



Research report

## Associations of personality profiles with various aspects of well-being: A population-based study

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### ABSTRACT

**Background:** Well-being consists of affective and non-affective components. Personality traits measure individual differences in adaptive functioning and mental health. In a previous Israeli study personality was strongly associated with well-being. However, it is not well known which aspects of this association are culture-specific, and which are common to most cultures. **Methods:** 1940 volunteer participants of the Cardiovascular Risk in Young Finns (CRYF) study completed the Temperament and Character Inventory (TCI), and the Multidimensional Scale of Perceived Social Support (PSS). Questions about positive and negative affect, satisfaction with life, and subjective health were also included. Multidimensional personality profiles were used to evaluate the linear and non-linear effects of interactions among dimensions on different aspects of well-being.

**Results:** Self-directedness was strongly associated with all aspects of well-being regardless of interactions with other dimensions. Cooperativeness was also associated with several aspects of well-being but especially strongly with perceived social support. Self-transcendence was associated with both positive and negative affect when the influence of the other character dimensions was taken into account. Personality explained half the variance in non-affective well-being and two thirds of the variance in affective well-being.

**Limitations:** The same assessment instruments were not used in the two countries we compared. Our data were cross-sectional.

**Conclusions:** Self-directedness and Cooperativeness are positively associated with well-being regardless of culture. The effect of Self-transcendence, however, seems to be culture-specific. Self-transcendence increases positive affect but, based on culture, it can also increase negative affect.

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## 1. Introduction

Well-being is a multidimensional concept that includes various aspects of mental and physical health, supporting social relationships, and ability to cope with stressful situations

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(McDowell, 2010; Stokes, et al., 1982). Extensive evidence demonstrates the importance of well-being in people's lives; current well-being appears to be relatively accurate indicator of one's future health condition (Chida and Steptoe, 2008). In addition, subjective well-being and subjective health are more highly correlated with each other than subjective health and objective physician assessed health; subjective health in turn has been found to be a better predictor of mortality than objective health measures (DeNeve and Cooper, 1998; Knauper and Turner, 2003).

The concepts of hedonic and eudaimonic well-being are often used to define well-being. Hedonic well-being refers to how and why people experience their lives in positive ways, and consists of a combination of negative and positive emotions and life satisfaction (Diener, 1984). Eudaimonic well-being encompasses the wider domains of personal growth, purposeful engagement and self development (Ryff, et al., 2004). The concepts of hedonic and eudaimonic well-being are distinct but related components of psychological functioning, and both are needed to fully understand the nature of well-being (Keyes, et al., 2002).

A high level of well-being is not equal to an easy problem-free life or life with only positive events. People have the ability to adapt to challenging events and setbacks and to evaluate their life from the view point of the changed life situation (Diener, et al., 1999; McDowell, 2010). When people adjust their expectations in response to, say, declining physical health, they can still feel well and content in the constraints of their new life situation. This emphasizes the difficulty of an objective observer in evaluating people's well-being, and highlights the importance of person-centered subjective experience.

In addition to individual experiences, perceptions of well-being are affected by culture and factors such as social norms and how important individual well-being is considered to be (Diener, et al., 2003). Differences in point of reference may also affect self-evaluations; people in different cultures may compare themselves against different standards (Heine, et al., 2002), so that two individuals with identical circumstances may evaluate themselves differently based on their cultural environment. While this poses a challenge to cross-cultural comparisons, it is important to consider such variability in assessing the universal relationship of personality with well-being.

In an Israeli population-based study, Cloninger and Zohar (2011) used a person-centered approach with multidimensional personality profiles in investigating how individual differences in personality profiles influence physical, emotional, and social aspects of well-being. They focused on character traits measured by the Temperament and Character Inventory (TCI) (Cloninger, et al., 1993). The three character dimensions of the TCI reflect three different aspects of self-concept: to what extent a person identifies the self as an autonomous individual (Self-directedness); an integral part of humanity and society (Cooperativeness); and an integral part of the unity of all things (Self-transcendence) (Cloninger, et al., 1993). Character dimensions aim at depicting maturity and integration of personality.

Cloninger and Zohar (2011) found that Self-directedness was strongly associated with both affective and non-affective well-being, including life satisfaction, social support, subjective health, positive affect, and negative affect. Cooperativeness was associated especially with perceived social support, and Self-transcendence predicted positive emotions when the influence of the other character dimensions was taken into account. The study showed that character traits have strong effects on the perception of well-being.

Given that subjective well-being may be evaluated with different criteria in different cultures, we examined whether personality (measured by the TCI) is associated with well-being in a population-based Finnish sample in a similar fashion as in

the previous Israeli study (Cloninger and Zohar, 2011). It is reasonable to presume that there are cultural differences, especially in spirituality and religiousness, between Jewish Israel and mostly Evangelical Lutheran and relatively secular Finland. The countries also differ in other sociopolitical issues, such as the quality of relationships with neighboring countries. We were interested in testing whether these cross-cultural differences influence the relationship between personality and well-being.

