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RESEARCH ARTICLE

How mood is affected by environment and upsetting events: The moderating role of psychological flexibility

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ABSTRACT
Objective: Patients suffering from psychological disorders report decreased quality of life and low mood. The relationship of these symptoms to daily upsetting events or environments, and in the context of active coping mechanisms is poorly understood. The present study thus investigates the association between mood, psychological flexibility, upsetting events, and environment in the daily life of outpatients.
Method: We investigated 80 outpatients at the beginning of treatment, using event sampling methodology (ESM). Patients' mood, occurrence of upsetting events, current environment, and psychological flexibility were sampled six times per day during a one-week intensive longitudinal examination. Data were analyzed using linear mixed models (LMMs).
Results: Participants reported worse mood the more upsetting events they experienced. Further, participants reported better mood when in private environments (e.g., with friends), and worse mood when at the hospital, compared to being at home. Higher levels of psychological flexibility, however, were associated with better mood, irrespective of the occurrence of upsetting events or current environment.
Conclusion: Results suggest that mood is positively associated with psychological flexibility, not despite, but especially during the dynamic and context-specific challenges of daily life. Psychological flexibility may thus potentially act as a buffer against distress-provoking situations as patients go about their daily lives.
Trial registration: ISRCTN.org identifier: ISRCTN11209732.

Keywords: mood; event sampling methodology (ESM); psychological flexibility; physical environment; daily life; meaningful life

Clinical or methodological significance of this article: This study contributes new insights into the mood of transdiagnostic outpatients and its associations with upsetting events, current environment, and psychological flexibility, by using event sampling methodology (ESM) to collect data in patients' daily life outside of the therapy room. Mood was lower when patients were at the hospital or the more upsetting events they experienced, while mood was higher when in private environments (e.g., with friends) and the higher the level of psychological flexibility, irrespective of occurrence of upsetting events or current environment. Results suggest a potential role for psychological flexibility as a potential buffer during challenges of daily life and especially in clinical work: This study suggests that improving the skill of psychological flexibility gives patients the opportunity to react to changes in their daily life in an independent and flexible manner across contexts. Psychological flexibility skills can be practiced during therapy sessions and patients can utilize these skills as they go about living their lives.

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Introduction

Contextual Factors of Mood

Some daily experiences have been associated with negative mood, for instance when we ruminate (Genet & Siemer, 2012), when interpersonal tensions arise (Almeida et al., 2002; Meier et al., 2013; van Winkel et al., 2015), or when we think about events that upset us (Bell-Pringle et al., 2004). Relationship conflict in the work place has been positively associated with angry mood, even spilling over into the evening (Meier et al., 2013). Higher depressive mood was linked to being engaged with work in young adults (Yim & Kwon, 2021) and negative events happening at work were negatively associated with mood of employees, even overriding effects of positive events (Miner et al., 2005). Other daily experiences are associated with positive mood, for instance when we experience face-to-face social interactions during work breaks (Watanabe et al., 2016) or in the past hours in general (Villanueva et al., 2019). There are indications that mood responds to various environmental factors (Kondo et al., 2020) such as increased mood when one is exposed to nature (Glasgow et al., 2019; Kondo et al., 2020; Li et al., 2018; Neill et al., 2019). On the other hand, the environment of transport (i.e., work-related vs leisure-related) was found to make no difference regarding mood (Glasgow et al., 2019).

These insights suggest a potential role for physical environments and specific daily experiences such as the occurrence of upsetting events in the web of factors impacting our mood. Research documenting these associations were established over varying time frames and range from roughly every 90 min (Hiekkaranta et al., 2021; Myin-Germeys et al., 2003; van Winkel et al., 2015), to "before the age of 18" (Bell-Pringle et al., 2004). However, research on state-based associations with short timeframes and repeated measures is necessary, as such studies are less reliant on the biases inherent in retrospective recall (Rinner et al., 2019) and may be particularly suited to reveal potential interventions relating to mood. This is especially relevant for patients suffering from psychological disorders, as the DSM stipulates that symptoms must cause a clinically significant impairment in functioning – which is imbedded in daily life (American Psychiatric Association, 2000). Further investigation of potential implications for symptoms and thus for the functioning in daily life is merited (Pemberton & Fuller Tyszkiewicz, 2016).

Event Sampling Methodology (ESM)

The investigation of patients' daily life while considering their ongoing experiences and naturally occurring environment requires data collection in participants' daily natural environment. ESM is the gold standard for assessing dynamic moods, thoughts, symptoms, environmental and contextual factors, as measured repeatedly and in an ecologically and externally valid manner. Usage of ESM-based data collection also reduces the effect of the memory-experience gap (Gloster et al., 2008; Myin-Germeys et al., 2018; Rinner et al., 2019).

