DISSERTATIONES PSYCHOLOGICAE UNIVERSITATIS TARTUENSIS
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Antecedents and concomitants of adult psychological distress

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CONTENTS

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Contribution of the author

The author of the dissertation contributed to the publications as follows:

In **Papers I and II**: formulating the research questions, carrying out some of the data analysis, participating in writing the manuscripts.

In **Papers III and IV**: Participating in the study design, formulating the research question, analysing the data and writing the manuscripts as the main author.

In **Paper V**: Formulating the research question, creating the study design, collecting and analysing the data and writing the manuscript as the main author.

1. INTRODUCTION

1.1. Psychological distress and its distribution

Psychological distress combines mostly anxiety and depressive symptoms that are indicative of the level of emotional ill-being. The latter is considered as a common feature of a wide range of psychiatric disorders (Kessler *et al.,* 2002). Thus psychological distress can serve as a useful indicator of mental health and mental illness in research and clinical settings as well as in public health. Depression and anxiety are usually recognized as core distress syndromes that each have psychological and somatic components. The inclusion of somatic complaints in distress measurement is under theoretical debate, but sleep disturbances, loss of energy and physical symptoms associated with clinical cases of anxiety and depression, are frequently present in distress scales. Exploratory and confirmatory factor analysis in various samples using different instruments has demonstrated the benefit of second order nonspecific psychological distress in structuring various affective, cognitive and possibly somatic dimensions of ill-being (Zautra, Guarnaccia, & Reich, 1988).

Structured diagnostic interviews for mental disorders are time-consuming and therefore expensive and become too much of a burden to the respondent to be used in large population surveys. Recently, several self-rating scales have been developed for screening psychological distress that mostly follow the example of the DSM-IV and ICD-10 criteria for anxiety disorders and major depression and depressive episodes, respectively. One of the most frequently used instruments for measurement of non-specific psychological distress through the continuum (ranging from absence of psychological distress to the presence of anxiety disorders or depression) is the Kessler Psychological Distress Scale (K10) and its shorter form K6 (Kessler *et al.,* 2002). Both instruments have proven to be excellent screening instruments for current depression in the general population (Cairney, Veldhuizen, Wade, Kurdyak, & Streiner, 2007). Short self-rating scales may also prove valuable in general medicine as screening instruments for common psychiatric disorders or for the identification of subclinical cases.

The results from surveys that use the popular self-rating scales have shown various results across the world. Despite their variability the psychological distress and related mental disorders (especially major depression or depressive disorder) as worldwide problems undoubtedly exist. For instance, in US a nationwide 30-day prevalence of nonspecific psychological distress of 3% has been reported, and the estimate has increased to 6.4% in New York City (McVeigh *et al.,* 2006). In Norway the corresponding values ranged between 13% and 16% in two different regions and with an 11 year measurement interval, showing the prevalence of distress remaining stable over the years (Svensson, Nygård, Sørensen, & Sandanger, 2009). Regarding working population, in Japan high psychological distress (clinically important symptoms that resemble categorical diagnosis) was measured in 10.8% of employees (Fushimi

et al., 2010). Studies in Europe also show that fatigue and psychological distress are common in the working population. For instance, the prevalence of 22% for fatigue and 23% for psychological distress was found from a large sample of working adults in the Netherlands (Bültmann, Kant, Kasl, Beurskens, & van den Brandt, 2002). Similarly to the depressive disorder, recurrent history of psychological distress has been found to be associated with progressively increasing risk of future distress in dose-response manner (Jokela *et al.,* 2011). Thus the thresholds for future affective reactions for example are likely to become progressively lower depending on the extent of the previous psychological distress. One major problem concerning the prevalence of serious psychological distress is that depression has a tendency for chronic course. High levels of psychological distress before or after a depressive episode have proven to be risk factors for future depression.

Alongside with anxiety disorders, depression is the most prominent mental disorder characterized by an elevated level of psychological distress. Wiltink *et al.* (2011) have recently made comparisons among main affective disorders across the regions: the one year prevalence of depression being 6.7% in United States, 6.9% in Europe, and 8.3% in Germany. Mental disorders characterized by high psychological distress are frequently comorbid, making adjustment especially difficult. Elevated psychological distress has also been found to be associated with several somatic conditions. Particularly high prevalence of comorbidity has been established between major depression and the other psychiatric disorders. Nearly three-fourth of respondents with life-time major depression also met criteria for at least one of the other mental disorders (Kessler, Merikangas, & Wang, 2007). Fifty nine percent of these lifetime coincidences occurred between major depression and at least one anxiety disorder. Also, increased psychological distress and especially depression is found to be associated with many somatic conditions: dyslipidemia, coronary heart disease, diabetes, and the history of stroke with Odd Ratios (*OR*s) ranging from 1.35 to 2.43, respectively (Wiltink *et al.,* 2011). Serious psychological distress was even found to be related to the increased mortality in a dose-response manner (Pratt, 2009).

1.2. Psychological distress and subjective well-being

Increasing levels of depressive symptoms are found to be related to increasing levels of psychosocial dysfunction and incidence of major depression (Lewinsohn, Solomon, Seeley, & Zeiss, 2000). Also important, the continuum of dysfunction found was observed across genders and across the life span from adolescence through to older adulthood. In general, psychological distress and clinically significant anxiety and depressive symptoms tend to be associated with enduring psychosocial impairment. These aspects of psychological distress bring us to the term well-being. We are using this term in the meaning of

subjective well-being, defined by Ed Diener as an "individual's global evaluation of his or her life across a variety of different aspects of that life" (Diener, Lucas, Schimmack, & Helliwell, 2009). In subjective well-being judgements an individual evaluates objective well-being factors (e.g. health or income) on the basis of his or her own interests, needs, preferences, or desires. The subjective well-being of an individual thus reflects differences between those psychological phenomena and his or her consideration of the current state. Several theories of subjective well-being (e.g. telic, activity, bottom-up versus top-down etc.) have been created (for a review see Diener, 1984). Recently, a successful attempt was made to join three leading models (hedonic, eudiamonic and social well-being) together in one comprehensive model of flourishing mental health (Gallagher, Lopez, & Preacher, 2009).

Although increasing values of clinically important anxiety and depressive symptoms are no doubt strong indicators of ill-being and absence of well-being, reports of affective states are not parallel with life satisfaction in general. There is always a possibility that an individual reporting an increased value of psychological distress can evaluate his or her general life as good or has been satisfied with the current state of affairs in at least some life domains. For instance, an individual having a serious mental disorder but receiving adequate medication can show good "mental health" if his or her life conditions and social life indicators such as access to professional life, social support network, living conditions etc. are adequate. Diener *et al.* (2009) have also pointed to the possibility that disturbed states of mood like anxiety and depression could weaken the link between well-being and the affective indicators of well-being, via inadequate reflection of environmental stimuli by affective responses. Secondly, some sophisticated evaluations of an individual's life may be purely cognitive and may not elicit an affective response. Political candidates and polices are some examples of attitude objects which have received primarily cognitive evaluations (Eagly, Mladinic, & Otto, 1993). For these reasons the affective indicators cannot serve as the only measure of ill or health.

The cognitive indicator of ill-being or well-being consists of the evaluative judgments that individuals make about their lives (Diener, 1984). The life satisfaction evaluations have been considered to have the closest connection to the higher-order construct of well-being compared to the affective measures. In the life satisfaction dimension of the well-being construct it is sometimes useful to differentiate between life areas. According to Diener, the structure of satisfaction with specific domains of an individual's life depends on the culture and the way his or her life is structured. Therefore, no universal structure of domain satisfaction or of well-being components exists, but a similar structure can be found for many cultures and groups because of their common features (Kuppens, Realo, & Diener, 2008; Møller & Saris, 2001). It is established that cultural variables related to objective factors (e.g. wealth), norms dictating appropriate feelings and importance of good experiences, and the relative approach or avoidance tendencies in societies explain differences in mean levels of subjective well-being (Diener, Oishi, & Lucas, 2003). Respectively, due to

the same cultural variables a different structure of judged life satisfaction and affective experiences can emerge. Kuppens *et al.* have found that national culture moderates the strength of links between the positive and negative experiences and life satisfaction judgments. They found that people from individualist countries were more sensitive to negative emotions when making their life satisfaction judgments, compared to people in collectivist nations. Given that, it is important to validate the supposed constructs in empirical studies.

Large population samples give a good opportunity for examining the relationships between life satisfaction and psychological distress constructs for measuring mental ill-health. Previous research on psychological distress and life satisfaction reveal that these are two different, though correlated, dimensions of a concept of mental health (Massé *et al.,* 1998). It is not yet clear for now what the best predictor of health-seeking behaviour is – a worsening in psychological distress or a decrease in satisfaction with life. Either due to the different cultural features or a variety of socio-economical status there cannot be one definite answer to that question. Yet, we can get a better understanding of common and specific features of the motivational structure of health-seeking behaviour across different cultures and societies.

Diener has pointed to the finding that domains which are closest and most immediate to people's lives are those that influence subjective well-being most. For instance, social differences in depression in Eastern Europe (Russia, Czech Republic and Poland) were found to be related to the current economic circumstances more strongly than to early life conditions or education (Nicholson *et al.,* 2008). Similarly, well-being is known to be more strongly associated with economic conditions in disadvantaged societies and population groups. For instance income is no longer influential for well-being when the basic needs of an individual are met. In wealthy societies the general life satisfaction judgments are not predicted by financial satisfaction, instead home life satisfaction is more strongly related to general satisfaction (Oishi, Diener, Lucas, & Suh, 1999). The authors also found that satisfaction with esteem needs predicted a global life satisfaction more strongly in individualist nations than in collectivist societies. In this sense the Estonian society has an interesting and ambivalent position – an Eastern-rooted economy and relative poverty of majority of people on one hand and a striving for freedom and self-actualization characteristic of Western culture on the other hand.

