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Original Article

Long-term personality changes and predictive adaptive responses after depressive episodes

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ABSTRACT

An external or internal "predictive adaptive response" (PAR) can be defined as an adaptive change in long-term behavior or development due to an environmental exposure that triggers it. A PAR can lead to differential development among initially similar individuals, and increase evolutionary fitness. Despite many theories and empirical observations of PAR-like changes in depressive tendencies, clear empirical findings on human personality changes following depressive symptoms are lacking, possibly because these changes take a long time to develop and most follow up studies have been short. Here we show that in sufficiently long (5- and 15-year) clinical and general-population follow ups, increases can be observed in the Temperament and Character Inventory's personality trait harm avoidance as a function of temporally accumulating major depressive episodes (132 depression patients from Vantaa Depression Study) and depressive symptoms (3105 participants from Young Finns general-population sample). Personality changes did not occur in the other six personality traits of the inventory, but did in a highly similar neuroticism trait from another inventory. Even when controlling for concurrent changes in depressive symptoms from the baseline to the endpoint, depressive symptoms that occurred during the follow-up period associated with harm-avoidance changes, rendering individuals more fearful and anticipating harm. This study provides consistent, specific, and plausible dose–response and temporal gradients between accumulated depressive episodes and personality change. Effect sizes were between small to moderate, though. Altogether, the findings support the feasibility of using existing systems of personality assessment (i.e., self-report questionnaires) to study PARs, despite the multiplicity of the systems.

1. Introduction

Differential environmental conditions could lead individuals to 'choose' a unique optimal developmental trajectory, producing stable developmental differences in behavior, that is, personality differences (Allport, 1937; Wolf, van Doorn, Leimar, & Weissing, 2007; Wolf, van Doorn, & Weissing, 2008). An external or internal "predictive adaptive response" (PAR) could be such a developmental trigger, but the issue of prevalence of PARs in humans lacks theoretical clarity (Del Giudice, 2014; Nettle, Frankenhuis, & Rickard, 2013), let alone empirical verification. Roughly, in an external PAR hypothesis, ones' surroundings provide a 'weather forecast' of circumstances to come, and the development is modified accordingly, whereas in an internal PAR the surroundings inflict a lasting impact on individual's somatic state (e.g., health) and the altered state requires compensating behavioral adjustments (Nettle et al., 2013). In principle, appropriate empirical evidence could put the matter to rest, but empirical studies are complicated by the fact that many validated measures of human personality are self-assessments that cannot be easily administered in early developmental periods, and there are several systems of assessment without a clear consensus on preference ordering (Grucza & Goldberg, 2007; John, Robins, & Pervin, 2008).

A 'brute force' approach to the issue would be to detect an adulthood PAR and simply show its impact on all, or at least several, major personality systems out there. Such an approach would also require a suitably common exposure that could feasibly trigger a PAR. Depressive disorder is common, functionally disabling (Bromet et al., 2011), and strongly associated with triggering stressful life events (Kendler, Karkowski, & Prescott, 1998) and somatic changes (Mykletun et al., 2007), thereby being relevant for both internal and external PARs. So relevant, that several theoretical works have studied the possible adaptive role of depression in evolution (Hagen, 1999; Nesse, 1991, 2000, 2009; Nettle, 2004; Rosenström, 2013). Furthermore, depression researchers have long been curious

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about the possibility of personality change due to depressive episodes. A specifically depression-predisposing change in personality has been called a personality "scar" in this literature (Wichers, Geschwind, van Os, & Peeters, 2010). Personality scarring has been interesting because it might help to explain many empirical results, such as the finding that first episode of depression is more likely to be preceded by major environmental stressors than the subsequent episodes (Monroe & Harkness, 2005; Stroud, Davila, & Moyer, 2008). Empirical studies have mostly failed to find lasting personality changes that follow depressive episodes, however (Jylhä, Melartin, Rytsälä, & Isometsä, 2009; Klein, Kotov, & Bufferd, 2011; Ormel, Oldehinkel, & Vollebergh, 2004; Wichers et al., 2010). Yet, we, and others (Wichers et al., 2010), argue that it is premature to abandon this possibility to demonstrate PARs in effect.

Instead of being caused by single episodes, scars may "develop gradually along the life cycle, proportionally to the severity and duration of the depressive symptoms experienced", and therefore it is critical to re-examine the issue of personality changes in a sufficiently long follow-up study with multiple temporal sampling points (Wichers et al., 2010). Indeed, in a recent study researchers fitted several statistical models of bivariate temporal development to traits from Emotionality–Activity–Sociability system of personality and a depressive symptoms scale assessed in a 15-year follow up, showing a reciprocal temporal interaction between negative emotionality and depression (Elovainio et al., 2015). That is, also the experienced depressive symptoms appeared to causally, or at least temporally (Hill, 1965), antecedent to the personality trait emotionality, not just other way around, suggesting personality scarring due to depression in a long-term follow up. We have previously studied long-term effects of personality on depression using different systems of personality assessment (Jylhä et al., 2009, 2011; Rosenström et al., 2014), but encouraged by the aforementioned results, we present here also a brute force analysis of personality scarring, or PARs (i.e., the opposite temporality), using two different personality systems and both clinical and general-population samples. Also, we now have followed longer the patients that previously led us to conclude a lack of scar-effects, and re-examine that inference (Jylhä et al., 2009).