Psychological Flexibility

Psychological flexibility describes the ability to respond to situations in ways that facilitate the pursuit of valued goals (Doorley et al., 2020; Gloster et al., 2020; Kashdan et al., 2020) and is important in dealing with challenging and distress-provoking situations in daily life (Kashdan & Rottenberg, 2010; Levin et al., 2019). One therapy that aims to promote psychological flexibility is acceptance and commitment therapy (ACT). Psychological flexibility, as a collection of trainable skills, can potentially be supportive in adapting to various situations relating to mood: Earlier studies using ESM found a positive association between psychological flexibility and well-being, healthy experiences when pursuing goals, and the use of helpful regulatory strategies in the context of stressful life events (Kashdan et al., 2020). Tailored coaching of psychological flexibility skills was associated with improvement in distress, positive mental health, and social functioning, compared to non-tailored coaching and no coaching at all (Levin et al., 2019). Further, it has been suggested that psychological flexibility buffers the relationship between stress and social interactions (Gloster et al., 2021). The relationship between psychological flexibility and mood in patients' daily life, however, remains open.

Aim and Hypotheses

The aim of this paper was to investigate the association between mood, psychological flexibility, upsetting events, and environment in the daily life of patients. The following hypotheses are deliberately non-directional, as the literature was partly contradictory.

We hypothesized the following: First, mood will differ depending on the occurrence of upsetting events. Second, the relationship between mood and occurrence of upsetting events will differ, associated with the level of psychological flexibility in the previous three hours. Third, mood will differ depending on the current environment. Fourth, the relationship between mood and current environment will differ,

associated with the level of psychological flexibility in the previous three hours.

Method

Participants

Participants (*n* = 92) were recruited from an outpatient clinic from ongoing intake procedures. If a participant responded to fewer than 50% of smartphone reminders during the ESM week, they were excluded due to the missing data. Thus, 12 participants dropped out of the study, leaving 80 participants in the study. The mean age of those remaining 80 participants was 35.78 years (*SD* = 12.94, range: 18–64 years), and 59% of the participants were female. Participants included in the current study represent a subset of patients recruited for a larger study (Villanueva et al., 2019). Inclusion criteria were: minimum 18 years of age, ability to speak German sufficiently, present for therapy and ability to attend sessions, and signing an informed consent statement. Exclusion criteria included: acute suicidal intent, acute substance dependency, active mania, previous experience with ACT, and inability to read or complete assessments. Otherwise, all diagnoses were eligible. When necessary, medication was optimized on starting treatment and, if possible, held constant throughout the treatment, as determined by the attending physician (Villanueva et al., 2019). 80.7% of the patients suffered from a primary anxiety-, adjustment- or somatoform-related disorder (phobia, OCD, adjustment disorder, somatoform disorder), 15.9% from an affective disorder (depressive episode, major depressive disorder, or persistent mood disorder), and 3.30% suffered from other disorders (related to alcohol, impulse control, or ADHD). Participants were financially compensated with up to 41 CHF for taking part in the ESM portion of the larger study (Villanueva et al., 2019).

Design and Procedure

The present study reports on a seven-day phase of Event Sampling Methodology (ESM) at the beginning of treatment. During the ESM-phase, participants carried a study-issued smartphone, which they received after completing informed consent procedures and study entry assessments. For more details on the procedure, please see (Villanueva et al., 2019).

Event Sampling Methodology (ESM)

An ecologically and externally valid examination of patients necessitates data collection in participants' daily natural environment. ESM is the gold standard for assessing dynamic moods, thoughts, symptoms, environmental and contextual factors. Usage of ESM-based data collection also reduces the effect of the memory-experience gap (Gloster et al., 2008; Myin-Germeys et al., 2018; Rinner et al., 2019). In light of the partly contradictory literature and in the increasing use of mobile technology in ambulatory assessments (Verster et al., 2021), we chose the ESM approach to extend conceptual understanding. As one week represents the average time between therapy sessions for outpatients and to balance between sensitively timed data collection and patient burden, signal-contingent reminders were defined at six times a day for one week. Reminders were adjusted to participants' usual bedtime, as to not interfere in participants' circadian rhythm, while enabling data collection approximately every three hours during participants' waking time.

Before starting the seven-day data collection using ESM study personnel met with the participants and explained the procedure. One questionnaire was completed together with the patients to ensure that potential questions during filling out the assessment were addressed. As the ESM phase started during the first week of therapy participants already had basic knowledge about specific concepts such as psychological flexibility, values etc., from the intake procedures. However, if patients were unsure about the meaning of specific concepts, the study personnel explained them. Data collection was performed through a mobile application.

Assessment

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID, Wittchen et al., 1997), which has moderate to excellent values for reliability and validity (DeFife & Westen, 2012; Lobbestael et al., 2011), was completed by all participants. Diagnoses were rated on the Anxiety Disorders Interview Schedule (ADIS) severity rating scale (Brown et al., 1994), and the primary diagnosis was defined as the diagnosis with the highest severity score. Data collection was made signal-contingent and occurred six times a day, or roughly every three hours (e.g., 8am, 11am, 2pm, 5pm, 8pm, and 11pm). ESM data collection was modified depending on individual daily parameters (e.g., waking time of participants, fixed breaks at work etc.).

