

Personality traits and the use of manual, alternative, and mental healthcare services and medication in Norwegian musicians

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Abstract

To investigate the association between personality traits and use of analgesic medication, anti-depressants and sedatives, mental health services, manual and alternative healthcare services among Norwegian musicians,

1,607 musicians from the Norwegian Musicians Union answered an online questionnaire.

Based on logistic regression analysis, adjusting for age, sex, education and general health, we investigated a possible dose-response

relationship between the personality traits neuroticism, extraversion, openness to experience, agreeableness and conscientiousness and the use of these services and types of medication.

As hypothesized, Neuroticism was positively associated with excess use of all types of the before mentioned health care services and medications. A higher score on openness to experience was positively associated with

use of alternative and complementary healthcare services. Contrary to our expectations, extraversion was positively associated with the use of mental health care services and unrelated to other type of health care and medication use. Conscientiousness was negatively associated with the use of mental health care services.

The results suggest that the relationship between personality and healthcare use cannot be attributed to occupation alone. The findings address the importance of differentiating behavior outcome (i.e. the use of health care services) from other outcome like symptom reporting or attitudes towards help seeking.

Keywords: Personality; Musicians; Healthcare services; Mental Health; Manual therapy; Complementary and alternative medicine; Medication

Adequate and flexible health behavior includes addressing symptoms and signs of major health problems and seeking appropriate health care services (Hampson et al., 2016).

Although it is well established that demographic and social environmental variables like gender, age, common mental problems, like anxiety and depression, and socioeconomic status contribute to health and health behavior, less is known about the role of personality and personality traits. Yet, over the last decades knowledge has emerged concerning human personality as an important venue for understanding both health related behavior and health outcome (e.g. Bogg & Roberts, 2013; Hampson et al., 2016). In the five factor model of personality (McCrae, 2010) five broad dispositions have been described that reflect basic tendencies in feeling, thinking and acting in certain ways; neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Given the strong link between

personality and stress-processes (Friedman & Kern, 2014; Hervas & Vazquesz, 2011), stable dispositions should be given more attention also in the study of the etiology of not only psychopathology but also general health and health behavior. Although the close association between personality and mental health has received strong support (e.g Kotov, Gamez, Smith & Watson, 2010), less is known about the relationship between personality and specific health care use. Further, few studies take into consideration that personality and health problems are not equally distributed in and across population sub-groups like occupation or education. Musicians, for instance, represent an occupational group where both musculoskeletal symptoms (Viljamaa, 2017) and symptoms of anxiety and depression (Vaag, Bjørngaard, & Bjerkeset, 2016a) is highly prevalent. More important, great differences exist in terms of availability, quality and cost of different health services in different countries (Levesque, Harris, & Russell, 2013). The Norwegian healthcare system is founded on the principles of universal access, decentralization and free choice of provider, and is financed by taxation (Ringard, Sagan, Sperre Saunes, & Lindahl, 2013). In addition, there are private healthcare providers, offering both conventional medicine and complementary and alternative health care services. These are not financially supported by the government healthcare system, but may be supported by private or company health insurance.

Regarding personality traits and health, people scoring high on neuroticism are more likely to rate their health as poor, and report higher levels of pain symptoms (Costa & McCrae, 1992), have more frequent visits to general practitioners (Jerram & Coleman, 1999), and are more sensitive to pain (Vassend, Røysamb, & Nielsen, 2013). Further, they are more prone to excess use of pain medication (Clark, Cao, & Krause, 2017). Neuroticism is also strongly correlated with symptoms of depression and anxiety (Ormel et al., 2013), and a large meta-analysis confirmed the strong association between Neuroticism, psychological distress, and anxiety disorders (Kotov, Gamez, Schmidt, & Watson, 2010). In turn, anxiety and depression

are linked to musculoskeletal complaints, and neuroticism has therefore been suggested as a shared risk factor that can explain this co-occurrence (Vassend, Røysamb, Nielsen, & Czajkowski, 2017). Neuroticism is also associated with increased use of mental health care services (Jylhä & Isometsä, 2006; Park et al., 2017), but less is known about the relationship between neuroticism and the use of manual related therapies like physiotherapy and acupuncture. Although neuroticism has been associated with ill health and raised mortality, other studies show the opposite; i.e. neuroticism being a protective factor for premature death (See Deary, Weiss, & Batty, 2010 for a comprehensive review on the relationship between personality and mortality). A recent study reported that neuroticism is associated with lower mortality, and the authors addresses the role of worry and perceived vulnerability in what has been labeled healthy neuroticism (Gale et al., 2017). The fact that neuroticism can represent a health advantage in some circumstances is further supported by the findings in the study by Hagger-Johnsen and colleagues (2012), where women with low SES, and high neuroticism were at higher risk of cardiac mortality, whereas for those with high SES, high neuroticism predicted reduced risk of mortality.