1.3. Psychological distress and subjective well-being in men and women

In general, adults with serious psychological distress are more likely to be female, have an education level less than a high school diploma, live in poverty, and are less likely married than adults without serious psychological distress (Pratt, Dey, & Cohen, 2007). Life satisfaction, on the other hand, has not shown such a strong relationship with demographic factors. Only having no partner and being dissatisfied with family life have received consistent significant support as correlates of decreased judgments of overall life satisfaction (Diener, 1984; Fugl-Meyer, Melin, & Fugl-Meyer, 2002). Interesting is that alongside with consistent gender-differentiated results of psychological distress and related psychiatric disorders (anxiety and depression) in general population the evidence of significant gender differences in life satisfaction are absent (Diener, 1984; Fugl-Meyer *et al.,* 2002). The gender differences between the levels of psychological distress cannot be readily explained by the measurement problems, as sometimes proposed. The evidence suggests that the higher mean levels of psychological distress observed in women reflect a true difference in distress and is unlikely to be a problem of gender-biased measurement (Drapeau *et al.,* 2010). For better understanding of that inconsistency it would be functional to examine the structures of psychological distress and subjective well-being in men and women and make comparisons between the genders.

Theories about sex differences in social behaviour, personality and abilities assume that biological, psychological and social processes mediate the pathway from basic cause (e.g. evolved psychological dispositions or social structure) to sex-differentiated behaviour (Archer, 1996). Amongst the several differences between the evolved psychological dispositions theory (Buss, 2004) and the social structural cause theory for individual differences (Eagly & Steffen, 1984) is that the former theory have given limited attention to the variation of sex differences in response to individual, situational, and cultural conditions. The social structural theory of origins of sex-differentiated behaviour emphasizes the influence of contemporaneous social conditions like different social roles and positions in hierarchy of men and women.

We were interested in the interactions between the cognitive (life satisfaction) and affective (psychological distress) components of ill-health. Specifically, we have considered the sex-differentiated structure of these constructs in our society. It would be logical to think that culture-specific norms have similarities and some overlaps across genders in society, but gender-specific stereotypes also exist. These stereotypes may influence the cognitive and affective responses and also modify verbal and behavioural components of these experiences differently in men and women. It is well-known that women seek help and go to the doctors more easily and frequently. They also value more social relationships and accept support from others, as compared to the average male in our society. Secondly, derived from evolved psychological dispositions or from social structure the levels of importance of various life

domains may influence both life satisfaction judgements and experienced psychological distress differently between genders.

One source of sex-differentiated variability in well-being could arise from temperamental-personality traits. The studies in the Big Five tradition on trait correlates of subjective well-being have confirmed the hypothesis that temperamental traits of emotionality, fearfulness, hostility and impulsivity (Neuroticism) have been associated especially with negative affect and with lower levels of well-being while the temperamental traits of sociability and activity (Extraversion) have been related with positive affect and higher levels of subjective well-being (Costa & McCrae, 1980). Neuroticism and Extraversion are more closely connected to the affective well-being than to the life satisfaction component of subjective well-being. The mediator model of personality and life satisfaction implies that one way how Extraversion and Neuroticism can influence life satisfaction is through affective mechanisms like hedonic balance (relative difference between negative and positive emotions, Schimmack, Diener, & Oishi, 2002). Women are found to have higher levels of Neuroticism compared to men (Goodwin & Gotlieb, 2004). Further, cultural variables, such as individualism and collectivism have been found to moderate the impact of hedonic balance to the life satisfaction judgments (Schimmack, Radhakrishnan, Oishi, Dzokoto, & Ahadi, 2002). Individualistic cultures emphasize the independence of individuals whereas collectivist cultures emphasize interdependence of individuals (Markus & Kitayama, 1991). Members of collectivist cultures are expected to subordinate personal goals to the interest of in-group members with a higher status (Radhakrishnan & Chan, 1997). Individuals in collectivist cultures in general consider following cultural norms more important than maximizing pleasure (Suh, Diener, Oishi, & Triandis, 1998). Essentially, a culture defines sensitivity/insensitivity of the community to distress manifestations, the normality and acceptability of these manifestations, the overall adequacy of expression of mental health problems, and the vulnerability or tolerance of the individual to life experience (Massé *et al*., 1998). These culture-specific factors could also moderate the sex-differentiated associations between personality and well-being.

1.4. Childhood adversity and clinically important distress symptoms in adulthood. The role of perceived control

Evidence supporting the contribution of childhood adversity to the adult psychopathology comes from several sources: epidemiology (Kessler, Davis, & Kendler, 1997; van der Vegt *et al.,* 2009), gene-environment interactions (Bale *et al.,* 2010), and animal models (Sanchez, Ladd, & Plotsky, 2001). Emotional neglect and psychological, physical, and sexual abuse in childhood have been found to be significant predictors for adult depression and anxiety (Spinhoven *et al.,* 2010). An association between the number of negative events in childhood

and the probability of lifetime and recent depressive disorder is also well known (Chapman *et al.,* 2004).

Several explanatory mechanisms have been suggested for the relationship between exposure to childhood adversity and mental health. An influential theory postulates that early adverse life events can sensitize an individual to stress and the latter in its turn could be responsible for elevated risk of psychological distress and affective disorders (Hammen, Henry, & Daley, 2000). For a recent systematic review of stress generation in depression see Liu and Alloy (2010). Previous psychopathology, for instance anxiety and depression, is found to be an important pathway to a future depressive episode (Kessler & Magee, 1993; Kessler *et al.,* 2007). A parallel perspective is that early adverse experiences could establish a cognitive vulnerability for development of psychological distress, as well as clinical depression and anxiety (Alloy, Kelly, Mineka, & Clements, 1990; Beck & Emery, 1985; Parker, Gladstone, Mitchell, Wilhelm, & Roy, 2000). The key component of this cognitive vulnerability consists of internal, global, and stable negative attributions for daily events and circumstances. Self-criticism related to low self-esteem is found to mediate between childhood verbal abuse and adult depressive and anxiety symptoms (Sachs-Ericsson, Verona, Joiner & Preacher, 2006). An important role amongst negative explanatory style belongs to the individual's beliefs about controllability of his or her personal life. A meta-analysis of the relationship between personality and subjective well-being has established the most closely related personality traits to be repressive-defensiveness, emotional stability, locus of control, hardiness, positive affectivity, self-esteem and tension (DeNeve & Cooper, 1998). High distress symptom levels have found to be strongly related to low self-esteem and external control (Ormel & Schaufeli, 1991).

Research on the relationship between childhood environment and adult psychological distress and associated affective disorders have suggested that early experiences with uncontrollable events may form a primary pathway to the development of anxiety via psychological vulnerability associated with external locus of control, ELOC (Chorpita & Barlow, 1998). The essence of the cognitive personality trait locus of control (LOC) lays on the assumption that people differ in their individual social learning experiences, which further lead to the different ability to associate reward and punishment with their own preceding behaviour (Rotter, 1966). Especially in case of chronic severe adversity it could be likely that the process of repeated learning and establishment of contingencies between recurring causal events, which is essential for development of the sense of personal control, could be deficient and lead to the development of generalized expectancy of uncontrollability. In this case an individual attributes the event to the luck, chance, fate, and powerful others or labels the event as unpredictable (ELOC). Psychological distress (Keeton, Perry-Jenkins, & Sayer, 2008) and its disorders are found to be associated with more elevated ELOC (Beekman *et al.,* 2000; Harrow, Hansford, & Astrachan-Fletcher, 2009; Kennedy, Lynch, & Schwab, 1998). People's beliefs about their

ability to exercise control over themselves and their environment was found to affect the way older persons interpret and manage their life-stress. Thus these control beliefs are impacting the stress-related outcomes of health (Montpetit & Bergeman, 2007). Findings suggest that mainly the perceived control over life events underlies social inequality in health (Bailis, Segall, Mahon, Chipperfield, & Dunn, 2001). Although internality has shown consistent correlation with happiness it still does not exclude the possibility that externality could be favourable regarding well-being. A few of the examples would be the society or culture with little freedom, or depressed patients who repeatedly blame themselves for negative outcomes even if the latter are objectively uncontrollable by the person.

There is cross-sectional evidence for LOC mediating the relationship between family environment, negative affect and further clinical anxiety symptoms in 6–15 year olds (Chorpita, Brown, & Barlow, 1998). Similar mechanisms have been suggested for development of generalized cognitions of threat and danger (Phillips, Hammen, Brennan, Najman, & Bor, 2005). The children in 1970–1980 in Europe are considered to have encountered more uncertainties and insecurity with increasing rates of unemployment, widening income inequality, and changes in family structure that have influenced the adult adjustment. A rapid polarisation of Estonian society starting from 90s with growing poverty and linked parental maladjustment (for example frequent alcohol consumption), increased level of parental divorce and single parent families could parallel the processes of 70–80s in Europe. Alongside with adverse circumstances like poverty and parental alcohol consumption, cultural capital in parental home is also considered as an important factor for social and psychological development of the child. The indicators of cultural capital (for example parents' education, number of books in parental home) have proved influential in future educational and professional status of an individual (Georg, 2004). These variables in turn are predictors of better mental and general health. According to the Estonian Health Interview Survey 2006, 58.3% of active adult men had upper secondary education and 33% had graduated from university. Among women respective numbers were 45.7% and 48.4%. Therefore our people are well-educated and there have usually been many books in the average household. The number of books in the home is considered as a good indicator of social and economic status providing children with opportunities for learning and intellectual growth (Matheson, Salganic, Phelps, Alsalam, & Smith, 1996). This kind of positive stimulation from outside can compensate for the insecure and difficult to control aspects of environment and lead to more generalized internal expectancy for control.