Participants answered questions about multiple aspects of their emotions and current environment at the moment of filling out the questionnaire: First, they were asked about their *current physical environment* ("Where are you right now?"), and asked to assign it to one of the following six categories

(single choice format): "Home", "Private (e.g. at friends')", "Work/educational institution", "Public place", "Nature", "Hospital" (including the clinic of their ongoing psychotherapeutic treatment), "Other" (this option included a text entry option, so that participants could freely describe where they currently were). Second, they were asked about their *current mood* ("How would you evaluate your current mood?") and asked to assign it to one of the following six categories (single choice format): "Very bad", "Bad", "Rather bad", "Rather good", "Good", "Very good".

Further, participants were asked about their experiences in the past three hours. First, they were asked about *upsetting situations in the past three hours* ("In the past three hours, did you experience an upsetting situation?") and asked to categorize it into one of the following six categories (single choice format): "None", "Very few", "Few", "A couple", "Many", "Very many". The use of single-item assessments has been shown to be similarly suitable to assess constructs, compared to multi-item subscales. This is especially true, as concise ways of assessments are preferred with the increasing use of mobile technology in ambulatory assessments (Verster et al., 2021). Based on these insights and to keep the burden on the participants as low as possible, mood and upsetting situations were assessed using a single item. Second, they were asked about their state *psychological flexibility in the past three hours*. To measure psychological flexibility, we used the Psy-Flex, a short self-report measure which covers all aspects of psychological flexibility (Gloster et al., 2021). In the scope of this paper, we measure psychological flexibility as understood in ACT: The tendency or ability to respond to situations in ways that facilitate the pursuit of valued goals (Doorley et al., 2020; Gloster et al., 2020; Hayes et al., 2012, 2004; Hulbert-Williams et al., 2015; Karekla et al., 2004). The items of the Psy-Flex were adapted in the current study to fit the time frame of the past three hours. Items refer to being present, being open for experiences, leaving thoughts be, steady self, awareness of one's own values, and being engaged. Patients were asked to rate each item on a scale from 0 (not at all) to 100 (very much). The exact wording of the items and their response scales are presented in a table in Appendix A.

Statistical Analysis

The data collected in this study using ESM consists of repeated measures with interdependent observations of data, nested within individuals. In consideration of the structure of the data, Linear Mixed Models (LMMs) were implemented, as the standard way of analyzing ESM data (Kleiman, 2017), with mood as the outcome variable for all hypotheses. For Hypothesis 1 (i.e., mood would differ depending on the occurrence of upsetting events being experienced), occurrence of upsetting events served as predictor, while for Hypothesis 2 (the relationship between mood and occurrence of upsetting events would differ, depending on the level of psychological flexibility), occurrence of upsetting events and psychological flexibility (centered) were the predictors. The category "None" (occurrence of upsetting events) was used as the reference group for Hypothesis 1 and 2. For Hypothesis 3 (i.e., mood would differ depending on the current environment), current environment served as predictor, while for Hypothesis 4 (i.e., the relationship between mood and current environment would differ, depending on the level of psychological flexibility), current environment and psychological flexibility (centered) were the predictors. The category "Home" (current environment) was the reference group for Hypothesis 3 and 4. LMMs contained a random intercept to account for the dependency among repeated measures. For each analysis, data were excluded if the participant responded to fewer than 50% of smartphone reminders during the ESM week. 12 participants dropped out of the study due to responding to fewer than 50% of reminders, therefore leaving 80 participants in the study. For all analyses which include psychological flexibility, an average score was calculated before centering, in consistency with (Gloster et al., 2021).

Results

Overall, participants in this study responded to 97.86% (n = 2234) of queried assessments. For Hypothesis 1 we investigated the relationship between mood and the occurrence of upsetting events experienced. Participants reported significantly worse mood, the more upsetting events were experienced (None vs. Very few: $\beta = -0.14$, SE = 0.05, $p = .002$; None vs. Few: $\beta = -0.46$, SE = 0.06, $p < .001$; None vs. A couple: $\beta = -0.75$, SE = 0.07, $p < .001$; None vs. Many: $\beta = -1.29$, SE = 0.10, $p < .001$; None vs. Very many: $\beta = -1.57$, SE = 0.15, $p < .001$).

Results for Hypothesis 2 indicated a positive interaction between psychological flexibility and the category "Many" (upsetting events) ($\beta = 0.020$, SE = 0.007, $p = .002$) but not with any of the other categories (None vs. Very few: $\beta = -0.003$, SE = 0.004, $p = .41$; None vs. Few: $\beta = -0.006$, SE =

Table 1. Differences in mood as a function of the occurrence of upsetting events, and their interactions with psychological flexibility.