The aim of this study was to assess if temporal accumulation of depressive or dysphoric episodes lead to changes, or scars, in personality traits using longitudinal data. In order to cover a sufficient time span for detecting changes in self-representation, we studied 5-year clinical follow-up data from the Vantaa Depression Study (VDS) (Holma, Holma, Melartin, Rytsälä, & Isometsä, 2008; Melartin et al., 2002) and a 15-year follow-up of general-population sample from Young Finns Study (YFS) (Raitakari et al., 2008). The aim was also to study consistency of findings across measures and clinical versus non-clinical populations. Whereas we previously found support for scarring using Buss's and Plomin's Emotionality–Activity–Sociability system of personality assessment (Buss, 1991; Elovainio et al., 2015), we now study also Cloninger's Psychobiological system of personality (Cloninger, Svrakic, & Przybeck, 1993; Cloninger, Przybeck, Svrakic, & Wetzel, 1994) and Eysenck's personality system (Eysenck & Eysenck, 1964), a predecessor of the well-known big five system of personality assessment (John, Naumann, & Soto, 2008). If all the personality systems and all the studied populations show consistent evidence for personality changes due to depressive episodes, that would constitute a strong argument for adulthood PARs. In contrast, if only sporadic and temporally ambiguous associations between baseline depression and personality change exist, that would suggest the lack of PAR-like causation between depressive episodes and commonly used measures of human personality (Hill, 1965).

2. Methods

2.1. Participants

2.1.1. Patients from Vantaa Depression Study (VDS)

Participants of the VDS were screened from all psychiatric patients aged 20–59 years who were inhabitants of the City of Vantaa in Finland (population 169 000 in 1997), and seeking treatment, receiving it, or referred to treatment in the Department of Psychiatry of the Helsinki University Central Hospital (former Peijas Medical Care District). Study inclusion criterion was Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV) defined major depressive disorder (MDD) with a new depressive episode (American Psychiatric Association, 1994). Patients provided information at the baseline in 1997, after 6 months, after 18 months, and after a five years' time from the baseline using a life-chart methodology (see Measures). Patients with bipolar spectrum, schizophrenia, and/or substance-induced mood disorders were excluded, as well as the patients who switched to other than MDD diagnosis during the five-year follow-up.

Originally, altogether 806 psychiatric patients were screened for depressive symptoms during an eighteen-month period. Of those 703 who had symptoms, 542 (77%) agreed to participate. They gave their written informed consents, and the study was approved by the ethics committee of the Healthcare District of Helsinki and Uusimaa. Then, a researcher using World Health Organization Schedules for Clinical Assessment in Neuropsychiatry diagnosed 269 patients out of the 542 as having DSM-IV defined MDD (judging from the 20 videotaped interviews, κ-coefficient for MDD was 0.86 and the observers agreed at 95% rate).

At the final follow up, a life chart of the entire five-year follow-up period was constructed individually for 142 patients by two interviewers, using all available medical and psychiatric records to complement the information. Finally, 132 patients provided the TCI at the final follow up. Further details of the sample can be found from previous publications (Holma et al., 2008; Melartin et al., 2002) and online supplement (available on the journal's Website at www.ehbonline.org). Examples of reasons for dropping out of the study are withdrawal of consent, or unreachable, dead, or living too far away subjects (Holma et al., 2008).

2.1.2. General-population sample from the Young Finns Study (YFS)

The YFS is an ongoing prospective study that began in 1980 (Raitakari et al., 2008). The original sample consists of 3596 healthy Finnish children and adolescents (1832 women, 1764 men) sampled from six birth cohorts with approximately equal frequency. In order to select a broadly sociodemographically representative sample, Finland was divided into five areas according to locations of university cities with a medical school. In each area, urban and rural boys and girls were randomly selected on the basis of their unique personal social security number. All participants gave written informed consent, and the study was approved by the local ethics committees. The sample has been followed subsequently in 8 data collection waves, but mainly data from the four latter waves (years 1997, 2001, 2008, and 2012) were used herein, as they contained relevant measures. Participants' ages were 20–35 at baseline, with the prospective follow-up period spanning 15 years.

Altogether 868 participants (301 men and 567 women) had provided complete data relevant for the analyses in the YFS data, but multiple-imputation methods made it possible to use information from 3105 participants (1432 men, 1673 women). Supplementary on-line material (available on the journal's Website at www.ehbonline.org) presents details of the imputation analysis, and also studies the sensitivity of the findings to the imputations.

2.2. Measures

2.2.1. Measures of depression

Depression can be conceptualized as a sum of severity-levels of depressive symptoms, or as a state of exceeding certain total severity or symptom count. The former way seems to be closer to natural reality (Haslam, Holland, & Kuppens, 2012), but the latter is more common in clinical practice and has the benefit of allowing one to compute the time an individual has spent in a disordered or dysphoric state. This study does not aim to solve what definition is best, but instead uses typical measures for both types of definitions and aims for conclusions that