According to a study by the Guttman Center (Levy, et al., 2002), 65% of Israeli Jews believe wholeheartedly that there is a God. In addition, 15% pray in a synagogue every day and 25% pray every Shabbat at a synagogue. Religious values of Finns were mapped in World Values Survey (WVSA, 2009) and European Commission's Eurobarometer (European Commission, 2005), according to which 41% of Finns believe there is a God and an additional 41% believe in some sort of spiritual entity or life force but not in God. Only 1.9% attend religious services more than once a week and 4.5% once a week. Americans have been the main population for empirical assessment in developing the theory of Temperament and Character Inventory (Cloninger, 1987; Cloninger, et al., 1993), so it is worth comparing the foregoing percentages to those observed in the United States. We used the results of World Values Survey (WVSA, 2009) and American Religious Identification Survey (Kosmin and Keysar, 2009), which indicated that 70% of Americans believe that there definitely is a personal God, while an additional 12% believe that there is a higher power but no personal God. Approximately 12% attend religious services more than once a week and 24% once a week.

In the light of these figures, Finland might be considered a rather secular country in the traditional religious sense of the word. About 82% of people in both Finland and the United States believe in either a personal God or some sort of higher spirit. But belief in personal God and attending religious services is rarer in Finland than in the United States or Israel. In an international comparison, Finns were ranked among the least active attending public religious service (Kääriäinen, et al., 2009). Finns prefer to take care of their relationship with God privately without a church and many think that the activities of the parish are simply not interesting and feel no interest in religious life (Kääriäinen, et al., 2009).

A person-centered approach to personality is a key element in our study. An approach conceptualizing personality as a combination of several components rather than single dimensions examined separately makes it possible to understand processes within individuals and not just differences between individuals facing the biopsychosocial reality (Bergman and Magnusson, 1997). We evaluate the interactions of specific combinations of character traits with affective and non-affective aspects of well-being in a population based Finnish sample. We assess well-being with multiple measures. Affective well-being is assessed with measures of positive and negative affect. Non-affective well-being is assessed with measures of life-satisfaction, social support and subjective health. In addition, we include a measure of depressive symptoms to set the findings of various alternative measures in a broader perspective of well-being and ill-health. Both linear and non-linear methods are used to take into account the complexity of developmental processes.

## 2. Methods

### 2.1. Participants

The Cardiovascular Risk in Young Finns Study started in 1980. The subjects for the original sample in 1980 ( $N = 3596$ ) were selected randomly from six different age cohorts in the population register of the Social Insurance Institution, a database covering the whole population of Finland. The design of the study and the selection of the sample have been described in detail by Raitakari et al. (Raitakari, et al., 2008). The measurements for the present study were carried out in 2001. In 2001 the cohorts were 24, 27, 30, 33, 36 and 39 years old. Participants with missing information on any of the three character traits were excluded. Some participants lacked these measures because they did not fulfill the criteria of having answered a minimum of 50% of the items. Full character data was available for 2095 participants in 2001. After removing participants with missing information in any of the variables used in this study, we obtained a sample of 1940 participants. These 1940 participants were used in all the analyses. 1118 (57.6%) of the participants were women and 822 (42.4%) men.

### 2.2. Measures

#### 2.2.1. Temperament and character

We used version 9 of TCI which has 240 items. Instead of the original true/false response format we used a 5 point Likert-scale with response categories ranging from 1) absolutely false to 5) absolutely true. The items measure four dimensions of temperament and three dimensions of character. The current study includes only the character dimensions. Character dimensions are Self-directedness (SD), Cooperativeness (CO) and Self-transcendence (ST). SD includes 44 items, CO 42 and ST 33 items. The Cronbach's alphas of the scales were 0.89 for SD, 0.91 for CO and 0.91 for ST. The use of the 5-point Likert version of the TCI is closely comparable to the use of the TCI-R used in the Israeli study (Cloninger and Zohar, 2011) except that our Persistence scale is shorter.

#### 2.2.2. Character profiles

To form the character profiles, the sample was divided into subjects above and below the median for each of the three character traits. 114 participants who were in the middle third of the distribution for all three traits were excluded. After this the participants were grouped according to all the possible combinations of high and low character scores to define the 8 possible character configurations shown in Table 1. The character profiles are listed in the same order as was used in the previous study by Cloninger and Zohar (2011). This order was associated with greater happiness and character integration in the USA (Cloninger, 2004).

#### 2.2.3. Affect, life satisfaction and social support

We measured *positive affect* using the mood dimension of Revised Dimensions of Temperament Survey (DOTS-R) (Windle and Lerner, 1986). It has seven items and high scorers are characterized by high levels of positive affect, e.g. smiling and being cheerful (Windle and Michael, 1992). A 5

**Table 1**

Frequency distribution of TCI character profiles.

Character profile	N (women/men)	Percentage (women/men)
SCT – creative	345 (256/89)	17.8 (74.2/25.8)
SCT – organized	365 (198/167)	18.8 (54.2/45.8)
ScT – fanatical	81 (46/35)	4.2 (56.8/43.2)
Sct – autocratic	172 (46/126)	8.9 (26.7/73.3)
sCT – moody	170 (133/37)	8.8 (78.2/21.8)
sCt – dependent	97 (63/34)	5.0 (64.9/35.1)
sCT – disorganized	380 (227/153)	19.6 (59.7/40.3)
sct – depressive	330 (149/181)	17.0 (45.2/54.8)
Total	1940 (1118/822)	100 (57.6/42.4)

point Likert-scale was used to measure mood. Scale reliability was  $\alpha = 0.92$ .

*Negative affect* was assessed with negative emotionality dimension of the EAS temperament inventory (Buss, 1991). It consists of two subcomponents, that is, anger and fear. Anger has seven items and fear five. Scale reliability was  $\alpha = 0.81$ .