Extraversion is related to both positive (e.g. exercising) and negative (e.g. drinking and smoking) health behaviors (Booth-Kewley & Vickers, 1994). Although neuroticism has received most attention regarding the development of psychopathology, Extraversion has emerged as a more specific, protective factor in the development of depression (Speed et al., 2015; Watson & Naragon-Gainey, 2014; Watson, Stasik, Ellickson-Larew, & Stanton, 2015). Higher scores on extraversion predicts fewer symptoms of depression (Langvik, Hjemdal, & Nordahl, 2016), and is linked to reduced use of mental health care services (Jylhä & Isometsä, 2006). Of note, extraversion is also associated with less self-stigmatizing beliefs towards mental health (Ingram, Lichtenberg, & Clarke, 2016), suggesting that the barriers for seeking professional help for mental problems might be lower.

In the study by Booth-Kewley and Vickers (1994), conscientiousness and agreeableness, along with neuroticism and extraversion, were reliable predictors of health behavior practices, (e.g. adherence to instructions by health care personnel). Higher levels of conscientiousness is also linked to lower prevalence of different mental health outcomes, like anxiety and depression (Kotov et al., 2010), and together with extraversion, high level of conscientiousness protects against affective disorders (Naragon-Gainey & Simms, 2017). Recent research supports the role of conscientiousness as an important predictor for good health through favorable health behaviors (e.g. physical activity, healthy diets, being non-smokers and refraining from alcohol) (Bogg & Roberts, 2013; Hampson, Edmonds, Goldberg, Dubanoski, & Hillier, 2015). Both conscientiousness and agreeableness are associated with favorable health behavior (Ingledeew & Brunning, 1999), and lower scores on agreeableness and conscientiousness were associated with opiate dependency in one recent study (Raketic et al., 2017). Agreeableness is, like extraversion, related to openness for seeking treatment for emotional problems (Ingram et al., 2016). Further, agreeableness has been found to moderate the link between neuroticism and symptoms, suggesting the relevance of the trait in regulating negative emotions (Ode & Robinson, 2007; 2009). However, an inverse relationship between agreeableness and mental health service utilization has been observed in another study (Park et al., 2017), advocating further investigation of the role of agreeableness.

The trait Openness to experience refers to the degree individuals generally are open to new experiences, have broad interests and are imaginative, whereas low scorers on this trait are down-to-earth, practical and traditional (Costa & McCrae, 1992). Previous studies have shown that openness to experience is associated with the willingness to use CAM (Smith et al., 2008), and practitioners of CAM score higher on this trait themselves, compared to the general population (Rise, Langvik, & Steinsbekk, 2012). Further, two studies have reported

an association between high scores on this trait and the use of complementary and alternative medicine (CAM) (Honda & Jacobson, 2005; Thomson, Jones, Browne, & Leslie, 2014). A recent study shows that openness to experience is associated with the use of mental health service utilization (Park et al., 2017)

People use health care services for a variety of reasons, both preventative and curative purposes (Rosenstock, 2005). Further, degree of healthiness and life expectancy varies significantly across occupations (Pestieau & Racionero, 2016). In our previous studies we found that musicians reported considerably higher levels of anxiety and depression symptoms and use of psychotherapy compared to the general workforce (-). Also, musculoskeletal problems are highly prevalent among musicians (Ackermann, Driscoll, & Kenny, 2012; Kenny & Ackermann, 2013; Leaver, Harris, & Palmer, 2011; Paarup, Baelum, Holm, Manniche, & Wedderkopp, 2011; Ranelli, Straker, & Smith, 2008). Generally, musicians also score substantially higher on personality traits such as openness to experience (Vaag, Sund, & Bjerkeset, 2017). Importantly, though, the relationship between personality and health is moderated by numerous factors like age, gender education, race, and socioeconomic status (Deary et al., 2010; Rosenstock, 2005). Hence, the association between personality and use of health care services should be investigated in a rather homogenous sample, in a setting where other potential cofounders are at a minimum. Controlling for contextual factors, such as occupation, is challenging (Johns, 2017) and the opportunity to investigate the relationship between personality and health-care use in a large sample of the same profession, equal regarding education and access to health care, is a great advantage.

Aim and objectives

We aim to investigate the associations between the personality traits in the five factor model and the use of manual therapy, analgesic medication, anti-depressant, sedatives

and complementary and alternative medicine (CAM) among musicians in Norway. Our results will provide data on these associations in a large representative sample of musicians, all with higher education, within the context of universal access to healthcare services.

Based on the literature reviewed, we pose the following hypotheses:

H1: There will be a positive association between higher score on neuroticism and use of all types of specific health care services and medications.

H3: There will be a negative association between extraversion and the use of psychologist and psychiatrist.