1.5. Affectivity and performance

Personality and job compatibility is not merely important for performance success but perhaps the most valuable consequence of the good person-job relation could be the prevention of job-related burnout and maintenance of general well-being. Job satisfaction is considered as an important contributor to the overall well-being.

It is assumed that, besides cognitive abilities, performance is also dependent on motivational processes, social orientation and emotional control, meaning that performance is related to personality traits. Earlier meta-analytic studies have found low, but consistent correlations of about $r = .21$ between performance ratings and personality (Schmitt, Gooding, Noe, & Kirsch, 1984). It is nearly the same as the correlation of $r = .19$ found between personality and subjective well-being (DeNeve & Cooper, 1998). Three large personality factors had particular importance in the performance and well-being context: Conscientiousness that primarily describes task behaviour and socially accepted impulse control; Neuroticism that identifies adjustment or lack of adjustment and Extraversion that focuses primarily on the quantity and intensity of relationships. Conscientiousness is thought to facilitate more positive experiences in achievement or social situations, which in turn enhance positive emotions and life satisfaction (McCrae & Costa, 1991). DeNeve found Conscientiousness as being the strongest correlate of life satisfaction. Conscientious people set higher goals for themselves and tend to achieve more in work settings (Barrick & Mount, 1991). They are more satisfied and experience less psychological distress. Extraversion and its facets predispose individuals toward a positive affect (Costa & McCrae, 1980). High positive emotions are mainly considered to be predictors of good teamwork (Rothstein & Goffin, 2006) or of the job performance requiring much social interaction (Barrick & Mount, 1991). DeNeve has argued the possibility that extroverted traits could be overestimated as the general predictors of positive emotions and life satisfaction. In a similar manner Tett, Jackson, Rothstein, & Reddon, (1999) have referred to several research findings about the detrimental impact of Extraversion on job performance and gave examples like sociability being negatively correlated to working independently, work attendance, and achievement orientation. Neuroticism on the other hand predisposes individuals toward negative affect that may interfere with job performance, especially when the levels of negative emotions are high. Anxiety is strongly correlated with both negative affect and rumination that can affect performance success in high stress professions and diminish job satisfaction. The likely consequence could be further deviation of emotional balance toward more negative emotions, future stress-generation and lack of satisfaction.

2. AIMS OF THE STUDY

The aims of the dissertation were:

- Constructing and establishing psychometric properties of a brief self-report screening questionnaire for anxiety and depression following the criteria of DSM-IV and ICD-10;
- Examining associations between depressive symptoms and socio-demographic factors and exploring psychological aspects of social adjustment of individuals with serious psychological distress in Estonia;
- Exploring sex-differentiated structural differences of two well-being indicators – life satisfaction and psychological distress – and sense of control in Estonian general population;
- Examining the mediating role of cognitive-personality trait locus of control between chronic childhood adversity and clinically important anxiety and depressive symptoms in adulthood;
- Establishing discriminant validity and usefulness of affective personality traits for selecting individuals for a stressful job.

3. METHODS

3.1. Participants

3.1.1. Population based samples (Papers I, II, III, and IV)

Data of two Estonian Health Interview Surveys (EHIS 1996 and EHIS 2006) were used in the thesis. These large population-based surveys were created to measure health, health-related behaviours and health determinants. They both were cross-sectional retrospective studies where face-to-face structured interviews were carried out by professional interviewers.

The EHIS 1996 sample was representative of the Estonian population in January 1996 **(Papers I, II, III)**. The multistage random sample of individuals was drawn from the 1989 census dataset. The survey was carried out in 1996–1997. In total, 6019 subjects aged 15–79 were selected for interview. The response rate was 78.3% (n = 4711). All respondents to EHIS 1996 who lived in Tartu or Tartu County, 479 subjects, were used as a group of normal controls in the psychometric assessment of the Emotional State Questionnaire (EST-Q) **(Paper I)**. Of these subjects 216 were men and 263 women. The mean age of respondents was 47.0 (SD = 19.5; range 15–79). A second population sample of 4677 individuals included respondents from EHIS 1996 who had completed EST-Q (Paper II). This sample consists of 2111 men and 2566 women. A third sample of economically active individuals aged 18–65 from EHIS 1996 comprised 1534 men and 1672 women **(Paper III)**.

The target population of EHIS 2006 **(Papers III, IV)** consisted of all permanent residents of Estonia born between 1921–1990. A stratified systematic sampling method was used to select the sample. Population Registry data was used as a population frame. The Tallinn Medical Research Ethics Committee approved the survey. The design and the sampling procedure of the survey are described in more detail elsewhere (Oja, Matsi, & Leinsalu, 2008). Fourth general population sample **(Papers III and IV)** contained a subsample of currently active respondents aged 18–65 from the EHIS 2006. An original subsample comprised 1934 (47.3%) men with a mean age of 39.60 years (SD = 12.57) and 2151 (52.7%) women with a mean age of 41.61 years (SD = 11.71). The subjects who did not respond to the EST-Q or life satisfaction questions were excluded. The final study sample consisted of 3211 subjects (1523 men, and 1688 women).

3.1.2. Clinical sample (Paper I)

The patient sample **(Paper I)** consisted of 194 inpatients at the Tartu University Hospital. EST-Q was provided to all patients who were hospitalized in the ward for depressive, anxiety, and substance abuse disorders between 1 April 1997 and 30 September 1998. Patients who were diagnosed as having depression, anxiety, or other neurotic disorders on the basis of ICD-10 criteria were included in the study. The resulting sample consisted of 49 men and 145 women

with a mean age of 39.0 years (*SD* = 12.7; range 18–72). Diagnosis according to the ICD-10 was established with an unstructured interview by experienced psychiatrists. The largest diagnostic group (123 subjects) was patients with depression; 29 patients had agoraphobia with panic disorder; 14 had general anxiety disorder; 22 somatoform disorder; and 6 had neurasthenia. Most of the patients (77.5%) with depression had moderate depression. The EST-Q was completed on the first or second day of admission to the hospital together with the Depression Scale.

3.1.3. Air traffic controllers' sample (Paper V)

Sixty air traffic controller (ATC) candidates (37 males and 23 females) who had entered the Tartu Aviation College between 1994-2001 formed the sample for examining the predictive usefulness of personality traits for job success **(Paper V)**. The sample consisted of all Estonian air traffic controllers trained at Tartu Aviation College up until 2006. Data was collected twice from this sample: from personality and cognitive ability tests at the time of admission to the Tartu Aviation College and their objective and subjective professional performance data in 2006.

3.2. Measures

3.2.1. Sociodemographic data, life satisfaction, and other indicators of social adjustment (Papers II, III, and IV)

Sociodemographic data and indicators of social adjustment were derived from structured interviews, EHIS 1996 and 2006 **(Papers II, IV)**. Income denotes the average monthly income in Estonian kroons per household member during the previous 12 months, where the household equivalence scales 1, 0.8, and 0.8 were used (United Nations Development Program, 1999). Quartiles of income were used to divide respondents into four groups. Occupational status was determined by the current or last occupation of the respondents **(Paper II)**.

Domains of subjective functioning were sense of control **(Papers II, III, IV)**, self-rated health, perception of the future, perceived social support and satisfaction with life in nine areas: career, work, financial situation, leisure, family life, life as a whole, trusting relationships, emotional and intimate relationships with a partner, and relationships with children **(Paper II)**. A 4-point rating scale ranging from 1 (satisfied) to 4 (not at all satisfied) was used. Satisfaction with life in four life areas was used for the analysis in **Papers III and IV.** Self-rated health was measured by asking: "Overall, how do you evaluate the status of your health?" The answers were scored on a 5-point scale from 1 (very good) to 5 (very bad). Perceived social support was assessed via the scope of relationships derived from the question: "Who are those you can really trust when you need help?" The categories of these answers, the items

and scale for the measuring perception of the future are presented in the Method section of **Paper II.** Perceived sense of control was defined as a general belief about having influence over one's personal life. Three items, two of them from the Rotter's (1966) I-E scale, were used. The items concerned a general sense of control over personal life, control over the realization of one's plans, and taking the initiative or leaving it to others. Each item contained two alternative statements indicating either a high or low sense of control. Respondents were divided into three groups for the analysis in **Paper II.** A sum score of three items was used, with higher scores indicating lower (more external) perceived personal control (Cronbach's $\alpha = 0.46$) for the analysis in **Paper III**. In **Paper IV** the three categorical control items served as indicators of a construct for generalized expectancy of control (Locus of control).

3.2.2. Childhood adversity (Paper IV)

Four retrospectively reported childhood adversities derived from EHIS 2006 were used in the analysis. To find out whether the respondent had experienced deprivation of basic need for food he/she was asked: "How often, if ever, did you go to bed hungry at your parental home?" The variable was assessed on a 4-point frequency scale ranging from 1 = never to 4 = often. Parental alcohol use was assessed with the question: "How often was alcohol used at your parental home?" The indicator was initially measured on a 5-point frequency scale ranging from 1 = every day/almost every day to 5 = not at all. For the final analysis the two last categories were merged together resulting in 4 = several times a year/not at all. The cultural capital was assessed by the number of books at parental home. Respondents were asked: "How many books were at your parental home?" The responses were prearranged into 6 categories ranging from 1 = no books at all; to 6 = 1000 ≤ books. An additional categorical variable, parental divorce was included in the analysis. Deprivation of food, frequent parental alcohol consumption, and a smaller number of books at the childhood home were indicators of the childhood adversity construct.