	Predictors	Outcome	
		Mood	
	Upsetting events, psychological flexibility	β (*SE*)	*p*
Hypothesis 1	Very few	−0.14 (0.05)	**.002****
	Few	−0.46 (0.06)	**< .001*****
	A couple	−0.75 (0.07)	**< .001*****
	Many	−1.29 (0.10)	**< .001*****
	Very many	−1.57 (0.15)	**< .001*****
Hypothesis 2	Psychological flexibility	0.291 (0.002)	**< .001*****
	Very few x psychological flexibility	−0.003 (0.004)	.41
	Few x psychological flexibility	−0.006 (0.004)	.18
	A couple x psychological flexibility	−0.002 (0.005)	.73
	Many x psychological flexibility	0.020 (0.007)	**.002****
	Very many x psychological flexibility	−0.012 (0.007)	.11

Note: Hypothesis 1: Mood will differ depending on the occurrence of upsetting events; Hypothesis 2: The relationship between mood and occurrence of upsetting events will differ, depending on the level of psychological flexibility; "None" was the reference group for all analyses involving the occurrence of upsetting events; β: Beta coefficient; SE: Standard error; β and SEs refer to linear mixed model results. *p*-values in bold writing indicate significant results. *p < .05. **p < .01. ***p < .001.

0.004, p = .18; None vs. A couple: β = −0.002, SE = 0.005, p = .73; None vs. Very many: β = −0.012, SE = 0.007, p = .11). Further, higher psychological flexibility was associated with better mood (β = 0.291, SE = 0.002, p < .001), irrespective of the occurrence of upsetting events (Table 1 and Figure 1).

For Hypothesis 3 we investigated the relationship between mood and current environment. Results indicated that participants reported significantly better mood when they were at a "Private" environment (e.g., at friends') (β = 0.26, SE = 0.08, p = .001) and when they were at "Other" environment (β = 0.29, SE = 0.09, p = .002), compared to when at "Home". Participants were asked to describe their current environment in more detail if they chose the option "Other". Of those, cases were re-coded by hand where clearly indicated (e.g., "Name of the clinic" was recoded as "Hospital"). There were 47 cases left which presented something unidentifiable (e.g., ".", or "?") or unclear environments which either did not fit any category or could belong to more than one category (e.g., "on the road", "practicing room"). Participants further reported significantly worse mood when they were at the "Hospital" (β = −0.40, SE = 0.20, p = .049), which included the clinic of their current psychotherapeutic treatment.

Results for Hypothesis 4 indicated that a positive interaction between psychological flexibility and the category "Hospital" (current environment) (β = 0.030, SE = 0.015, p = .04) but not with any of the other categories (Home vs. Private: β = −0.005, SE = 0.006, p = .36; Home vs. Work: β = −0.001, SE = 0.004, p = .80; Home vs. Public place: β = −0.004, SE = 0.004, p = .33; Home vs. Nature: β = 0.008, SE = 0.012, p = .52; Home vs. Other: β = −0.015, SE = 0.006, p = .07). Further, higher psychological flexibility was associated with better mood (β = 0.034, SE = 0.001, p < .001), irrespective of the current environment (Table 2 and Figure 2).

Discussion

The present study investigated how mood varies as a function of one's environment, upsetting events, and one's emotional response style (i.e., psychological flexibility) in a sample of transdiagnostic outpatients. We examined the association between mood and both the occurrence of upsetting events and one's current environment – and examined how psychological flexibility interacts with these factors. There were four main findings: First, as expected, participants reported worse mood, the more upsetting situations they experienced. Second, psychological flexibility and mood were positively associated, irrespective of the occurrence of upsetting situations. Third, mood differed depending on participants' current environment: Participants reported better mood when they were at a "Private" environment (e.g., at friends'), and worse mood when they were at the hospital, compared to being at home. Fourth, psychological flexibility and mood were positively associated, irrespective of the current environment. It can thus be considered a moderator in the relationship between upsetting events and mood, as well as between current environment and mood.
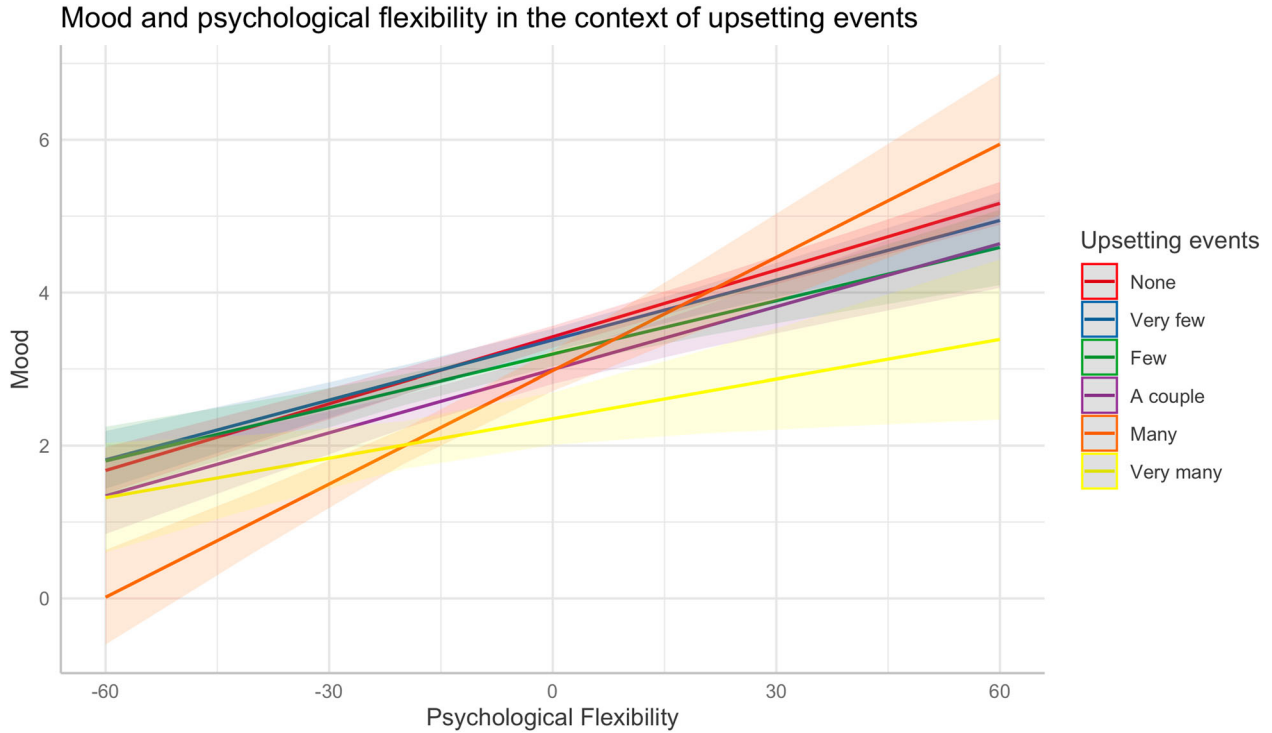
Mood and psychological flexibility in the context of upsetting events