H3: There will be a positive association between openness to experience and use of complementary and alternative medicine and mental health services (Psychologist and psychiatrist).

H2: There will be a negative association between Conscientiousness and use of mental health services, manual therapy, CAM and medications.

Methods

Participants and setting

4,168 members of the Norwegian Musicians' Union were invited to participate in an online survey between February and April 2013. Of these, 2,121 members (51%) responded, and among them there were 1,015 (48%) women and 1,105 men, with a mean age of 44.5 years (SD=10.7). A total of 1,607 (76%) members had been working as professional performing musicians in the last 12 months. 89.2 % of the sample (1435) had 3 or more years of university education, 6.3 % (102) had a high school degree as their highest education,

whereas 0.7 percent (3) had no formal education beyond elementary school. The procedure for the data collection has been described more in detail by Vaag and colleagues previously (2017).

Measures

Use of healthcare services.

Use of manual, complementary and alternative healthcare services was measured by asking each respondent if they had consulted a specific healthcare provider within the last 12 months (yes/no). If yes, different forms of conventional and alternative healthcare providers were listed as follows: physiotherapist, dietitian, chiropractor, homeopath, acupuncturist, reflexologist, aroma therapist, massage therapist, naprapath, osteopath and healer.

Physiotherapist, massage therapist, chiropractor, naprapath and osteopath were combined into a group labeled “manual-related therapy”. The group “complementary and alternative medicine” (CAM) includes acupuncturist, homeopath, reflexologist, aroma therapist and healer. The categories were dichotomized and respondents that had been visiting one or more of the providers within these categories were coded as 1.

Use of medication.

Use of medication was measured by asking each respondent to answer if they had been using the following type of medications: nonprescription/or prescription analgesics, anti-depressant and sedatives. The response alternatives were “not used during the last 4

weeks”, “less than weekly use”, “weekly, but not daily use” and “daily use”. Respondents answering weekly use or more were coded as 1 to the respective medication use.

General health

The respondents were asked to rate their own health by responding to “In general, how would you consider your own health?”, on a scale ranging from “Very bad”, “Bad”, “Neither bad or good”, “Good” and “Very good“

Personality traits.

BFI-20-N (Engvik & Claussen, 2011), a Norwegian short version of the BFI44 (Harald Engvik & Føllesdal, 2005; John & Srivastava, 1999) was used to measure personality traits. BFI-20 consists of 20 items, of which each of the five personality domains are measured with four items each on a Likert scale from one to seven. Indices were made for the extraversion ($\alpha = .78$), agreeableness ($\alpha = .54$), conscientiousness ($\alpha = .56$), neuroticism ($\alpha = .76$) and openness to experience ($\alpha = .69$). The values observed in this study is comparable to those observed in other studies using short versions of BFI (e.g. Soto & John, 1977).

Statistics

Data were analyzed using IBM SPSS statistics version 21. Descriptive statistics include mean, standard deviation, frequencies and percentages where applicable. Internal consistency of the personality dimensions were reported as Cronbach’s alpha (α). A scale analysis showed that removing one item (“Can be somewhat careless”) from the conscientious scale, could increase the internal consistency to .61. For the other domains, removing any item would reduce the alpha. Logistic regression analyses were conducted to identify a possible dose-response relationship between personality traits and the use of health

care services and the use of analgesic medications, antidepressants and sedatives. Analysis were adjusted for gender, education, age and general health.

Results

The sample consisting of 1607 musicians was mainly within the ages of 25 to 66, mean age was 44.49 years (SD 10.68), and 57 percent of the sample were men. Table 1 presents the prevalence of the different healthcare and medication use together with descriptive statistics for the personality variables for the total sample and within the different groups. 695 of the participants did not report use of any health care services nor medication. This group differed from the rest of the sample by having a significant lower score on neuroticism, 11.94(4.70) versus 14.29 (5.32), $t(1596) = 2.36, p < .001, d = .47$.

TABLE 1

Personality trait and use of manual-related therapy and CAM

A dose-response relationship was observed between neuroticism traits and the use of both manual-related therapy and CAM, also after adjusting for gender, age and general health (table 2). As hypothesized, higher score on openness to experience was associated with use of CAM (OR 1.06, CI 1.03-1.10, $p < .001$).

TABLE 2

Personality and use of mental health care services and medication

Logistic regression analysis of the association between personality traits and the use of Psychologist and Psychiatrist during the last 12 months (table 3) identified neuroticism as a statistically significant predictor ($p < .001$) in the adjusted model, with an OR of 1.17.

Extraversion was positively associated with use of psychologist or psychiatrist the last 12 months after controlling for gender, age and general health (OR 1.4, $p < .05$).

