopp & Skrabski, 1989). Another major figure in the history of the relation between psychology and medicine was Selye, a psycho-physiologist, who concentrated on the biochemical effects of the general adaptation syndrome and on the effect of environmental stressors to bodily processes (Selye, 1956).

There was a dramatic change in medicine at the beginning of the twentieth century which caused the reappearance of the psychological approach to medical problems (Gentry & Matarazzo, 1981). The development of vaccination, the use of penicillin, and better hygienic conditions resulted in a decrease of infectious illnesses, such as tuberculoses, smallpox, and polio. This process highlighted the problem of chronic diseases, cancer, cardiovascular diseases, and more recently immune deficiency and overreaction. Under these new disease labels, hundreds of different illnesses are very often understood: for example, cancer is a label for diverse disorders (Contrada, Leventhal & O'Leary, 1990). Moreover, the detection and diagnosis of the new diseases are problematic because of their long recruitment period and because of the fact that, with the available tools, it is very difficult to define the onset of these illnesses (Gatchel, Baum & Krantz, 1989).

In the development of chronic diseases behavioral factors are considered crucial. For example, in cases of cardiovascular disorders, poor dietary habits, high serum cholesterol level, overweight, lack of exercise and smoking are the best-known behavioral risk factors (Kannel, 1983, 1987). In the case of several cancer diseases, poor dietary habits and smoking

were proven to be a major risk factor in the onset of the diseases (American Cancer Society, 1989). For the definition and the detection of a disease, somatic symptoms are relevant. The problem of chronic diseases is that most of them are not diagnosed at an early stage before they start disturbing bodily functions or quality of life.

The nature of a disease may also change through the different stages of its development, for which reason the specification of personality factors and their relationship to disease characteristics is somewhat unclear (Contrada et al., 1990). The most important question to ask is whether individual differences in disease proneness are due to individual differences in personality. In other words, why do some people get sick but others stay healthy under equal circumstances (Adler & Mathews, 1994)? A growing number of studies were published about health and disease and the relationship between health and personality was extensively investigated (Contrada et al., 1990; Kobasa, 1990; Suls & Rittenhouse, 1990). The consistent problem in most of the studies in this field is not finding a statistically significant relationship between personality and health, but rather defining the quality and extent of such a relationship.

3.3.2 Recent trends in personality and health

In health relevant personality research, special emphasis was put on the predictive role of personality characteristics in the ontogenesis of illnesses. As Sanderman and Ranchor (1997) stated in their review on the predictive role of personality variables, the most common subjects of health related psychological research are cancer (e.g. Amelang, 1997; Kreitler, Kreitler, Chaitchik, Shaked & Shaked, 1997) and cardiovascular diseases (e.g. Denollett, 1997; Nunes, Frank & Kronfeld, 1987). These are, remarkably, those groups of illnesses that lead the mortality statistics in postmodern society. Other important foci of research are the group of chronic diseases (e.g. diabetes, allergy, arthritis or psychosomatic disorders) and the coping processes (e.g. with pain) that accompany long-term diseases (e.g., Hampson, 1997).

However, there is no generally accepted modern theory or model applicable to the

relationship between personality and somatic illnesses. Instead, there is a vast number of different conceptions about the ways diseases and personality or health and personality interact (De Raad, Hofstee & Van Heck, 1994; Sandermann & Ranchor, 1997; Van Heck, 1997).

In spite of these problems, there is the possibility of differentiating between three mainstream lines of research following the division of studies made by Smith and Williams (1992):

1. There are studies where personality characteristics are more or less directly connected to illness onset and development;
2. Other studies favor a less direct relationship between health and illness (e.g., emphasizing behavioral factors like risk taking);
3. Finally, there is a group of studies where personality plays a role as a buffer, and a person's vulnerability and resistance toward illness are measured through personality characteristics.

In the present study, personality characteristics are understood, as in the last group of the above-presented division, as mediating variables between health and illness.