Figure 1. Association between psychological flexibility and mood across different occurrence rates of upsetting events.

Mood, Upsetting Events, and Current Environment

The negative relationship between mood and number of upsetting events is in line with earlier research pointing to a negative relationship between mood and stressful negative events (Almeida et al., 2002; Bell-Pringle et al., 2004; Meier et al., 2013; Pemberton & Fuller Tyszkiewicz, 2016; van Winkel

Mood and psychological flexibility in the context of the current environment
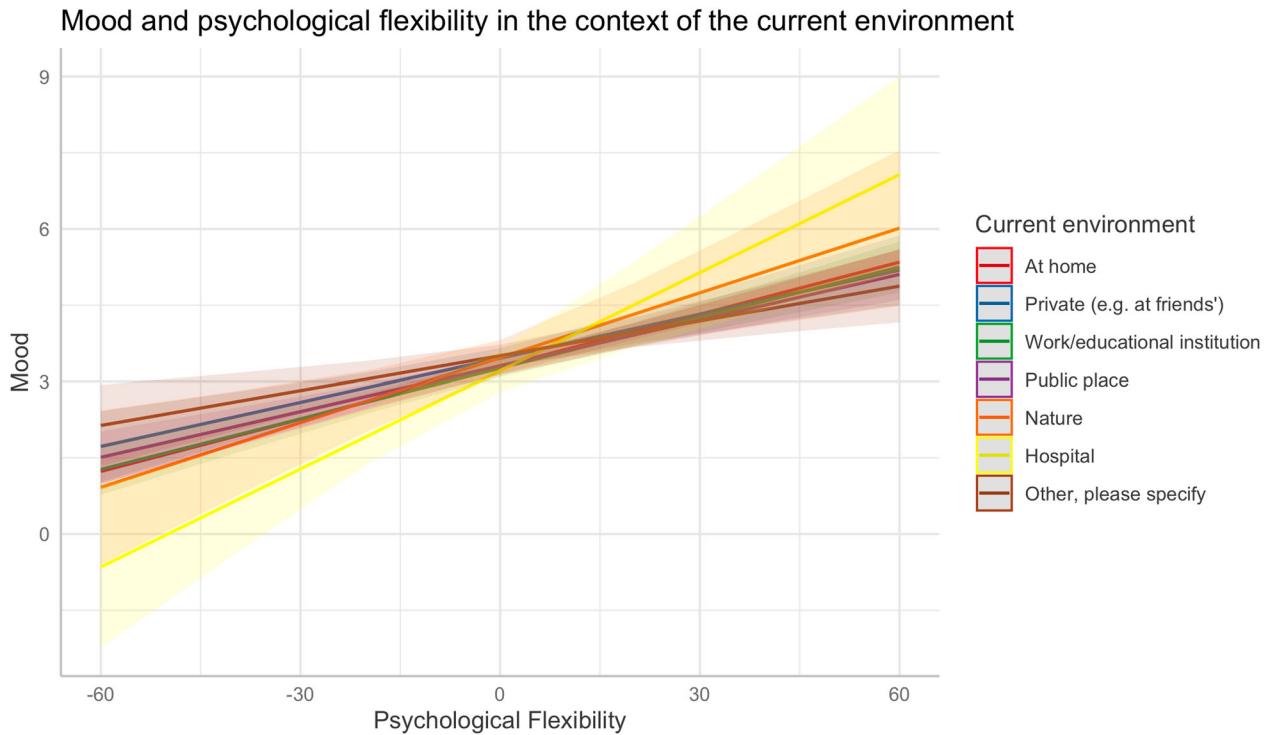

Figure 2. Association between psychological flexibility and mood across different physical environments.

