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Recovery from daily-life stressors in early and chronic psychosis

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ABSTRACT

Initial affective and psychotic reactivity to daily stressors is altered in psychosis, and most notably in early psychosis. In addition to altered initial stress reactivity, results from studies using Experience Sampling Methodology (ESM) and psychophysiological measures indicate that impaired recovery from mild stressors may also be a risk factor for mental illness.

The current ESM study investigated affective recovery from daily stressors in chronic psychosis patients (CP; n = 162), individuals at early stages of psychosis (EP; n = 127), and healthy volunteers (HV; n = 220) assessing fluctuations in negative affect (NA), tension, and suspiciousness ten times a day on six consecutive days. Recovery was operationalized for all three variables as the return to baseline (i.e., level at t_{-1}) following the first stressful event of a day (i.e., t_0).

The EP group showed a delayed recovery of NA (t_1-t_3: B = 0.185; p = .007 and B = 0.228; p = .002) and suspiciousness (t_1: B = 0.223; p = .010 and B = 0.291; p = .002) compared to HV and CP, respectively. Delayed recovery was detected for tension as well (t_1-t_2: EP > HV: B = 0.242; p = .040 and EP > CP: B = 0.284; p = .023), but contrary to both other momentary states, this effect disappeared when controlling for subsequent stressful events. There were no significant differences in recovery between HV and CP.

These results suggest that in EP, stressful daily events have longer-lasting effects on overall negative affect and subclinical psychotic-like experiences. Future studies should incorporate physiological and endocrine measures in order to integrate recovery patterns of the different stress systems.

1. Introduction

Stress sensitivity has been proposed as an important mechanism in the development of psychosis (Collip et al., 2008; Myin-Germeys and van Os, 2007; van Winkel et al., 2008). However, how stress impacts mental health remains unclear. It is thought that repeated or chronic exposure to stressors may result in a progressively greater response to future stressors, a concept referred to as sensitization, thereby putting an individual at risk for psychosis (Collip et al., 2008). In line with this theory, Experience Sampling Methodology (ESM) studies investigating reactivity to minor daily hassles have shown that patients diagnosed with a psychotic disorder show an increased affective response to these stressors when compared to individuals without psychosis

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(Myin-Germeys et al., 2001). Moreover, a recent network analysis showed that daily stressors precede psychotic-like experiences in chronic patients, revealing the putative link between stress and psychotic illness (Klippel et al., 2018). Several ESM studies indicated that stress sensitivity is increased in those at risk for psychosis and those in the early stages of psychotic illness (Palmier-Claus et al., 2012; Reininghaus et al., 2016; van der Steen et al., 2017), further implicating stress is in the development of psychosis. These individuals, at risk for or at early stages in the course of psychosis, even show increased stress sensitivity compared to chronic psychosis patients (Palmier-Claus et al., 2012; Reininghaus et al., 2016; van der Steen et al., 2017). This is in line with the stress sensitization hypothesis, posing that exposure to environmental stressors may facilitate the onset of psychosis (Collip et al., 2008). Higher overall negative affect ratings consistently reported in individuals across the psychosis continuum are likely to reflect presence of chronic stressors that individuals experience. The early stages of mental illness often comprise a very stressful period, where stress and the emergence of psychiatric symptoms reinforce each other. In these stages, the association between psychotic symptoms and momentary distress is much stronger than in later stages of psychotic illness (van der Steen et al., 2017). Therefore, a closer examination of the role of stressful daily experiences in early psychosis may provide insight in how these experiences relate to development of psychosis.

