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Decentering from Emotions in Daily Life: Dynamic Associations with Affect, Symptoms, and Well-being

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Abstract

Decentering is thought to be protective against a range of psychological symptoms, but little is known about the outcomes of decentering as a momentary state in daily life. We used ecological momentary assessment (42 reports across one week) to examine the temporal ordering of the associations of decentering with affect, dysphoria, participant-specific idiographic symptoms, and wellbeing. We also hypothesized that greater decentering predicts less inertia (persistence) of each variable, and weakens the association of affect with dysphoria, idiographic symptoms, and wellbeing. Results in 345 community participants indicated that decentering and these variables were mutually reinforcing over time, and that greater decentering was associated with less inertia of negative affect and dysphoria. Decentering generally predicted reduced impact of positive and negative affect on dysphoria symptoms, but results were mixed when predicting idiographic symptoms or wellbeing. Clinical implications and refinements for theory on decentering are discussed.

Keywords

decentering; affect; well-being; internalizing symptoms; ecological momentary assessment; dynamic structural equation modeling; inertia

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Decentering[1], or a detached observer perspective on one's ongoing internal experiences, is an increasingly important concept for understanding and treating mental health problems and improving wellbeing (Bernstein et al., 2015; Hayes et al., 2012; McCracken et al., 2014; Segal et al., 2013; Teasdale et al., 2002). Decentering is related to mindfulness, in that both involve an open present-moment awareness. More specifically, decentering may be considered a facet or consequence of mindfulness that is focused on awareness and nonreactivity of internal (rather than external) stimuli (Bernstein et al., 2015; Pearson et al., 2015). Because decentering entails attention to one's internal states, it is particularly relevant for responding to one's own emotions, thoughts, and psychological symptoms. Higher trait levels of decentering can be cultivated through meditation practice or therapy (e.g., cognitive behavioral therapy, mindfulness-based cognitive therapy, acceptance and commitment therapy), but decentered states also occur naturalistically to varying degrees in the general untrained population (e.g., Fresco, Moore, et al., 2007). The current study examines internal states such as affect and mental health, so we focus on decentering rather than mindfulness more broadly, as mindfulness includes other components (e.g., observing external stimuli) that may be less relevant to these internal experiences.

Protective Effects of Decentering

A growing body of work has supported the postulated benefits of decentering. This work has largely used cross-sectional methods with student, community, or treatment-seeking samples, or longitudinal methods in the context of examining relapse or treatment effects. For example, multiple cross-sectional studies have found that measures of decentering are associated with fewer symptoms of internalizing disorders (Forman et al., 2012; Fresco, Moore, et al., 2007; Gillanders et al., 2014; Hadash et al., 2017; Naragon-Gainey & DeMarree, 2017b), greater wellbeing and less distress among people with chronic pain (McCracken et al., 2014), and higher scores on measures of adaptive psychological processes (e.g., emotion regulation abilities) (Fresco, Moore, et al., 2007; Gillanders et al., 2014; Naragon-Gainey & DeMarree, 2017b). Studies in the context of treatment have found that scores on measures of decentering increase throughout the intervention (Gillanders et al., 2014; Hayes-Skelton et al., 2015; O'Toole et al., 2019), predict symptom improvement (Forman et al., 2012; Hayes-Skelton et al., 2015; O'Toole et al., 2019), and predict reduced incidence of symptom relapse following treatment (Fresco, Segal, et al., 2007; Teasdale et al., 2002).

One way that decentering may achieve these positive effects is by providing the psychological distance that is necessary (though not sufficient) to respond to internal processes in a more intentional manner. This space may allow people to make choices that promote their psychological health, rather than reactively responding in ways (e.g., suppression, rumination) that tend to maintain or increase psychological distress. In one study with multiple relatively large student and community samples, Naragon-Gainey and DeMarree (2017a) examined the link between trait levels of negative affect and internalizing

[1]Following Bernstein and colleagues (2015), we use "decentering" as an umbrella term to refer to several related concepts, including defusion and self-distancing, that have received recent attention in third wave approaches to understanding and treating mental health problems.

symptoms (e.g., dysphoria, social anxiety, panic). This study observed a strong association between trait negative affect and dysphoria or panic symptoms, but critically, found that this link was weaker among people with higher scores on measures of decentering. This is consistent with the idea that the psychological distance associated with decentering reduces the distress that frequently follows from negative affect.