In preliminary analyses we observed that the measures of positive and negative affect were negatively correlated ( $r = -.44$ ). Since our aim was to replicate the earlier study, we wanted uncorrelated measures for positive and negative affect in order for them to be comparable to the uncorrelated measures of positive and negative affect used in the Israeli study (Cloninger and Zohar, 2011). Hence, we regressed positive affect on negative affect and used the residuals from this analysis as a measure of pure positive affect in all the analyses of this study.

*Life satisfaction* was assessed with one item asking “how satisfied are you with your life?” It was rated (1) very satisfied, (2) rather satisfied, (3) not satisfied not unsatisfied, (4) rather unsatisfied or (5) very unsatisfied. This original scale was reversed for the statistical analyses in this study (i.e., (1) very satisfied was recoded as (5) etc.) This item showed satisfying individual variability with a mean of 4.01 and standard deviation of 0.80, which is comparable to the 5-item scale used in the previous study (Cloninger and Zohar, 2011).

*Social support* was assessed with the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, et al., 1988), as in the Israeli study. It includes four items to assess perceived support from friends, four items about family support and four items about support by a significant other. The 12 items were rated on a 5-point Likert scale each. Scale reliability was  $\alpha = 0.94$ .

#### 2.2.4. Health status

*Subjective health* was assessed with one item asking “what is your health like compared to others of your age?” It was rated with the following scale (1) very good, (2) rather good, (3) average, (4) rather bad, (5) very bad. This original scale was reversed for the statistical analyses in this study (i.e., (1) very good was recoded as (5) etc.) This item showed comparable variability to the single item used in the previous study of Cloninger et al. Its mean was 3.91 and standard deviation 0.83.

#### 2.2.5. Depression

Depressive symptoms were assessed using a modified version of Beck's Depression Inventory (Beck and Steer, 1987;

Katainen, et al., 1999). In the present study, the subjects were asked to rate 21 items (e.g., “I often feel sad”) on a 5-point scale ranging from totally disagree (1) to totally agree (5). Scale reliability was  $\alpha = 0.91$ .

2.2.6. Composite Health Index and Happiness Index

We formed two composite variables of our measures of well-being, Composite Health Index (CHI) and Happiness Index (HI), as was done in the Israeli study by Cloninger and Zohar. CHI provides a summary of perceived non-affective well-being (i.e., “wellness”). It was calculated as the mean of life satisfaction, social support and subjective health in standard form. HI provides a summary of perceived affective well-being (i.e., “happiness”). It is defined by the presence of positive emotion and the absence of negative emotion and was calculated by subtracting the measure of negative affect from positive affect in standard form.

2.3. Statistical analyses

Analysis of variance and Bonferroni corrected post-hoc comparisons were used to study the linear relationship between personality profiles and well-being. Linear regression analysis was used to study the relationship of continuous character scores and well-being. Interactive associations of the character traits with well-being were studied with t-tests performed for the character profiles. All analyses were conducted using SPSS for Windows version 17. All measures reported here were analyzed in standard form with a mean of zero and standard deviation of one.

3. Results

3.1. Correlations among indicators of well-being

Table 2 shows the correlations between different indicators of well-being. Due to using residuals as the measure of positive affect as described in the methods section, positive and negative affect were uncorrelated. Scores for the three non-affective measures of life-satisfaction, perceived social support and perceived health were weakly but positively correlated with one another ( $r = +0.21$  to  $+0.41$ ). Each individual non-affective measure was strongly correlated with the CHI ( $r = +0.69$  to  $+0.78$ ). The Happiness Index correlated positively with all indicators except Beck’s depres-

Table 2  
Correlations between measures of well-being.

	1	2	3	4	5	6	7	8
1. Composite health	-							
2. Happiness index	60	-						
3. Positive affect	46	70	-					
4. Life satisfaction	78	50	38	-				
5. Subjective health	69	35	19	32	-			
6. Social support	73	47	45	41	21	-		
7. Negative affect	-38	-71	0	-32	-30	-23	-	
8. Beck’s depression	-62	-70	-33	-53	-46	-38	66	-

Values are correlation coefficients multiplied by 100 ( $r \times 100$ ).  
Happiness index = positive affect – negative affect.  
Composite Health Index = mean of satisfaction with life, subjective health and social support.  
Except for  $r = 0.00$ , all correlations are significant at  $p < 0.001$ .

sion and negative affect ( $r = 0.35$  to  $0.70$ ). The correlations between the Happiness Index and negative affect and Beck’s depression were  $-0.71$  and  $-0.70$  respectively. Beck’s depression index correlated negatively with all indicators except negative affect ( $r = -0.70$  to  $-0.33$ ). The correlation between Beck’s depression index and negative affect was  $0.66$ .

3.2. Character profile and positive affect

Fig. 1 shows standardized positive affect scores in the 8 character profiles. Analysis of variance revealed highly significant differences among the groups ( $F = 28.76$ ,  $p < 0.001$ ). Bonferroni corrected comparison between groups showed that the creative (SCT) profile was significantly higher in positive affect than all other profiles. The depressive profile (sct) was significantly lower than creative (SCT), organized (ScT), fanatical (ScT) and moody (sCT) profiles. Non-linear influence of each of the character dimensions on positive affect was evaluated by comparing the high and low half of each character dimension when the other two character dimensions were controlled for. As can be seen in Table 5, higher Self-directedness was consistently associated with higher positive affect for each of the four possible configurations of Self-transcendence and Cooperativeness. Also Cooperativeness was consistently associated with higher positive affect for each of the possible configurations of Self-directedness and Self-transcendence. Self-transcendence was associated with higher positive affect for three of the four possible combinations of Self-directedness and Cooperativeness. Only the contrast of moody vs. dependent profiles (sCT vs sCt) did not quite reach statistical significance ( $t = 1.90$ ,  $p = 0.059$ ).