3.2.3. Emotional State Questionnaire EST-Q and EST-Q2 (Papers I, II, III. and IV)

A total of 33 items were derived from the symptoms presented in the diagnostic criteria for depression and anxiety disorders **(Paper I)** in the DSM-IV (American Psychiatric Association, 1994) and ICD-10 (World Health Organization, 1993). Each item was rated on a 5-point scale ranging from 0 to 4; 0 = not at all; 1 = seldom; 2 = sometimes; 3 = often; and 4 = all the time. Using these scales the subjects were instructed to assess how much the various problems had troubled them during the past 4 weeks. Depressive symptoms were measured on the EST-Q Depression subscale **(Paper II).** Psychometric properties of all EST-Q subscales are presented in **Paper I.** EHIS 2006 used a modified version of

EST-Q where three items not belonging to any of the subscales were excluded and two social anxiety items were added. Three EST-Q2 subscales, Depression, Anxiety, and Fatigue were used for the analysis in **Paper III.** In **Paper IV** Depression and Anxiety subscales only were used for the analysis.

The depression subscale comprises items concerning sadness, loss of interest, worthlessness, hopelessness, self-accusations, thoughts of suicide, feelings of loneliness, and impossibility of enjoyment (coefficient of $\alpha = 0.86$).

The anxiety subscale comprises items such as feeling easily irritated and annoyed, feeling anxious or fearful, tension or inability to relax, excessive worry about several different things, feeling so restless that it is hard to sit still, and being easily startled ($\alpha = 0.83$).

The fatigue subscale comprises fatigue or loss of energy, diminished ability to think or concentrate, feeling slowed down, rest does not restore strength, and being easily fatigued ($\alpha = 0.84$).

3.2.4. The Depression Scale, DEPS (Paper I)

The DEPS is a 10-item self-rating scale for screening depression, which has shown good psychometric properties (Pakriev, Vasar, Aluoja, Saarma, & Shlik, 1997; Salokangas, Poutanen, & Stengard, 1995). The symptoms of experiencing depression during the past month are rated on a four-point scale: 0 = not at all; 1 = a little; 2 = quite a lot; 3 = extremely.

3.2.5. NEO Personality Inventory (Paper V)

The NEO-PI version adapted to the Estonian language (Pulver, Allik, Pulkkinen, & Hämäläinen, 1995) was provided to the applicants at admission to the Tartu Aviation College. The NEO-PI version consists of 197 items measuring Big Five personality domains and the six facets of Extraversion, Neuroticism, and Openness to Experience. The Estonian version has a similar factor structure to Costa and McCrae's (1985) original questionnaire and acceptable overall reliability. The psychometric indices of the inventory are presented in **Paper V.**

3.2.6. Aptitude tests (Paper V)

The applicants were tested with the set of cognitive ability tests at admission to the Tartu Aviation College. The set of tests was assembled to measure general intelligence, verbal comprehension, mental arithmetic, spatial orientation, technical comprehension, memory, and perceptual and motor skills. All were paper and pencil tests. The results of ten separate ability tests were transformed to stanine values, summed and only the composite mean cognitive ability measure (M Stn-10) was used in further analysis.

3.2.7. Objective and subjective performance measures of air traffic controllers (Paper V)

For obtaining objective performance measures the persons were rated on the six-point general professional success scale (Vanker, 2006) based on available personnel data. The initial six ranking levels were merged into three more general and meaningful professional success levels to achieve a better-balanced and symmetrical distribution of participants between groups. The resulting distribution of participants is given in Table 2, **Paper V**. The subjective ATC performance evaluation was obtained from former instructors and today's supervisors of the participants. Evaluators rated the graduated participants in the sample on the 4-point ordinal job proficiency rating scale: from 4 (very good skills) to 1 (unsatisfactory skills). These ratings are both up to date and retrospective by their nature. From the participants who did not finish their studies the fifth category (0-not rated) emerged. The results of the initial rating were merged into three categories. The resulting distribution of participants is given in Table 3, **Paper V**.

3.3. Data analysis

Statistical analyses were carried out using EPI-INFO, STATISTICA 7.0, SPSS 11.0, PASW Statistics 18.0, and LISREL 8.8 software. Principal component exploratory factor analysis was performed to find out the subscales of EST-Q **(Paper I)**. Item total correlation **(Paper I)** and Cronbach's α were used to assess the reliability of the EST-Q **(Paper I)** and EST-Q2 **(Paper III)** subscales. Cronbach's α was also used to assess the reliability of a sum score for perceived sense of control **(Paper III).** The *post hoc* Tukey HSD test was used to assess differences in the mean subscale scores between diagnostic groups. The significance of differences between the general population and air traffic controller applicants' (ATC) mean levels of personality variables was examined using *t* test **(Paper V)**. The independent sample median test was used to evaluate differences between males and females in the distribution of childhood, personality, and clinical characteristics (**Paper 4**). Pearson correlation coefficients were used in the concurrent validity assessment of EST-Q Depression subscale with the Depression Scale (DEP) **(Paper I)** and in assessing associations between performance criteria, cognitive ability, and personality variables of ATCs **(Paper, V)**. The adjustment of correlations between performance criteria and mean cognitive ability (for all of 794 applicants to Tartu Aviation College) and between performance criteria and personality variables (for male and female population samples) was performed using formula recommended by Tabachnick and Fidell (2001, p. 58). Variance analysis (ANOVA) was used for assessing discriminant validity of EST-Q subscales in patient and nonpatient samples and also between diagnostic groups **(Paper I)**. One-way ANOVA was used for the comparison of depressive *versus* nondepressive groups based on the data of satisfaction, self-rated health, and

predictions about the future **(Paper II).** Logistic regression was used to assess the relationship of sociodemographic variables, sense of control, and scope of relationships with the symptoms of depression **(Paper II).** Odds ratios (*OR*) with 95% confidence intervals (*CI*) are reported as results. Linear regression analysis was undertaken to find out the best predictors of variances in ATCs' performance. In series of hierarchical regression models the variables were entered in the following order: gender and personality variable **(Paper, V)**. The obtained results were confirmed with using dominance analysis that allows computing the relative importance of each single predictor in the set of mutually related variables (Budescu, 1993). Confirmative factor analysis, multiple group comparisons and structural regression models were used in **Paper 3** to examine covariance structures. The analysis was performed on normalized data using both maximum likelihood and weighted least squares method of estimation. In **Paper 4** the analysis of mediator relationship between latent constructs was performed using weighted least squares method of estimation. For the evaluation of fit between covariance structures, four recommended (Bentler, 2007) and frequently used goodness-of-fit tests, the chi-square (χ^2), the root mean square error of approximation (*RMSEA*), the standardized root mean square residual (*SRMR*), and the comparative fit index (*CFI*) were presented in **Paper 4**. In **Paper 3** the fit between covariance structures was evaluated using χ^2, *RMSEA* and *CFI*.

4. RESULTS AND DISCUSSION

4.1. The prevalence of affective symptoms, socioeconomic factors and psychological adjustment

4.1.1. Psychometric properties of EST-Q (Paper I)

A short self-rating screening scale, the Emotional State Questionnaire (EST-Q) for affective symptoms, was developed and psychometrically assessed. The aim was to create an instrument for screening depressive and anxiety disorders in the general population and in primary care. Five subscales were determined by factor analysis from a total of 33 items in a patient sample. The results of factor analysis were presented in Table 1 of **Paper I.** Depression subscale consisted of 8 items (Cronbach's $\alpha = 0.87$), Anxiety subscale, 6 items (Cronbach's $\alpha = 0.69$), Agoraphobia-Panic subscale, 5 items (Cronbach's $\alpha = 0.82$), Fatigue subscale, 5 items (Cronbach's $\alpha = 0.77$), and Insomnia subscale, 3 items, (Cronbach's $\alpha = 0.76$). The internal reliability of total EST-Q was also good, $\alpha = 0.88$. The item-total correlations were satisfactory except for the Anxiety subscale. In patients with anxiety disorders however, the correlations of the subscale items with the total score became satisfactory. Reliability estimates of EST-Q in patient and control samples were similar.

The nonpatient group had significantly lower mean values on all subscales and on total score compared with population sample. The mean scores of the subscales differentiated significantly between the diagnostic groups. The Depression subscale had the highest score in the group of depressive patients. Patients diagnosed with a depressive disorder had a significant difference in the Depression score compared to groups of other neurotic disorders. The Anxiety score was highest in the generalized anxiety disorder sample, distinguishing this group significantly from the depressive disorder, social phobia, and agoraphobia-panic samples. All subscales correlated significantly with the EST-Q total score and the 10-item Depression scale (DEPS). DEPS had the strongest correlation with the Depression subscale.

Overall, EST-Q showed to be a reliable instrument in the assessment of such psychopathology dimensions as depression, general anxiety, agoraphobia-panic, fatigue and insomnia. Similar to other multidimensional instruments, the Depression subscale of EST-Q showed the highest internal consistency and the Anxiety subscale the lowest (Brown, Chorpita, Korotitsch, & Barlow, 1997; Holi, Sammallahti, & Aalberg, 1998; Zeffert, Clark, Dobson, Jones, & Peck, 1996). Possibly depression is a more unitary and better-defined construct compared to anxiety. Our results further prove this idea – in a large population sample with a large range of variance the internal consistency of Anxiety subscale became strikingly higher ($\alpha = 0.83$, **Paper III).** An unexpected effect was the emergence of a distinct fatigue factor. Symptoms of low energy and easy fatigability are usually included in diagnostic criteria for depressive disorders and constitute a part of rating scales for depression (Salokangas *et al.,* 1995).

To conclude, EST-Q had a good discriminative validity. Depression, Anxiety, and Agoraphobia-Panic subscales were diagnosis-specific and could be used in differentiating anxiety and depressive disorders. Fatigue and Insomnia were not discriminative across diagnostic categories suggesting that these subscales are measuring a general symptoms dimension, which characterizes several psychiatric disorders. As no diagnostic interview was used in the population sample the exact cut-off points of subscales for screening purposes were impossible to determine at the time of publishing the article. By now, EST-Q2 has already shown its applicability among primary care attendees (Ööpik, Aluoja, Kalda, & Maaroos, 2006) as a good screening instrument for depressive episode. Both sensitivity and specificity of 0.81 for the Depression subscale, using the cut-off score >11, are good and comparable with other instruments. EST-Q has proved to be a valid and reliable instrument for detecting psychological distress in the general population – depressive and anxiety symptoms and general distress, fatigue and problems with sleep. Scores of greater than 11 on the Depression subscale are valid markers of a current depressive episode.