Most prior studies have examined decentering in the context of negative emotions and cognitions, with very little empirical data on the consequences of decentering from experiences of positive affect. On the one hand, it could be argued that the psychological distance associated with decentering should be beneficial regardless of the valence of one's current emotional experiences. Indeed, some perspectives (e.g., Hayes et al., 2012) posit that adopting a defused, unattached stance towards positive thoughts (e.g., "I'm smart," "I feel really good about my partner") is healthy because it reduces aversive reactions and inflexible behaviors when the positive thoughts and feelings change (e.g., "I failed an exam so I must not be smart," "I don't feel as excited about my relationship anymore."). On the other hand, being fused (i.e., low decentering) with one's experiences of positive affect and related thoughts may be beneficial in some circumstances, such as creative pursuits (e.g., Bernstein et al., 2015). More broadly, it is possible that an objective, observer perspective could inhibit savoring or positive rumination (i.e., repetitively thinking about how good one feels and one's positive thoughts), which are known to amplify positive affect and increase wellbeing (e.g., Smith & Bryant, 2017). Naragon-Gainey and DeMarree (2017a) postulated that, for those with extreme trait levels of positive affect, decentering may protect against relevant symptoms (e.g., aspects of anhedonia for low positive affect, and mania or narcissism for high positive affect). While they found some support that decentering attenuated the associations of positive affect and related symptoms, results were mixed across samples and symptoms. Overall, whether and how decentering from positive emotions is associated with subsequent psychological health remains an open question.

Decentering and Momentary Experience

The above studies largely relied on cross-sectional assessment of decentering as a trait, which is assumed to capture one's average engagement of decentering in daily life. Trait measures can provide important information about beliefs regarding one's self and one's typical experiences (e.g., Robinson & Clore, 2002), allowing us to quantify individual differences in decentering across people. Yet, clinical processes such as decentering are inherently idiographic and within-persons (e.g., Piccirillo & Rodebaugh, 2019). That is, in therapeutic settings we are not primarily interested in altering one's typical use of decentering, relative to other people's typical use of decentering (as captured by trait measures). Rather, we are focused on increasing specific instances of decentering over time —relative to that person's baseline levels— at the appropriate time and place it is needed, as these contextualized decentered states are the process responsible for proximal changes in emotions and symptoms. As such, there is a mismatch in that the vast majority of research on decentering (and other clinical constructs) has used between-person, cross-sectional measurement to inform our understanding of within-person, longitudinal processes (e.g., development of decentering skills, changes in symptoms, response to interventions).

Ecological momentary assessment (EMA; repeated assessment of current states over short time periods in daily life) provides complementary information to trait measurement in that it captures real-time occurrence of fluctuating emotional and cognitive states over time. Strengths of EMA measures include minimal influence of retrospective recall biases and strong ecological validity (e.g., Gorin & Stone, 2001). Importantly, EMA designs allow for a test of temporal precedence of associations within-persons (i.e., the association of measured states on a given occasion for each individual), in addition to examining between-person associations (i.e., individual differences in average levels of measured states across the study). Within-person analyses allow us to examine whether momentary changes in decentering predict subsequent changes in psychological health, and/or vice versa, as described in further detail below. To our knowledge, only a few studies have examined decentering or defusion using intensive longitudinal designs (Donald et al., 2017; Krafft et al., 2021; Shoham et al., 2017). Their findings of significant within-person associations between momentary decentering and other variables suggest that levels of decentering vary within the course of a day in people's daily lives. We draw on these studies, as well as studies assessing mindfulness, in the summary below of key results relevant to the current study.

Temporal precedence.

EMA designs provide an opportunity to test several predictions regarding short-term dynamic and temporal associations among decentering, affect, symptoms, and wellbeing. First, theory has generally assumed that decentering and mindfulness precede and contribute to subsequent levels of psychological health, rather than the other way around (e.g., Bernstein et al., 2015; Keng et al., 2011; Naragon-Gainey & DeMarree, 2017a). However, it is also plausible that when one is currently feeling distressed, it is more difficult to step back from that experience and adopt a decentered perspective (Goldberg et al., 2020), in part due to the tendency to ruminate, worry, or suppress when confronted with intense negative emotions. That is, strong negative emotion and related symptoms may predict less subsequent engagement in decentering, forming a downward spiral wherein low decentering leads to more negative affect or symptoms, which leads to lower decentering. In contrast, decentering and positive affect may mutually contribute to an upward spiral of wellbeing (e.g., Garland et al., 2015). As described previously, longitudinal treatment studies over weeks or months support the theory that changes in decentering precede changes in symptoms temporally (e.g., Forman et al., 2012; Hayes-Skelton et al., 2015; O'Toole et al., 2019), but these studies speak little to the moment-to-moment dynamics that take place in daily life.

Existing EMA studies of decentering have only examined associations with affect in a single theory-consistent temporal direction (i.e., decentering predicting later affect). One study found support for concurrent momentary associations but not lagged associations (Krafft et al., 2021), and another study failed to find a significant relationship between momentary decentering and emotional valence [i.e., the difference score between happiness and sadness] (Shoham et al., 2017). In addition, several mindfulness EMA studies have examined the directionality of changes in mindfulness and affect, with mixed results for positive affect in particular. Most studies found bidirectional or reciprocal temporal effects

between greater mindfulness and lower negative affect (Brockman et al., 2017; Gotink et al., 2016; Tschacher & Lienhard, 2021; but see Snippe et al., 2015). Reciprocal temporal effects between greater mindfulness and greater positive affect were reported in some studies (Du et al., 2019; Gotink et al., 2016), whereas others found support for only one direction, though the direction was different across studies (Brockman et al., 2016; Snippe et al., 2015; Tschacher & Lienhard, 2021).

