Beyond lifestyle, logic and empathy: subjective health, mood, emotional intelligence, and personality as keys to well-being for women and men

Daiva Majauskiene[1,2*], Albertas Skurvydas[1], Natalja Istomina[3], Ruta Dadeliene[1], Emilija Strazdaite[1], Dovile Valanciene[4], Aiste Barbora Uspuriene[2] and Asta Sarkauskiene[5]

Abstract

In a study involving 831 women and 309 men aged 18 to 64, we sought to explore the key determinants influencing various components of well-being, including happiness, life satisfaction, and vigor/vitality. The determinants examined encompassed sociodemographic variables, health indicators, sedentary behaviors, physical activity, body mass index (BMI), sleep patterns, eating habits, alcohol consumption, smoking, mood indicators, personality traits, emotional intelligence, logical thinking, non-utilitarian decision-making, and adverse childhood experiences. Our findings indicate that happiness, life satisfaction, and vigor are most significantly affected by mood indicators—especially depression—emotional intelligence (particularly the ability to manage emotions), and overall subjective health. Additionally, specific personality traits, such as extraversion in women and neuroticism in men, played a significant role in influencing well-being. Conversely, determinants such as BMI, sleep habits, regular physical activity, sedentary behavior, dietary habits, avoiding smoking and excessive alcohol consumption, as well as logical thinking, non-utilitarian decision-making, and adverse childhood experiences, showed limited or no significant impact on well-being components like happiness, life satisfaction, and vigor. These findings provide valuable insights into the complex dynamics of human well-being, highlighting the distinct determinants of happiness, life satisfaction, and vigor/vitality for men and women.

Keywords Happiness, Well-being, Healthy lifestyle, Emotional intelligence, Logical thinking abilities, Moral decisions, Mood profile, Personality traits

*Correspondence:
Daiva Majauskiene
daiva.maja@gmail.com
[1]Department of Rehabilitation, Physical and Sports Medicine, Faculty of Medicine, Institute of Health Sciences, Vilnius University, 21/27 M.K. Ciurlionio St, Vilnius 03101, Lithuania
[2]Education Academy, Vytautas Magnus University, K. Donelaicio Street 58, Kaunas 44248, Lithuania
[3]Institute of Health Sciences, Faculty of Medicine, Vilnius University, 21/27 M.K. Ciurlionio Street, Vilnius 03101, Lithuania
[4]Faculty of Law, Vilnius University, Sauletekio al. 9, Vilnius 10221, Lithuania
[5]Department of Sports, Recreation and Tourism, Klaipeda University, Herkaus Manto Street 84, Klaipeda 92294, Lithuania

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Introduction

The happiness and well-being of individuals are pivotal components of life, shaped by a myriad of determinants including physical and mental health, positive emotions, engagement in specific activities, life aspirations, education, age, occupation, income, personality, meaningful familial connections, and more [1–11]. Besides, human flourishing encompasses a rich tapestry of facets, including mental and physical health, happiness, life satisfaction, purpose, meaning, personal virtues, and profound social connections [12]. However, unravelling the determinants of happiness presents intricate challenges. It's not merely the intricate interplay of these influencing determinants but also the multidimensional nature of happiness itself that complicates this exploration [4, 8].

Happiness encompasses diverse dimensions: emotional well-being, eudaimonic well-being linked to life's purpose, and evaluative well-being tied to life satisfaction [2, 4, 5, 8, 12, 13]. Assessing an individual's happiness is not solely reliant on rational thinking but encompasses intuitive emotional thought processes and approaches to complex moral decisions [14, 15]. Moreover, well-being intertwines with competence, emotional stability, engagement, meaning, optimism, positive emotions, relationships, resilience, self-esteem, and vitality [2, 16]. Ongoing research into the connection between happiness and health uncovers intriguing possibilities. It hints that impaired happiness might not solely arise from poor health but could also influence disease risk [8, 17–20]. Observational studies indicate a correlation between happiness and reduced mortality [8]. The mechanisms linking happiness to health involve lifestyle components such as physical activity (PA) and dietary choices, as well as intricate biological processes like neuroendocrine, inflammatory, and metabolic pathways [8, 21, 22]. Research indicates that higher PA levels correlate with increased well-being, better quality of life, and reduced depressive symptoms and anxiety across age groups [4, 7, 8, 22–33].

While studies across 15 European countries suggest a link between elevated PA levels and increased happiness, identifying the specific intensity associated with happiness remains somewhat elusive [34]. Aerobic training appears beneficial, and moderate-intensity activity seems advantageous, but the impact of longer exercise durations on various aspects of well-being remains inconclusive [24]. These complexities pose challenges and pave the way for further exploration in understanding the intricate relationship between happiness, well-being, and their multifaceted determinants. Moreover, most of the studies cited above explore the interaction of happiness fragmentarily with specific indicators. Thus, there's a lack of research on how the different components of happiness associate with the entire complex of various determinants. Therefore, our objective was to study how sociodemographic determinants, health, healthy lifestyle choices, personality traits, mood variations, emotional intelligence, childhood exposure to violence, logical thinking abilities, non-utilitarian decision-making, collectively contribute to shaping subjective happiness, life satisfaction, and vitality (vigor) in both men and women. Our study's primary hypothesis posits that well-being—encompassing happiness, life satisfaction, and vigor—is predominantly influenced by subjective health, body mass index (BMI), and a healthy lifestyle among the 37 determinants examined for both men and women. This hypothesis is based on the idea that good health and healthy habits, including sufficient sleep, regular PA, balanced nutrition, and the avoidance of smoking and excessive alcohol consumption, substantially improve mood, emotional intelligence, and cognitive functioning while mitigating stress. Furthermore, we hypothesize that among all personality traits, neuroticism will have the strongest negative association with well-being for both genders. We suggest that empathy, especially in women, and logical thinking ability, for both women and men, will significantly influence well-being.

