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Research paper

Can flow experiences be protective of work-related depressive symptoms and burnout? A genetically informative approach

Miriam A. Mosing[a,b,*,1], Ana Butkovic[c,1], Fredrik Ullén[a]

[a] Dept of Neuroscience, Karolinska Institutet, Stockholm, Sweden
[b] Dept of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden
[c] Dept of Psychology, University of Zagreb, Zagreb, Croatia

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ABSTRACT

Background: Genetic research on depression and burnout has focused mostly on adverse factors, although various aspects in daily life related to positive coping and well-being have been shown to potentially be protective. Using a large genetically informative sample, we aim to explore the potential relationship between flow proneness and work-related depressive symptoms and burnout.

Methods: About 10,000 Swedish twins filled in the Swedish Flow Proneness Questionnaire, a subscale of the Hopkins Symptom Checklist (SCL) depression scale, and the Emotional Exhaustion subscale of the Maslach Burnout Inventory-General Survey. A higher score indicated more flow, less emotional exhaustion and less depression. The classical twin design and co-twin control analyses were applied.

Results: Phenotypic correlations were .43 between depressive symptoms and flow proneness, .34 between burnout and flow proneness, and .62 between depressive symptoms and burnout. Broad-sense heritabilities (G) ranged between 33–35% for the three variables. Associations between the variables were due to significant genetic as well as non-shared environmental influences. Co-twin control analyses showed that associations remained significant when controlling for all genetic and shared familial factors, in line with a causal relationship.

Limitations: Although the co-twin control design can test for consistency of associations with a causal relationship, it cannot unequivocally establish causality.

Conclusions: Genetic liability has a substantial influence on associations between flow proneness and emotional problems at work (depression, burnout). However, the presence of significant environmental correlations is in line with a (partly) causal relationship between flow and work related depression and burnout, which in turn may suggest that interventions which increase flow could potentially reduce emotional problems at work.

1. Introduction

According to the World Health Organisation (WHO, 2016) globally more than 350 million people of all ages suffer from depression, the leading cause of disability worldwide. Depression is a highly recurrent disorder associated with poor physical health and a negative impact on person's work and interpersonal life and is among the most prevalent of all psychiatric disorders (Gotlib and Hammen, 2014). Accordingly, there has been an exponential increase in research examining factors related to onset, course and treatment of depression.

In the last two decades another condition has been studied across the globe and characterized as a diagnosable mental health disorder by the WHO: occupational burnout. It emerged as an important concept in the 1970s and from the 1990s onwards it has been researched in North America, Western and Eastern Europe, Asia, the Middle East, Latin America, Australia, New Zealand, Africa, China, and Indian subcontinent (Schaufeli et al., 2009). While most research uses the three-dimensional Maslach Burnout Inventory (MBI; Maslach and Jackson, 1981; Maslach et al., 1996) which consists of exhaustion, cynicism, and inefficacy, others regard burnout as a one-dimensional construct with emotional exhaustion as the only hallmark.

A recent review of more than 90 studies established that occupational burnout and depression are strongly related with correlations ranging between .50 – .60 and that the emotional exhaustion component of burnout showed the strongest association with depression (Bianchi et al., 2015). Notwithstanding the multitude of studies, the association between burnout and depression and its underlying biological architecture is still not well understood.

* Correspondence to: Department of Neuroscience, Karolinska Institute, Retzius v 8, SE-171 77 Stockholm, Sweden.
E-mail address: Miriam.Mosing@ki.se (M.A. Mosing).
[1] Authors have equally contributed to this work.

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While genetic influences on depressive symptoms have thoroughly been explored and its heritability has been estimated at about 37% (for a review see Flint and Kendler, 2014), only little is known about genetic influences on burnout or emotional exhaustion. In a study on Dutch twins, their siblings and spouses, Middeldorp et al. (2005) found that family environment contributed to individual differences in burnout (measured by the emotional exhaustion subscale of the Maslach Burnout Inventory (Maslach et al., 1996)), explaining 22% of the variance, while genetic influences were not significant. However, in another study in Dutch twins and their siblings using the same measure of burnout, Middeldorp et al. (2006) reported heritabilities of 30% for males and 13% for females with an additional 15% of variance explained by family environment in females. Finally, in a sample of Swedish twins using Pines Burnout Measure, Blom et al. (2012) found a heritability of 33% in both men and women. To our knowledge, Middeldorp et al. (2006) is the only study to date that has explored the association between burnout (emotional exhaustion) and anxious depression using a genetically informative sample. The phenotypic correlation between the two variables was estimated at .40 in both sexes, with 50% and 66% of the association being due to genetic factors in males and females, respectively.