3.3. Character profile and negative affect

Fig. 2 shows the standardized scores for negative affect among the participants in the 8 character profiles. Analysis of variance showed that the groups were significantly different from each other ( $F = 98.23$ ,  $p < 0.001$ ). Bonferroni corrected comparisons between groups showed that negative affect for the first four character profiles with high Self-directedness

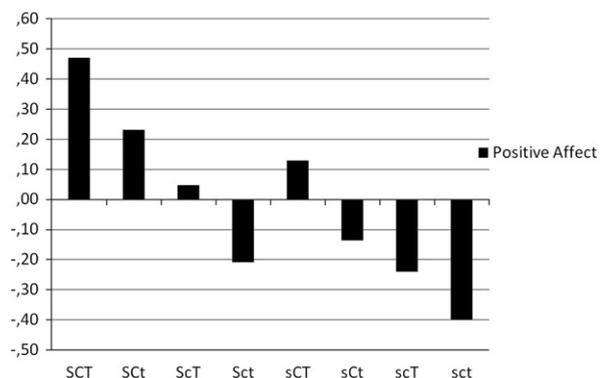


Fig. 1. Standardized values (mean = 0, SD = 1) of positive affect in different character combinations. SCT = creative; SCt = organized; ScT = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; scT = disorganized; sct = depressive. ANOVA:  $F = 28.76$ ,  $p < 0.001$ .

(SCT, SCt, ScT and Sct) was significantly lower than the last four profiles with low Self-directedness (sCT, sCt, scT and sct). These results show that Self-directedness explains the differences in negative affect between subjects' best. Those above the median for Self-directedness had lower scores in negative affect than those below the median. As can be seen in Table 5, the non-linear interactions of character dimensions on negative affect were much like those observed for positive affect. Self-directedness had a strongly significant inverse association with negative affect for each of the four possible configurations of the other two character traits. Also Cooperation had an inverse association with negative affect. Interestingly, Self-transcendence was associated with higher negative affect in three of the four possible character configurations. Only the contrast of moody vs. dependent profiles (sCT vs sCt,  $t = 0.60$ ,  $p = 0.55$ ) was not significant.

### 3.4. Character profiles and non-affective measures

Fig. 3 and Table 3 show the relationship between non-affective measures of well-being and character profiles. Analysis of variance revealed that the profile groups differed significantly for all three measures of well-being which were perceived social support ( $F = 60.24$ ,  $p < 0.001$ ), subjective health ( $F = 25.36$ ,  $p < 0.001$ ) and life satisfaction ( $F = 41.73$ ,  $p < 0.001$ ). The means of the profile groups are presented in Fig. 3 for all three measures of well-being. Bonferroni corrected post-hoc group comparisons showed that for social support the means of the creative (SCT) and organized (SCt) profiles were significantly higher than those of all profiles that were not high in both Self-directedness and Cooperativeness. Also the mean of depressed (sct) profile was significantly lower than that of all other profiles.

No profile differed significantly from all other profiles for subjective health. In particular, none of the profiles with high Self-directedness differed from each other. By contrast, the profiles with high Self-directedness differed from those with low Self-directedness with the exception of the dependent (sCt) profile. The same pattern was observed for life-satisfaction. Profiles with low Self-directedness did not differ from each other and neither did profiles with high Self-directedness. But all

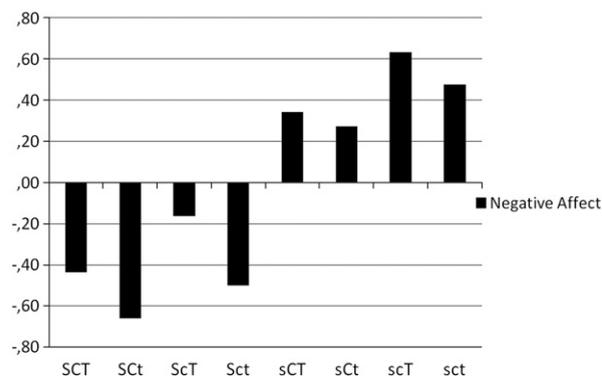


Fig. 2. Standardized values (mean = 0, SD = 1) of negative affect in different character combinations. SCT = creative; SCt = organized; ScT = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; scT = disorganized; sct = depressive. ANOVA:  $F = 98.23$ ,  $p < 0.001$ .

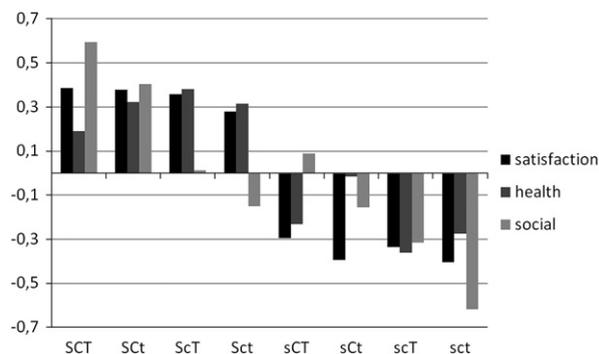


Fig. 3. Standardized values (mean = 0, SD = 1) of life satisfaction, subjective health and social support in different character combinations. SCT = creative; SCt = organized; ScT = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; scT = disorganized; sct = depressive. All three individual ANOVAs are significant at  $p < 0.001$ .

profiles with high Self-directedness differed significantly from those with low Self-directedness.