These studies assessing temporal precedence have some heterogeneous features and limitations that should be noted. First, they varied in the timing of assessments (including day-long lags that were likely too gross to capture the effects of quickly fluctuating states) and in the mindfulness measures used, which might account for some of the variability of findings. Furthermore, mindfulness measures typically include awareness of both internal and external stimuli, which may dilute findings when examining associations with internal experiences specifically (see e.g., DeMarree & Naragon-Gainey, 2022). In contrast, decentering measures specifically assess an open and distanced perspective on thoughts and emotions, and therefore may be better equipped to detect such effects. Last, no studies to our knowledge have examined the bidirectional lagged associations of mindfulness or decentering with symptoms or wellbeing, instead focusing solely on associations with affect. Thus, we do not currently have data on temporal precedence and directionality of associations between decentering and symptoms or wellbeing, which are important therapeutic outcomes.

Associations with inertia.

In addition to clarifying temporal precedence, repeated assessments of decentering and psychological health outcomes allow for an examination of inertia, or persistence of momentary states over time (e.g., Koval et al., 2015). Emotional inertia, especially of negative affect, is associated with a number of indicators of psychological ill-being, including increased symptoms of depression and lower self-esteem (Kuppens et al., 2010). Theory underlying acceptance and commitment therapy suggests that decentering may predict lower inertia of negative affect and of related internalizing symptoms. Specifically, the psychological distance that decentering provides may allow negative emotions and related thoughts to dissipate naturally and become more transient in nature, returning to one's baseline state more quickly (Hayes et al., 2012), such that people who decenter frequently should be less likely to get "stuck" in distressing emotional experiences. However, it is less clear whether decentering should impact inertia for positive affect and wellbeing, given contrasting theories described previously about decentering from positive experiences. Some existing empirical evidence supports the idea that greater psychological distance reduces affect duration, which found that a self-distanced perspective predicts shorter-lasting negative and positive emotional experiences (Verduyn et al., 2012). A small body of work on mindfulness has begun to examine affect inertia specifically, with two studies finding an association with lower negative affect inertia (Keng & Tong, 2016; Rowland et al., 2020), but only one of these studies found an association with (greater) positive affect inertia (Rowland et al., 2020). It will be important to test these hypotheses specifically with regard to one's relationship to internal experiences by

measuring decentering (as opposed to mindfulness more broadly), as well as examining associations with temporal persistence of several mental health outcomes.

Decentered states predicting momentary affect-symptom associations.

Very little research has examined decentering's *momentary, within-person* impact on the link between affect and symptoms or wellbeing in daily life. In the mindfulness literature, Blanke et al. (2018) found that when daily hassles co-occurred with higher levels of daily mindfulness, these hassles less strongly predicted people's affect. In addition to the previously described cross-sectional decentering results, Naragon-Gainey & DeMarree (2017a) included one dataset that measured affect and psychological symptoms three times daily for ten days. Baseline decentering scores predicted weaker relationships between momentary reports of negative affect and concurrent psychological distress (e.g., dysphoria, worry). Similarly, another study found that the association between momentary sadness and nonsuicidal self-injury was attenuated among individuals with higher baseline levels of decentering (Briones-Buixassa et al., 2021). Importantly, however, both these studies used a baseline trait assessment of decentering, rather than assessing momentary decentering during the EMA protocol. As such, it is unknown whether decentering in the *present moment* reduces risk for the negative consequences of extreme affect at that time, as theory and clinical applications suggest.

The Current Study

In the present research, we used an EMA paradigm that asked participants to report on their current naturalistic experiences (i.e., ratings of positive and negative affect, decentering, symptoms, wellbeing) six times per day for seven days. This study was designed to address several limitations in the existing literature. First, we measured naturally-occurring decentering in the presence of any emotional state (e.g., positive and/or negative), which may allow us to clarify the mixed theory and very little empirical work that examines the consequences of decentering from positive vs. negative emotions. In addition, the EMA design allows us to test two different types of models: 1) within-person, or how decentering is associated with affect and clinically-relevant outcomes on a given occasion, and 2) between-person, or how a person's overall level of decentering throughout the EMA study is associated with their overall levels of affect and outcomes. Whereas the within-person models are particularly important for establishing temporal precedence and state influences that are clinically-relevant, both models are informative in understanding the effects of decentering in daily life.

It is also noteworthy that most past studies have solely focused on how decentering relates to affect and/or some specific types of symptoms (e.g., depression, anxiety). Like prior studies, we also included positive and negative affect, and we selected dysphoria as a measure of internalizing symptoms given that dysphoria was most consistently predicted by decentering in some past work examining interactions with affect (Naragon-Gainey & DeMarree, 2017a). However, we extended our examination by assessing each participant's self-reported most bothersome symptom in an idiographic manner, because some participants may experience psychological distress that is not well-captured by dysphoria items (or any

fixed symptom measure administered to the whole sample). In addition, there is substantial evidence that eudaimonic wellbeing—that is, non-affective wellbeing characterized by a sense of meaning and engagement— is important for general psychological health and separable from hedonic wellbeing (for a review, see Ryan & Deci, 2001). Thus, we also measured (eudaimonic) wellbeing in the current study to capture momentary thriving (e.g., doing something one finds important or valuable) that need not be characterized by feeling "good" hedonically.