Table 2. Differences in mood as a function of the current environment, and its interaction with psychological flexibility.

Predictors		Outcome	
		Mood	
Current environment, psychological flexibility		β (SE)	p
Hypothesis 3	Private	0.26 (0.08)	**.001****
	Work	0.02 (0.05)	.78
	Public place	0.06 (0.06)	.31
	Nature	0.27 (0.18)	.13
	Hospital	−0.40 (0.20)	**.04***
	Other	0.25 (0.09)	**.004****
Hypothesis 4	Psychological flexibility	0.034 (0.001)	**< .001*****
	Private x psychological flexibility	−0.005 (0.006)	.36
	Work x psychological flexibility	−0.001 (0.004)	.80
	Public place x psychological flexibility	−0.004 (0.004)	.33
	Nature x psychological flexibility	0.008 (0.012)	.52
	Hospital x psychological flexibility	0.030 (0.014)	**.04***
	Other x psychological flexibility	−0.015 (0.006)	.07

Note: Hypothesis 3; Mood will differ depending on the current environment; Hypothesis 4: The relationship between mood and current environment will differ, depending on the level of psychological flexibility; "Home" was the reference group for all analyses involving current environment; β: Beta coefficient; SE: Standard error; β and SEs refer to linear mixed model results. *p*-values in bold writing indicate significant results. *p < .05. **p < .01. ***p < .001.

et al., 2015). Results of the current study suggest that this relationship also holds true for ESM data collected in patients' daily life and self-selected natural environments across a whole week, suggesting a robust relationship. It further underpins the relationship between stressful and potentially upsetting events in daily life and negative mood (Pemberton & Fuller Tyszkiewicz, 2016).

Multiple explanations for the relationship between mood and specific environments exist. First, the effect of being in a "Private" environment versus "Home" may have been positively associated with mood because they were engaged in social interactions there, presumably face-to-face. Earlier research has shown that face-to-face social interactions are associated with positive affect (Villanueva et a., 2019; Watanabe et al., 2016). Further, values connected to a social context are deemed especially important and valuable (Villanueva et al., 2020; Wersebe et al., 2017). Therefore, participants may have reported better mood in connection to living values connected to a social context at that moment. The effect of being at the "Hospital" versus "Home" was negatively associated with mood, which is plausible, considering this was the participants' first week of treatment. While starting psychotherapy can entail hope and a readiness to change (Irving et al., 2004; Jung et al., 2013), it may also entail doubt, fear, and low expectations regarding oneself or the treatment (Jung et al., 2013). Simultaneously, the process of confrontation with difficult thoughts, feelings, and memories

starts. Particularly in the beginning of a treatment this may possibly be difficult and may thus be reflected in a worse mood.

Interestingly, the effects of being at "Work", "Public place", or "Nature" versus "Home" were not differentially associated with mood. This contrasts with earlier research, at least regarding "Work", where participants reported depressive or angry mood when at work, or engaged with work (Meier et al., 2013; Miner et al., 2005; Yim & Kwon, 2021). The construct "Depressed mood at work" even has its own 10-item measure (Gallagher, 2012; Quinn & Shepard, 1974). One possible explanation includes possibly slightly different foci of the studies. Compared to the present one, earlier studies may have focused more strongly on events (such as relationship conflicts or other negative events) happening in the work place, in order to investigate spillover effects (Meier et al., 2013), or to compare their effects with positive events at work (Miner et al., 2005). The present study, however, focused on the physical work environment, therefore placing emphasis on the location than events happening in it. Capturing the effects of specific events on mood was, in fact, a separate hypothesis in the present study, namely, when we investigated the association between mood and upsetting events. In this sense, the results of the present paper are in line with the above-mentioned research: Upsetting events (be it relationship conflicts or other negative events) were associated with worse mood.

The effects of being in "Nature" versus "Home" was not associated with mood. This, too, contrasts with earlier research showing a positive association between mood and green environments (Glasgow et al., 2019; Kondo et al., 2020; Li et al., 2018; Neill et al., 2019). Multiple reasons may have contributed to this discrepancy: First, earlier studies (e.g. Glasgow et al., 2019; Kondo et al., 2020; Li et al., 2018), used GPS data to collect information on location, while in the present study this was based on self-report data. Second, the present study focused on participants' experiences in their self-determined and self-selected daily life, while other studies focused on a one-time exposure as part of the procedure of the study (Neill et al., 2019).

