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Temperament and Early Intentions to Retire

- a Northern Finland Birth Cohort 1966 Study

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Abstract

Objective: To examine associations between temperament traits and early retirement intentions.

Methods: In the Northern Finland Birth Cohort 1966, we analyzed early retirement intentions at the age 46 according to Cloninger's temperament traits at the age 46 (n=4409) and at the age 31 (n=3226). Ordinal logistic regression analyses were used. Adjustments were made for marital status, education, work type, job satisfaction, perceived health and mental health problems.

Results: 11% of men and 9% of women had strong retirement intentions. Especially higher harm avoidance was associated with higher early retirement intentions in both genders at the age of 46. A similar pattern of results, although with weaker associations, was found for temperament assessed at the age of 31.

Conclusions: Temperament and especially harm avoidance is related to early retirement intentions.

keywords: early retirement intentions, intentions to retire, early retirement, harm avoidance, temperament, personality

Early retirement is a major challenge affecting the national economies and social welfare systems globally. In most countries, the actual effective age of retirement is notably below the statutory age for pension.¹ The incidence of early retirement is usually not sudden, but rather a result of a long-lasting process including multiple aspects of thinking, planning and acting before the actual event.^{2,3} Obviously, not all retirement intentions lead to retirement behaviour.⁴ Nevertheless, the strength of retirement intentions has been shown to predict pre-term retirement with a dose-response pattern.⁵ Thus, in order to find ways for prevention of pre-term retirement, it is important to understand the backgrounds of retirement intentions.

So far, early retirement intentions have been linked to sociodemographic factors such as age⁵, gender^{5,6} low education⁷ and partnership⁸. Compared to continuously married women, ever divorced women have been shown to have lower retirement intentions⁸. A gendered pattern regarding the role of partnership has been found: when the spouse is not working, retirement intentions are higher among women and lower among men⁸. In terms of health and functioning, higher retirement intentions have been related to self-rated poor health^{9,10,11}, depressive symptoms¹², poor mental health functioning¹³, low subjective life expectancy¹⁴, sickness absence¹⁰ and low work ability^{10,15}. Also, unfavorable work related factors such as high effort reward imbalance¹⁶, high job demands¹⁷, low job control^{10,15,16,17}, low job satisfaction¹⁸ and organizational injustice¹⁰ have been related to higher retirement intentions.

Growing evidence shows that the dimensions of personality and temperament are associated with many work-related adversities, such as unemployment^{19,20,21,22}, perceived effort-reward imbalance²³ and job strain²⁴. The findings regarding personality traits and pre-term retirement are less clear. A longitudinal study, based on the Five Factor Model (FFM) of personality, showed that higher openness, lower conscientiousness and lower agreeableness were associated with disability pensions over a 5-year period among men but not among

women, even when health and occupation were taken into account.²⁵ In another study, baseline FFM traits did not predict retirement but they predicted higher retirement satisfaction and postretirement activities²⁶. In addition, a 30-year longitudinal cohort study on lower back pain patients linked those with higher neuroticism in Eysenck's personality model to a higher rate of incident disability pensions²⁷. However, previous research has only focused on the end point of actual retirement. There is no existing evidence on dispositional traits in relation to retirement intentions, albeit a better understanding of the early stages of the retirement process would be useful for preventive purposes.

Cloninger's Psychobiological Model of Temperament and Character defines temperament as individual differences in automatic response tendencies. Temperament traits are partly heritable, relatively stable and determined by neurobiological factors that already exist in early childhood.^{28, 29} The temperament dimensions are novelty seeking (NS), harm avoidance (HA), reward dependence (RD) and persistence (P). High NS is characterized by a tendency for disorderliness, extravagance, impulsivity, quick temper and actively avoiding frustration. NS includes four subscales named as explorative excitability, impulsiveness, extravagance and disorderliness. High HA reflects a tendency to inhibit or stop behavior in response to signals of aversive stimuli. The subscales of HA are worry/pessimism, fear of uncertainty, shyness and fatigability. RD is characterized by sensitivity to social cues and dependence on social rewards. RD subscales are sentimentality, attachment and dependence. P is a tendency to act perseveringly even in the face of difficulties or when tired. There are no subscales for P.^{28, 29, 30} The aforementioned Cloninger's temperament traits are known to considerably overlap with the FFM traits, for example harm avoidance correlates with neuroticism and novelty seeking with extraversion.³¹

Focusing on the role of temperament in early retirement intentions, we assume that temperament may affect an individual's perceptions about work^{23, 24} as well as the ways

through which the environment responds to the individual at work. Temperament can also influence the individual's own preferences, choices and potential to educational and occupational pathways^{21,32} as well as specific work tasks, all of which may have an impact on early retirement intentions. Moreover, temperament may have an effect on mental³³ and general health³⁴, which are fundamental for pre-term retirement intentions.⁹⁻¹³

In the current study, utilizing a large prospectively collected population-based birth cohort, we examined whether temperament traits would be cross-sectionally associated with early intentions to retire at the age of 46. In addition, we used temperament traits measured 15 years earlier at the age of 31 for longitudinal analyses. We hypothesized that temperament dimensions could play a role in intentions to retire. We took into account several potential confounders and mediators: marital status, education, work type, job satisfaction, perceived health and mental health problems. Moreover, because of previously reported gender differences in occupational distribution and employment¹, temperament dimensions³⁵ and retirement intentions⁶, we conducted all analyses stratified for gender.

Material and Methods

Participants

The Northern Finland Birth Cohort 1966 is a population-based birth cohort initiated during mid-pregnancy (www.oulu.fi/nfbc). All children whose expected date of birth fell in 1966 in the two northernmost provinces of Finland were sampled and 12,058 live-born children (6169 males and 5889 females, 96% of all births) were recruited in the study. The data have been collected since pregnancy at several study points. In the present analysis, we used data on temperament, early retirement intentions and background information from the 46-year follow-up survey questionnaires, including those who were at work and excluding

those who had already applied for a pension, as presented in Figure 1. In addition, we used temperament measured at the age of 31. The final sample size was 4409 in cross-sectional analyses at age 46, and 3226 when comparing temperament at age 31 with retirement intentions at the age of 46. Analyses are based on the data of individuals who gave their written informed consent to allow their data to be used for scientific purposes. The most recent ethical permission for the Northern Finland Birth Cohorts was given by the Ethics Committee of the Northern Ostrobothnia Hospital District (EETTMK 91/2011).