Our first aim was to examine the reciprocal temporal associations of decentering with the next report of negative affect, positive affect, dysphoria, idiographic symptoms, and wellbeing, to establish temporal precedence and direction of associations (Aim 1; see Figure 1). Based on theory and previous studies, we expected that decentering will predict lower subsequent negative affect, dysphoria, and idiographic symptoms, as well as greater positive affect and wellbeing. The examination of bidirectional effects for decentering is novel, but it is plausible that these variables may predict subsequent levels of decentering as well, based upon some mindfulness studies and theory described previously. Next, we predicted that individuals who reported higher levels of decentering averaged across the EMA study (i.e., between-person decentering) will have lower levels of inertia in their experiences of negative affect, dysphoria, and idiographic symptoms (Aim 2). That is, they should return to their baseline levels of these variables more quickly than those low in decentering. It is less clear whether or how decentering will relate to inertia of positive affect and wellbeing, but these effects were tested in an exploratory manner. Third, we tested whether decentering weakens the associations of negative and positive affect with three clinically-relevant outcomes (i.e., dysphoria, idiographic symptoms, and wellbeing) (Aim 3). These interactions were tested as within-person concurrent effects, within-person lagged effect at the next report, and between-person effects. As a replication and extension of Study 2 in Naragon-Gainey and DeMarree (2017a), baseline trait measures of decentering were also examined as a moderator of the momentary associations of affect and outcomes.

Transparency and Openness

Study methods and some aims/hypotheses were preregistered at https://aspredicted.org/m2u6m.pdf prior to data collection. The preregistration document describes two aims that we intended to publish in separate papers, given their scope. The first preregistered aim corresponds to the moderation analyses in the current study (Aim 3). Hypotheses for the temporal ordering of relationships with decentering and inertia (Aims 1 and 2) in the current study were developed before analyses began but after preregistration, given that they utilize an analytic technique (dynamic structural equation modelling) that was developed around the time we began collecting data.

Data, codebooks, and materials for the current study are available at https://osf.io/gct7x/, and Mplus syntax for the analyses are provided in the Online Supplement Appendix C. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study (only the measures analyzed are described in the main text, but all measures are included in the OSF link). The present study was approved by the University at Buffalo Institutional Review Board (Protocol No. 00001194, "Decentering in Daily Life:

Underlying Mechanisms and Impact on Well-Being"), in accordance with the provisions of the World Medical Association Declaration of Helsinki. Prior publications using this dataset are non-overlapping in that they reported baseline data only (DeMarree & Naragon-Gainey, 2021; Park & Naragon-Gainey, 2020), associations of a baseline measure of self-compassion as a predictor or moderator of associations among EMA variables (Biehler & Naragon-Gainey, 2022), or an EMA mediation model testing the Mindfulness-to-Meaning Theory (Sgherza et al., 2022).

Method

Sample Size Determination

We conducted a Monte Carlo power simulation for Aim 3 (within- and between-person interactions) using parameter estimates generated from pilot EMA data. Negative affect, decentering, and their interaction were modeled as predictors of depression using multilevel SEM. The simulation showed that a sample size of 175 people yielded power >.93 to detect the main effects and their interaction. However, we aimed to recruit at least 368 participants a priori (more if funds allowed) to improve estimate precision, account for some expected attrition and missing data in the EMA study, and allow for the possibility that some novel tests might have small effects. This is also consistent with dynamic SEM sample size recommendations (Schultzberg & Muthén, 2018).

Participants

Community adults from the Greater Buffalo, NY area enrolled in the study (N=379) in 2017-2018, and individuals who were either seeking or receiving psychological treatment at the time of study enrollment were oversampled (target=50% of sample). We oversampled this group to increase representation of mild to severe symptoms, as treatment-seeking individuals are more likely to have current or recent clinically-significant distress and symptoms. Brief online ads and flyers posted in the local community were used to recruit participants. English-speaking individuals aged 18 to 65 were eligible for the study. Individuals who reported or showed evidence of a current cognitive impairment (e.g., dementia, intellectual disability, an active psychotic disorder, delirium) were not eligible for the study.