4.1.2. The prevalence of depressive symptoms: associations with socioeconomic factors, perceived sense of control, satisfaction with life, and other indicators of social adjustment (Paper II, IV)

As reflected by general self-rated health, the great economic and social differentiation that emerged in Estonian society during the 1990s, had led to the unequal distribution of health resources among Estonian population (Leinsalu, 2002). It was logical to assume that the same factors also had influenced the distribution of psychological distress and mental disorders among population. Thus a situation in society represented a unique possibility for examining relationships between depression, socioeconomic factors and subjective adjustment of individuals.

The results indicated that 11.1% of the Estonian population had suffered from significant depressive symptoms during the previous 4 weeks. Depression was more common in women (14.9%) than in men (6.7%) that accords with the mounting evidence about the twice as high prevalence of depression in women compared to men (Kessler & Magee, 1993; Kessler *et al.,* 2007; Paykel, Brugha, & Fryers, 2005; Lepine, Gaspar, Mendlewicz, & Tylee, 1997). Similar female-male ratio of depressive symptoms was found in Estonian population sample 10 years later **(Paper II)**. The higher prevalence of depressive symptoms among non-Estonians was an interesting finding, which could not be explained by social and economic differences.

Table 1 in **Paper II** represents the association of depressive symptoms with sociodemographic factors, perceived control and scope of relationships. The odds of having clinically important depressive symptoms were higher in those who were older, who were never married or were divorced or widowed, in ethnic groups other than Estonians, in the unemployed and economically in-

active groups. Economic activity and income were significant predictors of psychological adjustment.

A significant effect of perceived control to depressive symptoms was found (*OR* = 5.35 for low control group compared with high control group). Subjects with no relationships or with relationships only outside the family had a higher occurrence of depressive symptoms (*OR* = 3.75 and 2.25, respectively) compared to the reference group with relationships both in- and outside the family or the group with relationships only within the family.

Table 2 in **Paper II** presents the mean scores of life satisfaction, self-rated health and prognosis about the future in the non-depressive and depressive groups. The ANOVA revealed that depressive subjects were significantly less satisfied with life in general and in all domains of life (job, career, family life, economic situation, leisure), and in the scope of relationships. A group of subjects with significant depressive symptoms was also characterized by lower self-rated health and with more pessimistic prognosis for the future. When group comparisons controlling for the effect of sex, age and possible satisfaction-related objective circumstances were performed, all differences between depressed and non-depressed subjects remained significant, except satisfaction with relationships with children.

Overall, the prevalence of clinically important depressive symptoms of about 11% found in our study was higher than the 1-month prevalence of depressive symptoms established in population studies based on structured clinical interviews (Blazer, Kessler, McGonagle, & Swartz, 1994; Murphy, Laird, Monson, Sobol, & Leighton, 2000). The higher result of depression could be partly explained by the specificity of our measurement tool. A self-rated scale for anxiety and depression (EST-Q) may also identify subclinical cases. The prevalence rates obtained in our study resemble more a prevalence of psychological distress in population studies (Fushimi et al., 2010; Svensson et al., 2009). For a comparison, one month prevalence of general distress obtained with Kessler's K10 and K6 psychological distress scales in a Canadian population study was as low as 2.0% (Cairney *et al.,* 2007). Accordingly, we suggest that the higher scores of depression found among the Estonian population were true indicators of high levels of psychological distress characteristic to a society in transition. This was also evidenced by a stronger relationship found between socio-demographic factors (especially with economic ones) and depressive symptoms in Estonian population. A strong association of economic factors with depressive symptoms has been usually found only in the lowest income groups or has been mainly associated with unemployment (Kessler *et al.,* 1994). Social differences in depression in Eastern Europe (Russia, Czech Republic and Poland) have been found to be more strongly related to the current economic circumstances than early life conditions or education (Nicholson *et al.,* 2008). Similarly, well-being is known to be more strongly associated with economic conditions in disadvantaged societies and population groups. If basic human needs are met, then home satisfaction is found to be a better predictor for general satisfaction with life compared to satisfaction with economic circumstances.

Subjective social adjustment is related to the perceived sense of control and more closely, to the satisfaction, enjoyment, and interest that people have in their role performance and relationships, which significantly overlap with the affective and cognitive components of subjective well-being. Depressive respondents have significantly poorer subjective social adjustment than respondents with a normal mood state. They have reported lower self-rated health and have experienced less satisfaction with life (Koivumaa-Honkanen, Kaprio, Honkanen, Viinamäki, & Koskenvuo, 2004). It is noteworthy that the relationship of social adjustment with depressiveness remained considerable even after controlling for objective life circumstances. The combination of low satisfaction and low perceived control found in subjects with clinically important depressive symptoms support the cognitive models of depression (Abramson, Metalsky, & Alloy, 1989; Beck, 1976) and cognitive-motivational-emotional cycles proposed by research. A combination of hopelessness and uncontrollability has been regarded as the major cognitive correlate of depressive symptoms. Our results also suggest a vicious circle maintaining depression. If dissatisfaction is combined with negative beliefs about control, it leads to low levels of both activity and attempts to change the situation (poor social adjustment), which in turn, confirms negative cognitions and helplessness, thus maintaining depression. The finding is also in accordance with the stress-generation perspective of depression and of affective states in general (Hammen & Shih, 2008).

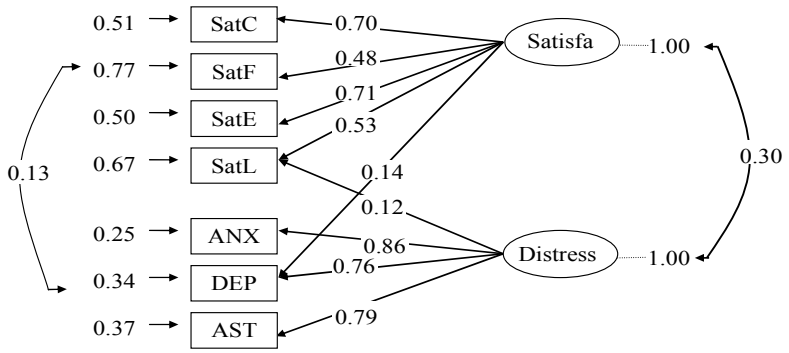
4.2. Gender differences in the structure of mental health (Paper III, IV)

Results of two population health surveys in Estonia have disclosed strong evidence of the importance of subjective adjustment to life. Mental health and especially depression was significantly related to the cognitive correlates of psychological functioning. For a period of EHIS 2006 interviews the economic and social situation in Estonia was more stabilized, which could be concluded from significantly lower prevalence of psychological distress symptoms, compared with results of EHIS 1996 (3.3% of clinically significant depressive symptoms and 3.9% of serious anxiety symptoms in men, and 6.8% and 8.8% respectively in women by EHIS 2006, Table 1, **Paper IV**). A greater difference however remained in the prevalence of significant psychological distress (especially anxiety) between the women from Estonia and from Western societies.

The main aim of the third study was to compare the structure of mental health between men and women. The stability of socio-economic processes is thought to be essential in the sense that this circumstance suggests better validity and generalization of results from found covariance structures between variables.

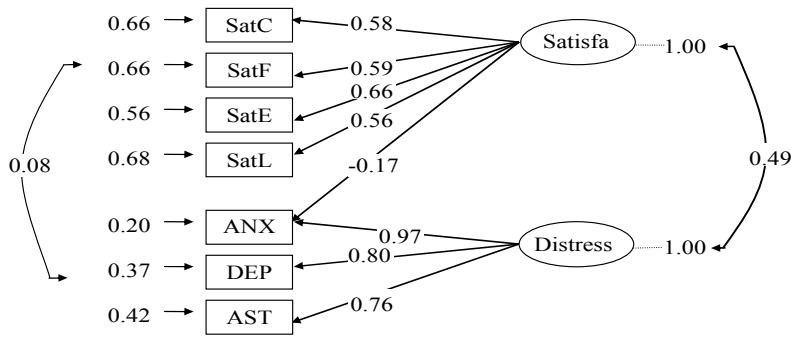
The first hypothetical model for explaining individual differences of subjectively reported mental health in Estonian population consisted of two correlated factors of Distress and Satisfa (satisfaction with life; see **Paper III** for the

indicators of latent constructs and the process to final models for men and women). The relationships (standardized coefficients, all significant as minimum at $p<.05$ level) between the indicators and correlated factors of Life Satisfaction and Psychological Distress across genders are depicted on Figures 1 and 2.



SatC = satisfaction with career; F = family; E = economic, L = leisure,
ANX = anxiety, DEP = depression, AST = fatigue

Figure 1. The two-factor model of mental health for men.



SatC = satisfaction with career; F = family; E = economic, L = leisure,
ANX = anxiety, DEP = depression, AST = fatigue

Figure 2. The two-factor model of mental health for women.

The resulting models showed the excellent fit with the covariance structure between the indicators of psychological distress and life satisfaction of EHIS 2006 and the acceptable fit with the population covariance data of EHIS 1996 (fit indices of the models across genders, fitted with the data of EHIS 2006, are presented in Table 2, **Paper III**). Overall, about 10% of variance of self reported mental health in men and of 24% in women were explained by the model.