3.3.3 Psychosomatics in adolescence

There are not many psychosomatic illnesses that are as specific for adolescence as anorexia nervosa, puberty-obesity, juvenile hypertonia and facial acne (Zauner, 1978). In most cases, the antecedents of adult psychosomatics are investigated in adolescence or at an earlier age. It was found, for example, that emotional regulation problems and aggression in young girls precede adult age physical deficits, like suffering from pain attacks or experiencing fatigue (Kokkonen, Pulkkinen & Kinnunen, 2001). Parental effects also have an impact on the development of psychosomatic problems: an emotionally strict opposite sex parent may increase the risk of the development of physical complaints in adolescence (Prokopcakova, 1999). Women, who reported to be exposed to sexual abuse in their childhood, often reported

sexual abuse in their adult life and suffered more from asthma, chronic fatigue or migraines (Romans, Belaise, Martin, Morris & Raffi, 2002).

Zauner (1978) emphasized the importance of adolescence in the development or avoidance of adult neurosis. He stated, that in this particular life sequence, early developmental deficits can be corrected, but depending on the structural development in adolescence, early bodily symptoms (like digestion problems, anxiety, diarrhea proneness) can also persist or worsen and lead to manifest psychosomatic disorders in adulthood. It is, therefore, important to continue studying this problem in modern personality psychology.

3.3.4 The Big Five model and psychosomatic complaints

In the search for relations between the five factors of the Big Five model and psychosomatic complaints we have to rely largely on adults. Until recently, there has been a limited number of studies using the Big Five model in relation to psychosomatic complaints from a developmental perspective. With the emergence of the Big Five model in personality a good basis is provided for the organization of the quite scattered field of health research: it opens a chance for a multidimensional and detailed interpretation of the findings (De Raad, Hofstee & Van Heck, 1994). Health research benefits from the results of personality research, on the one hand, and it administers well-established methods from all fields of psychology on the other (McCrae & John, 1992; Smith & Williams, 1992).

The Big Five relevant personality research demonstrates improving relevance in the field of health (Costa & McCrae, 1987a, 1987b; McCrae, 1991; McCrae 1992) and results support the assumption that the Big Five model provides a good framework for the interpretation of many health oriented investigations and measures, in which it brings more system in the scattered field of health research (Marschall et al., 1994; McCrae & John, 1992; Szirmák 1994, 1995). Comparable organizational results have been found in clinical psychology (McCrae, 1991), educational psychology (De Raad & Schouwenburg, 1996), organizational psychology and developmental psychology (De Fruyt & Mervielde, 1998).

3.3.5 Emotional Stability/Neuroticism in psychosomatics and adolescence

Though a growing number of researchers study health and disease from a Big Five personality point of view, particularly the scientific achievements of the Costa and McCrae research team define most of the results in the field of the Big Five model in relation to psychosomatic medicine. Costa and McCrae, in co-operation with several of their colleagues, are to a larger extent responsible for the detection and confirmation of the crucial role of Neuroticism (emotional instability) and its facets (angry hostility, anxiety, depression, vulnerability, self conscientiousness and impulsiveness) in psychosomatics in several longitudinal studies (e.g., Costa & McCrae, 1984; Costa et al., 1987).

Neuroticism was also found to play an important predicting role in studies on several specific diseases, like cardio-vascular diseases (e.g., Costa, 1981; Costa, 1986; Costa, Fleg, McCrae & Lakatta, 1982) and on subjective well-being (e.g. Costa & McCrae, 1980). Moreover, Costa and McCrae emphasized that Neuroticism should be interpreted as being part of the normal personality domain and under no circumstances should it be equalized with the psychiatric term neurosis because the latter term includes certain cognitive dysfunctions and perceptional distortions that lie far beyond the spectrum of the Big Five Neuroticism domain (Costa & McCrae, 1987b). Emotionally unstable individuals have difficulties coping with stressful life events; they often feel sad and worried and show difficulties in emotional regulation and emotional expression (Costa & McCrae, 1984). These characteristics should be distinguished from stress reactions and depression and should be considered as personality relevant and as being present over life.