Psychological Flexibility: A Skill that Helps with Daily Struggles?

Higher psychological flexibility was associated with better mood across the whole week – irrespective of the occurrence of upsetting events or the current environment. Overall, the data suggests that the more upsetting events were experienced by the patients, the worse their mood was. However, with psychological flexibility, the effect of upsetting events on mood was markedly reduced. That is, the higher the psychological flexibility, the better the mood, despite of the occurrence of upsetting events. Indeed, the interaction between psychological flexibility and "Many" (upsetting events), and the interaction between psychological flexibility and "Hospital" (current environment) points to psychological flexibility having been especially important when there were many upsetting events, and when participants were at the hospital. This suggests that the higher the psychological flexibility, the more upsetting events patients could experience without their mood being affected in a negative way, and it further suggests that the higher the psychological flexibility, the less was their mood affected by being at the hospital. Thus, psychological flexibility may have acted as a powerful buffer in these contexts (Gloster et al., 2021; Hulbert-Williams et al., 2015). Similarly to a study by Oliver et al. (2012), in which more psychologically flexible individuals may have been protected against delusional thinking, despite negative schemas and anxiety, in the present study participants may have been protected against mood, despite upsetting events and specific environments, which both were associated with lower mood. These results are in line with the notion of psychological flexibility being especially important in challenging and distress-provoking situations (Kashdan & Rottenberg, 2010; Levin et al., 2019) such as

challenging environments or upsetting events, presumably especially in the context of suffering from a psychological disorder. Psychological flexibility may also partially provide more information regarding individual differences in the association between stressful (and potentially upsetting) daily life events and mood (Pemberton & Fuller Tyszkiewicz, 2016) and associations potentially based on specific states (Pemberton & Fuller Tyszkiewicz, 2016; van Winkel et al., 2015). Psychological flexibility is indeed different in each individual and can also be seen as a state (Benoy et al., 2019). As such, it may also prove helpful in situations in which individuals struggle to reduce negative mood once it is heightened (Pemberton & Fuller Tyszkiewicz, 2016).

Several factors may contribute to the present results: First, higher capacity to be aware – a part of psychological flexibility (Hayes et al., 2012) – may have supported participants to anchor in the here and now, for instance when ruminating about upsetting events that happened recently. Indeed, past studies have found that negative mood was associated with more rumination (Genet & Siemer, 2012) and mind wandering (Smallwood et al., 2009). Mind wandering is suggestive of being less mindful while, in contrast, mindfulness is suggested to promote cognitive resilience (Jha et al., 2017), which is important in overcoming negative effects on cognitive functioning (Staal et al., 2008).

Second, higher capacity to be engaged with one's values – an important part of psychological flexibility (Hayes et al., 2012) – may have reminded participants of what is important to them, for instance when being with friends. Presumably, developing psychological flexibility aids patients in living their lives more in accordance with their values, which possibly then leads to better mood. Indeed, higher psychological flexibility is suggested to contribute to living life more fully and meaningfully (Doorley et al., 2020; Gloster et al., 2020; Hayes et al., 2012, 2004; Hulbert-Williams et al., 2015; Karekla et al., 2004) and was found to be associated with increased quality of life across multiple studies (Gloster et al., 2017a, 2017b; Hulbert-Williams et al., 2015). A review further found improved psychological flexibility to act as buffer to psychological distress (Hulbert-Williams et al., 2015), and, potentially, difficult situations in therapy and upsetting events in daily life may be counted as adding to psychological distress. Thus, if psychological flexibility acted as a buffer in these situations, it may have been reflected in better mood. Clinicians might want to emphasize the transfer of learned content, such as psychological flexibility, to daily life more strongly. Through increased use of psychological flexibility in their daily life, patients can firstly, experience self-

effectiveness, and secondly, are supported to ultimately live a more fulfilling life. Using mobile health treatment delivered via app is one possibility to facilitate the transfer of learned content to daily life. Promising results in this area have emerged recently (Vaessen et al., 2019), showing that patients considered using an ACT-focused app between therapy sessions as helpful to integrate the learned ACT skills into diverse contexts of daily life. While this study has investigated specifically early psychosis individuals, the authors emphasize the transdiagnostic value of ACT, suggesting their results may be applicable to other patient populations as well (Vaessen et al., 2019).