Most behaviour genetics research on depression and burnout has focused on adverse factors, such as negative life events (Mather et al., 2014; Wichers et al., 2012), rumination (Johnson et al., 2014) and anxiety sensitivity (Waszczuk et al., 2015). However, various factors related to positive coping and well-being in daily life have been shown to be negatively associated with depression and burnout. If this relationship is not entirely due to shared underlying genetic aetiology, possibly lifestyle factors promoting enjoyment and intrinsic motivation may be protective for development of depressive symptoms and burnout and as such may serve as a good starting point for interventions. Only two studies to date have explored this using a genetically informative design. Waszczuk et al. (2015) reported a significant negative association between mindfulness, commonly defined as the state of being attentive to and aware of what is taking place in the present (Brown and Ryan, 2003), and depression ($r = -.34$). Most of this association (60%) could be explained by overlapping genetic factors. Whisman et al. (2014) looked at another possible protective factor for depression: experience of pleasant events. Phenotypic correlations between the different measures of experience of pleasant events (frequency, enjoyment and obtained pleasure) with depressive symptoms were all negative and significant (ranging between $-.31$ to $-.44$) and were largely due to shared genetic factors (65%).

Here, we explore individual differences in the proneness to have psychologícal flow experiences (flow proneness) as a possible protective factor for depression and emotional exhaustion. Flow is defined as a subjective state that has the following characteristics: intense and focused concentration on what one is doing in the present moment, merging of action and awareness, loss of reflective self-consciousness, a sense that one can control one's actions, distortion of temporal experience, and experience of the activity as intrinsically rewarding (Nakamura and Csikszentmihalyi, 2002). A series of studies on different Japanese samples have shown that flow experiences are associated with better health in elderly people (Hirao et al., 2012), that students who experienced flow more often in their daily lives are more likely to show higher self-esteem and lower anxiety, use active coping strategies more often and passive coping strategies less often, and they also report more Jujitsu-kan, a Japanese sense of fulfilment, and greater satisfaction with their lives (Asakawa, 2010). Further, unemployed adults who experienced more flow in daily life had significantly higher health-related quality of life (Hirao and Kobayashi, 2013).

In the present study, using a large, genetically informative sample of Swedish twins, we aim to: (1) explore the potentially protective influence of flow proneness on emotional exhaustion and depressive symptoms; (2) estimate genetic and environmental influences on individual differences in emotional exhaustion; and (3) understand the genetic and environmental aetiology underlying the relationship between the three variables.

2. Methods

2.1. Participants

Participants in the study were twins from the Swedish Twin Registry (STR), one of the largest registries of its kind (Lichtenstein et al., 2002, 2006), born between 1959 and 1985. The participants were part of the STAGE cohort (Lichtenstein et al., 2006), which has been approached several times, and the data for the present study were collected between 2012 and 2013 as part of a web survey (Mosing et al., 2014). The full sample included 10,120 twins with a score for at least one of the studied variables, with 2337 full twin pairs (1114 monozygotic (MZ) and 1223 dizygotic (DZ) pairs) and 7783 single twins without the co-twin participating. Their age was between 27 and 54 years ($M = 40.7$, $SD = 7.75$). Single twin individuals contribute to the estimation of means, variances, and covariate effects and were therefore included in the analyses. Zygosity was determined based on questions about intra-pair similarities and has subsequently been confirmed in 27% of the twins in the STR using genotyping confirming that the questionnaire based zygosity determination was correct for more than 98% of twin pairs. For further details on the STAGE cohort and zygosity determination in the STR see (Lichtenstein et al., 2002, 2006). All participants gave informed consent to participate and the study was approved by the Regional Ethics Review Board in Stockholm (Dnr 2011/570-31/5, 2011/1425-31, and 2012/1107/32).

2.2. Measures

2.2.1. Flow

Flow proneness (FP) was measured with the Swedish Flow Proneness Questionnaire (SFPQ; Ullén et al., 2012) which measures FP in three domains: work, leisure and maintenance. In addition, a subscale measuring flow proneness in the musical domain, i.e. how frequently the participant experienced flow during musical activities, was included. Note that for this reason, the FP questions in leisure activities explicitly excluded musical activities such as playing an instrument or singing. All four sub-scales consisted of seven items each rated on a five-point Likert scale ('never' to 'every or almost every day'). Global FP was calculated as the mean score of flow proneness in work, leisure and maintenance or as the mean score of any other two areas if the participant were missing a score in one of the three areas (see Mosing et al., 2012b). Cronbach alpha reliabilities in this study were .76, .86, .79 and .86 for FP in work, leisure, maintenance, and music, respectively.

2.2.2. Depressive symptoms

Depressive symptoms were measured with a six item subscale of the Hopkins Symptom Checklist (SCL) depression scale, which has previously been used in Swedish and Danish population studies Magnusson Hanson et al., 2014). The items are graded from 0 to 4 giving a range of full scores from 0 to 24. Note that the scale is reversed scored, so that a higher score indicates less depressive symptoms. The Cronbach alpha reliability in present study was .89.

2.2.3. Bournout

Emotional exhaustion was measured with the Emotional exhaustion subscale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli et al., 1996) which was developed to measure burnout in occupations without direct personal contact with service recipients or with only casual contact with people. The scale has five items (e.g. “I feel tired when I get up in the morning and have to face another day on the job”). In this study items were scored on a 6-point frequency rating scale as in some previous studies in Sweden (e.g. Magnusson Hanson et al., 2008), ranging from 'every day ' (1) to 'a few times per year or