



Original article

Is sensitivity to daily stress predictive of onset or persistence of psychopathology?



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ABSTRACT

Purpose: The aim of the current study was to replicate findings in adults indicating that higher sensitivity to stressful events is predictive of both onset and persistence of psychopathological symptoms in a sample of adolescents and young adults. In addition, we tested the hypothesis that sensitivity to mild stressors in particular is predictive of the developmental course of psychopathology.

Methods: We analyzed experience sampling and questionnaire data collected at baseline and one-year follow-up of 445 adolescent and young adult twins and non-twin siblings (age range: 15–34). Linear multilevel regression was used for the replication analyses. To test if affective sensitivity to mild stressors in particular was associated with follow-up symptoms, we used a categorical approach adding variables on affective sensitivity to mild, moderate and severe daily stressors to the model.

Results: Linear analyses showed that emotional stress reactivity was not associated with onset ($\beta = .02$; $P = .56$) or persistence ($\beta = -.01$; $P = .78$) of symptoms. There was a significant effect of baseline symptom score ($\beta = .53$; $P < .001$) and average negative affect (NA: $\beta = .19$; $P < .001$) on follow-up symptoms. Using the categorical approach, we found that affective sensitivity to mild ($\beta = .25$; $P < .001$), but not moderate ($\beta = -.03$; $P = .65$) or severe ($\beta = -.06$; $P = .42$), stressors was associated with symptom persistence one year later.

Discussion: We were unable to replicate previous findings relating stress sensitivity linearly to symptom onset or persistence in a younger sample. Whereas sensitivity to more severe stressors may reflect adaptive coping, high sensitivity to the mildest of daily stressors may indicate an increased risk for psychopathology.

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1. Introduction

Stress plays a major role in the aetiology and persistence of psychopathology [1–3]. It is hypothesised that stress impacts on

psychopathology through a process called stress sensitisation [4,5], according to which repeated exposure to stressors results in an increased response to stressors of the same intensity or a heightened response to stressors of lower intensity. These low intensity stressors, or daily hassles, as well as an individual's emotional reactivity to those stressors, have been studied using the experience sampling method (ESM) – a structured diary technique assessing momentary affect, behaviour and context in an individual's real life [6]. Using ESM, greater hypothalamus-pituitary-adrenal

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(HPA) responsivity to daily-life stressors has been associated with an increased genetic risk for psychosis [7]. Moreover, higher emotional reactivity to daily hassles has been linked to mood [8–10] and psychotic disorders [9,11–15]. However, this has mainly been found in cross-sectional studies. Two longitudinal studies found that high emotional reactivity to daily stressors is associated with the prospective risk of developing chronic physical health impairments in a general population sample [16] and increased mortality in elderly men [17]. With regard to psychopathology, two longitudinal studies have studied the effects of affective reactivity to stressors on symptoms. Wichers et al. [18] reported high emotional reactivity to daily stressors to be predictive of depression onset and general increase in affective symptoms in general population female twins. A second prospective study in the same sample linked higher emotional reactivity to daily events not to the onset, but to the persistence of psychotic symptoms [19], raising questions about the relationship between emotional stress reactivity and psychopathology. Is high emotional stress reactivity a marker of emerging psychopathology or rather a signal of risk for persistence or recurrence? Furthermore, the sample used in these two studies consisted of adult female twins. As the onset of psychopathology often occurs early in life during the critical period of adolescence [20], it may be more relevant to study the relationship between emotional stress reactivity and psychopathology in a sample of both male and female adolescents and young adults.

Emotional reactivity to daily stressors in ESM is typically measured as the linear association between stressor intensity and negative affect [14], assuming that an increased association between stressor intensity and negative affect across all levels of stress reflects hyperreactivity. However, this may not always be the case. In mood disorders, the kindling hypothesis [21] describes how, especially in vulnerable individuals, sensitisation to stressors of smaller magnitude may trigger depressive symptoms. In a healthy population, a hypersensitised stress system may be more reflected in a relatively strong response to milder daily stressors in particular, whereas a strong affective response to more unpleasant or stressful circumstances may actually be adaptive. However, no prospective study to date has investigated whether sensitisation reflected in stronger responses to smaller stressors in particular is a better predictor of developmental course of psychopathological symptoms.