Costa and McCrae (1984) came to the conclusion that there is a relationship between neuroticism and somatic complaints but this relationship is not inevitably and directly responsible for the development of psychosomatic diseases. The findings of Costa and McCrae and their research team support the assumption that emotional instability in fact affects the onset and prognosis of diseases indirectly and this indirect negative effect is

reinforced through health endangering behavior (Costa & McCrae, 1985, 1987a, 1987b).

Furthermore, in adolescence Neuroticism plays the most important role in the personality oriented psychosomatic domain. Looking at the literature, it seems that the studies that have been conducted and published during the last decade can be sorted into three major groups, namely medically oriented studies, investigations of the mediating role of neuroticism and neuroticism as a risk factor.

1. Studies that focus on the medical impact of neuroticism in adolescence

Most of the studies belong to this group, like the investigation of anxiety in asthma (Vila et al., 1999) and studies on the high-risk relationship between neuroticism, emotional distress and asthma (Gillaspy, Hoff, Mullins, Van Pelt & Chaney, 2002). Kovalenko, Hoven, Wu, Wicks and Mandell (2001) found a significant relationship between panic disorders and anxiety. They suggested that in some cases the over-sensitivity of the immune system could cause both anxiety and allergy, which was true especially in those cases where no organic cause for the allergy could be detected.

Asthmatic children, or children suffering from congenital health disease, show higher levels of anxiety. Moreover, an increased level of anxiety in mothers is accompanied by increased levels of anxiety in their children (Gupta, Mitchell, Giuffre & Crawford, 2001). A relationship was found between asthma and anxiety also with psychoanalytic methods: asthmatic children showed high anxiety and had difficulty in the separation from an object (Hargitai, 2001).

2. Investigations of the mediating role of neuroticism

The studies which fit to the second group are those in which the mediating role of neuroticism has been investigated, like the study from Muris (2002). He found significant evidence that the relationship between low levels of emotional self-efficacy and high neuroticism went together in adolescence and such low levels of self-efficacy often lead to somatically manifested anxiety disorders. Emotional Stability showed protection effects, like predicting

satisfaction of life and general happiness, especially in young ages (Hills & Argyle, 2001).

3. *Neuroticism as a risk factor*

The third group includes all those illness-oriented studies in which the role of neuroticism for the development of particular mental or physical illnesses is investigated. It is found that high levels of neuroticism, measured in adolescence, increase the risk of suffering from schizophrenia (Van-Os & Jones, 2001). High levels of neuroticism also play a major role in eating disorders, both in anorexia and bulimia nervosa (Diaz-Marsa, Carrasco & Saiz, 2000; Ghaderi & Scott, 2000).

It is concluded that, in general, long-term high-level neuroticism is in many ways connected to somatic problems and it indicates important psychological malfunctioning.

3.3.6 The empirical study

The study relies on three successive assessments conducted twice in the sixth grade (W3 and W4) and once in the seventh grade (W5). The effect of the personality variables is examined over a period of about one year. The effects are assessed through linear regression analysis, with a control for possible gender effects.

3.3.7 Subjects

Participants in the sixth grade (W3) provided the data for the analysis of the relationship between psychosomatic complaints and personality characteristics. This sample consisted of 823 pupils (401 boys; 414 girls; 8 gender unknown) with a mean age of 11.8 years (min.: 10, max. 15; SD: .68).

The short-term causal interpretation of the personality characteristics over an approximately five-month period was assessed in the dataset provided by the W4 group. Only the replies by those pupils were used for the analysis which provided valid answers at the beginning and at the end of the sixth grade survey period. Here, the sample consisted of 772 pupils (374 boys; 391 girls; 7 gender unknown) with an age range between 10 and 15 years (mean: 12.8; SD: .67).

For the long-term (one-year) effects of personality, only those pupils participated as subjects who provided valid results in all three assessments (W3, W4, and W5) from the beginning of the sixth grade to the beginning of seventh grade. The long-term effects were assessed in a sample of 504 pupils (227 boy; 274 girls; 3 gender unknown) with ages ranging from 10 to 15 years.