Neuroticism showed a dose-response relationship with use analgesic in the unadjusted model (Table 3), that remained after controlling for age, gender and general health (OR 1.05, CI 95%, $p < .001$). Regarding psychotropic medication (Table 4) there was a dose-response relationship between increasing degree of neuroticism and elevated use of anti-depressant after controlling for age, education, sex and general health (OR 1.20, $p < .01$). The same was observed for sedative medication, where higher score on neuroticism was associated with use, both in the unadjusted and adjusted model (1.27, $p < .01$).

TABLE 3 & 4

Discussion

Research concerning personality and health care use has mainly focused on the use of mental health care services (Jylhä & Isometsä, 2006) or stigma towards seeking professional help for mental problems (Ingram et al., 2016). Further, as different occupations often have distinct personality profiles (e.g. Rise et al., 2012) as well as common health challenges (Ackermann et al., 2012; Kenny & Ackermann, 2015; Paarup et al., 2011; Viljamaa, 2017), the specific impact of the different personality traits on health and health behaviors has been difficult to estimate.

We observed a dose-response relationship between neuroticism and the use of manual-related therapy and CAM in a large sample of Norwegian musicians. This finding was robust to adjustment for sex, age, education and general health. Prior findings of neuroticism being related to pain medication misuse (Clark et al., 2017) suggested a relationship between neuroticism and use of analgesic, and this was supported in the adjusted model. These findings are consistent with the notion of neuroticism as a general distress factor related to symptom reporting, pain sensation and muscular complaints (Costa & McCrae, 1987; Vassend et al., 2013; Vassend et al., 2017). However, the findings also resonate with the hypothesis of healthy neuroticism (Gale et al., 2017). Regarding the use of mental health care services, we observed a considerable stronger effect of neuroticism than for those observed with the use of other health care services. The same is observed in the use of anti-depressant and sedative medications; a relatively strong dose-response relationship after controlling for sex, education, age and general health. The results are in line with the literature on neuroticism and the use of mental health care services (Jylhä & Isometsä, 2006) and neuroticism and mental disorders in general (Jeronimus, Kotov, Riese, & Ormel, 2016; Kotov, Gamez, Schmidt, & Watson, 2010; Ormel et al., 2013).

The literature suggest that extraversion is a protective factor in regard to mental disorders, especially depression (Jylhä & Isometsä, 2006; Kotov et al., 2010; Watson & Naragon-

Gainey, 2014), and higher score on extroversion is associated with less use of mental health care services (Jylhä & Isometsä, 2006). In this study, extraversion was positively related to the use of mental health services and CAM in the unadjusted models. Although it contradicts our hypothesis regarding extraversion, these findings are consistent with prior findings on the association between extraversion and openness for seeking treatment for emotional problems (Ingram et al., 2016). These results highlights the importance of distinguishing between symptom reporting, illness, and health care utilization, and partially support the role of extraversion being important in explaining help seeking behavior for mental health problems. The literature on the relationship between Agreeableness and health care utilization is relatively scarce and inconsistent (Ingledeew & Brunning, 1999; Park et al., 2017), and in this study we found no statistical evidence for an association between agreeableness and care utilization or medication use. Although the internal consistency of this scale was relatively low (.54), the scale analysis did not identify problematic items, and abbreviated scales often present lower values (Soto & John, 2017). Although agreeableness probably plays an important role in understanding symptom-reporting (Ode & Robinson, 2007; 2009), the results from this study support the finding by Park and colleagues (2017) in that agreeableness is unrelated to health service utilization. Some prior findings suggest that openness to experience is associated with the use of alternative and complementary medicine health care services (CAM) (Honda & Jacobson, 2005), which is in keeping with our findings. As musicians generally score higher on Openness to experience (Vaag et al., 2017) and make use of CAM more often compared to the general population (Vaag & Bjerkeset, 2017), the relationship between openness and use of CAM could be attributed to occupation. In this study, we observed a moderate association between Openness to experience and the use of CAM, that remained unchanged after controlling for age, sex, and general health, supporting our hypothesis and prior findings (Smith et al., 2008; Thomson et al., 2014). Apart

from a positive association between Openness to experience and use of non-prescription analgesic, the trait was unrelated to use of other medications, psychologist, psychiatrist, and manual based therapy. The literature (e.g. Bogg & Roberts, 2013; Hampson et al., 2015) suggests a negative association between conscientiousness and use of health care services and medications, which was confirmed by our findings. This can, at least partly, be explained by sensible and cautious health behavior in people with these traits (Hampson et al., 2015). Especially the role of Conscientiousness as a protective factor in the development of anxiety and depression has received support (Kotov et al., 2010; Naragon-Gainey & Simms, 2017). In this study of musicians, conscientiousness was negatively associated with the use of psychologist and psychiatrist, consistent with hypothesis and the literature review. However, Conscientiousness was statistically unrelated to other type of health care use and use of medications. As musicians in Norway have lower score on conscientiousness compared to the general workforce (Vaag et al., 2017), these findings should be interpreted with caution, especially given the relatively low internal consistency of the measure (.56). However, re-running the analysis with the abbreviated conscientious scale (α .61) did not alter the results.