In the current study, we investigate the effect of increased emotional reactivity to stressful daily events as measured with ESM on the development of psychopathological symptoms one year later using a prospective design in a general population sample of adolescents and young adults using both a linear and a non-linear, categorical approach to stress sensitisation. We hypothesised that:

- increased emotional reactivity to daily stressors using a linear approach is associated with future symptoms, replicating the results of Wichers et al. [18];
- emotional stress reactivity is particularly predictive of future symptoms in individuals with higher levels of symptoms at baseline (i.e. symptom persistence);
- using a categorical approach, the predictive value of emotional stress reactivity depends on the stress severity level, where reactivity to milder stressors is more strongly associated with future symptoms than reactivity to stressors of larger magnitude.

2. Methods

2.1. Participants

Participants were recruited as part of the TwinssCan study, an ongoing longitudinal adolescent/young adult twin study.

Individuals were recruited through a population based twin register (East Flanders Prospective Twin Survey, EFPTS [22]), which prospectively registers multiple births from 1964 onwards. In order to oversample adolescent participants, twins between 15 and 18 years of age were sent letters inviting them to participate. Additionally, all twins and their (non-twin) siblings between 15 and 34 years were eligible to participate and could register via the twin register newsletter. Approval from the local Ethics Committee (Commissie Medische Ethiek van de Universitaire ziekenhuizen KU Leuven, No. B32220107766) was obtained. Participants provided written informed consent before study inclusion. If participants were younger than 18 years, parents provided additional written informed consent. Participants were assessed using online questionnaires at baseline (T0) and one year later at follow-up (T1).

2.2. Experience sampling method

ESM is a well-validated structured diary technique that assesses individual and contextual measures in the current moment, throughout the day on six consecutive days [6,23–25]. During the assessment period, participants are prompted to fill out a brief questionnaire assessing their current mood, thoughts, context and their appraisal of the context, at a frequency of 10 times a day at an unpredictable moment in each of ten 90-minute time blocks between 7:30 and 22:30. For the current study, participants received a digital device that allowed them to fill out the questionnaires electronically. Participants who completed less than 30% of the ESM questionnaires were excluded for analyses [26].

Negative affect (NA) was calculated using a weighted mean score of ESM items “I feel insecure”, “I feel anxious”, “I feel down”, “I feel guilty” and “I feel lonely”, each rated on a 7-point Likert scale (1 = not at all; 7 = very). Cronbach's Alpha for these items was .74. For the stressor assessment, participants were asked to think about the most important event that happened since the previous report and then report “How pleasant was this event?” (–3: very unpleasant; 3: very pleasant). If the event was rated lower than 0 (i.e. unpleasant events) the event was considered stressful; all scores higher than 0 (i.e. pleasant events) were recoded to 0. Emotional stress reactivity was calculated per person as the within-person average effect size of event unpleasantness on NA [18]. For the categorical analyses, we calculated separate emotional stress reactivity scores as the effect size of mild– (i.e. event pleasantness: –1), moderate– (i.e. event pleasantness: –2) and severe– (i.e. event pleasantness: –3) stressors on NA, each compared to neutral events (score 0).

2.3. Symptoms

The Symptom CheckList 90 (SCL-90) [27] was used to assess symptoms indicative of psychopathology. The SCL-90 is a 90-item self-report questionnaire assessing the extent to which an individual was bothered by psychopathological symptoms during the last week on a 4-point Likert scale, ranging from “not at all” to “extremely”. Internal consistency was high at both T0 ($\alpha = .97$) and T1 ($\alpha = .97$). Affective symptoms were constructed using the weighted mean of the depression and anxiety subscales (26 items; $\alpha = .93$ at T0; $\alpha = .93$ at T1; see Wichers et al., 2009) [18]. As Collip et al. [19] used a measure of overall psychotic experiences, and we had no hypotheses involving specific psychotic symptom clusters, we assessed psychotic symptoms using the weighted mean of both the paranoid ideation and psychoticism symptom subscales (16 items; $\alpha = .87$ at T0; $\alpha = .084$ at T1). Both scales correlate strongly with the schizophrenia subscale of the Comprehensive Psychopathological Rating Scale [28,29].

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