Materials and methods

Participants

A total of 1,140 individuals participated in the study, with 309 (27.1%) identifying as men and 831 (72.9%) as women, aged 18 to 64 years. Sociodemographic details are provided in Table 1. Informed consent was obtained from all participants, emphasizing the study's goals, participant anonymity, and the option to withdraw at any time. The study adhered to the Declaration of Helsinki and received approval from Klaipėda University (Protocol No. STIMC-BTMEK-09) (approval date: December 16. 2021). Utilizing a snowball sampling method, we employed a cross-sectional survey approach. Initial participants were drawn from personal and professional networks, and they were encouraged to invite others to participate. The online questionnaire was shared through social networks and emails between May 2021 and June February 2022.

Measures

Sociodemographics. Participants were asked to indicate their age, gender, family status, education, place of residence, financial security, and job type.

Subjective health assessment was conducted through participants' responses to the query *'How would you rate your health over the last few months?'.* Participants indicated their health status using a Likert-type scale (1 = poor, 2 = satisfactory, 3 = good, 4 = excellent). To facilitate analysis, responses were categorized into two groups: poor health and good health.

Table 1 Gender differences in average (SD) of descriptive variables

	Women	Men	*p*-value
Number	831	309	
Happiness indicators			
Happiness	7.94 (1.5)	8.0 (1.2)	0.55
Life satisfaction	7.71 (1.4)	7.97 (1.3)	0.02
Vigor*	8.73 (3.7)	9.99 (3.5)	0.001
Sociodemographic indicators			
Age (years)	41.9 (11.6)	40.1 (11.2)	0.12
Living in the city (%)	82.8	84.8	> 0.05
University educated (%)	79.2	74.7	> 0.05
Sedentary work (%)	51	43.4	< 0.05
Living above average (%)	50.2 (16.8)	62.2 (14.2)	< 0.05
Health indicators			
Excellent or very good health (%)	72.8	79.9	< 0.05
Chronic diseases (%)	20.6	13.6	< 0.05
BMI (kg/m²)	24.2 (4.5)	26.5 (4.9)	< 0.001
Lifestyle indicators			
Non-exercising (%)	30.9	17.5	< 0.001
MVPA (min/week)	594.5 (214.5	755.4 (357.2)	< 0.001
SB (min/day)	755.4 (357.2)	755.4 (357.2)	0.73
Sleeping time (h)	7.34 (0.94)	7.28 (0.86)	0.094
Bedtime (h)	22.9 (0.86)	22.9 (0.86)	0.141
Breakfast eating (%)	70.8	74.4	> 0.05
Overeating (%)	20.6	19.6	> 0.05
Completely alcohol-free (%)	14.8	17.2	> 0.05
Non-smokers (%)	61.1	46.9	< 0.05
Perceived stress (the PSS-10 score)	16.8 (6.2)	14.1 (6.4)	0.004
Emotional intelligence			
Emotional intelligence	128 (16.1)	122.1 (14.1)	< 0.001
Managing own emotions	35.9 (5.6)	35.4 (6.2)	0.167
Perception of emotions	38.7 (6.6)	36.2 (7.1)	< 0.001
Managing other's emotions	30.5 (4.6)	28.6 (5.4)	< 0.001
Utilization of emotions	23.1 (4.2)	22.1 (4.4)	< 0.001
Mood profile			
Tension	3.56 (1.7)	3.11 (2.3)	0.054
Depression	2.81 (2.6)	2.43 (2.2)	0.11
Anger	2.45 (2.5)	2.31 (1.7)	0.51
Fatigue	5.6 (4.1)	4.45 (3.1)	< 0.001
Confusion	3.06 (3.1)	2.64 (3.1)	0.061
Logical thinking and non-utilitarian decisions			
Logical task solutions	2.21 (0.31)	2.27 (0.47)	0.37
Non-utilitarian decisions	1.76 (0.24)	1.6 (0.25)	< 0.001
Adverse childhood experiences			
Frequency of bullying (%)	50.5	50.2	0.93
Frequency of violence (%)	30.4	26.9	0.29
Personality traits			
Extraversion	30.4 (5.8)	29.7 (6.2)	0.07
Conscientiousness	40.8 (6.8)	39.9 (6.8)	0.062
Agreeableness	43.7 (7.6)	41.1 (7.5)	< 0.001
Neuroticism	34.5 (6.8)	31.9 (6.6)	< 0.001
Openness	47.7 (6.1)	47 (6.1)	0.21
The three most important aspects of life			
Personal growth (%)	27.6	26.5	> 0.05

Table 1 (continued)

	Women	Men	*p*-value
Success at work (%)	24.7	22.8	> 0.05
Leisure time (%)	22	21.5	> 0.05

Note. BMI– body mass index; MVPA– moderate to vigorous physical activity; p– the level of marginal significance within a statistical hypothesis test; PSS-10– The Perceived Stress Scale; SB– sedentary behaviour; * - Vigor is one of the indicators in the mood profile