[Flow chart 1 near here]

Measures

Temperament traits were assessed with Cloninger's Temperament and Character Inventory (TCI, version IX) with 107 true/false statements (40 for NS, 35 for HA, 24 for RD and 8 for P). A detailed description of the temperament dimensions and their subscales can be found in the TCI guidebook.³¹ In the 46-year-olds' survey, the Cronbach's alphas of the scales were 0.783 for NS, 0.873 for HA, 0.708 for RD and 0.580 for P. In the 31-year-olds' survey the corresponding reliabilities were 0.779 for NS, 0.852 for HA, 0.695 for RD and 0.546 for P.

Intentions to retire early were assessed by a single question^{5,13} with four response options: 'Have you considered retiring before normal retirement age due to medical or any other reasons?' The response options were: 1) I have not considered, 2) Yes, I have considered sometimes, 3) Yes, I have considered often, 4) I have already applied for a pension. Since the fourth category no longer reflects intentions, these respondents were excluded from the study.^{5,13} For convenience, the other categories were named as "no", "weak" and "strong intentions", respectively.

Current employment was assessed by a single question including the following alternatives (one or more of which were possible): 1) permanent full time, 2) temporary full time, 3) permanent part time, 4) temporary part time, 5) self-employed full time, 6) self-employed part time, 7) student, full time, 8) student, part time, 9) unemployed, less than 6 months, 10) unemployed, 6 months to 1 year, 11) unemployed, over 1 year, 12) supported working/studying, 13) temporarily laid off or reduced working hours, 14) on parental leave, 15) retired, 16) homemaker or 17) other. We included the analysis for those who were in employment (answers 1-6 and 13) and excluded others.

Gender was based on national population register information. Marital status was assessed by a single question in the survey and categorized into the following three categories: 1) married, cohabitating or in a registered partnership, 2) single or 3) divorced/widowed. The level of education was based on two questions on basic and vocational education and classified as basic (≤ 9 years of school and no vocational education or only a short course), secondary (vocational school or college degree and/or matriculation examination) or tertiary (polytechnic or university degree). The basic and secondary education groups were pooled because of the small number participants in the basic education group ($n = 4$).

Work type was assessed by a single question with three alternatives: 'Is your work mainly (over half of your work time) 1) mental, 2) physical or 3) as much mental as physical work?' Job satisfaction was assessed by a single question: 'How satisfied are you with your job?' The responses on a 5-point Likert scale were dichotomized as satisfied (very satisfied, satisfied) or dissatisfied (quite satisfied, dissatisfied, very dissatisfied).

Perceived health was obtained from a one-item question 'How is your present health?' with a 5-point Likert scale and categorized as good (very good, good) vs. poor (average, poor, very poor).

Mental health problems were dichotomized as yes vs. no, based on the question whether the respondents had ever had 1) psychosis, 2) depression or 3) any other mental health problem diagnosed by a physician. Any yes-answer was considered an indicator of a mental health problem.

Statistical analyses

We first explored the distributions of the categories of retirement intentions and potential confounders and calculated the mean values and standard deviations of the temperament dimensions. The correlations of retirement intentions with potential confounders as well as temperament dimensions were then examined by using Spearman's rho correlation coefficient.

We used ordinal logistic regression analyses to evaluate the association of the ordinal categories of retirement intentions with the continuous scores of temperament dimensions. All temperament traits were analyzed separately. Unadjusted model was calculated first (Model 1). Secondly, to take potential confounding factors into account, we adjusted our analyses for marital status, education, work type and job satisfaction (Model 2). Lastly, we additionally adjusted for perceived health and mental health problems (Model 3). These analyses, conducted with temperament values at age 46, were then replicated with temperament values measured at age 31. All the statistical analysis was done using IBM SPSS version 25.

Attrition analyses

To evaluate the representativeness of our study sample, we performed attrition analyses with regard to the original cohort members by using the participants' data in nationwide registers on gender and education (Statistics Finland), employment (Finnish Centre for Pensions), and ICD-diagnoses (care registers for health care) concerning psychiatric and musculoskeletal diseases, representing the central causes of pre-term disability retirement³⁶, by using Pearson's chi-squared test.

When comparing our final 46-year-old study sample to all cohort members in employment in 2012, females participated more commonly than males (70.3% vs. 65.8%, $p < 0.001$) and those with tertiary and secondary level education more commonly than those with basic level or less education (72.7% and 64.5% vs. 54.8%, $p < 0.001$). Among individuals with any recorded psychiatric disorders, the participation rate was lower than among those with no such diagnoses (59.5% vs. 69.4%, $p < 0.001$). There was no statistically significant difference in the participation rate between those who had musculoskeletal diseases and those who had not (67.0% vs. 69.3%, $p = 0.052$).

Results

Cross-sectional analyses at the age of 46

Descriptive statistics are presented in Table 1. Approximately one in ten reported strong intentions to early retirement at the age of 46 (11.1% of men and 8.7% of women). On the other side, roughly half of the participants (49.7% of men and 56.1% of women) reported no intention of early retirement. As table 2 shows, early retirement intentions correlated ($p < 0.01$) with all potential confounders in both genders, except marital status in men, and the highest correlations ($r > 0.2$) were found with perceived health.

Retirement intentions also correlated with numerous temperament dimensions, at strongest ($r > 0.1$) with some dimensions of harm avoidance (HA).

[Tables 1 and 2 near here]

Of the temperament dimensions, as shown in Table 3, higher HA was most strongly associated with higher retirement intentions in both genders ($p < 0.001$). These associations remained significant even after adjustments for demographics and work characteristics in both genders and after additionally adjusting for health among women. Notably, higher scores of all HA subscales were associated with higher retirement intentions in both genders, most strongly the subscale of fatigability. Among men, the HA main scale and the HA subscales of worry/pessimism and fatigability were associated with retirement intentions even after adjusting for family and work-related factors but not any longer when health was adjusted for. In contrast, among women, the HA main scale as well as all subscales except fear of uncertainty remained significant even after adjusting for health-related factors.