Of the 379 participants who participated in the baseline portion of the study, 356 enrolled in the EMA portion of the study. Of these, 11 participants were excluded from EMA analyses because they submitted fewer than 30% valid EMA reports.[2] Thus, the final sample consisted of 345 participants (67.0% female; mean age = 34.52, SD = 14.03, range = 18–65). In terms of race/ethnicity, 66.4% identified as White, 13.6% as Black or African American, 12.8% as Asian, 6.7% as more than one race, and 0.6% as Native American or Alaska Native. Of the participants, 50.7% had completed a 4-year degree or higher degree, 28.7% with some college education, 13.6% with a 2-year degree, and 7.0% with a high school diploma or some high school education. In terms of employment, 33.9%

[2]The final sample did not differ from the 34 participants who were excluded from EMA analyses in terms of sex, age, ethnicity, education level, marital status, and employment status (ps > .05). However, there were significant differences for race and household income between the two groups (ps < .05).

were employed part-time, 31.9% were full-time students, 25.5% were unemployed, 24.9% were employed full-time, and 6.1% were part-time students (multiple responses possible). A majority of the participants (55.7%) were single (married = 20.6%; single but cohabitating with a partner = 12.8%; divorced = 9.9%; widowed = 1.2%). Most participants had a gross household income of less than $40,000 annually (less than $10,000 = 30.5%; $10,000-$20,000=16.5%; $20,000-$40,000 = 22.6%; $40,000-$60,000 = 11.0%; $60,000-$80,000 = 6.1%; more than $80,000 = 13.4%). A majority of the participants (60.6%) reported having experience with meditation or mindfulness practice, with a reported mean duration of 32.1 months (SD = 54.9, range = 1 to 410). Based upon a semi-structured diagnostic interview, 41.6% of the sample met criteria for one or more emotional disorders, with the most common diagnoses being social anxiety disorder (24.9%), generalized anxiety disorder (20.4%), and a unipolar depressive disorder (11.4%). Consistent with our sampling target, about half of the sample (49.6%) reported currently receiving therapy (mean duration = 25.2 months, SD = 43.8) and/or taking psychiatric medication (mean duration = 59.2 months, SD = 70.9).

For the EMA data, individual reports were removed if they were completed outside of the required 30-minute response window or were completed extremely quickly (i.e., if more than half of the items were answered in less than one second each). After removing invalid reports, there were a total of 11,954 completed reports out of 14,490 possible reports. Thus, a mean of 82.5% of the reports (SD = 14.7%) were submitted and valid, ranging from 31% to 100% of reports across participants.

Procedure

Participants completed an email or phone screening to determine eligibility and schedule a baseline appointment. Following informed consent at the 3 to 4-hour lab baseline assessment, individuals completed an assessment of heart rate variability, cognitive tasks and eye-tracking, and a battery of self-report surveys on the computer, which was followed by a semi-structured clinical interview with a trained graduate student. Participants were compensated $50 for this portion of the study.

Participants were then invited to enroll in a 7-day follow up study where they completed brief surveys 6 times a day from their smartphone (or a loaned one if needed). After registering their phone to receive text messages with links to Qualtrics surveys sent through the SurveySignal system (Hofmann & Patel, 2015), surveys began within 4 days of the baseline appointment and lasted for 7 days. Participants were shown how to complete the surveys and reviewed example items with the research assistant, who described several of the questions that were anticipated to be potentially unfamiliar or confusing. The participant also specified their most bothersome symptom, which was embedded in the EMA idiographic symptom items. If they had difficulty identifying a symptom initially, the research assistant worked with them to select an internal experience or situation that had come up repeatedly and was at least mildly distressing.

Surveys were sent between 9am and 9pm at pseudo-random intervals (i.e., randomly within each 2-hour block, with the stipulation of at least 60 minutes between surveys), and participants were asked to complete them within 30 minutes of receiving the text message

with a link to the survey. Participants were sent a reminder if they did not complete the survey within 20 minutes. In order to improve adherence and resolve any problems, research assistants screened data daily. Participants were contacted via email two days and five days into the EMA study, with additional contact immediately following recognition of any problematic responding. They were compensated $1.50 for each survey completed within the specified time frame, with an additional $15 bonus if no more than 9 of 42 surveys were missed, for compensation of up to $78. Participants were also entered into a lottery to win one of four iPads, where the odds of winning linked to the number of surveys they completed.

Measures[3]

Multidimensional Awareness Scale (MAS; DeMarree & Naragon-Gainey, 2021).—The 12-item Decentered Awareness subscale of the MAS (MAS-DA) measures present-moment awareness from a psychologically distant and objective perspective, and was written to be applicable to positively- or negatively-valenced experiences. Each statement is rated on a 7-point response scale (1 = *strongly disagree* to 7 = *strongly agree*), with higher scores indicating more decentering. The MAS-DA subscale showed strong reliability and validity in multiple samples (DeMarree & Naragon-Gainey, 2021), and the MAS-DA scale had an alpha of .79 in this sample.

Experiences Questionnaire (EQ; Fresco et al., 2007).—The EQ is an 11-item measure of decentering developed within the Mindfulness-Based Cognitive Therapy framework. Each item is rated on a 5-point Likert-type scale (1 = *never* to 5 = *all the time*), with higher scores representing higher trait decentering. Cronbach's alpha = .85 for the total scale score in this sample.

Cognitive Fusion Questionnaire (CFQ: Gillanders et al., 2014).—The CFQ is a 7-item measure of the extent to which people tend to struggle with or respond emotionally to their thoughts, with higher scores reflecting lower trait decentering. Responses are measured on a 7-point Likert-type scale (1 = *never true* to 7 = *always true*). Cronbach's alpha = .92 for the total scale in this sample.