PA level was evaluated using the long *International Physical Activity Questionnaire (IPAQ)* [35]. The *IPAQ* covers four physical activity domains: work-related, transportation, domestic, and recreational physical activity. Within the *IPAQ*, participants were asked about the frequency of their physical activities and the average duration of their activities per day in these specific activity domains. Total weekly physical activity level was calculated by weighting the duration of each intensity activity by its metabolic equivalent (MET) energy expenditure. Vigorous activities were assigned a MET value of 8.0, moderate activities 4.0, and low-intensity activities 3.3, respectively. IPAQ is a validated and reliable tool for measuring physical activity levels, with high validity (Spearman correlation 0.8–0.9) and reliability (test-retest reliability: ICC = 0.8) [35].

Emotional intelligence was evaluated using the *Schutte Self-Report Emotional Intelligence Test (SSREIT)* [36]. The *SSREIT* consist of 33 questions divided into four subsections: Perception of emotions (10 items), Ability to deal with one's own emotions (9 items), Ability to deal with the emotions of others (8 items) and Use of emotions (5 items). Participants rate each item on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Total scores range from 33 to 165, with higher scores indicating a greater level of emotional intelligence. SSREIT has well-documented reliability and validity, with Cronbach's α ranging from 0.87 to 0.90. Studies also confirm the construct validity of this instrument [36].

Mood responses were assessed using the 24-item *Brunel Mood Scale-LTU (BRUMS- LTU)* [37], adapted from the Terry et al., (2003) [38] and validated in Lithuanian by Terry et al. [37]. The scale contains six subscales of four items each (i.e., Tension items: nervous, anxious, worried, panicky; Depression items: unhappy, miserable, depressed, downhearted; Anger items: bitter, angry, annoyed, energetic; Vigor items: energetic, active, lively, alert; Fatigue items: exhausted, tired, worn out, sleepy; and Confusion items: mixed up, muddled, uncertain, confused). Participants indicated their responses using a 5-point Likert scale (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, and 4 = extremely), with the potential subscale scores ranging from 0 to 16. The assessment referred to the present moment (e.g., *'How do you feel right now?'*). The 24 items, condensed into six subscale scores, were considered as continuous variables. The BRUMS-LTU has shown satisfactory internal consistency, with Cronbach's α coefficients ranging from 0.83 to 0.89 for all six subscales [37].

Personality characteristics were evaluated utilizing the *Big Five Inventory (BFI)* [39]. This 44-item inventory was designed to provide the five personality dimensions when there is no need for more differentiated measurement of individual facets. Participants rated each *BFI* item on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree); scale scores were computed as the participant's mean item response. Scale scores were calculated as the sum of the respective items. BFI has been validated across various cultural contexts, with Cronbach's α coefficients exceeding 0.7 for all five dimensions [39].

Perceived stress was evaluated using the 10-item *Perceived Stress Scale (PSS-10)* [40]. The *PSS-10* is used to assess the extent to which the individual has perceived situations in their life as unpredictable, uncontrollable, and overloading over the past month. Participants rated each *PSS-10* question on a 5-point scale from 0 (never) to 4 (very often). Total scores ranged from 0 to 40, with higher scores indicating a higher perceived stress level. PSS-10 demonstrates high internal consistency (Cronbach's α = 0.78–0.91) and good construct validity [40].

Smoking and alcohol consumption. The respondents had to indicate their smoking habits on a scale of 1 to 4, where 1 is "*I have never smoked*"; 2 is "*I smoke occasionally*"; 3 is "*I smoke every day*"; 4 is "*I used to smoke, but quit*". Alcohol consumption was assessed on a scale of 1 to 7, where 1 is "*I don't drink at all*" and 7 is "*Daily*".

High-conflict personal moral dilemmas were used to assess what *moral decisions* (utilitarian or non-utilitarian) participants make [41]. Participants were asked to make decisions in 3 high-conflict personal dilemmas: an "appropriate" answer indicated a utilitarian response and an "inappropriate" answer indicated a non-utilitarian response. For our research purposes, the total number of decisions and the percentage of utilitarian and non-utilitarian decisions were calculated.

The Cognitive Reflection Test (CRT). This test, taken from Frederick (2005) [42], consists of three questions:

1) 'A bat and a ball together cost $1.10. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents';

2) 'If it takes 5 machines 5 min to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes';

3) 'In a lake, there is a patch of lily pads in a lake. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days'.

The measure is scored as the total number of correct answers. The *CRT* measures the cognitive process, i.e., the tendency to suppress an incorrect, intuitive response and arrive at a more conscious, correct response.

Eating breakfast and overeating. Eating breakfast was evaluated on a scale of one to three, where 1 is "no"; 2 is "sometimes"; and 3 is "yes"). Overeating was also assessed using a scale of one to three, where 1 is "no"; 2 is "rarely"; and 3 is "often").

We calculated the *body mass index* (BMI) indicator based on the height and weight values provided by the respondents.

The Life Satisfaction index was determined by asking *'Are you satisfied with your life?'* with response options on a 10-point scale ranging from 1 ("very dissatisfied") to 10 ("very satisfied"). The Happiness index was assessed using the question 'Are you happy in life?' with response options on a 10-point scale from 1 ("very unhappy") to 10 ("very happy"). While Vigor was derived from the *BRUMS-LTU*.