Reward dependence (RD) main scale was inversely related to higher retirement intentions among women in the unadjusted model. Of RD subscales, lower attachment was most consistently associated with higher retirement intentions, even after all adjustments among women. Among men, RD subscales higher sentimentality, lower attachment and lower dependence were associated with retirement intentions in the unadjusted models. Lower Novelty seeking (NS) main scale was related to higher early retirement intentions among women in the unadjusted model, but not among men. A gendered pattern emerged also in terms of NS subscales. Among men, higher retirement intentions were related to impulsiveness, consistently after all adjustments, and inversely to explorative excitability in the unadjusted model. Among women, explorative excitability and extravagance were

inversely associated with retirement intentions in the unadjusted models. Persistence (P) was not associated with early retirement intentions in any model in either gender.

[Table 3 near here]

Longitudinal analyses

As shown in Table 4, some of the temperament dimensions measured at the age of 31 were analogously associated with retirement intentions 15 years later, as compared to the cross-sectional results at the age of 46, although with figures smaller in magnitude and to a lesser extent in the adjusted models.

In the unadjusted models, especially higher harm avoidance at the age of 31 was associated with retirement intentions at the age of 46 in both genders ($p < 0.01$). Also, HA subscales worry/pessimism, shyness and fatigability were associated with later retirement thoughts in both genders, as was also fear of uncertainty among women. These longitudinal associations remained significant even after adjusting for sociodemographic and work-related factors for the subscale of worry/pessimism among both genders and for the HA main scale and its subscale fatigability among women. Further adjustments for health and mental health problems diluted the aforementioned associations concerning HA and its subscales.

In terms of reward dependence subscales at the age of 31, a slight inverse association with retirement intentions at age 46 was found for dependence among men in the unadjusted model. Among women, a consistent inverse association between attachment at age 31 and retirement intentions at age 46 was found, even in the fully adjusted model, analogously to the cross-sectional analysis. Regarding novelty seeking subscales, a small association of explorative excitability with later retirement thoughts emerged among men in the unadjusted model. No clear pattern concerning persistence was found.

[Table 4 near here]

Discussion

To the best of our knowledge, this is the first study on the associations between temperament traits and early retirement intentions. Higher harm avoidance, and its subscales fatigability and worry/pessimism, were especially associated with higher early retirement intentions in both genders. In addition, retirement thoughts were inversely associated with the reward dependence subscale of attachment among women and positively associated with the novelty seeking subscale of impulsiveness among men. Moreover, some of the cross-sectional findings at the age of 46 regarding harm avoidance and its subscales in both genders and the reward dependence subscale of attachment among women were observed also in the longitudinal design, even when sociodemographic and work-related factors were taken into account. This suggest that the temperament measured at the age of 31 may have had a role on retirement intentions 15 years later in this large population-based cohort study.

In our data, retirement intentions were assessed very early at the age of 46. Notably, our final adjustments for perceived health and mental health problems diluted many of the crude associations of temperament traits with retirement intentions, suggesting that health plays an important role behind retirement intentions at this age. Nevertheless, the associations of retirement intentions with HA and its subscales worry/pessimism, shyness and fatigability as well as the reward dependence subscales attachment among women and impulsiveness among men persisted even after adjusting for perceived health and mental health problems. We note that especially HA significantly correlated with perceived health and mental health problems in our sample. It is possible that the associations between temperament and retirement intentions were diluted in the fully adjusted models because general and mental health acted as mediators^{33,34} of these associations, at least partially. Indeed, as high HA has previously been linked to depression and related disorders³³,

retirement intentions among those with high HA may be at least partly explained by a higher rate of psychiatric disorders, belonging to the main reasons for early retirement in Finland.³⁶

In consideration of potential mechanisms in working life behind our findings, higher HA might contribute to negative perceptions about both work conditions and ability to work, therefore leading to early retirement thoughts. At the HA subscale level, fatigability is by definition characterized by getting tired easily and a lack of energy to meet upcoming (work life) challenges.³⁰ Higher worry/pessimism might also lead to negative perceptions about work and slower recovery from negative feedback and other challenging situations. Moreover, fear of uncertainty is likely to be related to how an individual tolerates uncertainty and changes in work and adapts to them.

Lower reward dependence, and most consistently lower scores of its subscale attachment, were associated with higher retirement intentions in women, as were also all three RD subscales among men although not total RD. Associations of lower RD and its subscales with retirement intentions may be explained by lower perceptions of the rewarding social aspects of work like social networks with co-workers. Especially for those with low dependence, it is not as important to have emotional support and social approval.³⁰ Lower attachment may reflect disinterest and lower commitment to workplace social settings. Those with lower RD may also invest less in their job careers and therefore not obtain optimal positions in work life.³⁷ That may also be linked to higher retirement intentions explaining our results.

Lower novelty seeking and its subscales extravagance in women, higher impulsiveness in men and lower explorative excitability in both genders were related to higher retirement intentions. It may be that low explorative excitability is related to lesser

excitement arising from upcoming challenges at work. High impulsiveness may trigger quicker frustration about nonoptimal work conditions, leading to higher retirement intentions.

Persistence was not at all associated with early retirement intentions in either gender. This might appear counterintuitive, since P is described as the tendency to continue action even in the face of difficulties, including endurance³⁰ and even potential for intentions to lengthen the work career. On the other hand, P might lead to inactivity to seek any alteration to the present state even in stressful situations, which could be related to lower retirement intentions. Also, the lower number of items on the persistence scale may affect the ability of the scale to detect differences between retirement intention groups.

Keeping in mind that retirement is a long-lasting process, our results on temperament traits and retirement intentions accord with some previous findings on corresponding personality traits being associated with actual retirement.^{25,27} Specifically, our findings regarding HA and its subscales are in line with earlier research showing that actual disability retirement is predicted by neuroticism (a trait related to HA)³¹ in women.²⁵ Also, the inverse relationships of RD and its subscales to retirement intentions found in this study are in line with a previously reported association between higher extraversion and agreeableness with lower disability retirement in men.²⁵ These FFM traits are known to correlate with RD in Cloninger's model.³¹

The following limitations should be taken into account when interpreting these results. First, temperament and early retirement intentions were both obtained from self-reported questionnaires, presenting a risk for common method variance, which may either inflate or deflate results.³⁸ For example, those high in HA may answer more negatively and those high in RD may answer in a way what they feel to be more socially desirable. However, common method variance is usually rather small in organizational research.³⁹ Second, we only had

temperament traits available. The TCI character items would have supported even wider understanding of the relationship between personality and retirement intentions. Third, retirement intentions were only measured at one point. Thus, causal inferences cannot be drawn. Nevertheless, the similarity of the results obtained in the longitudinal analysis as compared to the cross-sectional findings adds to the plausibility of our results.