The large majority of the pupils were German citizens and native German speakers (80 %, at the first personality relevant questioning in the beginning of the 6th Grade).

3.3.8 Instruments

The personality characteristics were assessed by the five personality dimensions of the adapted FFPI. The instrument was presented as part of a larger battery that included questions and scales regarding various psychological and sociological constructs such as social competence, depression and school related aspects (see Appendix E).

Psychosomatic complaints were assessed by the "Skala zu psychosomatischen Beschwerden" [Psychosomatic Complaints Scale] (Engel & Hurrelmann, 1989). This four-point scale (from 1 = “never” to 4 = “often”) included eight items that described diverse psychosomatic complaints such as headache, sleeping difficulties, nervousness and digestive dysfunctions (see Appendix B). To answer the questions, pupils were asked to concentrate on the last three months, and they were asked to report on the frequency of the symptoms. The questions were formulated as simply and clearly as possible (e.g.: “How often have you been anxious?”).

3.3.9 Results

In the following, the short-term prevalences of the psychosomatic symptoms and the personality relevant results are presented.

3.3.9.1 Reliabilities and gender differences

The internal consistencies of the Psychosomatic Complaints Scale were at the first measurement .78 (W3), at the second .79 (W4) and the last .75 (W5).

Gender specific differences were found in Emotional Stability, where girls turned out to be more emotionally unstable then boys ($t = 4.3$; $p < .001$), and in Agreeableness, where boys were less agreeable then girls ($t = 8.1$; $p <. .001$). These findings confirm the adult Big Five results (e.g., Cramer & Imaike, 2002).

3.3.9.2 The frequencies of psychosomatic complaints

At the first assessment for the beginning of the sixth grade (W3), the most frequent complaint was tiredness (Table 8). Over half of the total group, 56 percent, complained about having been tired occasionally during the last three months. The least frequent symptom was diarrhea; almost 70 percent reported not having it at all for the questioned period. Every fifth pupil in the sample reported suffering from sleeping difficulties often. Every seventh student had headaches frequently. Only three percent (23 pupils) of all 827 participants reported no psychosomatic symptoms at all, at the beginning of the assessment, and one percent (8 pupils) at the third occasion ($N = 630$) in the seventh grade. The majority of the pupils reported that they seldom had complaints: 55 percent in the first and 54 percent in the last measurement reached less than the half of the scores on the psychosomatic scale. Approximately five percent reported various and quite frequent accuring psychosomatic complaints in both measurements (W3 and W5).

It is interesting how often pupils reported having the given symptoms either seldom or sometimes. Even though the results match with the results of the "Jugendgesundheitssurvey" [Youth –Health Status Survey] (Kolip, 1997) that showed a relative frequency of psychological disturbances and somatic complains even at a young age, it is rather alarming for eleven years old to deal with with such a variety of complains. Psychosomatic complaints are considered to be signs of unsolved coping processes and/or stress induced somatic disturbances and so a serious physical and psychological symptom that marks the general health situation even at a young age (Holler-Nowitzki, 1994; Kolip, 1997).

It happens quite often that these symptoms are not taken seriously enough; they are

suppressed by medication and therefore, receive a symptom oriented short-term treatment without searching for the real cause of the problem.

Table 8. The frequencies of psychosomatic symptoms at the first personality relevant measurement (W3).

	never			seldom			sometimes			often		
Items	**total**	**girls**	**boys**	**total**	**girls**	**boys**	**total**	**girls**	**boys**	**total**	**girls**	**boys**
Headache	164	66	97	315	160	155	230	124	100	17	66	50
Sleeplessness	172	73	98	299	137	158	211	119	91	145	87	56
Anxiety	467	221	244	244	124	115	83	50	32	32	21	11
Nervousness	283	132	150	310	158	148	165	87	77	68	39	28
Tiredness	131	56	72	230	121	106	213	120	92	251	118	132
Stomachache	316	144	172	292	142	147	147	84	60	63	41	20
Stress	354	178	174	309	149	156	113	63	49	49	25	23
Diarrhea	557	293	261	206	92	112	54	28	23	8	1	7

Note: *N* total = 827; *N* girls = 416; *N* boys = 403.