Single questions were employed to quantify participants' average sleep duration, bedtime,. We inquired whether the participants' encountered instances of violence and bullying during their childhood. If you experienced physical or psychological violence in childhood, indicate how often: very rarely (1), rarely (2), often (3), very often (4).

Statistical analysis

A variety of statistical methods and analyses were used in the study. We verified that all interval data followed a normal distribution using the Kolmogorov–Smirnov test. Prior to statistical analysis, all continuous variables were screened for normality using skewness and kurtosis metrics. Skewness values between -1 and $+1$ and kurtosis values between -2 and $+2$ were considered acceptable for normal distribution. The statistical analyses were carried out using *IBM SPSS Statistics* software (*Version 22; IBM SPSS, Armonk, NY, USA*). To examine the interaction of happiness, life satisfaction, and vigor (dependent variables) with various influencing determinants (totalling 37 determinants, independent variables), We extracted standardized regression coefficients (beta coefficients) and *p*-values from the latter. Moreover, we also calculated the coefficient of determination (R^2). For assessing the

significance of differences between the averages of men and women, we employed *p*-value calculations based on an independent samples T-test. Moreover, when comparing indicators between men and women, we utilized chi-square test *p*-values. Statistical significance was defined as $p < 0.05$, but for enhanced precision in most instances, where applicable, more accurate *p*-values were employed.

Results

Descriptive data

In the first table, the average and standard deviation values of various indicators for men and women are presented. Women and men with university education were 79.2% and 74.7%, respectively. 30.9% of men and 17.5% of women did not engage in exercise, while 1.8% of women and 5.8% of men were professional athletes. The BMI for men and women was 26.5 ± 4.9 kg/m^2 and 24.2 ± 4.5 kg/m^2, respectively ($p < 0.001$). The percentage of women and men with normal body weight (BMI: >18.5 to 25 kg/m^2) was 59.9% and 40.8%, respectively ($p < 0.001$), while those with BMI from 25 to 29.9 kg/m^2 were 24.8% and 46% ($p < 0.001$), and those with BMI of 30 and above were 11.8% and 13.3% ($p > 0.05$). Women reporting good and excellent subjective health were 57.3% and 15.5%, respectively, while for men, it was 55% and 24.9% (excellent health in men vs. women– $p < 0.001$). In urban areas, the respective percentages of women and men were 81.8% and 88.8%. Sedentary and standing work was performed by 79.2% of women and 71.2% of men. Men exhibited significantly higher life satisfaction and vigor, with no gender disparity in happiness (Table 1). They rated their health and economic life significantly better, experienced less fatigue, yet demonstrated lower emotional intelligence compared to women. Men statistically significantly rated their health better and had fewer chronic illnesses compared to women. Logical thinking abilities did not significantly differ between men and women. Men engaged significantly more in sports and had higher levels of moderate to vigorous physical activity (MVPA) but also had a higher BMI compared to women. In addition, women experienced higher levels of stress than men, and women tended to exhibit greater levels of neuroticism and agreeableness, as well as non-utilitarian decision-making. There was no disparity between men and women concerning negative experiences like childhood bullying and violence.

Determinants of happiness, life satisfaction, and vigor

The second table presents the relationship between the dependent variables (happiness, life satisfaction, and vigor) and 37 studied indicators, expressed through beta standardized coefficients and *p*-values derived from regression analysis, separately for men and women. The first figure highlights only the statistically significant

determinants influencing happiness, life satisfaction, and vigor. In our research (Table 2; Fig. 1), most sociodemographic determinants showed no significant influence on happiness, life satisfaction, or vigor for either men or women.

Higher economic status significantly influenced women's happiness and the life satisfaction of both genders. Subjective health had a positive impact on life satisfaction and vigor for both men and women, and additionally on happiness specifically for men. Perceived stress negatively affected happiness for both genders and life satisfaction for women. Interestingly, chronic illness and Body Mass Index (BMI) did not significantly influence happiness, life satisfaction, or vigor in either men or women. Key indicators of a healthy lifestyle—such as participation in sports, MVPA, SB (with the exception of its negative impact on men's happiness), sleep patterns, alcohol consumption, smoking, breakfast habits, and overeating—showed no significant association with happiness or life satisfaction for either gender. However, an unexpected positive relationship was found between men's overeating and life satisfaction.

Vigor was significantly influenced by sports and MVPA for both genders, yet it showed no significant relationship with other lifestyle indicators, including smoking, alcohol consumption, sleep, breakfast habits, and overeating. Both happiness and life satisfaction had the strongest negative associations with depression in both genders and a positive correlation with vigor, except for women's life satisfaction. In men, tension was significantly and negatively associated with happiness and life satisfaction, while in women, tension negatively impacted vigor. Surprisingly, confusion was positively associated with life satisfaction for both genders. Furthermore, vigor was inversely related to fatigue in both men and women.

Life satisfaction and vigor were positively associated with extraversion among women. For both genders, vigor was negatively associated with neuroticism, and neuroticism was also negatively linked to happiness in men. Logical thinking and non-utilitarian decision-making were not significantly related to happiness, life satisfaction, or vigor in either gender. However, the ability to manage emotions was significantly and positively associated with happiness and vigor in both genders, although it did not show a similar effect on men's life satisfaction. Childhood bullying significantly affected happiness in men, while childhood violence impacted happiness in women.