Our study sample consists of middle-aged Finnish men and women living in a highly developed European society, facing the challenges of aging population and the need for lengthening work careers, shared by most western societies. Still, as there are inherent cultural differences as well as differences in pension systems between countries that may affect early retirement intentions, caution is needed in generalizing our results to other nations. At the age of 46, disabilities are the only pathways to pre-term retirement in Finland, thus excluding other reasons such as voluntary retirement.⁴⁰ This may emphasize the relevance of health status behind retirement intentions. The register-based attrition analysis showed that the excluded participants were less educated, had more psychiatric diagnoses and were more often men than women. Therefore, our results might be generalized better for women and for those who are higher educated and healthier.

We were able to take into account marital status, but not the quality of relationships within the family or financial reasons, which could make retirement more or less attractive from an individual's perspective. However, many of the associations persisted after adjustments for education, an established indicator of socioeconomic status, and also after adjusting for work type and job satisfaction at the age of 46.

As a major strength, our large sample is based on general population and thus covers all different occupational groups and branches of the economy. Since the cohort members are all of the same age, differences in the macro level economic cycles with differing labor

market opportunities and policies do not cause any bias. We had an opportunity to take into account a wide set of background variables known to affect retirement intentions. Lastly, we measured associations of temperament to early retirement thoughts both cross-sectionally and longitudinally over 15 years.

It is worth noting, that a considerable proportion of these middle-aged participants already had early retirement intentions as early as approximately 20 years before the statutory pension age, emphasizing the relevance of our study question. Bearing in mind that early retirement is not a sudden incidence, our results suggest that more individually-oriented practices, recognizing individuals high in HA, could add to the current health- and workplace-related practices used in support of lengthening work careers. Temperament-sensitive approaches, especially for those individuals with multiple risk factors for early retirement, might be of use for occupational health care practitioners and other stakeholders as well as at the workplace level. In practical terms, possibilities of vocational guidance, career counselling and job crafting in order to improve person-job fit could be systematically explored as part of routine management. Importantly, diverse temperament-sensitive approaches for motivating employees need to be developed to support lengthening work careers.

While our birth cohort study adds to the research on temperament traits and retirement intentions, studies in other cohorts with other established measures of personality traits remain needed. Future studies should also both follow up how temperament affects actual retirement later on and evaluate how temperament affects the causal pathways on the retirement process.

In conclusion, this is the first study on temperament and retirement intentions, showing an association especially between harm avoidance and preterm retirement intentions. For developers and practitioners in the field, our results serve as an evidence basis suggesting

a need for designing more individual, temperament-sensitive and tailored approaches to support the lengthening of work careers.

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References

1. OECD. (2018, January). Average effective age of retirement versus the normal age in 2016 in OECD countries. Available from <http://www.oecd.org/els/emp/average-effective-age-of-retirement.htm>. Accessed October 10, 2018.
2. Beehr, T. A. (1986). The process of retirement: A review and recommendations for future investigation. *Personnel Psychology*, 39(1), 31-55. <http://dx.doi.org/10.1111/j.1744-6570.1986.tb00573.x>
3. Feldman, D. C., & Beehr, T. A. (2011). A three-phase model of retirement decision making. *American Psychologist*, 66(3), 193. <http://dx.doi.org/10.1037/a0022153>
4. Topa, G., Moriano, J. A., Depolo, M., Alcover, C. M., & Morales, J. F. (2009). Antecedents and consequences of retirement planning and decision-making: A meta-analysis and model. *Journal of Vocational Behavior*, 75(1), 38-55. <https://doi.org/10.1016/j.jvb.2009.03.002>
5. Harkonmäki, K., Martikainen, P., Lahelma, E., Pitkäniemi, J., Halmeenmäki, T., Silventoinen, K., & Rahkonen, O. (2009). Intentions to retire, life dissatisfaction and the subsequent risk of disability retirement. *Scandinavian Journal of Public Health*, 37(3), 252-259. <https://doi.org/10.1177/1403494808100273>

6. von Bonsdorff, M. E., Huuhtanen, P., Tuomi, K., & Seitsamo, J. (2010). Predictors of employees' early retirement intentions: an 11-year longitudinal study. *Occupational Medicine*, 60(2), 94-100. <https://doi.org/10.1093/occmed/kqp126>
7. Volanen, S. M., Suominen, S., Lahelma, E., Koskenvuo, K., Koskenvuo, M., & Silventoinen, K. (2010). Sense of coherence and intentions to retire early among Finnish women and men. *BMC Public Health*, 10(1), 22. <http://dx.doi.org/10.1186/1471-2458-10-22>
8. Damman, M., Henkens, K., & Kalmijn, M. (2015). Women's retirement intentions and behavior: The role of childbearing and marital histories. *European Journal of Population*, 31(4), 339-363. <https://doi.org/10.1007/s10680-014-9335-8>
9. Elovainio, M., Kivimäki, M., Vahtera, J., Ojanlatva, A., Korkeila, K., Suominen, S., Koskenvuo, M. (2003). Social support, early retirement, and a retirement preference: a study of 10,489 Finnish adults. *Journal of Occupational and Environmental Medicine*, 45(4), 433-439. [https://doi: 10.1097/01.jom.0000058334.05741.7a](https://doi:10.1097/01.jom.0000058334.05741.7a)
10. Heponiemi, T., Kouvonen, A., Vänskä, J., Halila, H., Sinervo, T., Kivimäki, M., & Elovainio, M. (2008). Health, psychosocial factors and retirement intentions among

Finnish physicians. *Occupational Medicine*, 58(6), 406-412.