When interactions among the character traits were taken into account, higher Self-directedness was associated with greater life satisfaction, perceived social support and subjective health in all contrasts (Table 3). Higher Cooperativeness was strongly associated with greater social support in all contrasts but had little association with life-satisfaction or subjective health. Self-transcendence had no significant association with life-satisfaction or subjective health but it had an association with perceived social support.

### 3.5. Character profile and Composite Health Index and Happiness Index

Table 4 shows descriptive statistics for CHI, HI and positive and negative affect by character profile. Analysis of variance showed that the profile groups differed on the CHI significantly ( $F = 74.33$ ,  $p < 0.001$ ). The means of the different groups for the CHI are shown in Fig. 4. Bonferroni corrected post-hoc comparisons between groups showed that profiles with high Self-directedness are significantly different from those with low Self-directedness. Profile-based analysis revealed more information about the impact of character on well-being. Summary of the impact of each character trait on non-affective and affective aspects of well-being is given in Table 5. Non-affective well-being (i.e. "wellness") is measured by the CHI and affective well-being (i.e. "happiness") is measured by the HI. For both non-affective and affective well-being, higher Self-directedness was strongly associated with higher well-being regardless of the other two traits. Also Cooperativeness was associated with higher non-affective and affective well-being regardless of the other two character traits. Mean differences for Cooperativeness were somewhat smaller in magnitude than for Self-directedness but all contrasts were, nevertheless, significant. Results for Self-transcendence were mixed. Self-transcendence was not associated with non-affective or affective well-being but it seemed to increase reported positive and negative affect. In other words, individuals with high Self-transcendence tend to report more positive affect and more negative affect, even though positive and negative affect are uncorrelated in the sample.

**Table 3**

Comparisons between character profiles in standardized measures of well-being, social support and subjective health.

	Life satisfaction		Social support		Subjective health	
	MD	p	MD	p	MD	p
<i>Self-directedness</i>						
SCT vs sCT	0.681	0.000	0.507	0.000	0.423	0.000
Sct vs sCt	0.772	0.000	0.559	0.000	0.337	0.002
SCT vs sCt	0.695	0.000	0.329	0.006	0.741	0.000
Sct vs sct	0.684	0.000	0.467	0.000	0.590	0.000
<i>Cooperativeness</i>						
SCT vs Sct	0.028	0.755	0.582	0.000	-0.188	0.093
Sct vs Sct	0.099	0.176	0.554	0.000	0.008	0.920
sCT vs sCt	0.042	0.660	0.404	0.000	0.130	0.159
sCt vs sct	0.011	0.928	0.462	0.000	0.261	0.026
<i>Self-transcendence</i>						
SCT vs Sct	0.008	0.895	0.191	0.001	-0.132	0.061
Sct vs Sct	0.079	0.439	0.162	0.184	0.065	0.569
sCT vs sCt	0.099	0.469	0.243	0.059	-0.217	0.097
sCt vs sct	0.068	0.380	0.301	0.000	-0.086	0.248

SCT = creative; Sct = organized; Sct = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; sCt = disorganized; sct = depressive.

### 3.6. The influence of character profiles on extremes of non-affective well-being

Fig. 5 shows the associations of character profiles with the extremes of non-affective well-being. The top sixth and the bottom sixth of the distribution of the CHI were selected and named “best health” and “worst health” respectively, as was done in the Israeli study. We then calculated how many percents in each character profile group had “best health” and “worst health”. The profile groups differed significantly in the proportion that had “best health” ( $\chi^2 = 171.27$ ,  $df = 7$ ,  $p < 0.001$ ) and “worst health” ( $\chi^2 = 224.06$ ,  $df = 7$ ,  $p < 0.001$ ). These results are due the strong impact of Self-directedness and Cooperativeness on overall well-being with lesser influence from Self-transcendence. The percentage of people who had worst health increased steadily from moody (sCT), dependent (sCt) and disorganized (sCt) profiles to depressive (sct) profile. Individual with creative (SCT) or organized (Sct) profile were frequently in the best of health and only rarely in the worst of health. Fig. 5 also shows that the shift from predominant good health to ill health happened between autocratic (Sct) and moody (sCT) profiles.

**Table 4**

Descriptive statistics for standardized Composite Health Index (CHI), Happiness Index (HI) and positive and negative affects by character profile.

Character profile	CHI		HI		Positive affect		Negative affect	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SCT	0.391	0.030	0.907	0.058	0.470	0.048	-0.437	0.043
Sct	0.369	0.029	0.890	0.056	0.231	0.047	-0.659	0.044
Sct	0.250	0.058	0.211	0.139	0.048	0.107	-0.163	0.099
Sct	0.148	0.047	0.292	0.090	-0.209	0.068	-0.501	0.063
sCT	-0.146	0.058	-0.212	0.100	0.129	0.087	0.341	0.070
sCt	-0.188	0.074	-0.409	0.140	-0.136	0.105	0.273	0.088
sCt	-0.338	0.036	-0.872	0.065	-0.240	0.047	0.632	0.048
sct	-0.432	0.042	-0.877	0.070	-0.400	0.057	0.477	0.050

SCT = creative; Sct = organized; Sct = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; sCt = disorganized; sct = depressive.