Ecological momentary assessment items.—Items for negative affect, positive affect, dysphoria, the "vitality" wellbeing item, and one decentering item were drawn from prior EMA studies (e.g., Breines et al., 2008; Naragon-Gainey & DeMarree, 2017a; Shoham et al., 2017), and the "meaning" wellbeing item was adapted from a state measure (Lambert et al., 2013). The other EMA items were novel and based upon existing trait measures and theory. Decentering items were written to capture both disidentification from internal

[3]Several strategies were used to identify and remove invalid responses for the baseline questionnaires. Participants responded to 7 validity questions (e.g., agreeing with "I often ride the wild animals at the zoo", indicates a likely invalid response; items taken from the Comprehensive Assessment of Traits Relevant to Personality Disorders [CAT-PD]; Simms et al., 2011). Validity items were embedded in other scales using the response format of the scale in which it appeared. Responses were recoded to a 0-1 scale, with higher values indicating invalid responses, and then averaged. Consistent with our past research (Naragon-Gainey & DeMarree, 2017a, 2017b), participants whose invalidity index score was ≥ 2 standard deviations above the sample mean had their baseline data excluded from analyses (N = 16). In addition, we removed responses to baseline questionnaires that were answered extremely quickly, indicating non-contingent responding. Fast outliers were identified, based upon the response time distributions for each measure. This resulted in the removal of 3.4% of responses for the EQ, 0.8% for TMS, 1.1% for CFQ, and 5.3% for MAS.

experiences and reduced reactivity to thoughts—two components identified in theoretical and empirical studies (e.g., Bernstein et al., 2015; Naragon-Gainey & DeMarree, 2017b; but see DeMarree & Naragon-Gainey, 2021, which finds a single-factor structure).

Participants rated how much each statement applied to them currently or very recently (i.e., in the past 30 minutes) on a 5-point Likert-type scale (1 = *very slightly or not at all* to 5 = *extremely*). Negative affect was assessed with four items (upset, sad, afraid/anxious, irritable), as was positive affect (active, interested, excited, strong). Wellbeing consisted of two items (How much meaning have you felt in your life recently? To what extent have you felt alive and vital recently?), dysphoria consisted of four items (I felt depressed, I felt inadequate, I felt discouraged about things, I had little interest in my usual hobbies and activities), and idiographic symptoms consisted of two items (To what extent have you experienced [*most bothersome symptom*] recently? To what extent has [*most bothersome symptom*] interfered with your ability to accomplish things recently?).[4] Last, decentering included 3 novel items modified from trait measures (I have been able to observe my thoughts and feelings without being drawn in, I have struggled with my thoughts and feelings, I have been caught up in my thoughts) and one item from Shoham et al., 2017 (I have experienced my thoughts and feelings as separate from myself). In addition to the above items, EMA surveys also assessed emotion regulation, meta-awareness, and self-control, but these variables were not analyzed in the current study.

In support of their convergent validity, the between-person variance of the EMA composites for each variable were moderately to strongly associated with corresponding established trait measures in the current sample (rs = .46 to .69, ps < .001; see Online Supplement Appendix A for further detail). Coefficient omega, an index of internal consistency that does not assume equal factor loadings, indicated that EMA composites with three or more items had acceptable to excellent internal consistency at both levels (following Geldhof et al., 2013 for multilevel syntax). These included Negative Affect (omega within = .79, between = .91), Positive Affect (omega within = .82, between= .95), and Dysphoria (omega within = .78, between = .95). The Decentering composite required further refinement, as described in detail in "Results," but the final 3-item composite had acceptable internal consistency (omega within = .62, between = .79). Last, multilevel correlations indicated strong associations between items in the two-item composites: Idiographic Symptoms (r within = .61, r between = .86) and Wellbeing (r within = .56, r between = .89).

Data Analysis

Factor scores were computed for each variable at each assessment to reduce measurement error, and subsequently these factors scores were used in each model as dependent and independent variables (see Asparouhov & Muthen, 2010). To establish goodness-of-fit for measurement models from which factor scores were derived, multilevel confirmatory factor

[4]For participant-specific idiographic symptom items, 60% of the sample selected a specific worry or worrying in general (e.g., "worries about finances"; "worries about mother's health"), 7% reported depression or other mood related symptoms (e.g., "feeling like you've let yourself down"; "mood swings"), 7% reported feelings of frustration/irritation/annoyance (e.g., "irritable with others"; "feeling annoyed by family"), 7% reported intrusive or aversive thoughts (e.g., "overthinking and regretting"; "memories of the car accident"), 6% reported anxiety (e.g., "feeling on edge"; "panic attacks"; "social anxiety"). The remaining 13% selected a range of other concerns (e.g., "thoughts about meaning in life"; "compulsive list-making"; "difficulty trusting people").

analyses were tested using robust maximum likelihood estimators (i.e., MLR in Mplus). Model fit was evaluated with the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). Interpretation of these indices is based on the guidelines set forth by Hu and Bentler (1999): CFI should be "close to" .95 or above for good fit, SRMR values should be < .08, and RMSEA should be < .06.