<https://doi.org/10.1093/occmed/kqn064>

11. Suadicani, P., Bonde, J. P., Olesen, K., & Gyntelberg, F. (2013). Job satisfaction and intention to quit the job. *Occupational Medicine*, 63(2), 96-102.
<https://doi.org/10.1093/occmed/kqs233>
12. Nexø, M. A., Borg, V., Sejbaek, C. S., Carneiro, I. G., Hjarsbech, P. U., & Rugulies, R. (2015). Depressive symptoms and early retirement intentions among Danish eldercare workers: Cross-sectional and longitudinal analyses. *BMC Public Health*, 15(1), 677. <https://doi.org/10.1186/s12889-015-1973-1>
13. Harkonmäki, K., Rahkonen, O., Martikainen, P., Silventoinen, K., & Lahelma, E. (2006). Associations of SF-36 mental health functioning and work and family related factors with intentions to retire early among employees. *Occupational and Environmental Medicine*, 63(8), 558-563. <https://doi.org/10.1136/oem.2005.022293>
14. van Solinge, H., & Henkens, K. (2009). Living longer, working longer? The impact of subjective life expectancy on retirement intentions and behaviour. *The European Journal of Public Health*, ckp118. <https://doi.org/10.1093/eurpub/ckp118>

15. von Bonsdorff, M. E., Vanhala, S., Seitsamo, J., Janhonen, M., & Husman, P. (2010). Employee well-being, early-retirement intentions, and company performance. *Journal of Occupational and Environmental Medicine*, 52(12), 1255-1261. <https://doi.org/10.1097/JOM.0b013e3181f9f0b9>
16. Siegrist, J., Wahrendorf, M., Von Dem Knesebeck, O., Jürges, H., & Börsch-Supan, A. (2007). Quality of work, well-being, and intended early retirement of older employees—baseline results from the SHARE Study. *The European Journal of Public Health*, 17(1), 62-68. <https://doi.org/10.1093/eurpub/ck1084>
17. Elovainio, M., Forma, P., Kivimäki, M., Sinervo, T., Sutinen, R., & Laine, M. (2005). Job demands and job control as correlates of early retirement thoughts in Finnish social and health care employees. *Work & Stress*, 19(1), 84-92. <http://dx.doi.org/10.1080/02678370500084623>
18. Sibbald, B., Bojke, C., & Gravelle, H. (2003). National survey of job satisfaction and retirement intentions among general practitioners in England. *BMJ*, 326(7379), 22. <https://doi.org/10.1136/bmj.326.7379.22>
19. Kokko, K., Pulkkinen, L., & Puustinen, M. (2000). Selection into long-term unemployment and its psychological consequences. *International Journal of*

Behavioral Development, 24(3), 310-320.

<https://doi.org/10.1080/01650250050118295>

20. Kokko, K., Bergman, L. R., & Pulkkinen, L. (2003). Child personality characteristics and selection into long-term unemployment in Finnish and Swedish longitudinal samples. *International Journal of Behavioral Development*, 27(2), 134-144.

<https://doi.org/10.1080/01650250244000137>

21. Hintsanen, M., Lipsanen, J., Pulkki-Råback, L., Kivimäki, M., Hintsanen, T., & Keltikangas-Järvinen, L. (2009). EAS temperaments as predictors of unemployment in young adults: A 9-year follow-up of the Cardiovascular Risk in Young Finns Study. *Journal of Research in Personality*, 43(4), 618-623.

<http://dx.doi.org/10.1016/j.jrp.2009.03.013>

22. Viinikainen, J., & Kokko, K. (2012). Personality traits and unemployment: Evidence from longitudinal data. *Journal of Economic Psychology*, 33(6), 1204-1222.

<http://dx.doi.org/10.1016/j.joep.2012.09.001>

23. Hintsanen, M., Hintsanen, T., Widell, A., Kivimäki, M., Raitakari, O. T., & Keltikangas-Järvinen, L. (2011). Negative emotionality, activity, and sociability temperaments predicting long-term job strain and effort-reward imbalance: A 15-year prospective follow-up study. *Journal of Psychosomatic Research*, 71(2), 90-96.

<http://dx.doi.org/10.1016/j.jpsychores.2011.02.012>

24. Hintsala, T., Hintsanen, M., Jokela, M., Elovainio, M., Raitakari, O., & Keltikangas-Järvinen, L. (2010). The influence of temperament on long-term job strain and its components: The cardiovascular risk in Young Finns Study. *Personality and Individual Differences*, 49(7), 700-705.
<http://dx.doi.org/10.1016/j.paid.2010.06.007>
25. Blekesaune, M., & Skirbekk, V. (2012). Can personality predict retirement behaviour? A longitudinal analysis combining survey and register data from Norway. *European Journal of Ageing*, 9(3), 199-206. <http://dx.doi.org/10.1007/s10433-011-0212-6>
26. Löckenhoff, C. E., Terracciano, A., & Costa Jr, P. T. (2009). Five-factor model personality traits and the retirement transition: longitudinal and cross-sectional associations. *Psychology and Aging*, 24(3), 722. <http://dx.doi.org/10.1037/a0015121>
- 27 Ropponen, A., Svedberg, P., Huunan-Seppälä, A., Koskenvuo, K., Koskenvuo, M., Alexanderson, K., . . . Kaprio, J. (2012). Personality traits and life dissatisfaction as risk factors for disability pension due to low back diagnoses: A 30-year longitudinal cohort study of Finnish twins. *Journal of Psychosomatic Research*, 73(4), 289-294.
<http://dx.doi.org/10.1016/j.jpsychores.2012.07.003>

28. Cloninger, C. R. (1986). A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatric Developments*, 3(2), 167-226.
29. Cloninger, C. R., Svrakic, D. M., & Przybeck, T. R. (1993). A psychobiological model of temperament and character. *Archives of General Psychiatry*, 50(12), 975-990.
<http://dx.doi.org/10.1001/archpsyc.1993.01820240059008>
30. Cloninger, C. R., Przybeck T. R., Svrakic D. M., & Wetzel R. D. (1994). *The Temperament and Character Inventory (TCI): A guide to its development and use*. St. Louis, MO: Center for Psychobiology of Personality, Washington University.
31. de Fruyt, F., Van De Wiele, L., & Van Heeringen, C. (2000). Cloninger's psychobiological model of temperament and character and the five-factor model of personality. *Personality and Individual Differences*, 29(3), 441-452.
[http://dx.doi.org/10.1016/S0191-8869\(99\)00204-4](http://dx.doi.org/10.1016/S0191-8869(99)00204-4)
32. Gutiérrez, F., Gárriz, M., Peri, J. M., Vall, G., & Torrubia, R. (2016). How temperament and character affect our career, relationships, and mental health. *Comprehensive psychiatry*, 70, 181-189. <https://doi.org/10.1016/j.comppsy.2016.07.014>
33. Miettunen, J., Isohanni, M., Paunio, T., Freimer, N., Taanila, A., Ekelund, J., ... & Veijola, J. (2012). Predicting depression with psychopathology and temperament traits: the

northern Finland 1966 birth cohort. *Depression research and treatment*, 2012.