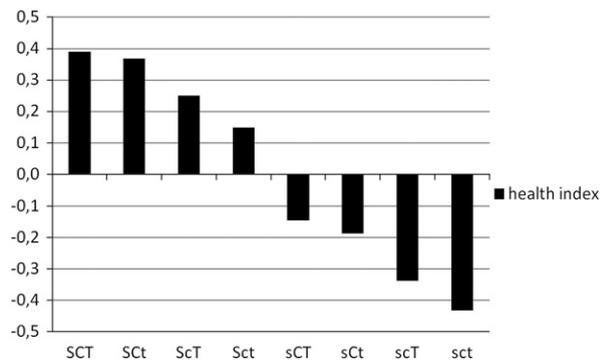


Fig. 4. Standardized values (mean = 0, SD = 1) of Composite Health Index in different character combinations. SCT = creative; Sct = organized; Sct = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; sCt = disorganized; sct = depressive. ANOVA:  $F = 74.33$ ,  $p < 0.001$ .

### 3.7. Linear influence of character traits on well-being

Overall influence of the three character variables on affective and non-affective well-being was assessed by using regression analysis. HI or CHI was used as the dependent variable and the three character traits were used as independent variables. TCI character explained 56% of the variance in non-affective well-being (CHI, R square 0.557,  $F = 290.44$ ,  $p < 0.001$ ) and 65% in affective well-being (HI, R square 0.654,  $F = 481.28$ ,  $p < 0.001$ ). For HI, the linear influence of Self-directedness was strong ( $\beta = 0.53$ ,  $t = 24.71$ ,  $p < 0.001$ ), Cooperativeness was weaker but still highly significant ( $\beta = 0.19$ ,  $t = 8.92$ ,  $p < 0.001$ ) and Self-transcendence was weak but significant ( $\beta = 0.05$ ,  $t = 2.84$ ,  $p = 0.005$ ). For CHI, the linear effect of Self-directedness was also strong ( $\beta = 0.51$ ,  $t = 21.55$ ,  $p < 0.001$ ), Cooperativeness was weaker than for HI but still significant ( $\beta = 0.09$ ,  $t = 3.70$ ,  $p < 0.001$ ) and Self-transcendence was about the same magnitude as Cooperativeness ( $\beta = 0.08$ ,  $t = 3.91$ ,  $p < 0.001$ ). When we used only Self-directedness to predict non-affective well-being in regression analysis, 30% was explained. In affective well-being Self-directedness alone explained 40% of the variance. Cooperativeness explained 14% of the variance in non-affective well-being when used as the only predictor in linear regression analysis. In addition, Cooperativeness explained 24% of the variance in affective well-being. Cooperativeness was a weaker predictor of non-affective and affective well-being than Self-directedness but still important. According to linear regression analyses, Self-transcendence had a negligible effect on well-

**Table 5**

Comparisons between character profiles in standardized measures of Happiness Index (HI), Composite Health Index (CHI), and negative and positive affect.

	HI		CHI		Negative affect		Positive affect	
	MD	p	MD	p	MD	p	MD	p
<i>Self-directedness</i>								
SCT vs sCT	1.120	0.000	0.537	0.000	−0.778	0.000	0.341	0.001
SCt vs sCt	1.299	0.000	0.556	0.000	−0.931	0.000	0.367	0.002
ScT vs scT	1.083	0.000	0.588	0.000	−0.795	0.000	0.288	0.011
Sct vs sct	1.169	0.000	0.580	0.000	−0.978	0.000	0.191	0.032
<i>Cooperativeness</i>								
SCT vs ScT	0.696	0.000	0.141	0.039	−0.273	0.007	0.423	0.000
SCt vs sCt	0.598	0.000	0.221	0.000	−0.158	0.040	0.440	0.000
sCT vs scT	0.660	0.000	0.192	0.004	−0.291	0.001	0.369	0.000
sCt vs sct	0.468	0.002	0.245	0.006	−0.204	0.049	0.264	0.027
<i>Self-transcendence</i>								
SCT vs ScT	0.017	0.831	0.022	0.591	0.222	0.000	0.239	0.000
ScT vs sCt	−0.080	0.617	0.102	0.170	0.337	0.003	0.257	0.039
sCT vs scT	0.196	0.246	0.042	0.663	0.069	0.548	0.265	0.059
sCt vs sct	0.005	0.960	0.094	0.089	0.155	0.026	0.160	0.029

SCT = creative; SCt = organized; ScT = fanatical; Sct = autocratic; sCT = moody; sCt = dependent; scT = disorganized; sct = depressive.

being when used as the only predictor, explaining 0% of affective and non-affective well-being.

#### 4. Discussion

The findings of this study in Finland are in agreement with the results obtained by Cloninger and Zohar (2011) in a sample of Israeli people. The results support the hypothesis that character profiles are strongly associated with individual differences in both affective and non-affective aspects of well-being. Furthermore, each character trait gives an independent contribution to well-being depending on the effect of other character traits, that is, trait by trait interactions.