Strengths and limitations

The strength of this study includes a large, representative sample of one occupational group, in a setting where health-care services are universal accessible. We were also able to control for gender, age and general health status. This specific research approach allows for a thorough investigation of the association between personality and health care and medication use.. However, some limitations must be kept in mind in the interpretation of the results. The cross-sectional design delimitates causal inferences about the role of personality as a predictor of use of health care services and medications. However, the endogenous nature of personality traits enables sensible assumptions about the direction. The moderate internal consistency of the measurement of Agreeableness and Conscientiousness delimits conclusion

about these traits being unrelated to the use of health care services and medication use. Further research should preferably make use of more extensive measures of personality.

Concluding remarks

Our results provide support for the association between personality and the use of healthcare services and medications among a large representative sample of musicians, within the context of universal access to healthcare services. As predicted, higher levels of Openness to experience predicted use of CAM. Neuroticism was significantly related to all types of health care and medication use, but the relationship was strongest for the use of mental health services, antidepressant and sedative medication.

References

- Ackermann, B., Driscoll, T., & Kenny, D. T. (2012). Musculoskeletal pain and injury in professional orchestral musicians in Australia. *Medical Problems of Performing Artists, 27*(4), 181–187.
- Ackermann, B., Driscoll, T., & Kenny, D. T. (2012). Musculoskeletal pain and injury in professional orchestral musicians in Australia. . *Medical Problems of Performing Artists, 27*(4), 8.
- Bogg, T., & Roberts, B. W. (2013). The Case for Conscientiousness: Evidence and Implications for a Personality Trait Marker of Health and Longevity. *Annals of Behavioral Medicine, 45*(3), 278-288. doi:10.1007/s12160-012-9454-6
- Clark, J. M. R., Cao, Y., & Krause, J. S. (2017). Risk of Pain Medication Misuse After Spinal Cord Injury: The Role of Substance Use, Personality, and Depression. *The Journal of Pain, 18*(2), 166-177. doi:https://doi.org/10.1016/j.jpain.2016.10.011
- Costa, P. T., Jr., & McCrae, R. R. (1987). Neuroticism, somatic complaints, and disease: is the bark worse than the bite? *J Pers, 55*(2), 299-316.
- Deary, I. J., Weiss, A., & Batty, G. D. (2010). Intelligence and Personality as Predictors of Illness and Death. *Psychological Science in the Public Interest, 11*(2), 53-79. doi:10.1177/1529100610387081
- Gale, C. R., Čukić, I., Batty, G. D., McIntosh, A. M., Weiss, A., & Deary, I. J. (2017). When Is Higher Neuroticism Protective Against Death? Findings From UK Biobank. *Psychological Science, 28*(9), 1345-1357. doi:10.1177/0956797617709813
- Hampson, Edmonds, G. W., Barckley, M., Goldberg, L. R., Dubanoski, J. P., & Hillier, T. A. (2016). A Big Five approach to self-regulation: personality traits and health trajectories in the Hawaii longitudinal study of personality and health. *Psychology, Health & Medicine, 21*(2), 152-162. doi:10.1080/13548506.2015.1061676
- Hampson, S. E., Edmonds, G. W., Barckley, M., Goldberg, L. R., Dubanoski, J. P., & Hillier, T. A. (2016). A Big Five approach to self-regulation: personality traits and health trajectories in the Hawaii longitudinal study of personality and health. *Psychology, Health & Medicine, 21*(2), 152-162. doi:10.1080/13548506.2015.1061676
- Hampson, S. E., Edmonds, G. W., Goldberg, L. R., Dubanoski, J. P., & Hillier, T. A. (2015). A life-span behavioral mechanism relating childhood conscientiousness to adult clinical health. *Health Psychology, 34*(9), 887-895. doi:10.1037/hea0000209
- Honda, K., & Jacobson, J. S. (2005). Use of complementary and alternative medicine among United States adults: the influences of personality, coping strategies, and social support. *Preventive Medicine, 40*(1), 46-53. doi:https://doi.org/10.1016/j.ypmed.2004.05.001
- Ingledeu, D. K., & Brunning, S. (1999). Personality, Preventive Health Behaviour and Comparative Optimism about Health Problems. *Journal of Health Psychology, 4*(2), 193-208. doi:10.1177/135910539900400213
- Ingram, P. B., Lichtenberg, J. W., & Clarke, E. (2016). Self-stigma, personality traits, and willingness to seek treatment in a community sample. *Psychol Serv, 13*(3), 300-307. doi:10.1037/ser0000086