The finding that two emotional distress measures were directly related to the factor of life satisfaction indicates that satisfaction is not a purely cognitive phenomenon but contains an affective component as well. This affective component had intriguing gender differences – lower life satisfaction associated with lower level of self-reported anxiety in women and higher self-reported depression in men. The idea that lower anxiety could accompany dissatisfaction with life in women seems a counterintuitive finding at first. The probable reason could lie in the ways women cope with adverse circumstances. Nolen-Hoeksema *et al.* (2008) have shown that women are more likely to respond to initial negative affect with rumination – passive and repetitive focussing on symptoms of distress, negative thoughts and events. It is highly probable that with increasing dissatisfaction women ruminate more and thus down-regulate anxiety and activation, which could be an effective strategy in the short run but leads to increasing psychological distress and depression in the longer perspective. This accords well with the suggested function of rumination to avoid detrimental events and diminish the need for activity, eventually leading to reduced motivation and initiative.

On the other hand, the combination of low satisfaction and depressive symptoms could indicate that men react to increasing dissatisfaction rapidly with a loss of pleasure, which is a core symptom of depression. Evidence shows that men tend to react to distress with externalizing behaviours like use of alcohol and drugs and risky behaviours (Marcus *et al.,* 2005), but also with active instrumental and leisure activities like sports (Addis, 2008) which could all be the attempts to reduce dissatisfaction-related anhedonia. This is further supported by our result that low satisfaction with leisure is directly associated with psychological distress only in men. If men lack satisfactory leisure activities to regulate anhedonia, it could lead to increased distress.

The fit indices between covariance structures of a restricted model (with all estimates equal across genders) and population data for men and women showed the overall compatibility of relationships between the indicators and factors across genders. However some significant differences in strength of associations in the structure of mental health between men and women emerged from the exact χ^2 difference test. According to the prevailing notion we found women having a significantly stronger relationship between psychological distress and all of the three indicators, especially of anxiety and depressive symptoms compared with men (Daughters *et al.,* 2009; Macintyre, Hunt, & Sweeting, 1996; McDonough & Walters, 2001). We have not measured externalizing symptoms, which might be more relevant indicators of psychological distress for males (Marcus *et al.,* 2005). The influential domain, which significantly differentiated life satisfaction between genders, was satisfaction with family life. The finding that satisfaction in close relationships is more important for females' general life satisfaction and psychological distress is in accordance with research from several lines (Beck, 1991; Daig, Herschbach, Lehmann, Knoll, & Decker, 2009; Dozois & Beck, 2008; Hammen, 2003; Rehman, Gollan, & Mortimer, 2008; Widiger & Anderson, 2003). Although

there was no direct association between life satisfaction and depression for women in our study, a direct association between depressive symptoms and satisfaction with family life was found for both genders. We think that being dissatisfied with family life will cause depressed feelings for both genders and inversely, lowered mood states may reduce satisfaction with familial relationships across genders. Compared to males, the females' satisfaction with family relationships affects the general judgment of life satisfaction more.

The relationship of sense of control with psychological distress and life satisfaction is depicted in Figures 3 and 4. Our results did not support the Plaisier *et al.,* (2008) idea of work role as a specific protecting factor from life dissatisfaction and emotional distress in males.

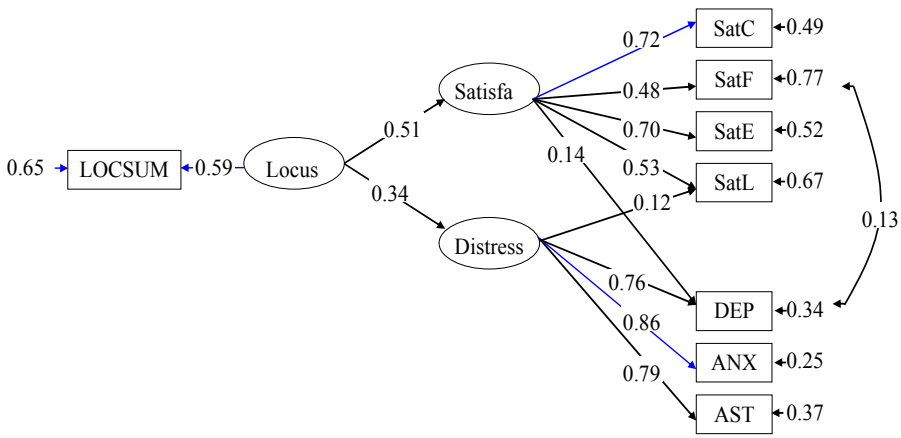


Figure 3. Relationship of sense of control with psychological distress and life satisfaction in men. Acronyms are the same as on previous figures.

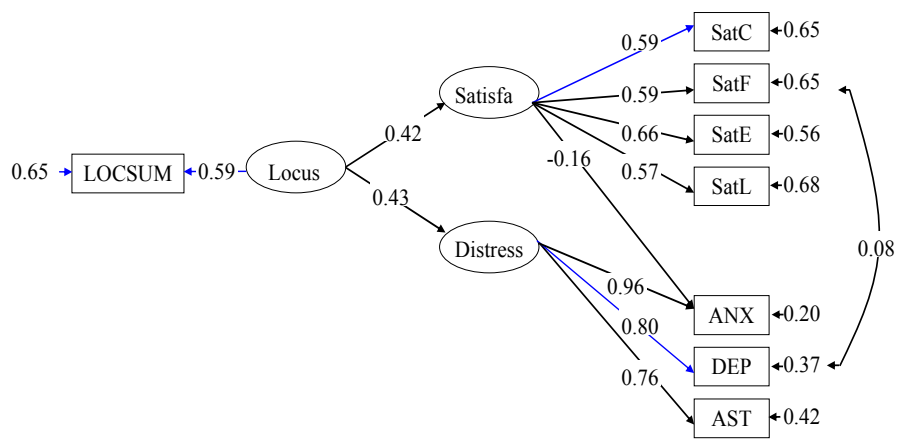


Figure 4. Relationship of sense of control with psychological distress and life satisfaction in women. Acronyms are the same as on previous figures.

Satisfaction with career was an equally important indicator of life satisfaction for both genders. A German population study of gender and age differences in different life satisfaction domains and impact on depressive and anxiety symptoms Daig *et al.,* (2009) also did not find gender differences in satisfaction with work. However, a specific association between personal sense of control and career satisfaction was found in the women's sample of our study (not shown in Figure 4).

Similarly to Daig and colleagues we found that satisfaction with leisure activities can directly reduce psychological distress in men, but not in women. Leisure activities can serve as an effective means of processing negative emotions in men. Alongside the effect of active instrumental activity (in contrast to the passive coping as rumination and worry) leisure may have some other mechanisms for buffering stress and maintaining mental health in men. Coleman & Iso-Ahola, (1993) argue that "leisure requires self-determination and it results in self-determination". Thus leisure activities in contrast to obligated activities are associated with perception of freedom and personal control and considered therefore more intrinsically motivating. Men may have a stronger perceived leisure freedom (Coleman, 1993), which in the case of frustration may cause negative affective responses. Men had a stronger association between perceived sense of control and satisfaction with life and leisure activities with greater levels of personal choice and freedom could further enhance the positive control beliefs in men. Perceived sense of control predicted 26% of variance in judged life satisfaction and 12% of variance in psychological distress in men. The predictive effect of sense of control on women's life satisfaction and psychological distress was more similar between these two factors, 17% and 19% respectively. In both genders lower scores of personal control were related to lower scores in life satisfaction and higher levels of psychological distress (fit indices of models depicted in Figures 3 and 4 are presented in Table 2, **Paper III**) The more internal control and the stronger association of it and leisure satisfaction with general satisfaction judgments in men could refer to the more individualist (values and beliefs) orientation among men in our society.

One interesting finding was that the inverse relationship between anxiety symptoms and life dissatisfaction found in women was the strongest in the area of satisfaction with the economic situation. One possible explanation could be that women are more concerned with economic safety and that this sensitivity is likely to provoke more dysfunctional coping like rumination, worry, and denial for example. Studies on connections between personality traits and subjective well-being have found the repressive-defensive personality trait to contribute significantly to general life satisfaction (DeNeve & Cooper, 1998), which mainly comprises negative attributions and passive coping that parallels with ruminative coping proposed by Nolen-Hoeksema. These features and especially the stronger relatedness of general life satisfaction to economic satisfaction in women resemble more the results found in less advanced countries. It seems

that women are more conservative. Thus we still have the differences between well-being of men and women that is not characteristic for developed countries.

Although we did not study clinical disorders, our results may still have some implications for detecting, preventing and treating mental health problems associated with psychological distress. It seems that more positive judgments of women on satisfaction, at least in some domains, cannot always be considered as true markers of low psychological distress and better mental health. Especially our results showing the reverse association between satisfaction with economic situation and anxiety underscore this. However, the judgments of general life satisfaction and satisfaction with family life especially may constitute an easily applicable and useful indicator of presence or absence of psychological distress in females (Koivumaa-Honkanen *et al.,* 2004). A judged satisfaction with leisure activities could be a signal of presence or absence of successful adaptation or perhaps even of sufficient level of self-determination in men. Thus encouraging men to participate in sports and other active leisure activities can help them to maintain their mental and physical health. The use of general behavioural activation techniques to overcome withdrawal from active coping would be an appropriate strategy against psychological distress in women.

4.3. Implications of a childhood low control environment for the adult locus of control and psychological distress (Paper IV)

4.3.1. Prevalence of some childhood chronic adversities in Estonian population (Paper IV)

More than 14% of respondents reported frequent alcohol consumption in their childhood home, compared to the 18.4% with serious family drinking problems reported by Kessler and Magee (Kessler & Magee, 1993). None of the respondents to the EHIS 2006 agreed with the statement that their parent was an alcoholic. Thus, we seem to have rather conservative results, especially in the female sample. Alcohol consumption was significantly associated with parental divorce suggesting the former being a possible reason for familial discord and subsequent divorce in our society. Nearly 17% of our respondents reported parental divorce before age 16, which is significantly more than 8.9% reported by other authors (Clark, Caldwell, Power, & Stansfeld, 2010; Comijs *et al.,* 2007; Kessler & Magee, 1993; Wainwright & Surtees, 2002). Divorce and frequent alcohol use at the parental home can seriously disturb the child's need for age relevant care and assistance, especially if co-occurring, and the consequences revealed no essential decrease with age. In our study, women recalled significantly less adversity than men, but parental frequent alcohol use was a significant contributor to the Childhood Adversity factor only for women (Table 2, **Paper IV**). This finding would be comparable with evidence of the gender

specific relationship found between parental alcoholism and adult depression (Veijola *et al.,* 1998).