<http://dx.doi.org/10.1155/2012/160905>

34 Wessman, J., Schönauer, S., Miettunen, J., Turunen, H., Parviainen, P., Seppänen, J. K., ... & Taanila, A. (2012). Temperament clusters in a normal population: Implications for health and disease. *PloSOne*, 7(7), e33088.

35. Miettunen, J., Veijola, J., Lauronen, E., Kantojärvi, L., & Joukamaa, M. (2007). Sex differences in Cloninger's temperament dimensions—a meta-analysis. *Comprehensive Psychiatry*, 48(2), 161-169.
<http://dx.doi.org/10.1016/j.comppsy.2006.10.007>

36. Finnish Centre for Pensions & The Social Insurance Institution of Finland (2015). *Statistical yearbook of pensioners in Finland 2014*. Helsinki: ETK and Kela.
https://www.etk.fi/wpcontent/uploads/Statistical_yearbook_of_pensioners_in_Finland_2015.pdf. Accessed October 10, 2018.

37. Mendlowicz, M. V., Jean-Louis, G., Gillin, J. C., Akiskal, H. S., Furlanetto, L. M., Rapaport, M. H., & Kelsoe, J. R. (2000). Sociodemographic predictors of temperament and character. *Journal of Psychiatric Research*, 34(3), 221-226.
[http://dx.doi.org/10.1016/S0022-3956\(00\)00014-5](http://dx.doi.org/10.1016/S0022-3956(00)00014-5)

38. Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879.
<http://dx.doi.org/10.1037/0021-9010.88.5.879>
39. Spector, P. E. (2006). Method variance in organizational research truth or urban legend?. *Organizational Research Methods*, 9(2), 221-232.
<https://doi.org/10.1177/1094428105284955>
40. Hietaniemi, M., & Ritola, S. (2007). *The Finnish pension system*. (Ed.). Helsinki: Finnish Centre for Pensions.
<https://www.julkari.fi/bitstream/handle/10024/129395/TheFinnishpensionsystem.pdf?sequence=1>. Accessed October 10, 2018.

Flowchart 1.

The participants of the 46-year follow-up survey

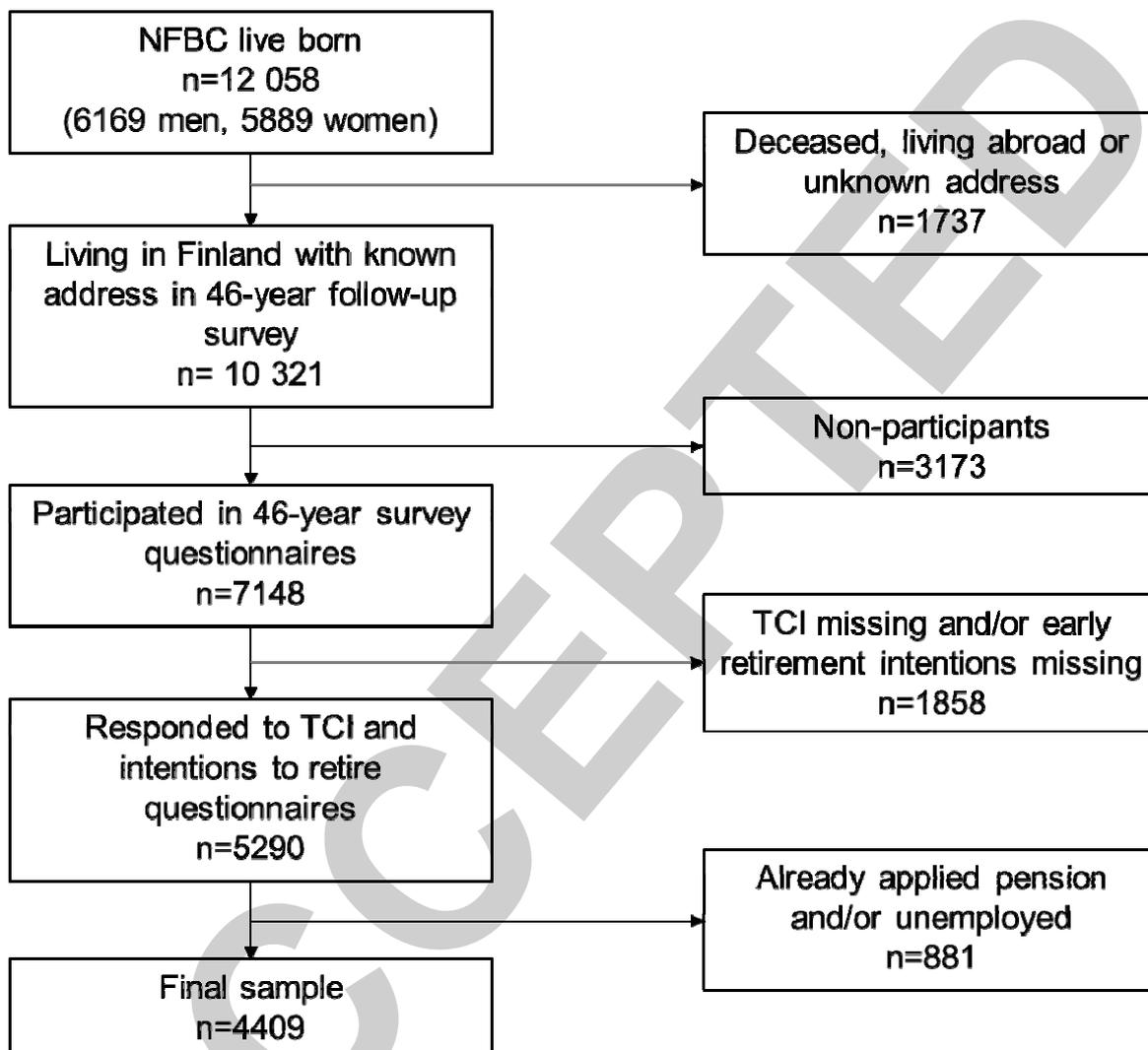


Table 1.