3.3.9.3 Gender differences in the occurrence of psychosomatic symptoms

As often described in literature, girls reported more psychosomatic problems then boys (e.g., Kolip, 1995a). Table 9 presents the gender specific results, and shows that there were significant differences between girl and boys: girls reported suffering more often from headaches ($t = 2.97$, $p < .005$), had greater difficulty falling asleep at night ($t = 3.74$, $p < .000$) and complained about stomachaches more often ($t = 3.54$, $p < .000$). In the case of anxiety, there was a tendency that girls experienced more anxiety than boys at the age of ten-eleven ($t = 2.76$, $p = .006$). Nevertheless, these gender specific effects (ε) are rather weak and therefore, caution is suggested by the interpretations. It is supposed that in the background of these results different bodily processes are that affect girls more than boys at this age. Moreover, also cultural factors, like identification with the female social role in society, could influence the different gender tendencies in reporting psychosomatic complaints (Kolip, Nordlohne & Hurrelmann, 1995).

Striving for independence from the parents accompanies the biological changes in the

hormone system. Coping with these changes and challenges is a responsible and difficult task for both gender groups. If these tasks cannot be solved without complications, insufficient and inadequate solutions may occur. Helferich (1995) sorted such inadequate reactions into two groups: "regressive" and "aggressive" reactions. Somatic reactions to problems belong to the regressive reactions and is considered traditionally specific for girls. Aggressive reactions like juvenile delinquency or deviance is characteristic for boys. The appearance of psychosomatic problems may be interpreted as a signal for being overburdened by the developmental tasks and for having difficulties in coping with everyday hassles in the life of a teenager.

Table 9. Results of the t-tests on gender differences in the Psychosomatic Complaints Scale at the first time of questioning.

	Girls[1]		Boys[2]				Mean	
Items	**M**	**SD**	**M**	**SD**	**t**	**p**	**diff.**	**ε**
Headache	2.46	.94	2.26	.95	2.97	**.003**	.20	.21
Sleeping Difficulties	2.53	1.01	2.26	.98	3.74	**.000**	.27	.26
Anxiety	1.69	.86	1.53	.75	2.76	**.006**	.16	.20
Restlessness	2.09	.95	1.98	.92	1.63	.104	.11	.12
Tiredness	2.73	1.03	2.68	1.11	.69	.492	.05	.05
Stomach complaints	2.05	.99	1.81	.87	3.54	**.000**	.24	.26
Tension	1.84	.89	1.82	.86	.27	.784	.02	.02
Diarrhea	1.36	.62	1.43	.67	-1.40	.163	-.06	-.11

Note: [1] $N = 422$; [2] $N = 397$.

3.3.9.4 The predictive role of personality

The role of the five personality domains was studied through multiple regression analyses where the independent variables were the scale scores for Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Autonomy from the for adolescents adapted FFPI. As the dependent variable the sum-score of the "Skala zu psychosomatischen Beschwerden" was entered into the regression. All presented analyses were conducted with a control for gender, calculated over a short-term period of five months (W4) and over a long-term period

of one year (W5). In Tables 10 to 12 the results of these analyses are presented.

3.3.9.5 The multiple regression analyses

Through the multiple regression analyses the possible predictive effects of the personality dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Autonomy against psychosomatic symptoms was tested. The results of the multiple regression analyses are presented in Table 10. Two full models were tested here (all predictors were entered at once) at two measurements (W4 and W5): Model 1 with gender as a predicting variable and Model 2 with gender, Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Autonomy as predicting variables.