Feelings of hunger were reported by 4.8% of females and 6.4% of males compared to the 8% having a neglected/underfed appearance found by Clark *et al*. (2010). Again, females recalled such events significantly less frequent than males, but being deprived of food was a similarly significant adversity indicator for both genders.

The lack of books at the childhood home was the strongest indicator of childhood adversity. The number of books at the parental home is considered as an indicator of cultural capital that influences the future educational and professional status of an individual (Georg, 2004).

4.3.2. Mediation pathway from childhood adversity to adult distress (Paper IV)

Psychological distress and affective disorders are found to be associated with more elevated externality in generalized expectancy for control – external locus of control, ELOC (Keeton *et al.,* 2008). Our fourth study was aimed at exploring, whether associations between exposure to childhood adversity, locus of control, and distress symptoms found in children are present in the adult population. We proposed that lower control expectations, partly influenced and formed by childhood neglect/abuse, could function as a general pathway to anxiety and depression. We assumed these relations to be universal across genders, despite of marked gender differences in the distribution of distress symptoms and affective disorders. Significant differences were found between males and females on the distress symptoms, locus of control, and some childhood characteristics (Table 1, **Paper IV**). Therefore, the analysis of covariance structures was performed separately in male and female samples. The conceptual model for mediation analysis is depicted in Figure 5. The hypothetical measurement model was tested allowing all latent variables to be freely correlated. The indices showed a good fit in the female sample and an acceptable fit in male sample.

As a main result we found that external locus of control was a full mediator between childhood adversity and adult distress symptoms in both genders. Thus, the influence of childhood adverse experiences on the formation of general cognitive style and individual differences in personality may continue during adulthood.

The enduring impact of adversity on the maintenance and persistence of the general expectancy of limited control could possibly be a factor that predisposes a vulnerable individual to the increased distress when faced with life's difficulties. In other words, if the experience of childhood adversity associated with low controllability participates in the analysis and evaluation of current stressful situations, the generalization of uncontrollability and negative affect may more likely occur. It is assumed that in infancy the formation of ELOC in the

presence of adversity is influenced by the temperamental features – specifically, by ability to selectively redirect attention to the comforting, reinforcing stimuli and away from unpleasant ones (Declerck, Boone, & De Brabander, 2006). There was no evidence that women had more adversity, thus our results indirectly support the hypothesis of elevated sensitivity in females for developing ELOC if exposed to the reduced control in childhood. The possibility of developing ELOC in a low control environment seems to be especially salient when the genetic predisposition meets another disadvantageous environmental aspect – lower attention stimulation from outside and fewer stimuli for learning and intellectual growth. ELOC predicted twice as high significant distress for women compared to men. This result could be explained by the greater neuroticism in females. Previous evidence exists about this temperamental-personality trait being a partial mediator between chance locus of control and depression (Clarke, 2004).

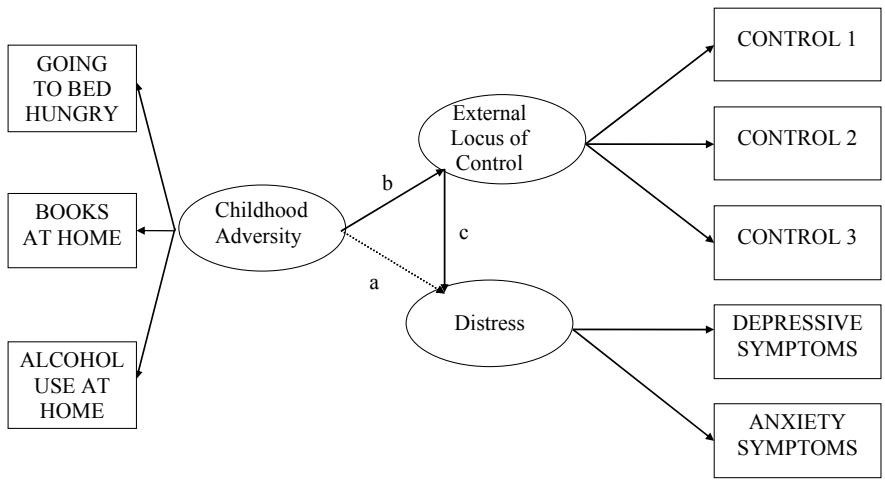


Figure 5. Conceptual model for the mediational relationship.

4.4. Predicting performance based on personality characteristics in high stress job (Paper V)

The personality-performance relationship has been the topic of contradictory opinions and results. Until Barrick, and Mount, (1991 and Tett, Jackson, and Rothstein, (1991 and Tett *et al*., (1999) meta-analytical studies the general prevailing opinion was that personality traits have negligible impact on job performance. Since the early nineties however, progress in research of personality-performance relationships has been promising. The central role in this development is commonly attributed to the availability of unified taxonomy

of the personality traits (The Big Five) and to the more thorough jobs analysis considering different demands for performance. Therefore, the personality-performance relationship could be studied taking into account job specificity and its relations to the personality dimensions, as well as to the narrower traits. The main purpose of our study was to evaluate relationships between cognitive abilities, personality characteristics and air traffic controllers' (ATC) performance. We were interested in the usefulness of personality traits for predicting ATC's performance at admission to *ab-initio* training.

In our ATC sample the female gender predicted significantly lower professional success. We propose two possible explanations for women being less successful than men. First, women may have reasons other than cognitive ability or personality makeup for being less successful in career (e. g., their biological and social mission to bear and care for children). Our finding that gender is more related to career success than supervisory ratings supports this idea. On the other hand, similar affective and behavioural responses of men and women could be differently perceived and evaluated by others on the basis of gender stereotypes. For instance, supervisors in our study evaluated aggressiveness of women compared to men as being more detrimental concerning job proficiency, while gender in general was not a significant predictor for supervisory ratings. Higher scores of Aggressiveness in females was the only facet of Neuroticism that negatively predicted supervisory ratings for job performance. In terms of *dominance analysis,* gender had *complete dominance* compared to the mean aptitude score and Extraversion in predicting objective performance. Females were less successful, tended to work in lower responsibility workplaces and fall out of profession more often compared to men. The implication of the gender of ATCs in performance prediction needs further investigation, especially with regard to affectivity.

Another interesting finding was that the mean value of Extraversion dimension and especially its Gregariousness and Positive Emotions facets were valid and useful negative predictors for objective and subjective performance. Air traffic controllers who displayed more positive emotions received more negative evaluation from their supervisors and these evaluations were less influenced by their gender and cognitive ability level. Extraversion, Gregariousness, and Positive Emotions were valid and useful negative predictors of performance over and above cognitive ability level, adding 8.2%, 12.6%, and 12.7% to the variance of objective performance success respectively.

5. CONCLUSIVE REMARKS

Studies indicate that the 4-week prevalence of psychological distress and clinically important depressive symptoms were high in the Estonian general population in the mid-1990s. The strong association between depressive symptoms and socio-economic factors was characteristic of that time period, but even so, significant independent associations of psychological distress and social adjustment factors were apparent. People with significant depressive symptoms were caught in a situation where poor psychological adjustment like dissatisfaction with life and diminished sense of personal control became a further source of strain, higher psychological distress and more difficult social adjustment. Supposedly, these consequences of poor psychological adjustment were triggered by major changes in the Estonian society during these years.

Given the concerns about public health the need for a reliable and easy to manage assessment instrument for psychological distress symptoms became urgent. The Emotional State Questionnaire (EST-Q) developed for these purposes is a psychometrically sound brief self-rating screening scale for identifying people currently having significant symptoms of anxiety, depression and/or general distress. For now the Depression subscale of EST-Q2 has proven to be a reliable instrument for screening major depressive episodes in primary care attendees.

Data from the Estonian Health Interview 2006 showed significant improvement in people's mental health with prevalence rates for anxiety, depressive symptoms and fatigue being in general comparable to respective indices in the rest of Europe. However, the difference rates in psychological distress levels between genders remained more elevated compared with these societies. It's a typical finding that women have higher distress rates, but this difference has shown decreasing tendencies.

Thus an important aim of our study was to examine relationships between the maintaining components (involved in the so-called vicious cycles of stress) of psychological distress and look for possible differences between men and women in these factors of mental illness and mental health. As a main result we found different relationships between cognitive and affective components in the structure of mental health by gender. The distress emotions with different directions were connected to life satisfaction judgments of females and males – lower life satisfaction associated with lower levels of self-reported anxiety in women and higher self-reported depression in men. The reason why lower anxiety, not higher, as expected, accompanied dissatisfaction with life in women could lie in the ways how women cope with adverse circumstances. Women are more likely to respond to initial negative affects with passive and repetitive focussing on symptoms of distress, negative thoughts and events. It is also apparent from our studies that women are more concerned with economical problems and close relationships. It is highly probable that with increasing dissatisfaction women use some cognitive strategy to down-regulate distress, like rumination or worry which has the propensity to diminish emotional and

physical reactions in stressful situations in the short run but can ultimately prolong psychological distress. There seems to be a deep biological reason for the process of adjustment to life being more complicated in women. However, better adaptation and greater satisfaction with life could be obtainable by understanding cognitive mechanisms of emotion regulation better and changing the tactics of coping with stressful events, especially with emotions. The use of general behavioural activation techniques to overcome withdrawal from active coping would be an appropriate strategy for women for dealing with psychological distress.