Descriptive statistics at the age of 46: Proportions of men and women in the categories of retirement intentions and potential confounders. Means and standard deviations (SD) of the temperament dimensions.

		Men		Women	
		N=1940		N=2469	
		N	%	N	%
Early retirement intentions	No	964	49.7	1384	53.3
	Weak	760	39.2	869	36.9
	Strong	216	11.1	216	9.8
Marital status	Married	1587	83.7	1912	78.5
	Single	183	9.6	235	9.6
	Divorced/Widowed	127	6.7	289	11.9
Education	Basic/Secondary	1291	72.5	1550	66.0
	Tertiary	490	27.5	799	34.0
Work type	Mental	964	50.8	1374	56.5
	Physical	372	19.6	268	11.0
	Mental/Physical	560	29.5	790	32.5
Job satisfaction	Good	1248	66.0	1647	68.1
	Poor	642	34.0	773	31.9
Perceived health	Good	1334	70.2	1750	72.1
	Poor	565	29.8	676	27.9
Mental health problems	No	1761	93.2	2077	86.4
	Yes	128	6.8	327	13.6
		mean	SD	mean	SD
Novelty seeking		17.76	5.75	19.09	5.87

	Explorative excitability	5.93	2.45	6.54	2.43
	Impulsiveness	3.96	2.33	4.24	2.40
	Extravagance	4.26	2.13	4.97	2.03
	Disorderliness	3.61	1.78	3.34	1.76
Harm avoidance		12.27	6.20	13.45	5.96
	Worry/pessimism	3.29	2.05	3.64	2.01
	Fear of uncertainty	3.31	1.72	4.02	1.57
	Shyness	3.28	2.20	3.17	2.08
	Fatigability	2.40	1.96	2.62	2.04
Reward dependence		13.41	3.75	16.04	3.59
	Sentimentality	4.58	2.08	6.17	2.08
	Attachment	5.09	2.12	5.89	1.97
	Dependence	3.74	1.46	3.98	1.41
Persistence		4.38	1.88	4.27	1.92

N varies N=1781-1899 for men and N=2349-2436 for women due to some missing data in background variables

Table 2. Correlation matrix for men (lower diagonal) and women (upper diagonal) for all variables at the age of 46.

Spearman's Rho	Retirement intentions	Marital status	Education	Work type	Job satisfaction	Perceived health	Mental health problems	Novelty seeking	Explorative excitability	Impulsiveness	Extravagance	Disorderliness	Harm avoidance	Worry/pessimism	Fear of uncertainty	Shyness	Fatigability	Reward dependence	Sentimentality	Attachment	Dependence	Persistence
Retirement intentions	1	-.064**	-.092**	.064**	.194**	.233**	.079**	-.055**	-.072**	-.013	-.043*	.000	.147**	.107**	.093**	.090**	.168**	-.044*	.021	-.073**	-.026	-.017
Marital status	.005	1	.005	-.002	-.007	.030	.081**	.072**	.039	.043*	.077**	.050*	-.028	-.049*	-.038	-.0008	.013	-.048*	-.008	-.042*	-.063**	-.026
Education	-.163**	-.055*	1	-.354**	-.058**	-.089**	.037	.088**	.125**	.010	.034	.075**	-.096**	-.070**	-.096**	-.086**	-.050*	-.014	-.069**	.013	.054*	.088**
Work type	.105**	.083**	-.412**	1	.036	.063**	-.054*	-.080**	-.093**	-.008	-.056**	-.065**	.090**	.055**	.072**	.099**	.045*	-.016	.049*	-.036	-.079**	-.038
Job satisfaction	.211**	.069**	-.067**	.090**	1	.212**	.125**	-.041*	-.072**	-.023	-.017	.004	.201**	.170**	.127**	.125**	.201**	-.031	.028	-.069**	-.019	.001
Perceived health	.223**	.143**	-.106**	.090**	.236**	1	.169**	-.008	-.097**	.033	.018	.062**	.235**	.193**	.137**	.086**	.321**	-.031	.072**	-.104**	-.022	-.007
Mental health problems	.102**	.101**	.047	.009	.112**	.083**	1	.006	-.033	.018	.000	.042*	.191**	.176**	.114**	.094**	.216**	.003	.023	-.015	-.004	.009
Novelty seeking	-.012	-.074**	.021	-.076**	-.105**	-.018	.005	1	.686**	.734**	.639**	.609**	-.341**	-.241**	-.363**	-.330**	-.140**	.106**	-.027	.239**	-.028	-.055**
Explorative excitability	-.078**	-.116**	.111**	-.124**	-.172**	-.141**	-.016	.665**	1	.269**	.268**	.260**	-.409**	-.264**	-.407**	-.387**	-.242**	.186**	.015	.308**	.015	.155**
Impulsiveness	.062*	-.043	-.038	-.012	-.026	.022	-.013	.697**	.215**	1	.322**	.363**	-.205**	-.164**	-.230**	-.172**	-.073**	-.051*	-.089**	.068**	-.091**	-.165**
Extravagance	-.042	-.027	-.009	-.037	-.051*	.023	.029	.679**	.297**	.308**	1	.206**	-.122**	-.089**	-.139**	-.141**	-.004	.141**	.010	.207**	.049*	-.072**
Disorderliness	.041	-.014	-.019	-.027	-.003	.070**	-.001	.558**	.179**	.301**	.190**	1	-.157**	-.123**	-.162**	-.177**	-.026	.018	.037	.033	-.047*	-.095**
Harm avoidance	.115**	.165**	-.088**	.099**	.275**	.252**	.154**	-.328**	-.444**	-.164**	-.115**	-.132**	1	.766**	.760**	.794**	.728**	.023	.137**	-.211**	.165**	-.204**
Worry/pessimism	.117**	.115**	-.068**	.091**	.268**	.234**	.148**	-.245**	-.288**	-.140**	-.123**	-.084**	.791**	1	.499**	.461**	.426**	.063**	.130**	-.130**	.152**	-.053*
Fear of uncertainty	.047	.136**	-.017	.049*	.160**	.135**	.132**	-.342**	-.405**	-.193**	-.136**	-.164**	.751**	.493**	1	.533**	.409**	.079**	.167**	-.128**	.149**	-.123**
Shyness	.088**	.128**	-.107**	.101**	.218**	.166**	.093**	-.331**	-.440**	-.133**	-.140**	-.155**	.800**	.497**	.504**	1	.400**	-.058**	.079**	-.238**	.088**	-.150**
Fatigability	.111**	.130**	-.066**	.064**	.223**	.255**	.142**	-.090**	-.245**	-.039	.049*	.010	.724**	.467**	.415**	.405**	1	-.007	.046*	-.142**	.121**	-.305**
Reward dependence	-.019	-.045	.037	-.024	-.048*	-.061*	.058*	.146**	.270**	-.012	.115**	-.014	-.016	.040	.055*	-.113**	-.011	1	.687**	.654**	.550**	.014
Sentimentality	.043	.023	-.040	.016	.061*	.031	.095**	.010	.061*	-.043	.003	.016	.112**	.101**	.141**	.067**	.045	.663**	1	.119**	.124**	.094**
Attachment	-.054*	-.090**	.066**	-.034	-.142**	-.122**	.002	.251**	.387**	.069**	.168**	-.011	-.264**	-.148**	-.161**	-.340**	-.154**	.685**	.110**	1	.164**	-.005
Dependence	-.044	-.025	.055*	-.062*	-.008	-.036	.015	.013	.082**	-.064**	.058*	-.060*	.188**	.175**	.190**	.112**	.130**	.583**	.168**	.188**	1	-.094**
Persistence	-.029	-.037	.069**	-.046	-.082**	-.045	.031	-.056*	.179**	-.133**	-.101**	-.132**	-.280**	-.122**	-.182**	-.191**	-.397**	.041	.111**	.065**	-.112**	1