Discussion

Our study findings partially confirmed the initial hypothesis that well-being—encompassing happiness, life satisfaction, and vigor—is predominantly influenced by subjective health, body mass index (BMI), and a healthy lifestyle among the 37 determinants examined for both men and women. The data suggest that determinants such as BMI, sleep, regular PA, dietary habits, and the avoidance of smoking and excessive alcohol consumption have limited or no significant impact on well-being components like happiness, life satisfaction, and vigor. Instead, the results highlight that mood (particularly the absence of depression), emotional intelligence (especially the ability to regulate emotions), and subjective health evaluation are the strongest determinants of well-being among the determinants studied. Additionally, personality traits such as neuroticism in men and extraversion in women emerged as significant predictors of well-being. In contrast, empathy and logical thinking ability demonstrated no significant association with the components of well-being for either gender.

Our research indicates that men have certain advantages over women in various areas such as life satisfaction, mood (with higher vigor and lower fatigue), health (they perceive their health more positively and report fewer chronic diseases), and economic status. Men also engage in exercise more frequently and have higher levels of MVPA. Furthermore, they experience lower stress levels and lower neuroticism and make utilitarian decisions more often. On the other hand, women tend to have a lower BMI, smoke less, exhibit better emotional intelligence, and demonstrate a more pronounced agreeableness personality trait. Interestingly, there were no significant differences between men and women in terms of happiness, efficiency in logical thinking, sleep and eating habits, alcohol consumption, sedentary behavior, mood indicators (such as depression, tension, anger, and confusion), personality traits (including conscientiousness, extraversion, and openness), or in three key life aspects: personal growth, success at work, and leisure time. This suggests that differences among men not only exist in happiness indicators but also in the determinants influencing them. Therefore, we believe that the chosen strategy to examine happiness determinants separately for men and women is appropriate. Our previous data showed that men have higher MVPA than women, experience lower stress, but have a higher BMI and lower emotional intelligence [30, 43]. This aligns with our current research findings, but earlier studies indicated that men's efficiency in solving logical tasks was better than that of women (while in our current case, we didn't find a difference between men and women). The current findings of our study align with an earlier study [44] in that men had higher mood indicators of vigor and lower fatigue than women. Furthermore, in previous research, we found a significant positive correlation between mood profile and PA level [44]. Quite interestingly, our research coincided with Youssef et al., [45], showing that women tend to make significantly fewer utilitarian decisions than men. Additionally, it was found that the more people

Table 2 Determinants influencing the subjective happiness, life satisfaction and Vigor of men and women