Limitations

There are five main limitations of this study: First, although ESM is the gold-standard for collecting data in people's natural lives, the data collection nevertheless relied on self-reports of participants and is thus subject to the biases of subjective self-reporting. Nevertheless, ESM is considered a more accurate measure of real-life behavior than questionnaires alone, due to the fine-grained and temporally sensitive information it is able to capture (Myin-Germeys et al., 2018). As constructs should be assessed in multiple ways to get a more robust picture of them (Gloster and Karekla, 2020), ESM can be part of a larger, multi-method approach of data collection. As such, it indeed is an indispensable tool in investigating participants' everyday experiences. Second, the item asking about their current physical environment ("Where are you right now?") included the response category "Private (e.g., at friends')". The framing of this category may have induced participants to think predominantly of social contexts when assigning physical environments to response categories. This may imply that the social context played an important role as well regarding mood. This is a possibility briefly discussed in the Discussion section. Third, decisions on the categorization of the current environment were made by participants themselves. However, we could not verify that they were at the environment which they reported. Observational, rather than self-report data would be necessary for this verification. While this is theoretically possible, this would entail considerable resources and violate participants' personal privacy. Fourth, the present results apply to a transdiagnostic sample of outpatients, including diagnoses such as affective, anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders (Villanueva et al., 2019), who were willing to participate in the ESM part of

the study. While this subgroup represents participants who were willing to take part in the study, it does reflect differing diagnoses. Fifth, although the statistical approach used in this paper has been widely used for ESM data, the analyses do not differentiate time intervals between measurement time points, use lagged-effects, or auto-regressive effects (Albers & Bringmann, 2020; Hjartarson et al., 2021) and the conclusions drawn from the statistical analysis are correlational. Thereby, conclusions regarding the relationship between fluctuations in one variable (of one reminder) with respect to fluctuations in another variable (in the next reminder) need to be interpreted with this in mind. While reciprocal causation will remain an issue and has been argued to depend largely on theoretical reasoning (Singer & Willett, 2003), future studies may consider using lagged-effects (e.g. Hjartarson et al., 2021), or the implementation of models which are more sensitive to gradual or abrupt changes in emotion dynamics (e.g. Albers & Bringmann, 2020). Nevertheless, the present results have clinical significance in that they indicate an important association between psychological flexibility and environmental factors in the daily life of patients and based on the previous three-hour windows. This is especially important, as the patients investigated in this study constituted of outpatients, on which – due to the nature of their treatment setting and in contrast to inpatients – less information on their daily life is available.

In summary, this study contributes new insights into the daily life of transdiagnostic outpatients at the beginning of their treatment. Results suggest that psychological flexibility was associated with better mood, regardless of the occurrence of upsetting events, or the current environment. This implies that a stronger focus on training patients' psychological flexibility might support patients in experiencing overall better mood, not despite, but especially during the dynamic and context-specific challenges of daily life.

Within the scope of ACT, therapeutic change is achieved through training psychological flexibility (Levin et al., 2012; Ruiz, 2012). While this process may start in the therapy room, it ultimately aims at enabling patients to live a more fulfilling life outside of the therapy room. Data collected in an ecologically and externally valid manner are crucial to aid patients in transferring learned content to their daily life. As data was collected in participants' daily life and their natural environments, the present study highlights the effect psychological flexibility can have in regularly happening life situations, for instance, in the context of an upsetting situation, a specific environment, or when we are in a bad mood.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Ethical Approval

The study was registered with the ISRCTN: ISRCTN11209732. Participants in the study were treated in accordance with international ethical standards. The study was approved by the Ethics Committee of northwestern and central Switzerland (Ethikkommission Nordwest- und Zentralschweiz; EKNZ): Project 2165/13.

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Appendix

Appendix A

Items used to measure psychological flexibility (adapted to the ESM format, based on Gloster et al., 2021).

The questions refer to your experiences in the last three hours.

1. Being present: Even if I am somewhere else with my thoughts, I can focus on what's going on in important moments. Scale: 0 (not at all) – 100 (very much).

2. Being open for experiences: If need be, I can let unpleasant thoughts and experiences happen without having to get rid of them immediately. Scale: 0 (not at all) – 100 (very much).

3. Leaving thoughts be: I can look at hindering thoughts from a distance without letting them control me. Scale: 0 (not at all) – 100 (very much).

4. Steady self: Even if thoughts and experiences are confusing me I can notice something like a steady core inside of me. Scale: 0 (not at all) – 100 (very much).

5. Awareness of one's own values: I determine what's important for me and decide what I want to use my energy for. Scale: 0 (not at all) – 100 (very much).

6. Being engaged: I engage thoroughly in things that are important, useful, or meaningful to me. Scale: 0 (not at all) – 100 (very much).

Appendix B

Equations pertaining to the Linear Mixed Models used in the analysis.

Hypothesis 1: $Mood_{ij} = \gamma00 + \gamma10 UpsEv_{ij} + U0j + Rij$

Hypothesis 2: $Mood_{ij} = \gamma00 + \gamma10 UpsEv_{ij} + \gamma20 stPF_{ij} + \gamma30 UpsEv_{ij} * stPF_{ij} + U0j + Rij$

Hypothesis 3: $Mood_{ij} = \gamma00 + \gamma10 Where_{ij} + U0j + Rij$

Hypothesis 4: $Mood_{ij} = \gamma00 + \gamma10 Where_{ij} + \gamma20 stPF_{ij} + \gamma30 Where_{ij} * stPF_{ij} + U0j + Rij$

Legend:

Mood: Mood; UpsEv: Upsetting Events; stPF: state psychological flexibility; Where: current physical environment; ID: Patient ID

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