The linear regression analyses were conducted three times: once for the whole group (Total) of subjects, once for the intervention group (Intervention), which participated in a primary prevention program (see section 2.1.4), and once for the control group (Control) with no prevention topic of any kind. The criterion variable was the sum-score on the Psychosomatic Complaints Scale. For the three groups and measurements, the following statistical parameters were computed: the explained variance (R^2), the adjusted R^2, the value of the correction for shrinkage which shows a compensated multiple correlation for wide range populations (Bortz, 1999), the F-value, the degrees of freedom (df) and the two tailed p-value (p). The product moment correlations (r) and Beta weights of the predicting variables are presented together with the corresponding p-values in Table 11.

In Table 12 the usefulness of the two models are depicted. The changes R^2, F, and in the p-value of F in the models 1 and 2 are presented for all subject groups and both measurements. This form of presentation is chosen in order to be able to present all relevant results in a compact but still comprehensible way.

Table 10. The comparison of two prediction models (Model 1 and Model 2) of personality in psychosomatics over the short and long term period.

Variables in the Model:		Model 1 Gender		Model 2 Gender & FFPI	
		W4	W5	W4	W5
Multiple R	Total	.12	.08	.36	.33
	Intervention	.05	.10	.32	.37
	Control	.19	.06	.41	.33
R^2	Total	.02	.01	.13	.11
	Intervention	.00	.01	.10	.12
	Control	.04	.00	.17	.11
R^2 adjusted	Total	.02	.01	.11	.10
	Intervention	.00	.01	.09	.12
	Control	.03	.00	.15	.09
F	Total	11.65	3.46	18.56	10.40
	Intervention	1.07	2.65	6.91	6.77
	Control	13.84	1.02	12.44	5.18
df	Total	1	1	6	6
	Intervention	1	1	6	6
	Control	1	1	6	6
p-value (2-tailed)	Total	.001	.063	.000	.000
	Intervention	.302	.105	.000	.000
	Control	.000	.314	.000	.000

Table 11. The predictive role of the personality variables Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Autonomy and gender (Model 2) in psychosomatics over the short and long term period.

Variables	Groups	r		Beta		p_	
		W4	W5	W4	W5	W4	W5
Gender	Total	-.12	-.08	-.09	-.04	.015	.328
	Intervention	-.06	-.10	-.05	-.08	.380	.210
	Control	-.19	-.06	-2.32	.01	.021	.852
Extraversion	Total	-.14	-.13	-.07	-.09	.040	.037
	Intervention	-.16	-.21	-.09	-.15	.083	.018
	Control	-.11	-.05	-.07	-.03	.168	.629
Agreeableness	Total	-.06	.01	-.03	.04	.455	.341
	Intervention	-.08	-.07	-.02	.01	.686	.889
	Control	-.11	.08	-.03	.09	.563	.137
Conscientiousness	Total	-.04	-.14	-.04	-.05	.266	.255
	Intervention	-.12	-.12	-.02	-.03	.721	.667
	Control	-.19	-.16	-.06	-.07	.233	.251
Emotional Stability	Total	-.34	-.30	-.29	-.28	.000	.000
	Intervention	-.29	-.30	-.26	-.27	.000	.000
	Control	-.38	-.30	-.33	-.29	.000	.000
Autonomy	Total	-.03	-.04	-.01	-.04	.774	.410
	Intervention	-.06	-.13	-.06	-.11	.233	.060
	Control	-.01	.04	.04	.63	.405	.527

Note: W4 - *N*: Total=765, Intervention=384, Control=381; W5 - *N*: Total=529, Intervention=264, Control=265.

Table 12. The change in R^2 , F, and significance of F over the short and long term prediction period between the Regression Models with Gender (Model 1) and Gender, Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Autonomy (Model 2) as independent variables.