Determinants	Happiness		Life satisfaction		Vigor	
	Women (β, *p*) $R^2 = 0.46$	Men (β, *p*) $R^2 = 0.51$	Women (β, *p*) $R^2 = 0.51$	Men (β, *p*) $R^2 = 0.54$	Women (β, *p*) $R^2 = 0.55$	Men (β, *p*) R2 = 0.62
Sociodemographic indicators						
Age	-0.048 (0.080)	-0.046 (0.415)	-0.03 (0.92)	-0.085 (0.127)	-0.015 (0.64)	-0.001 (0.98)
Education	-0.010 (0.723)	0.087 (0.069)	-0.005 (0.87)	0.047 (0.34)	0.039 (0.142)	-0.055 (0.22)
Nature of a job	0.012 (0.694)	-0.075 (0.153)	0.001 (0.99)	-0.067 (0.21)	0.022 (0436)	-0.009 (0.85)
Economic status (living above average)	0.132 (0.000)	-0.030 (0.535)	0.17 (0.000)	0.109 (0.025)	0.007 (0.778)	0.049 (0.26)
Health and health related indicators						
Health	0.057 (0.058)	0.250 (0.000)	**0.129 (0.000)**	**0.188 (0.000)**	0.11 (0.000)	0139 (0,004)
Chronic diseases	-0.028 (0.326)	-0.050 (0.271)	-0.018 (0.5)	-0.009 (0.84)	0.003 (0.92)	0,064 (0,13)
Perceived stress	-0.117 (0.004)	-0.129 (0.018)	-0.089 (0.032)	-0.026 (0.7)	-0.067 (0.087)	**-**0.099 (0.11)
BMI	-0.011 (0.699)	0.003 (0.950)	-0.012 (0.68)	-0.066 (0.17)	-0.02 (0.45)	-0.064 (0.15)
Healthy lifestyle indicators						
Exercise/sports	-0.029 (0.3)	0.019 (0.69)	-0.028 (0.31)	0.033 (0.49)	0.127 (0.000)	0.111 (0.011)
MVPA	-0.030 (0.296)	0.024 (0.629)	-0.003 (0.91)	0.025 (0.61)	0.079 (0.004)	0.095 (0.036)
SB	0.010 (0.727)	-0.104 (0.031)	0.04 (0.172)	0.033 (0.5)	0.01 (0.72)	-0.021 (0.63)
Sleeping time	0.032 (0.285)	-0.040 (0.469)	0.016 (0.55)	-0.038 (0.42)	-0.033 (0.19)	-0.079 (0.064)
Bedtime	-0.028 (0.379)	0.027 (0.658)	-0.044 (0.097)	0.009 (0.85)	-0.029 (0.26)	-0.005 (0.89)
Smoking	0.005 (0.841)	0.001 (0.990)	-0.013 (0.63)	-0.011 (0.8)	-0.006 (0.82)	-0.014 (0.74)
Alcohol consumption	0.021 (0.423)	-0.009 (0.841)	0.001 (0.98)	-0.004 (0.93)	-0.03 (0.23)	-0.017 (0.68)
Breakfast eating	0.028 (0.280)	-0.018 (0.699)	0.028 (0.28)	0.004 (0.93)	0.041 (0.097)	0.034 (0.44)
Overeating	0.009 (0.752)	0.085 (0.063)	-0.007 (0.79)	0.097 (0.037)	-0.008 (0.75)	0.017 (0.69)
Mood profile						
Tension	0.031 (0.538)	-0.216 (0.012)	-0.041 (0.41)	-0.274 (0.002)	0.124 (0.009)	0.13 (0.087)
Depression	-0.473 (0.000)	-0.495 (0.000)	-0.383 (0.000)	-0.366 (0.000)	-0.063 (0.191)	-0.058 (0.48)
Anger	-0.025 (0.578)	0.129 (0.095)	0.001 (0.98)	0.114 (0.15)	0.122 (0.004)	0.123 (0.087)
Fatigue	0.059 (0.088)	0.104 (0.114)	0.1 (0.009)	0.047 (0.47)	-0.428 (0.000)	-0.412 (0.000)
Confusion	0.075 (0.11)	0.114 (0.092)	0.105 (0.018)	0.239 (0.004)	0.003 (0.95)	0.043 (0.57)
Vigor	0.174 (0.000)	0.249 (0.002)	**0.155 (0.000)**	-0.004 (0.95)		
Personality traits						
Extraversion	-0.012 (0.785)	0.016 (0.833)	**0.101 (0.021)**	0.069 (0.38)	**0.244 (0.000)**	0.106 (0.13)
Conscientiousness	0.084 (0.099)	0.140 (0.094)	0.014 (0.78)	0.119 (0.15)	0.049 (0.31)	0.126 (0.096)
Agreeableness	0.008 (0.883)	0.157 (0.101)	0.01 (0.85)	0.179 (0.064)	0.04 (0.43)	0.007 (0.94)
Neuroticism	-0.056 (0.269)	**-0.277 (0.011)**	-0.022 (0.41)	**-0.293 (0.002)**	**-0.319 (0.000)**	**-0.314 (0.000)**
Openness	-0.004 (0.930)	-0.101 (0.167)	-0.037 (0.36)	-0.019 (0.8)	0.014 (0.72)	0.112 (0.053)
Non-utilitarian decision making, cognitive abilities, and emotional intelligence						
Non-utilitarian decision making	0.037 (0.164)	0.061 (0.168)	0.022 (0.41)	0.067 (0.143)	-0.011 (0.65)	-0.024 (0.57)
Logical thinking	-0.007 (0.799)	-0.060 (0.182)	0.011 (0.68)	-0.086 (0.059)	-0.008 (0.76)	0.032 (0.44)
Emotional intelligence	**0.202 (0.008)**	**0.175 (0.012)**	0.07 (0.15)	0.06 (0.24)	0.033 (0.27)	0.037 (0.28)
Managing own emotions	**0.248 (0.000)**	**0.227 (0.001)**	**0.168 (0.000)**	0.121 (0.165)	**0.142 (0.000)**	**0.228 (0.004)**
Perception of others' emotions	0.018 (0.596)	-0.026 (0.684)	0.013 (0.69)	0.014 (0.83)	-0.038 (0.24)	0.032 (0.59)
Managing others' emotions	0.025 (0.494)	0.086 (0.243)	0.056 (0.13)	0.081 (0.28)	0.027 (0.45)	-0.067 (0.32)
Emotion utilization	-0.061 (0.067)	-0.071 (0.236)	-0.033 (0.32)	-0.09 (0.143)	0.059 (0.064)	0.012 (0.82)
Adverse childhood experiences						
Frequency of bullying	-0.002 (0.945)	**-0.116 (0.021)**	-0.014 (0.64)	-0.022 (0.69)	0.013 (0.64)	-0,001 (0,98)
Frequency of violence	**-0.081 (0.034)**	0.052 (0.331)	-0.055 (0.06)	0.053 (0.33)	-0.028 (0.32)	-0,026 (0,6)