- Jeronimus, B. F., Kotov, R., Riese, H., & Ormel, J. (2016). Neuroticism's prospective association with mental disorders halves after adjustment for baseline symptoms and psychiatric history, but the adjusted association hardly decays with time: a meta-analysis on 59 longitudinal/prospective studies with 443 313 participants. *Psychol Med*, *46*(14), 2883-2906. doi:10.1017/s0033291716001653
- Jerram, K. L., & Coleman, P. G. (1999). The big five personality traits and reporting of health problems and health behaviour in old age. *British Journal of Health Psychology*, *4*(2), 181-192. doi:10.1348/135910799168560
- Johns, G. (2017). REFLECTIONS ON THE 2016 DECADE AWARD: INCORPORATING CONTEXT IN ORGANIZATIONAL RESEARCH. *Academy of Management Review*, *42*(4), 577-595. doi:10.5465/amr.2017.0044Invited
- Jylhä, P., & Isometsä, E. (2006). The relationship of neuroticism and extraversion to symptoms of anxiety and depression in the general population. *Depression and Anxiety*, *23*(5), 281-289. doi:10.1002/da.20167
- Kenny, D., & Ackermann, B. (2013). Performance-related musculoskeletal pain, depression and music performance anxiety in professional orchestral musicians: A population study. *Psychology of Music*, *43*(1), 43-60. doi:10.1177/0305735613493953
- Kenny, D., & Ackermann, B. (2015). Performance-related musculoskeletal pain, depression and music performance anxiety in professional orchestral musicians: A population study. *Psychology of Music*, *43*(1), 43-60. doi:10.1177/0305735613493953
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "big" personality traits to anxiety, depressive, and substance use disorders: a meta-analysis. *Psychological bulletin*, *136*(5), 768-821. doi:10.1037/a0020327
- Langvik, E., Hjemdal, O., & Nordahl, H. M. (2016). Personality traits, gender differences and symptoms of anhedonia: What does the Hospital Anxiety and Depression Scale (HADS) measure in nonclinical settings? *Scandinavian Journal of Psychology*, *57*(2), 144-151. doi:10.1111/sjop.12272
- Leaver, R., Harris, E. C., & Palmer, K. T. (2011). Musculoskeletal pain in elite professional musicians from British symphony orchestras. *Occupational Medicine*, *61*(8), 549-555. doi:10.1093/occmed/kqr129
- Levesque, J.-F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, *12*(1), 18. doi:10.1186/1475-9276-12-18
- Naragon-Gainey, K., & Simms, L. J. (2017). Three-way Interaction of Neuroticism, Extraversion, and Conscientiousness in the Internalizing Disorders: Evidence of Disorder Specificity in a Psychiatric Sample. *J Res Pers*, *70*, 16-26. doi:10.1016/j.jrp.2017.05.003
- Ode, S. & Robinson, M. D.(2007). Agreeableness and the self-regulation of negative affect: Findings involving the neuroticism/somatic distress relationship. *Personality and Individual Differences*, *43*, 2137-2148.
- Ode, S. & Robinson, M. D. (2009). Can Agreeableness Turn Gray Skies Blue? A Role for Agreeableness in Moderating Neuroticism-Linked Dysphoria. *Journal of Social and Clinical Psychology*, *28*, 436-462.
- Ormel, J., Jeronimus, B. F., Kotov, R., Riese, H., Bos, E. H., Hankin, B., . . . Oldehinkel, A. J. (2013). Neuroticism and common mental disorders: Meaning and utility of a complex relationship. *Clinical Psychology Review*, *33*(5), 686-697. doi:https://doi.org/10.1016/j.cpr.2013.04.003