Although there is much research on initial reactivity to stress, no study to date has investigated recovery from daily stressors in psychosis. Here, recovery refers to the process in which a system returns to some baseline level following an acute response, thereby reinstating homeostasis. From a psychophysiological perspective, there is evidence of altered baseline autonomous nervous system (ANS) activity in psychosis (Clamor et al., 2016), which may influence the ability to recover from stress. While initial cardiovascular reactivity to stressors may be unaltered across the psychosis continuum (Brenner et al., 2009; Jansen et al., 2000; Lincoln et al., 2015; van Venrooij et al., 2012), there is some evidence suggesting a delayed recovery in terms of heart rate in frank psychosis (Andersen et al., 2018) and those at elevated risk for psychosis (Weintraub et al., 2019). Moreover, decreased responsiveness of the parasympathetic nervous system may result in impaired recovery from stress in psychosis patients (Castro et al., 2008; Montaquila et al., 2015); a similar effect was found in individuals at familial risk for psychosis (Castro et al., 2009). However, no study to date directly compared recovery between individuals at early stages of psychosis and those with chronic psychosis. Cortisol release in response to stress – an important hormone for stress and recovery – appears altered in psychosis as well (Borges et al., 2013; Pruessner et al., 2017; Zorn et al., 2017), and this effect has also been observed in response to daily hassles in an ESM study (Vaessen et al., 2018). Excessive baseline cortisol release, for instance due to chronic stress, may affect brain dopamine function (Walker et al., 2008), which is perturbed in psychosis and plays a major role in the development of psychotic symptoms. Disrupted dopaminergic function in psychosis (Schifani et al., 2018) may in turn result in a decreased cortisol response to stress. According to the coherence/compensation model (Andrews et al., 2013), the increase in peripheral cortisol following acute stress serves to return physiological and affective responses to baseline. A decreased cortisol response due to chronically increased baseline levels, then, would result in impaired recovery of the other systems. In sum, these findings provide an account of impaired biological stress recovery in psychosis. No study to date, however, has investigated the process of affective recovery from stressors in psychosis.

ESM is an exceptionally well-suited technique to map the temporal course of stress recovery, providing a series of snapshots throughout the day in a naturalistic setting. Recovery, then, can be measured in time following the occurrence of a stressor. Using ESM, recovery analyses have been done in the context of positive affect fluctuations in response to physical activity (Wichers et al., 2012) and reward (Heininga et al., 2019). Yet, no studies to date have identified the pattern of affective recovery in individuals across the psychosis continuum, outlining how they cope with stressful daily situations.

The current study aimed to investigate affective recovery in healthy volunteers (HV) and individuals with psychosis, in response to naturally occurring stressors in everyday life. Furthermore, considering the differences between those at risk for or with first-episode psychosis and chronic psychosis patients (CP) in affective stress reactivity, we aimed to investigate if these differences are apparent in the recovery process as well. From a symptom- or stress-related perspective, the distinction between a clinical high-risk state for psychosis and the diagnosis of first-episode psychosis (FEP) is ultimately arbitrary. As stress may play a different role in the early stages of psychosis compared to chronic psychosis, we aimed to investigate a sample that consisted of both individuals at clinical high-risk for psychosis and FEP patients; a group that will henceforth be referred to as those at early stages of psychosis (EP). We were particularly interested in the temporal course of affect and psychotic-like experiences following a stressful daily event, and tested whether there were group differences in the time course of recovery. More specific, we hypothesized that i) EP and CP would have increased baseline levels of NA, tension, and symptoms compared to HV; ii) EP and CP would show increased initial reactivity to the first stressor of the day on all variables compared to HV, while EP would show increased reactivity compared to CP; and iii) based on findings of impaired physiological recovery, EP and CP would show impaired affective and symptomatic recovery from this stressful event compared to HV, as reflected in a longer time period before baseline levels are reached.

2. Materials and methods

2.1. Participants

We used previously collected data from six ESM studies in samples along the psychosis continuum (NARSAD, MAPS, EUGEI, STRIP1, STRIP2, iTHINK; Lataster et al., 2013; Myin-Germeys et al., 2001; Reininghaus et al., 2016; Vaessen et al., 2018; Hermans et al., submitted). Together, these studies provided a dataset of 590 participants, 257 of which were healthy volunteers HV, 141 of which were categorized as EP, and 192 of which were CP. The EP status was determined using either the Comprehensive Assessment of At-Risk Mental State (Yung et al., 1998; Yung et al., 2005) or the Schizophrenia Prediction Instrument, Adult version (Schultze-Lutter et al., 2007). For CP, diagnoses were based on either OPCRIT criteria (McGuffin et al., 1991), Community Assessment of Symptoms and History (Andreasen et al., 1992), or Research Diagnostic Criteria (Taylor et al., 1975). All studies were carried out in accord with the guidelines of the local ethical committee. All participants provided informed consent.

2.2. Procedure

2.2.1. Experience sampling

ESM is a structured diary technique that requires participants to fill out a short questionnaire on their momentary mood, context, and behavior, several times during a day. Three of the studies included used paper and pencil diaries for data collection (MACS, NARSAD, STRIP-1); the other three studies used a dedicated electronic device (STRIP-2, iThink, EUGEI). In all studies, participants were prompted to complete the questionnaire at ten semi-random moments per day between 7:30 AM and 10:30 PM, for six consecutive days. Each day was divided in ten 90-minute blocks, and