The combination of low satisfaction and depressive symptoms in males could indicate that men rapidly react to increasing dissatisfaction with a loss of pleasure, which is a core symptom of depression. This is further supported by our results that low satisfaction with leisure is directly associated with psychological distress only in men. If men lack satisfactory leisure activities to regulate anhedonia it could lead to increased distress. Thus encouraging men to participate in sports and other active leisure activities can help them to maintain their mental and physical health. We may conclude that even though no substantial gender differences in overall life satisfaction have previously been found, our studies suggest that the more complex cognitive-affective structures of subjective well-being may differ in men and women, which can have implications for mental health assessments as well as for choosing methods of intervention.

Another essential factor of mental health and good life is people's beliefs system regarding control over their personal world. These beliefs are important predictors of life satisfaction and psychological distress. Based on the findings of our research, there is reason to believe that women, compared to men, can attain more external control beliefs when their childhood environment has diminished possibilities for control. However, the mediating role of external locus of control between childhood adversity and significant adult anxiety and depressive symptoms was found across genders. Our findings support the importance of the early environment in the development of psychological characteristics affecting adult mental health.

We found that satisfaction with career was a significant indicator of general life satisfaction across genders. Especially in high stress jobs the person-work compatibility could be an important factor for performance success and maintenance of well-being and health. It turned out that positive affectivity is not a universal predictor of good performance and staying in the profession. Air traffic controllers who have less positive emotions and were less extraverted were working in positions of higher responsibility and had received better performance evaluations from supervisors. Thus introverted personality traits could be significant predictors of better performance, career longevity and general well-being of air traffic controllers. The gender differences we found in air traffic controllers' performance success need further research.

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SUMMARY IN ESTONIAN

Täiskasvanute psühholoogilise distressi eelnevad ja kaasnevad tingimused

Psühholoogilise distressi all mõeldakse pinge- või ebamugavusseisundit, mille iseloomulikeks joonteks on ärevuse- ja depressioonisümptomid. Enamasti koondatakse emotsionaalse distressi nime alla ka väsimus, uneprobleemid ja mõned muud emotsionaalse seisundi kõrvalekalletega seonduvad kehalised sümptomid. Psühholoogilist distressi on hakatud kirjeldama kontiinumis, mille ühes otsas on distressi puudumine ehk mugav ja tasakaalustatud emotsionaalne enesetunne ning teises otsas asuvad depression ja ärevushäired. Distress kaasneb enamuse psüühikahäiretega, aga teda esineb sageli ka koos üldlevinud kehaliste haigustega. Psühholoogilist distressi peetakse ka nõndanimetatud stressihaiguste riskifaktoriks. Seoses järjest kasvava survega inimesele kasvab ka distress ning sagenevad haigestumised depressiooni ja ärevushäiretesse.

Kaks esimest uurimust käsitlevad emotsionaalse enesetunde küsimustiku (EEK) loomist, selle adapteerimist Eesti elanikkonnal ja neurootiliste häiretega patsientidel (I uuring) ning distressi sümptomite leviku seoseid majanduslike ja psühholoogiliste faktoritega (II uuring). EEK on lühike 33 küsimusega sõeltest, mis võimaldab suure täpsusega eristada emotsionaalselt tasakaalustatud inimesi neist, kelle psühholoogilise distressi määr lubab oletada depressiooni või ärevushäire olemasolu või nende vallandumise ohtu. Testi on lihtne ja kiire täita ning testi psühhomeetrilised omadused on head. Testil on viis alaskaalat (Depressioon, Üldine Ärevus, Agorafoobia-Paanika, Asteenia ja Insomnia), millest 3 esimest võimaldavad eristada vastava psüühikahäire kahtlusega inimesi tervetest. Teises uuringus kasutati Eesti 1996 aasta terviseküsitluse andmeid inimeste eluga rahulolu (eluga üldiselt ja 8 erinevas valdkonnas, nagu töö, pereelu, vaba aja veetmine jne.), tervisele, tulevikule ja sotsiaalsele toetusele antavaid hinnanguid ning isiklikke veendumusi selle kohta, kas neil on või ei ole kontrolli nende jaoks olulistes eluvaldkondades ning nende hinnangute seoseid emotsionaalse enesetunde ja demograafiliste näitajatega. Valimisse kuulus 4667 isikut. Uuritavatest 11% esines depressiooni sümptomeid, kusjuures depressiooni esinemissagedus oli üle kahe korra suurem naistel (14.9%) kui meestel (6,7%). Terviseuuringust ilmnes kindel seos rahva majandusliku olukorra ja psühholoogilise distressi ning eluga rahulolu vahel. Eriti häiritud oli vaimne tervis ja eluga rahulolu vanematel, üksikutel ja ilma tööta inimestel. Elumuutuste poolt vallandatud emotsionaalsete kõrvalekallete ja heaolu vähenemise püsimise seisukohalt olid olulised negatiivsete emotsioonidega kaasnevad suhtumised ja käitumine ning nende tagasimõju emotsionaalsele enesetundele. Leitud seostest kasvaski välja mõte ja vajadus põhjalikumalt uurida inimeste vaimse tervise struktuuri kolme olulise komponendi – kontrolliveendumuste, eluga rahulolu ja negatiivsete emotsioonide – omavahelisi seoseid.

Nende seoste uurimiseks sobisid hästi 2006. a. läbi viidud Eesti terviseuuringu andmed, kuna sellelaadsed analüüsid eeldavad stabiilsust sotsiaalsetes protsessides (uuring III). Analüüsiti 18-65 aastaste majanduslikult aktiivsete isikute heaolu ja psühholoogilise distressi näitajaid. Kuna naiste distressi hinnangud olid mõlemas terviseuuringus kaks korda kõrgemad kui meestel, oli oluline uurida naiste ja meeste erinevusi vaimse tervise komponentide omavahelises seoses. Uuringu tulemused näitasid, et naiste ja meeste heaolu ja vaimse tervise struktuur on üldiselt võrreldavad, aga samas ilmnes ka olulisi erinevusi. Naised pidasid oma eluga rahulolu üle otsustamisel olulisemaks rahulolu majandusliku olukorraga, mida peetakse tüüpilisemaks vähemarenenud majandusega ja vaesemates riikides. Naistele oli tähtsam rahulolu pereeluga, mis nagu ka rahulolu majandusliku olukorraga mõjutas rohkem nende üldist eluga rahulolu. Meestel omakorda olid oluliseks rahulolu allikaks ja stressi reguleerimise vahendiks vabaajategevused ja nendega rahulolu. Järeldati, et naised oleks nagu konservatiivsemad, samas kui meeste rahuloluhinnangutes võis näha heaoluühiskonnale iseloomulikke väärtusi ja hoiakuid. Ilmselt kõige olulisem erinevus meeste ja naiste vahel oli naiste kalduvus vähem tegutseda ja rohkem kasutada emotsionaalse enesetunde kõrvalekalletega seoses nõndanimetatud kognitiivseid toimetulekustrateegiaid nagu muretsemine, mõtete mõlgutamine ja juurdlemine. Sellisele järeldusele sai jõutud naiste kõrge ärevuse seotuse kaudu suurema eluga rahuloluga.

Edasi tuli töös vaatluse alla inimeste kontrolliveendumuste roll negatiivsete emotsioonide esinemisel ja seoses lapsepõlvetingimustega (uuring IV). Eesti 2006. a. terviseuuringu majanduslikult aktiivsete täiskasvanute andmete alusel tehtud analüüs näitas, et nii meestel kui naistel olid isikliku kontrolli alahindamisega seotud uskumused mehhanismiks, mille kaudu lapsepõlve kahjulikud faktorid mõjutasid täiskasvanuea ärevuse- ja depressioonisümptomeid. Veelkord selgus naiste tugevam haavatavus. Nimelt, ebastabiilse ja raskesti kontrollitava lapsepõlvekeskkonna tagajärjena esines isikliku kontrolli alahindamist oluliselt rohkem naistel kui meestel. Raamatute hulk lapsepõlvekodus seostus tugevama isikliku kontrolli tajumise kujunemisega.

Nii meestel kui naistel oli rahulolu elus edasijõudmisega oluline subjektiivse heaolu ennustaja. Naistel seostus tugevam isikliku kontrolli tajumine suurema rahuloluga oma professionaalse karjääriga. Seega on isikuomaduste ja töö iseärsuste omavaheline sobivus tähtis inimese üldise heaolu ja vaimse tervise seisukohalt vaadatuna. Viies uurimus käsitles Eesti lennujuhtide objektiivse ametis edasijõudmise ja superviisorite poolt antava subjektiivse hinnangu ennustamise võimalikkust erialaõppesse kandideerimise ajal. Nii võimed kui ka mõned isiksuslikud omadused osutusid kasulikeks indikaatoriteks erialase edukuse prognoosimiseks. Selgus, et sotsiaalsus, aktiivsus ja positiivsed emotsioonid ei ole universaalselt kasulikud omadused; lennujuhtide ametialases edukuses neist igatahes kasu ei olnud. Naiste lennujuhiametis edasijõudmine oli meestest halvem ja nad oli meestest sagedamini erialasest tööst loobunud. Sellise olukorra põhjused vajavad kindlasti edasist uurimist.

Kuigi psühholoogilise distressi määr langes oluliselt kümne aasta jooksul, jäi kliiniliselt oluliste negatiivsete emotsioonidega naiste hulk kaks korda kõrgemaks võrreldes meestega. Üldine arvamus on, et meeste ja naiste vahelised erinevused vähenevad heaolu kasvades. Igatahes veel 2006 aastal heaolu afektiivse komponendi järgi seda meie ühiskonna kohta öelda ei saa.

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