



# Big Five personality traits may inform public health policy and preventive medicine: Evidence from a cross-sectional and a prospective longitudinal epidemiologic study in a Swiss community

Michael P. Hengartner<sup>a,\*</sup>, Wolfram Kawohl<sup>b</sup>, Helene Haker<sup>c</sup>, Wulf Rössler<sup>b,d</sup>, Vladeta Ajdacic-Gross<sup>b</sup>

<sup>a</sup> Department of Applied Psychology, Zurich University of Applied Sciences, Switzerland

<sup>b</sup> Department of Psychiatry, Psychotherapy and Psychosomatics, University of Zurich, Switzerland

<sup>c</sup> Translational Neuromodeling Unit (TNU), Institute for Biomedical Engineering, University of Zurich and ETH Zurich, Switzerland

<sup>d</sup> Institute of Psychiatry, Laboratory of Neuroscience (LIM 27), University of Sao Paulo, Brazil

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## ABSTRACT

**Background:** Some evidence documents the importance of personality assessments for health research and practice. However, no study has opted to test whether a short self-report personality inventory may comprehensively inform health policy.

**Methods:** Data were taken from a population-based epidemiologic survey in Zurich, Switzerland, conducted from 2010–2012. A short form of the Big Five Inventory was completed by  $n = 1155$  participants (54.4% women; mean age = 29.6 years), while health-related outcomes were taken from a comprehensive semi-structured clinical interview. A convenience subsample averaging  $n = 171$  participants additionally provided laboratory measures and  $n = 133$  were subsequently followed-up at least once over a maximal period of 6 months.

**Results:** Personality traits, in particular high neuroticism and low conscientiousness, related significantly to poor environmental resources such as low social support ( $R^2 = 0.071$ ), health-impairing behaviours such as cannabis use ( $R^2 = 0.071$ ), and psychopathology, including negative affect ( $R^2 = 0.269$ ) and various mental disorders ( $R^2 = 0.060$ – $0.195$ ). The proportion of total variance explained was  $R^2 = 0.339$  in persons with three or more mental disorders. Personality significantly related to some laboratory measures including total cholesterol ( $R^2 = 0.095$ ) and C-Reactive Protein ( $R^2 = 0.062$ ). Finally, personality prospectively predicted global psychopathological distress and vegetative symptoms over a 6-month observation period.

**Conclusions:** Personality relates consistently to poor socio-environmental resources, health-impairing behaviours and psychopathology. We also found some evidence for an association with metabolic and immune functions that are assumed to influence health. A short personality inventory could provide valuable information for preventive medicine when used as a means to screen entire populations for distinct risk exposure, in particular with respect to psychopathology.

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## 1. Introduction

Personality traits are important predictors of psychosocial functioning, psychopathology, physical health and mortality [25,51,58]. Specifically, previous studies have demonstrated that personality significantly relates to job strain and burnout [6,61,70], sexual problems [24,43], psychosis-spectrum disorders [60,62,72], major depression [26,34], health-impairing behaviours such as substance use [40,71], stress reactivity and resilience [3,27,46], and health-promoting socio-environmental resources such as relationship quality and social support [2,13,59]. Moreover, personality relates substantially to physical health

problems [21,29,32] and consequently to longevity and all-cause mortality [16,31,36].

Another important line of evidence emerged from the very proliferous contemporary research in animal personalities. In biological specialities such as ecology, ethology, or behavioural biology, it is now widely acknowledged that personality trait variation is among the driving forces behind adaptations to environments and its influences on fitness, including health, survival, and fecundity [19,37,75,76]. Most importantly, those findings from animal research can also inform personality research in humans and foster the understanding of human health and functioning [22,37,48]. Currently the main conclusion drawn from the literature on human and animal personality is that successful adaptations to the environment, thereby increasing health and longevity, are an interaction between personality and environmental conditions [15,47,53,76]. In accord with that it has been shown that selection processes, that is, one's propensity to create,

\* Corresponding author at: Department of Applied Psychology, Zurich University of Applied Sciences (ZHAW), PO Box 707, CH-8037 Zurich, Switzerland.

E-mail address: michael.pascal.hengartner@zhaw.ch (M.P. Hengartner).

shape or move into environments that match with one's trait disposition, are powerful determinants of human life-histories, for better or for worse [49,57,59,64]. An important research question is therefore to quantify to which degree environmental resources that impact on health and wellbeing are influenced by personality traits. Such data could help to set priorities and to define specific target areas, where benefits from personality-centred interventions are most likely to be expected.

Despite some promising evidence stating that personality traits are crucial for human health and wellbeing, they have not been considered a major target in preventive medicine yet [29,44]. That is, personality traits are mainly overlooked in health research and practise, although strong and convincing cases for their public health significance have been made [12,25,41]. Arguably the concept of personality is unfamiliar to many health experts with biomedical orientation. One purported argument against the inclusion of personality is for instance the widely held misbelief that personality traits are mostly immutable. However, there is a compelling body of evidence that personality traits and disorders can be treated effectively [9,73,78]; with both psychological [8] and pharmacological interventions [67]. Another reason for the neglect of personality variation in public health and preventive medicine could be that a thorough and comprehensive assessment of personality is time-consuming and therefore no option for most health practitioners with tight time schedules. It is thus necessary to validate short self-report instruments for their application in the field, as health policy and practise could certainly benefit from a delineation of vulnerable at-risk populations based on specific personality characteristics [25]. For instance, primary prevention could specifically target the increased risk of substance abuse in persons scoring low on conscientiousness [12], while secondary prevention and therapeutic interventions could be aimed at maladaptive neuroticism to prevent relapses and chronicisation of depression [41].