Variables in the Model:		Model 1 Gender		Model 2 Gender & FFPI	
		W4	W5	W4	W5
Change in R^2	Total	.02	.01	.11	.10
	Intervention	.00	.01	.10	.13
	Control	.04	.00	.13	.10
Change in F	Total	11.65	3.46	19.66	11.71
	Intervention	1.07	2.65	8.06	7.52
	Control	13.84	1.02	11.77	5.99
Change in p-value of F	Total	.001	.063	.000	.000
	Intervention	.000	.105	.000	.000
	Control	.302	.314	.000	.000

Note: W4 - *N*: Total=765, Intervention=384, Control=381; W5 - *N*: Total=529, Intervention=264, Control=265

3.3.9.6 Model 1 - Gender

Looking at the first model with gender alone as predicting variable, it is shown that gender showed a small but significant short-term predicting effect in the control group ($R^2 = .04$, $F = 13.84$, $p < .001$): four percent explained variance of the psychosomatic variable at W4 (Table 10). It also showed a significant effect in the total group in the short-term measurement ($R^2 = .02$, $F = 11.65$, $p < .001$). It means that gender alone played a small but significant role in the prediction of psychosomatic complaints, in that girls reported to be more often affected by psychosomatic problems than boys. However, as illustrated in Table 12, the rather low changes in R^2 in Model 1 supported the usefulness and meaningfulness of Model 2 compared to Model 1, therefore Model 2 should be discussed in more detail in the following.

3.3.9.7 Model 2 - Gender and the personality variables

This model was highly significant ($p < .001$) in all subject groups and at both assessments (W4 and W5) and showed a highly significant ($p < .001$) improvement of its usefulness compared to Model 1 (Table 10). Therefore, this model was chosen for the purpose of further interpretation of the prevention effects of the Big-Five personality variables.

Major effects

Emotional Stability seemed to play a major role in the regression model. The effect appeared in all groups of subjects and at all three assessments. Moreover, this effect remained significant after a correction for the test wise α error rates was computed as desribed by Bortz (1999, p. 261). This calculation of a corrected α value (α') was necessary to conduct because of a possible α error cumulation based on simultaneous testing with gender and the five personality variables. The calculation resulted, by a test wise error rate of .05, a corrected value of $\alpha' = 1 - (1 - \alpha)^{1/6} = 0.00851$. The correction by Bortz ($\alpha' = 1 - (1 - \alpha)^{1/m}$) was preferred to the Bonferoni-correction ($\alpha' = \alpha / m$) because of its better preciseness.

The substantial correlations between the psychosomatic variable and Emotional Stability in all analyses seemed not solely supporting the predictive character of Emotional Stability but also pointing to a possible overlap in the conceptual characteristics of the constructs (Table 11). Nevertheless Emotional Stability seemed to play a strong predicting role against the occurrence of psychosomatic symptoms in adolescence. This effect hadn't become weaker over the one-year period and showed a robust relationship between the predictor and criterion variable. In other words, Emotional Stability accounted for approximately 30 percent of the variance in the psychosomatic variable as well as in the short term five months as in the one-year longitudinal measurements. This result was also supported by the psychosomatic complaint as expressed in percentages: in the short term measurement (W4), from those who reported high values on Emotional Stability, only ten percent complained about psychosomatic symptoms five months later. More than twice as many (24%) students, who reported to have health problems after the five-month period, were low on Emotional Stability.

In the long-term measurement (W5) this trend was repeated. Those who scored high on Emotional Stability at the first measurement (W3) remained relatively free of complaints

(only 7% reported frequent symptoms) in comparison to those who scored low at W3, while 24 percent reported suffering from various psychosomatic symptoms. This means that the less emotionally stable an adolescent is, the more likely it is that he or she will suffer from psychosomatic symptoms such as headaches, sleeping difficulties or tiredness.

In conclusion, Emotional Stability should be interpreted as a meaningful personality predictor dimension in early adolescence.

Secondary effects

Gender showed a relatively small effect in predicting psychosomatic symptoms, but even this small effect should be taken into consideration and, therefore, the variable gender was included in the second model together with the personality predictors Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Autonomy. There was a negative correlation between gender and the dependent variable in all groups and measurements, meaning that girls scored relatively higher on the psychosomatic scale. Interestingly enough, this effect was only significant in the control group and not in the intervention group. Unfortunately, it was not possible to prove the possible personality relevant side effects of the primary prevention program on the basis of the present data, but it will be a promising aspect for further research to check such an influence.