- Paarup, H. M., Baelum, J., Holm, J. W., Manniche, C., & Wedderkopp, N. (2011). Prevalence and consequences of musculoskeletal symptoms in symphony orchestra musicians vary by gender: a cross-sectional study. *BMC Musculoskeletal Disorders*, *12*(1), 223. doi:10.1186/1471-2474-12-223
- Park, S., Lee, Y., Seong, S. J., Chang, S. M., Lee, J. Y., Hahm, B. J., & Hong, J. P. (2017). A cross-sectional study about associations between personality characteristics and mental health service utilization in a Korean national community sample of adults with psychiatric disorders. *BMC Psychiatry*, *17*(1), 170. doi:10.1186/s12888-017-1322-2
- Pestieau, P., & Racionero, M. (2016). Harsh occupations, life expectancy and social security. *Economic Modelling*, *58*(Supplement C), 194-202. doi:https://doi.org/10.1016/j.econmod.2016.05.030
- Raketic, D., Barisic, J. V., Svetozarevic, S. M., Gazibara, T., Tepavcevic, D. K., & Milovanovic, S. D. (2017). Five-Factor Model Personality Profiles: The Differences between Alcohol and Opiate Addiction among Females. *Psychiatr Danub*, *29*(1), 74-80.
- Ranelli, S., Straker, L. M., & Smith, A. (2008). Prevalence of Playing-related Musculoskeletal Symptoms and Disorders in Children Learning Instrumental Music. *Medical Problems of Performing Artists*, *23*(4), 178-185.
- Ringard, A., Sagan, A., Sperre Saunes, I., & Lindahl, A. K. (2013). Norway: health system review. *Health Syst Transit*, *15*(8), 1-162.
- Rise, M. B., Langvik, E., & Steinsbekk, A. (2012). The personality of homeopaths: a cross-sectional survey of the personality profiles of homeopaths compared to a norm sample. *J Altern Complement Med*, *18*(1), 42-47. doi:10.1089/acm.2010.0713
- Rosenstock, I. M. (2005). Why People Use Health Services. *Milbank Quarterly*, *83*(4), Online-only-Online-only. doi:10.1111/j.1468-0009.2005.00425.x
- Smith, B. W., Dalen, J., Wiggins, K. T., Christopher, P. J., Bernard, J. F., & Shelley, B. M. (2008). Who Is Willing to Use Complementary and Alternative Medicine? *EXPLORE: The Journal of Science and Healing*, *4*(6), 359-367. doi:https://doi.org/10.1016/j.explore.2008.08.001
- Soto, C. J. & John, O. P. (2017). Shory and extra-short forms of the Big Five Inventory-2: The BFI-2-S and BFI-2-XS. *Journal of Research in personality*, *68*, 69-81.
- Speed, B. C., Nelson, B. D., Perlman, G., Klein, D. N., Kotov, R., & Hajcak, G. (2015). Personality and emotional processing: A relationship between extraversion and the late positive potential in adolescence. *Psychophysiology*, *52*(8), 1039-1047. doi:10.1111/psyp.12436
- Thomson, P., Jones, J., Browne, M., & Leslie, S. J. (2014). Why people seek complementary and alternative medicine before conventional medical treatment: A population based study. *Complementary Therapies in Clinical Practice*, *20*(4), 339-346. doi:https://doi.org/10.1016/j.ctcp.2014.07.008
- Vaag, J., Bjørngaard, J. H., & Bjerkeset, O. (2016a). Symptoms of anxiety and depression among Norwegian musicians compared to the general workforce. *Psychology of Music*, *44*(2), 234-248. doi:10.1177/0305735614564910
- Vaag, J., Bjørngaard, J. H., & Bjerkeset, O. (2016b). Use of psychotherapy and psychotropic medication among Norwegian musicians compared to the general workforce. *Psychology of Music*, *44*(6), 1439-1453. doi:10.1177/0305735616637132
- Vaag, J., & Bjerkeset, O. (2017). Musicians are High Consumers of Complementary and Alternative Healthcare Services: The Norwegian Musicians' Health Project. *Medical problems of performing artists*, *32*(4), 215-220

- Vaag, J., Sund, E. R., & Bjerkeset, O. (2017). Five-factor personality profiles among Norwegian musicians compared to the general workforce. *Musicae Scientiae*, 0(0), 1029864917709519. doi:10.1177/1029864917709519
- Vassend, O., Røysamb, E., & Nielsen, C. S. (2013). Five-factor personality traits and pain sensitivity: A twin study. *PAIN®*, 154(5), 722-728. doi:https://doi.org/10.1016/j.pain.2013.01.010
- Vassend, O., Røysamb, E., Nielsen, C. S., & Czajkowski, N. O. (2017). Musculoskeletal complaints, anxiety–depression symptoms, and neuroticism: A study of middle-aged twins [Press release]
- Viljamaa, K., Liira, J. Kaakkola, S., & Savolainen, A. . (2017). Musculoskeletal Symptoms Among Finnish Professional Orchestra Musicians. *Medical Problems of performing artists* 32(4). doi:https://doi.org/10.21091/mppa.2017.4037
- Watson, D., & Naragon-Gainey, K. (2014). Personality, Emotions, and the Emotional Disorders. *Clin Psychol Sci*, 2(4), 422-442. doi:10.1177/2167702614536162
- Watson, D., Stasik, S. M., Ellickson-Larew, S., & Stanton, K. (2015). Extraversion and psychopathology: A facet-level analysis. *J Abnorm Psychol*, 124(2), 432-446. doi:10.1037/abn0000051

Table 1: Table 1: Internal consistency (α), means and standard deviation (SD) for the personality traits in the total sample and for the groups reporting use of health care services and/or medication