Note. BMI– body mass index; MVPA– moderate to vigorous physical activity; p– the level of marginal significance within a statistical hypothesis test; SB– sedentary behaviour; β– the standardized regression coefficient
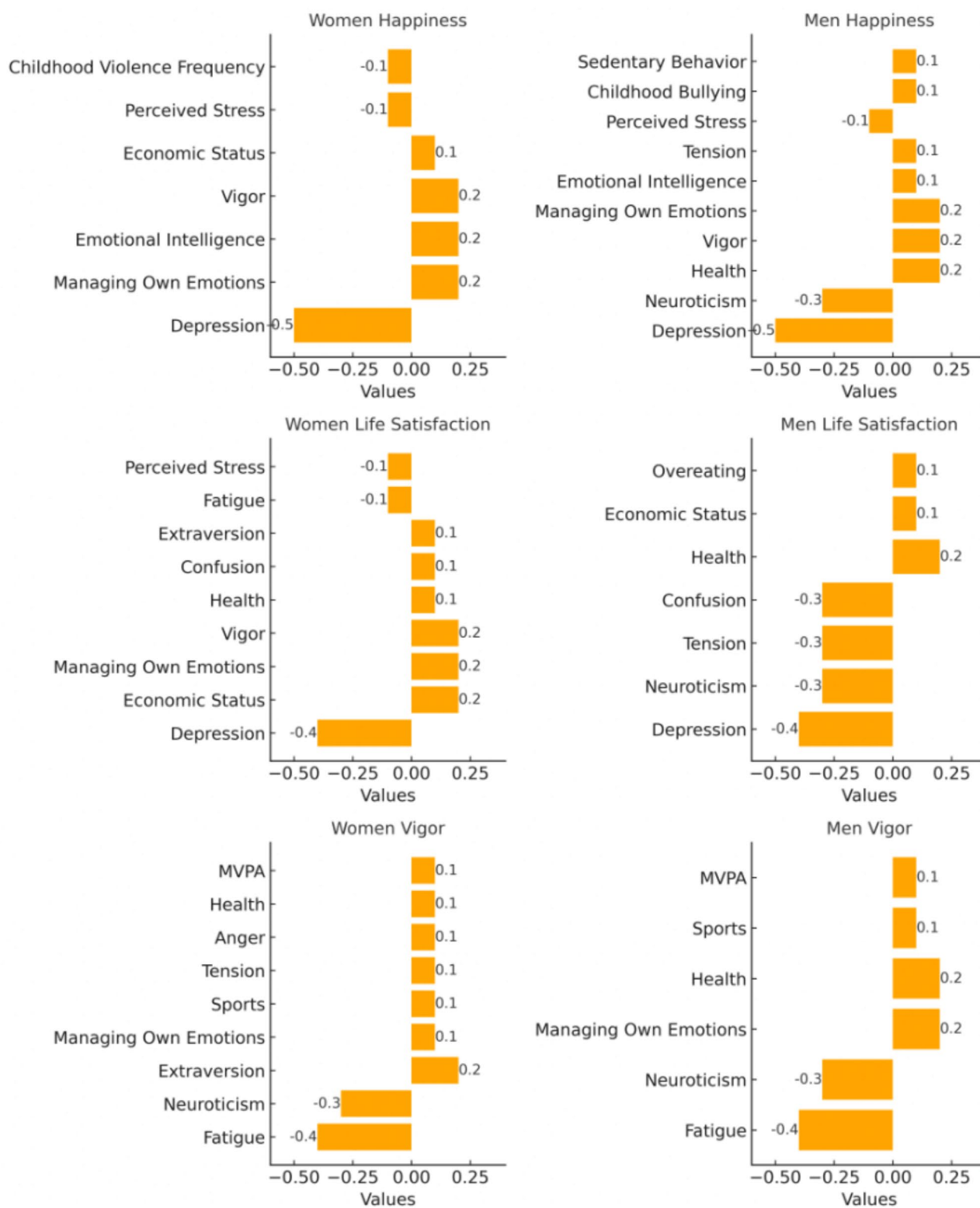
Fig. 1 Determinants (standardized beta coefficients of variables) influencing subjective happiness, life satisfaction, and vigor in women and men. Only statistically significant values are displayed in the columns

experience stress, the more inclined they are to make non-utilitarian decisions [45]. We can only speculate that in our case, women experienced higher stress than men, hence their dominance in non-utilitarian decisions over men. Moreover, intriguing studies indicate that exercise-induced exertion and fatigue can influence moral reasoning and decision-making towards a non-utilitarian direction. This shift is possibly due to limitations in pre-frontal-cortex mediated executive resources, more pertinent for utilitarian reasoning and decision-making [46]. We can only speculate that higher fatigue and stress in women, coupled with lower vigor, create more favourable conditions for them to make non-utilitarian decisions compared to men. To our knowledge, these findings highlighting the differences between men and women are original—a novelty stemming from our research, indicating that the determinants of happiness should not be generalized across both genders but rather studied separately for men and women.

The second and primary finding of our research is that, using linear logistic regression analysis, we comprehensively examined the determinants (sociodemographic, health, healthy lifestyle, mood profile, personality traits, emotional intelligence, logical thinking, non-utilitarian decisions, adverse childhood experiences, important aspects of life) of happiness, life satisfaction, and vigor. To our knowledge, this is the first study that has so extensively explored the determinants of happiness differently for men and women. Half of the determinants we examined (19 out of 38) (specifically, economic status, health, perceived stress, exercise, MVPA, sedentary behaviour, overeating, all mood indicators, personality traits extraversion and neuroticism, emotional intelligence, managing own emotion, adverse childhood experiences, and important aspects of life) are statistically significantly associated with happiness, life satisfaction, and vigor. However, this also depends on gender and the specificity of the happiness construct. It is quite unexpected that none of the happiness constructs we studied are significantly associated (for both men and women) with age, education, nature of a job, chronic diseases, BMI, sleep, smoking and alcohol consumption, breakfast eating, personality traits conscientiousness, agreeableness, and openness, logical thinking, non-utilitarian decisions, perception of others' emotions, managing others' emotions, and emotion utilization. Among all indicators, mood indicators stand out the most, especially depression, which has the greatest negative impact on happiness and life satisfaction, influencing them more significantly (Fig. 1). It can be assumed that mood indicators are more related to hedonic (affective well-being) happiness, as affective well-being is more linked to feelings of joy and pleasure, eudaimonic well-being to a sense of meaning and purpose in life, and evaluative well-being more closely reflects life satisfaction [8, 13]. Of course, being happy and finding life meaningful often overlap and are difficult to distinguish [13].