Taken together, our results replicated very closely the previous Israeli study by Cloninger and Zohar (2011). In both studies Self-directedness was an important predictor of life satisfaction, social support, subjective health and positive and negative affect. Also, the association of Cooperativeness with perceived social support was replicated. However, in our Finnish data all associations of Cooperativeness with happiness, composite health or affect were significant while no such associations were observed in the Israeli study, suggesting that Cooperativeness may be more important

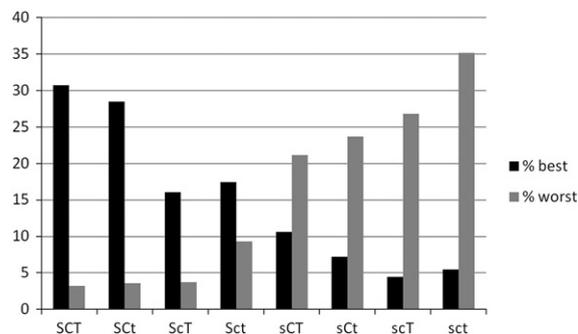
predictor of affective and non-affective well-being in Finland than in Israel. We also found that Self-transcendence was positively associated with increased reports of both positive and negative affect. This twin effect is different from the Israeli results in which Self-transcendence was only associated with positive affect.

People who have high Self-directedness are responsible, purposeful and resourceful (Cloninger, et al., 1993). People with low Self-directedness are more likely to have personality disorders and they are characterized by being irresponsible, aimless and helpless (Svrakic, et al., 1993). High Self-directedness also helps in recovery from physical illnesses and mental disorders (Cloninger, 2006). Self-directedness regulates people's hopes and desires (Cloninger, et al., 1993) which influences strongly physical, mental and social well-being, as this study strongly demonstrates.

Cooperativeness is measured by a person's empathy, helpfulness and social tolerance (Cloninger, et al., 1993). As our study shows, Cooperativeness is strongly associated with the perception of social support which increases non-affective well-being and reduces negative emotions.

Self-transcendence enhances awareness of connections beyond the individual self with other people and the world as a whole (Cloninger, et al., 1993). Interestingly, our results showed that when the interactions among character traits are taken into account Self-transcendence has a consistent impact on the presence of both positive and negative emotions. As Table 5 shows the trends are very clear. In all the contrasts when the other two character traits are held constant, Self-transcendence increases both negative and positive affect. Not all the differences are significant but the trend is clear. This consistent non-linear impact of Self-transcendence on emotional well-being would have been missed if only linear regression analysis had been used.

The most noticeable difference between the original study by Cloninger and Zohar (2011) and our study is that we found higher negative affect for high Self-transcendent people in Finland, while this was not observed in the Israeli sample. This might reflect cultural differences. Certain personality



**Fig. 5.** Percentage of people who have best or worst subjective health. Best health = belongs to the highest sextile on Composite Health Index. Worst health = belongs to the lowest sextile on Composite Health Index.

characteristics and behavior are endorsed and others frowned upon based on the cultural norms and ideals. Perhaps high Self-transcendence increases personal positive affect but the way other people react to a person with high Self-transcendence causes higher negative affect. Furthermore, high Self-transcendence makes people worry more about the environment (Hirsh, 2010), which suggests that Self-transcendence might awaken a “global conscience” in a person. Given that Self-transcendence describes people’s relationship to the world around them (Cloninger, et al., 1993), it could be that high Self-transcendence leads people to be more aware and worry more about global problems, such as climate change, environmental problems, injustice, famine and global conflicts, which might then increase negative emotions. It is also possible that religion is a protective buffer between high Self-transcendence and negative emotions which could explain the differences between Finland and Israel. Believing in “the will of God” might decrease the experience of negative emotions in highly Self-transcendent people (Atran and Norenzayan, 2004). Finland being more secular than Israel might explain why Finnish people with high Self-transcendence have more negative emotions.

The present and previous (Cloninger and Zohar, 2011) findings indicate that well-being consists of several components that are weakly to moderately correlated. Perceptions of health, social support and life satisfaction were positively correlated with one another and with positive emotions (Table 2). Also, each of these measures was negatively correlated with negative emotions. Correlations among different components of well-being were rather weak, implying that well-being is a concept with multiple dimensions that may vary substantially in the course of their development. This also implies that well-being cannot be reduced to just one dimension of physical, mental or social well-being. They must be considered as a whole to get a comprehensive picture of a person (Cloninger, 2004).

A limitation of our test of replicability is that the same assessment instruments were not used in the two countries. However, we had closely comparable measures in different languages, as indicated by the consistency of most findings in the two countries. A further limitation in this as well as the original study is that the observations are based on a cross-sectional sample in which causation cannot be established. However, the link between personality and a perception of well-being is now replicated in two independent samples which gives the results more credibility.

The different configurations of character profiles used in this study describe the dimensions of the whole person and they take into account the interactions of traits within the individual. This person-centered approach makes it possible to understand human development within an individual. The results also show that fitting models with and without assuming linearity gives more information than just relying on linear analyses. We found that the non-linear interactions and dynamics explain well-being in a clear and consistent manner. Our results clearly indicate that all three dimensions of character measured by the TCI influence affective and non-affective well-being by means of their joint interactions. Future studies of well-being need to evaluate the multidimensional nature of well-being and related personality traits.

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#### Conflict of interest

The authors declare no conflict of interests.