	Psychologist							
		Total sample	CAM	MRT	Psychiatrist	Analgesic	Antidepressant	Sedatives
	α	(N 1607)	(n 314)	(n 710)	(n 175)	(n 220)	(41)	(18)
Neuroticism	.76	13.27 (5.19)	14.43 (5.33)	14.05 (5.33)	17.40 (5.15)	15.48 (5.30)	19.20 (5.34)	20.44 (5.14)
Extroversion	.78	18.85 (5.19)	19.63 (5.19)	18.99 (5.08)	19.03 (5.25)	18.80 (5.69)	16.98 (6.00)	17.22 (7.04)
Openness	.69	21.72 (4.16)	22.53 (4.22)	21.59 (4.35)	22.07 (4.12)	21.97 (4.46)	21.85 (4.11)	21.22 (4.92)
Agreeableness	.54	21.81 (3.57)	21.98 (3.73)	21.82 (3.54)	21.45 (3.75)	21.95 (3.82)	21.05 (3.54)	20.78 (4.80)
Conscientiousness	.56	20.11 (3.90)	20.19 (4.03)	20.09 (3.95)	18.99 (3.80)	19.79 (3.96)	19.37 (3.97)	19.89 (5.09)

Table 2: Logistic regression analysis of the association between personality traits and the use of manual-related therapy (physiotherapist, chiropractor, naprapath, massage therapist and/or osteopath) and use of alternative and complementary therapy (acupuncture, healer, reflexology, aroma t. and homeopathy) during the last 12 months. Estimated odds ratio (OR) with 95% CI.

	Manual-related therapy (n1602)		Alternative and complementary therapy (n1606)	
	Unadjusted	Adjusted ¹	Unadjusted	Adjusted ¹
Neuroticism	1.06 (1.04-1.09)**	1.03(1.01-1.06)**	1.07 (1.05-1.10)**	1.04 (1.01-1.06)*
Extroversion	1.03 (1.01-1.05)*	1.01 (.99-1.04)	1.04 (1.02-1.07)**	1.02 (1.00-1.05)
Openness	.99 (.96 -1.01)	.99 (.97-1.02)	1.06 (1.02-1.09)**	1.03 (1.03-1.10)**
Agreeableness	1.01 (.98-1.04)	1.00(.97-1.03)	1.01(.97-1.05)	1.00 (.96-1.03)
Conscientiousness	1.01 (.98-1.04)	1.00 (.97-1.03)	1.02 (.98-1.05)	1.01 (.97-1.04)

¹Adjusted for Age, Sex, Education and General health, * = $p < .05$, ** = $p < .01$, (CI95%)

Table 3: Logistic regression analysis of the association between personality traits and the use of Psychologist/Psychiatrist and of use of more than weekly use of analgesic drugs during the last 12 months. Estimated odds ratio (OR) with 95% CI.

	Psychologist/ Psychiatrist (n 1602)		Analgesic drugs (n 1607)	
	Unadjusted	Adjusted ¹	Unadjusted	Adjusted ¹
Neuroticism	1.20 (1.16-1.24)**	1.17(1.13-1.21)**	1.11 (1.08-1.14)**	1.06 (1.02-1.09)**
Extroversion	1.05 (1.02-1.09)**	1.04 (1.01-1.08)*	1.02 (.99-1.05)	1.01 (.98-1.04)
Openness	1.03 (.98 -1.07)	1.03 (.99-1.07)	1.02 (.98-1.06)	1.02 (.98-1.05)
Agreeableness	1.02(.97-1.07)	1.02 (.97-1.07)	1.04 (1.00-1.09)	1.03 (.99-1.08)
Conscientiousness	.95 (.91-.99)*	.94 (.90-.99)*	.99 (.95-.1.03)	1.00 (.95-1.04)

¹Adjusted for Age, Sex, Education and General health, * = $p < .05$, ** = $p < .01$, (CI95%)

Table 4: Logistic regression analysis of use of more than weekly use of anti-depressant or sedatives during the last 12 months. Estimated odds ratio (OR) with 95% confidence intervals (n

	Use of anti depressant (n 1607)		Use of sedative medication (n 1607)	
	Unadjusted	Adjusted ¹	Unadjusted	Adjusted ¹
Neuroticism	1.24 (1.16-1.32)**	1.21 1.13-1.30**	1.31 1.18-1.45**	1.27 (1.14-1.42)**
Extroversion	.98 .92-1.04	.99 .93-1.05	1.01 .92-1.10	1.02 (.93-1.12)
Openness	1.02 .95-1.11	1.02 .94-1.10	.99 .89-1.10	.88 .92-1.09

Agreeableness	.99 .91-1.09	1.00 .91-1.09	.97 .85-1.10	.97 .85- 1.10
Conscientiousness	1.00 .92-1.08	1.02 .93-1.11	1.05 .93-1.19	1.10 .96-1.26

¹Adjusted for Age, Sex, Education and General health, * = $p < .05$, ** = $p < .01$, (CI95%)