The major objective of this work was thus to explore, whether a short 15-item self-report personality questionnaire could inform public health policy and practise. Specifically, we wanted to determine the relevance of personality by evaluating whether personality traits would relate to a broad range of important living conditions, environmental resources and health outcomes. In order to validate our cross-sectional epidemiologic findings we additionally included laboratory measures and conducted a longitudinal study of the prospective impact of personality traits on the repeated assessments of subsequent global psychopathological distress and vegetative symptoms.

## 2. Methods

### 2.1. Study design and sampling

This study was conducted with data from the Epidemiology Survey of the Zurich Programme for Sustainable Development of Mental Health Services (ZInEP; in German: “Zürcher Impulsprogramm zur nachhaltigen Entwicklung der Psychiatrie”) [1], a research and health care programme involving several psychiatric research divisions and mental health services from the canton of Zurich, Switzerland. The Epidemiology Survey is one of various ZInEP subprojects and consists of four components: 1) a short telephone screening, 2) a comprehensive semi-structured face-to-face interview followed by self-report questionnaires, 3) tests in the socio-physiological laboratory, and 4) a longitudinal survey. For the present study we used comprehensive data from all four components. For a graphical illustration see Fig. 1. The telephone screening and semi-structured interviews started in August 2010, the tests at the socio-physiological laboratory in February 2011, and the longitudinal survey in April 2011. The screening ended in May 2012 and all other components in September 2012. Detailed information about the ZInEP Epidemiology Survey is provided elsewhere [1].

First, a total of 9829 Swiss males and females aged 20–41 years at the onset of the survey and considered representative of the general

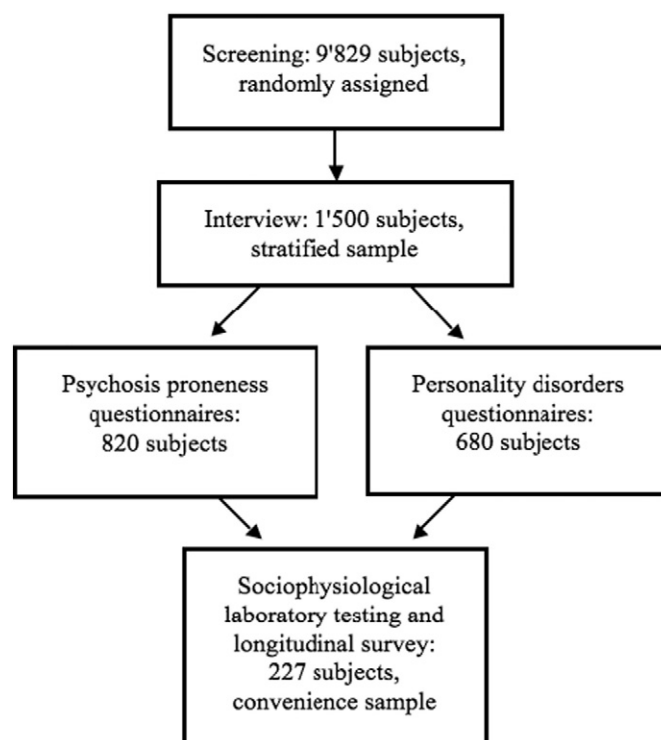


Fig. 1. The sampling procedure of the ZInEP Epidemiology Survey.

population of that age range in the canton of Zurich, Switzerland, were screened by computer assisted telephone interview (CATI) using the Symptom Checklist 27 (SCL-27) [23]. All participants were randomly chosen through the resident registration offices of all municipalities in the canton of Zurich. Residents without Swiss nationality were excluded from the survey. The CATI was conducted by GfK (Growth for Knowledge), a major market and field research institute, in accordance with instructions from the ZInEP research team. The overall response rate was 53.6%. Reasons for non-response were only telephone responder, incorrect telephone number, unavailability during the study period and refusal by a third person or the target person. In cases where potential subjects were available by telephone, the response rate was 73.9%. The discrepancy between overall and availability response rates is due to the fact that in Switzerland increasingly more young adults first, do not have an entry in a telephone number registry and second, do not respond to calls from a call centre.

Second, 1500 subjects were randomly selected from the initial screening sample for subsequent face-to-face interviews. We applied a stratified sampling procedure including 60% high-scorers (scoring above the 75th percentile of the global severity index of the SCL-27) and 40% low-scorers (scoring below the 75th percentile of the global severity index). The basic sampling design was adapted from the longitudinal Zurich cohort-study [5] and was chosen to enrich the sample with subjects at high-risk of mental disorders. Such a two-phase procedure with initial screening and subsequent interview with a stratified subsample is fairly common in epidemiological surveys [20]. Face-to-face interviews were conducted by experienced and extensively trained clinical psychologists. The interviews took place either at the participants' homes or at the University Hospital of Psychiatry in Zurich. Upon completion of the semi-structured interviews participants received a 20 CHF coupon for a Swiss hypermarket. All participants who completed the semi-structured interview were required to complete additional questionnaires. Complete personality assessments were obtained from 1155 persons (77% of the total sample).

Third, a convenience sample comprising 227 subjects was selected for the longitudinal survey based on the outcome on two scales of

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