Temporal associations between decentering and outcomes.—Residual dynamic structural equation modelling (DSEM) was used to assess the temporal relationships among decentering and all mental health outcomes (i.e., negative and positive affect, dysphoria, idiographic symptoms, wellbeing) in Aims 1 and 2, controlling for the effect of time (McNeish & Hamaker, 2020). Residual DSEM models the multilevel structure of the data, where within-person processes reflect temporal dynamics for an individual over time, and between-person processes evaluate differences between individuals. Variables at the within-level are latent person-mean centered to improve interpretability of within-person associations, and also to overcome Nickell's bias in the estimation of the autocorrelations (Asparouhov & Muthén, 2019).

The main advantage of DSEM over multilevel SEM is that DSEM is specifically designed to model lagged relations and to account for the time-order of the observations in within-person models (McNeish & Hamaker, 2020). A multilevel vector autoregressive model with lag 1 (VAR(1)) was used for Aims 1 and 2, with an example model illustrated in Figure 1. Autoregressive associations represent inertia, or the degree to which a variable at one report predicts itself at the next report. Cross-lagged paths indicate how changes in one variable are related to changes in the other variable at the next assessment. For all models, a linear trend of time was included (i.e., EMA report number 1-42), as well as random effects for intercepts, slopes (i.e., autoregressive and cross-lagged regression paths), and residual variances. This allows for and takes into account individual differences across participants in levels of the outcome variable, associations between variables, and the amount of variance accounted for in each outcome, respectively. Adequate model convergence was determined via potential scale reduction (PSR) metrics close to one, indicating the between-chain variation to be small relative to the total of between- and within-chain variation (Muthén, 2010). Further technical details of residual DSEM procedures and interpretations are outlined in Appendix B of the online supplement.

Momentary moderating effects of decentering.—As residual DSEM is currently not suited to probing within-level interactions, a multilevel structural equation modeling (MSEM) framework was chosen for Aim 3, in accordance with Asparouhov and Muthén (2021). Specifically, MSEM with random slopes was used to examine the momentary moderating effects of decentering on the association between negative or positive affect and three outcomes (i.e., dysphoria, wellbeing, or idiographic symptoms), accounting for linear trends over time. Negative affect and positive affect were examined in separate models. An interaction term was first created by multiplying the person-mean centered factor scores for decentering and positive or negative affect. In each concurrent model, decentering and affect, as well as their interaction term, were included at the within- and between-person levels

to predict each outcome (i.e., dysphoria, idiographic symptoms, wellbeing). Then, lagged within-person models were run wherein current decentering and affect predicted outcomes at the next report, with freely estimated variance and covariances at the between-person level, and the time lag between reports as a covariate.

Moderating effects of trait decentering.—To assess whether baseline decentering moderated the momentary associations between affect and each outcome, a cross-level interaction was specified in additional MSEM models (i.e., baseline decentering predicting the random slope of each outcome on affect), accounting for time trends. To improve interpretability of between-person moderating associations, trait decentering was grand-mean centered.

Probing interactions.—The nature of each significant interaction was examined through approaches outlined in Bauer and Curran (2005), referred to as the points-to-plot simple slopes method. Specifically, the simple slopes of affect predicting each outcome were examined at low, medium, and high levels of decentering. As factor scores were created prior to running models, the medium decentering group had a mean of zero, and low and high decentering groups reflected 1.5 standard deviations below and above the mean, respectively. Likewise, the slope between outcome and affect was examined at a range of 1.5 standard deviations below and above mean affect scores.

Results

Preliminary Analyses

Measurement models.—We first tested confirmatory factor analyses (CFA) of the items analyzed here to ensure that they provided good measurement of each construct and formed distinct factors. Model fit for the single-factor CFA of the baseline decentering measures could not be assessed because the model was just-identified (i.e., zero degrees of freedom), but standardized factor loadings were strong and in the expected direction (EQ=.72, MAS=.97, CFQ=−.83). We next conducted a multilevel CFA on the EMA variables, specifying six latent variables (i.e., Negative Affect, Positive Affect, Decentering, Wellbeing, Dysphoria, and Idiographic Symptoms) at both levels and allowing the factors to freely covary. This model did not converge on a proper solution, as there was a negative residual variance at the between-person level for one of the decentering items, and this issue persisted when the EMA decentering items were tested alone in a multilevel CFA. In examining the correlations among the four decentering items, it was notable that one EMA item (Decentering 3: “I have experienced my thoughts and feelings as separate from myself”) was uncorrelated with items 2 and 4 at the within-person level (rs=−.04), and correlated in a theoretically-inconsistent direction with items 2 and 4 at the between-person level (rs=.17 and .15). Given these results, Decentering 3 was dropped from subsequent analyses, and we used the remaining three items as the Decentering composite (omega within=.62, between=.79). Last, we conducted a multilevel CFA on the other EMA variables, which arrived at a proper solution. This model showed a good fit to the data: $\chi^2(188)=1686.967$, $p<.001$, CFI=964, RMSEA=.026, SRMR within=.026, SRMR between=.040. At both levels, standardized factor loadings were large (within-

person loadings=.50-.84, between-person loadings=.78-.98; *p*s < .001) and in the expected direction. Thus, no modifications were made to these factors.