There was another specific secondary effect regarding the predictive role of Extraversion ($p < .05$). Here, the effect appeared in the intervention group and became significant in the long-term (W5) measurement. Possibly extraverted adolescents are more likely to be influenced by a school-based intervention program. This could explain the occurrence of this effect of the prevention at a later measurement. Perhaps this influence needs time to become relevant to the broader personality relevant domain. This reasoning can also be related to the tendency that was observed in Autonomy at W5 in the intervention group. It is to note, that these latter results cannot be considered significant when the above described correction for the test wise α error rates was taken into account.

3.3.10 Conclusions

The study provided self-report results on the relationship between the Big Five dimensions and psychosomatic symptoms in adolescence. The results showed that Emotional Stability mainly influenced both short- and long-term prevention aspects. This means that self-assured, emotionally well-balanced young adolescents do not suffer that much from psychosomatic symptoms; they sleep better, cope with stress better than the emotionally less stable adolescents.

Solving emotional problems is much more difficult in cases where illness had already appeared. Though a medical solution at the symptom level and the prescription of medication and concentration on the bodily aspects often leads to the neglection of the real psychological background. Furthermore, when the symptoms had already appeared, the reason for the symptoms is shadowed and, therefore, only the symptoms are dealt with and the basic problem is left unattended in most of the cases.

Unproductive coping strategies can be reinforced even at a young age; a bias toward somatic reactivity can be supported. This means that the projection of emotional problems into bodily physical problems becomes acceptable and successful, and that can possibly lead to the manifestation of persistent and hardly curable psychosomatic diseases in later adulthood. Difficulties like stress, coping with developmental tasks and environmental influences may be disguised even at a young age as headaches, stomachaches or sleeping disorders.

A long-lasting and successful solution to these symptoms can only be attained through a disclosure and acceptance of the original problem. Therefore, Holler-Nowitzki (1994) described the adolescent life-period as extraordinarily conflict-ridden where the majority of conflicts take place in the social structural context and where detachment from the parents is the most important developmental task. She proposed an immediate intervention after the manifestation of the symptoms, when the causality is still detectable, and the interval between

treatment and occurrence of the problem is not too large. Campo and Fritz (2001) argued that careful assessment, a well-established diagnosis, and a cognitive behavioral approach must be preferred in cases of medically unexplained physical symptoms. There is however little systematic research available on treatment in childhood and adolescence. Rundell (2000) argued, that children and adolescents should not be considered as "little adults" but seen within their own developmental setting, and not only through their symptoms. He also feared that sudden extraordinary attention paid to the children with unexplained physical symptoms could cause an undesirable effect, namely that the symptoms do return at a later time when similar basic conflicts reappear. If personality characteristics can indicate a potential risk for the development of psychosomatic disorders, it becomes possible to act early in order to support the personality development with adequate preventive measures before the appearance of persistent bodily responses.

These results show that personality is to be considered both a potential protective-factor and a risk factor. The necessity of early recognition of these aspects and a need for personality training and positive personality developmental reassuring interventions is supported by this study. The more known about the nature of the relationship between health and personality and the more detailed and precise this knowledge is, the better prevention can be achieved. On the basis of good prevention, inadequate coping strategies can be replaced by more promising alternatives and therefore, can help to avoid that inadequate mechanisms become cemented or reinforced. If maladaptive coping strategies, like psychosomatic reactions to conflicts, can be fought, the health endangering physical and psychological reactions to the maladaptive strategies can be eluded also. Through these mechanisms, adolescents can learn to become more competent and resistant adults.

It is concluded that psychological characteristics already performed in early life a determining role, and should not be underestimated. A further goal of future research should be to point out a more elaborate picture on the role of personality factors, especially in the

case of Emotional Stability, and to check its contribution to one's individual development, so that the developmental tasks of the adolescence-phase can be effectively accomplished by all.