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#### References

- Atran, S., Norenzayan, A., 2004. Religion’s evolutionary landscape: counter-intuition, commitment, compassion, communion. *Behav. Brain Sci.* 27, 713–730.
- Beck, A.T., Steer, R.A., 1987. *Manual for the Revised Beck Depression Inventory*. Psychological Corporation, San Antonio, TX.
- Bergman, L.R., Magnusson, D., 1997. A person-oriented approach in research on developmental psychopathology. *Dev. Psychopathol.* 9, 291–319.
- Buss, A.H., 1991. The EAS theory of temperament. In: Strelau, J., Angleitner, A. (Eds.), *Explorations in Temperament: International Perspectives on Theory and Measurement*. Plenum Press, New York, pp. 43–60.
- Chida, Y., Steptoe, A., 2008. Positive psychological well-being and mortality: a quantitative review of prospective observational studies. *Psychosom. Med.* 70, 741–756.
- Cloninger, C.R., 1987. A systematic method for clinical description and classification of personality variants – a proposal. *Arch. Gen. Psychiatry* 44, 573–588.
- Cloninger, C.R., 2004. *Feeling Good. The Science of Well-being*. Oxford University Press Inc., New York.
- Cloninger, C.R., 2006. The science of well-being: an integrated approach to mental health and its disorders. *World Psychiatry* 5, 71–76.
- Cloninger, C.R., Zohar, A.H., 2011. Personality and the perception of health and happiness. *J. Affect. Disord.* 128, 24–32.
- Cloninger, C.R., Svrakic, D.M., Przybeck, T.R., 1993. A psychobiological model of temperament and character. *Arch. Gen. Psychiatry* 50, 975–990.
- DeNeve, K.M., Cooper, H., 1998. The happy personality: a meta-analysis of 137 personality traits and subjective well-being. *Psychol. Bull.* 124, 197–229.
- Diener, E., 1984. Subjective well-being. *Psychol. Bull.* 95, 542–575.
- Diener, E., Suh, E.M., Lucas, R.E., Smith, H.L., 1999. Subjective well-being: three decades of progress. *Psychol. Bull.* 125, 276–302.
- Diener, E., Oishi, S., Lucas, R.E., 2003. Personality, culture, and subjective well-being: emotional and cognitive evaluations of life. *Annu. Rev. Psychol.* 54, 403–425.
- European Commission, 2005. *Eurobarometer: Social Values, Science and Technology*.
- Heine, S.J., Lehman, D.R., Peng, K.P., Greenholtz, J., 2002. What’s wrong with cross-cultural comparisons of subjective likert scales?: the reference-group effect. *J. Pers. Soc. Psychol.* 82, 903–918.
- Hirsh, J.B., 2010. Personality and environmental concern. *J. Environ. Psychol.* 30, 245–248.
- Kääriäinen, K., Ketola, K., Niemelä, K., Palmu, H., Salomäki, H., 2009. Facing Diversity: The Evangelical Lutheran Church of Finland from 2004 to 2007. Church Research Institute, Tampere.
- Katainen, S., Raikkonen, K., Keltikangas-Jarvinen, L., 1999. Adolescent temperament, perceived social support, and depressive tendencies as predictors of depressive tendencies in young adulthood. *Eur J Pers* 13, 183–207.
- Keyes, C.L.M., Shmotkin, D., Ryff, C.D., 2002. Optimizing well-being: the empirical encounter of two traditions. *J. Pers. Soc. Psychol.* 82, 1007–1022.
- Knauper, B., Turner, P.A., 2003. Measuring health: improving the validity of health assessments. *Qual. Life Res.* 12, 81–89.
- Kosmin, B.A., Keysar, A., 2009. *American Religious Identification Survey: Summary Report*. Trinity College, USA.
- Levy, S., Levinsohn, h., Katz, E., 2002. A Portrait of Israeli Jewry: Beliefs, Observances, and Values among Israeli Jews. The Israel Democracy Institute and The AVI CHAI Foundation, Israel.
- McDowell, I., 2010. Measures of self-perceived well-being. *J. Psychosom. Res.* 69, 69–79.

- Raitakari, O.T., Juonala, M., Ronnema, T., Keltikangas-Jarvinen, L., Rasanen, L., Pietikainen, M., Hutri-Kahonen, N., Taittonen, L., Jokinen, E., Marniemi, J., Jula, A., Telama, R., Kahonen, M., Lehtimaki, T., Akerblom, H.K., Viikari, J.S.A., 2008. Cohort profile: the cardiovascular risk in Young Finns Study. *Int. J. Epidemiol.* 37, 1220–1226.
- Ryff, C.D., Singer, B.H., Love, G.D., 2004. Positive health: connecting well-being with biology. *Philos. Trans. R. Soc. Lond. Ser. B-Biol. Sci.* 359, 1383–1394.
- Stokes, J., Noren, J., Shindell, S., 1982. Definition of terms and concepts applicable to clinical preventive medicine. *J. Community Health.* 8, 33–41.
- Svrakic, D.M., Whitehead, C., Przybeck, T.R., Cloninger, C.R., 1993. Differential-diagnosis of personality-disorders by the 7-factor model of temperament and character. *Arch. Gen. Psychiatry* 50, 991–999.
- Windle and Michael, 1992. Revised Dimensions of Temperament Survey (DOTS-R): simultaneous group confirmatory factor analysis for adolescent gender groups. *Psychol. Assess.* 4, 228–234.
- Windle, M., Lerner, R.M., 1986. Reassessing the dimensions of temperamental individuality across the life span: the Revised Dimensions of Temperament Survey (DOTS-R). *J. Adolescent Res.* 1, 213–229.
- WVSA, 2009. World Values Survey 2005 Official Data File v.20090901. World Values Survey Association, ASEP/JDS, Madrid.
- Zimet, G.D., Dahlem, N.W., Zimet, S.G., Farley, G.K., 1988. The multidimensional scale of perceived social support. *J. Pers. Assess.* 52, 30–41.