p<0.05=*, p<0.01=** (two-sided tests)

Table 3.

Cross-sectional analyses: Ordinal logistic regression models of retirement intentions, logit coefficients and statistical significance at the age of 46.

Men	Model 1	Model 2	Model 3
Novelty seeking	-0,034	0,035	0,029
Explorative excitability	-0,173***	-0,059	-0,032
Impulsiveness	0,090*	0,126**	0,134**
Extravagance	-0,055	-0,057	-0,086
Disorderliness	0,075	0,090	0,062
Harm avoidance	0,263***	0,147**	0,062
Worry/pessimism	0,257***	0,142**	0,071
Fear of uncertainty	0,100*	0,037	-0,011
Shyness	0,178***	0,075	0,028
Fatigability	0,271***	0,177***	0,089
Reward dependence	-0,043	-0,024	-0,019
Sentimentality	0,097*	0,058	0,038
Attachment	-0,099*	-0,045	-0,021
Dependence	-0,107*	-0,083	-0,073
Persistence	-0,038	0,017	0,000
Women			
Novelty seeking	-0,114**	-0,062	-0,068
Explorative excitability	-0,160***	-0,088	-0,060
Impulsiveness	-0,040	-0,015	-0,024
Extravagance	-0,094*	-0,064	-0,078
Disorderliness	0,002	0,009	-0,022
Harm avoidance	0,352***	0,248***	

			0,164***
Worry/pessimism	0,263***	0,176***	0,104*
Fear of uncertainty	0,198***	0,118**	0,068
Shyness	0,203***	0,116**	0,096*
Fatigability	0,403***	0,329***	0,222***
Reward dependence	-0,083*	-0,077	-0,079
Sentimentality	0,049	0,017	-0,016
Attachment	-0,165***	-0,127**	-0,101*
Dependence	-0,054	-0,044	-0,036
Persistence	-0,038	-0,026	-0,030

Model 1: Adjusted only for temperament scales

Model 2: Adding marital status, education, work type and job satisfaction

Model 3: Adding perceived health and mental health problem to adjustments in Model 1 and 2.

Logit coefficients in bold are statistically significant. * p<0.05, ** p<0.01, ***p<0.001

Table 4.

Longitudinal analyses: Ordinal logistic regression models for retirement intentions, logit coefficients and statistical significance. Temperament at age 31 and other variables at age 46.

Men	Model 1	Model 2	Model 3
Novelty seeking	-0,009	0,025	0,018
Explorative excitability	-0,116*	-0,067	-0,057
Impulsiveness	0,063	0,053	0,048
Extravagance	-0,011	0,000	-0,014
Disorderliness	0,045	0,090	0,080
Harm avoidance	0,168**	0,079	0,030
Worry/pessimism	0,197***	0,137*	0,110
Fear of uncertainty	0,080	0,050	0,017
Shyness	0,101*	-0,010	-0,053
Fatigability	0,134**	0,059	0,015
Reward dependence	-0,078	-0,044	-0,051
Sentimentality	0,031	0,036	0,028
Attachment	-0,089	-0,045	-0,043
Dependence	-0,106*	-0,093	-0,102
Persistence	0,001	0,003	0,026
Women			
Novelty seeking	-0,052	-0,048	-0,060
Explorative excitability	-0,090	-0,048	-0,028
Impulsiveness	-0,012	-0,034	-0,043

Extravagance	-0,062	-0,078	-0,097
Disorderliness	0,037	0,042	0,014
Harm avoidance	0,220***	0,136**	0,061
Worry/pessimism	0,164***	0,100*	0,025
Fear of uncertainty	0,149**	0,072	0,036
Shyness	0,167***	0,096	0,058
Fatigability	0,185***	0,139**	0,065
Reward dependence	-0,035	-0,025	-0,036
Sentimentality	0,069	0,065	0,033
Attachment	-0,125**	-0,120*	-0,106*
Dependence	-0,005	0,015	0,014
Persistence	-0,014	0,008	0,016

Model 1: only temperament scales

Model 2: adding marital status, education, work type and job satisfaction

Model 3: adding perceived health and mental health problem to adjustments in Model 1 and 2.

Logit coefficients in bold are statistically significant: *= p<0.05, **=p<0.01, ***=p<0.001