Data from other researchers clearly show that higher PA level is associated with higher well-being and quality of life independently of age [4, 7, 8, 23, 27, 28, 47, 48]. However, our research data indicate that MVPA and exercise are statistically significantly positively associated only with vigor (for both men and women), while the relationship with happiness and life satisfaction is not significant. Interestingly, among men, there is a statistically significant relationship between sedentary behaviour and happiness. It is noteworthy that neither sleep duration, bedtime, alcohol consumption, smoking, breakfast eating, overeating (except for men, where overeating is positively associated with life satisfaction; indicating a hedonic aspect of happiness) were significantly related to happiness, life satisfaction, or vigor. This contradicts excellent research suggesting that a balanced diet, abstaining from overeating [49], sufficient rest—especially quality sleep [50], minimizing prolonged periods of sitting [26, 28], and numerous other determinants, including diet, smoking, alcohol consumption, significantly influence human health and well-being [51]. Surprisingly, our studies did not show any significant correlation between BMI and happiness, life satisfaction, and vigor, even though it is widely acknowledged that an increased BMI (especially obesity) is a significant risk determinant for numerous chronic diseases [28].

One of the most interesting findings from our research is that neither logical thinking nor non-utilitarian decision-making is significantly associated with happiness, life satisfaction, or vigor. In contrast, the emotional intelligence component of the ability to manage one's emotions is significantly positively associated with happiness, vigor, and life satisfaction for both men and women (except for men). Our previous studies have shown an inverse relationship between logical thinking and emotional intelligence [30, 43, 52]. When individuals make moral decisions in a non-utilitarian manner, they express a reluctance to harm others, and this "unwillingness to harm others" is widely considered the most basic element of human morality [53]. Unfortunately, our research did not indicate that constructs of happiness are dependent on moral decision-making strategies. However, it also did not show that they (happiness constructs) are not related to logical thinking but are associated with the ability to manage one's emotions. The ability to manage one's emotions is one of the most crucial human abilities, influencing success in various spheres, such as sports [54]. Other researchers have shown that participants who expressed stronger support for utilitarian solutions exhibited higher scores on measures of psychopathy, Machiavellianism, and a sense of life meaninglessness [55]. Another notable

discovery from our study regarding personality traits is particularly intriguing. It is noteworthy that women's vigor is significantly positively linked with extraversion, while neuroticism (specifically for men) negatively influences both happiness, life satisfaction, and vigor (for women, vigor is not negatively associated with neuroticism). Scholars delving into personality and happiness have come to a general conclusion that personality dispositions are connected with happiness, physical and psychological health, and spirituality [1]. However, as our study indicates, only extraversion and neuroticism are correlated with happiness constructs. A similar conclusion was reached in an excellent study by other researchers, demonstrating that global satisfaction with social relationships is associated with extraversion, neuroticism (negatively), and the ability to manage one's emotions [56]. Surprisingly, we discovered statistically significant negative associations between men's and women's happiness and childhood adverse experiences. However, these findings should be further expanded upon in future research.

Limitations

Our study grapples with a primary limitation—the challenge of establishing causal relationships between happiness constructs and numerous determinants. The intricate interplay of the 37 determinants influencing the three happiness constructs poses an additional complexity, as the linear logistic regression analysis method falls short in identifying their causal interactions.

Our study, with its focus on a specific demographic, suggests a potential avenue for future research. Expanding the scope to include diverse cultural contexts could unveil variations in the determinants of happiness. Cultural nuances may play a pivotal role in influencing the significance of certain determinants in shaping well-being. Additionally, future research endeavours could explore the effectiveness of interventions or well-being programs targeting specific determinants identified in this study. Understanding how targeted interventions impact happiness and life satisfaction holds practical implications for promoting overall well-being. In acknowledging these limitations, our commitment to ongoing research reflects a dedication to refining our understanding of the intricate dynamics of happiness determinants and contributing to the broader discourse on human well-being.

Conclusion

Our research, despite its limitations, clearly identifies key determinants influencing happiness, life satisfaction, and vigor, with separate analyses for men and women. The findings underscore that mood indicators, particularly depression, have the strongest associations with happiness, life satisfaction, and vigor/vitality. These components are also closely linked to emotional management and overall subjective health. Additionally, specific personality traits, such as extraversion in women and neuroticism in men, significantly impact overall well-being. Conversely, determinants such as BMI, sleep, regular PA, SB, dietary habits, avoidance of smoking and excessive alcohol consumption, as well as logical thinking, non-utilitarian decision-making, and adverse childhood experiences, showed limited or no significant effects on well-being components like happiness, life satisfaction, and vigor. These findings offer valuable insights into the complex dynamics of human well-being, emphasizing the distinct determinants of happiness, life satisfaction, and vigor for men and women.

Abbreviations
BMI   Body mass index
MVPA   Moderate to vigorous physical activity
PA   Physical activity
SB   Sedentary behaviour
p   The level of marginal significance within a statistical hypothesis test
β   The regression coefficient

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The survey was conducted in accordance with the Declaration of Helsinki, and the survey protocol was approved by Klaipėda University (Protocol No. STIMC-BTMEK-09).

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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