Zero-order associations.—See Online Supplement Table A for EMA factor SDs (factor means were set to zero), correlations at both levels, and intraclass correlations. Intraclass correlations indicated that all variables had substantial variance at both levels (i.e., 41%-58% within-person variance and error variance combined; 42%-59% between-person variance). All correlations except one (i.e., between-person Positive Affect-Idiographic Symptoms) were statistically significant at $p < .001$ and in the expected direction. At the within-person level, most variables were moderately correlated (|*r*s|=.20-.43). However, Decentering was strongly associated with Negative Affect (*r*=−.59) and Dysphoria (*r*=−.55), as were Negative Affect and Dysphoria (*r*=.62) and Positive Affect and Wellbeing (*r*=.63). At the between-person level, associations were comparable or stronger compared to within-person associations for most variables. In particular, Decentering and factors reflective of poor psychological functioning (i.e., Negative Affect, Dysphoria, Idiographic Symptoms) were all strongly to very strongly intercorrelated in the expected direction (|*r*s|=.64-.82), as was Positive Affect and Wellbeing (*r*=.91). These associations indicate that Dysphoria, Idiographic Symptoms, and Wellbeing were sufficiently distinct at both levels (*r*s<.65) to warrant examining them separately as outcomes in moderation analyses.

Directionality of Associations and Relations with Inertia

The temporal direction of effects between Decentering and each of the five other variables (Negative Affect, Positive Affect, Dysphoria, Wellbeing, and Idiographic Symptoms) were examined in separate bivariate VAR(1) models to test Aims 1 and 2. For example, Decentering and Dysphoria at T-1 were specified as within-person predictors of Decentering and Dysphoria at T (i.e., the next report), allowing for an examination of the unique effect of each (see Figure 1). Results are shown in Table 1. Across models, all variables had significant and moderate autoregressive random associations (i.e., persistence of each variable from one report to the next and individual differences in this association) and random residual variances (i.e., individual differences in the proportion of variance explained; not shown in the table) as well as a significant trend over time. In addition, the minimum PSR for each model was below 1.01, indicating good convergence of each model.

With regard to the cross-lagged associations with affect, state Decentering significantly predicted a decrease in Negative Affect (β=−.06, 95% Credibility Interval [CI]: −.09, −.04) and an increase in Positive Affect (β=.07, CI: .05, .09) at the next assessment point, holding constant prior levels of affect. These associations were bidirectional, as Negative Affect predicted less subsequent Decentering (β=−.22, CI: −.25, −.20) and Positive Affect predicted more subsequent Decentering (β=.09, 95% CI: .07, .11) at the next time point. Furthermore, higher between-person Decentering was associated with less Negative Affect inertia (β=−.30, CI: −.44, −.14), but was unrelated to Positive Affect inertia (β=.13, CI: −.04, .29). That is, variance in negative affect was less likely to persist at the next assessment for those with higher average decentering.

For variables indicating psychological distress or health, a similar pattern was found whereby state Decentering predicted later decreases in Dysphoria (β=−.11, CI: −.14, −.09) and Idiographic Symptoms (β=−.09, CI: −.11, −.07), as well as increases in Wellbeing (β=.08, CI: .06, .10). Likewise, higher levels of Dysphoria (β=−.17, CI: −.20, −.15) and Idiographic Symptoms (β=−.12, CI: −.15, −.10) were associated with decreases in subsequent Decentering, and Wellbeing was associated with increased subsequent Decentering (β=.06, CI: .03, .08). Finally, higher between-person Decentering was associated with less inertia in Dysphoria (β=−.21, CI: −.36, −.05), but was unrelated to Idiographic Symptoms inertia (β=−.08, CI: −.25, .08) and Wellbeing inertia (β=.11, CI: −.05, .27).

Taken together, Decentering and the other variables appear to contribute to feedback loops that serve to increase (for Wellbeing, Positive Affect) or decrease (for Dysphoria, Idiographic Symptoms, Negative Affect) experiences associated with psychological health. In addition, greater Decentering was associated with reduced persistence of Negative Affect and Dysphoria over time.[5]

Interaction of State Decentering and Affect

Table 2 shows the results for three types of moderation analyses: within-person concurrent associations (i.e., momentary associations at a given report), within-person lagged associations (i.e., outcomes at one report predicted by Affect and Decentering on the previous report), and between-person associations (i.e., individual differences in decentering and outcomes across the study).

Dysphoria.—When predicting Dysphoria, Affect and Decentering had significant unique main effects in the expected direction across all models (i.e., within-person concurrent, within-person lagged, and between-person): Negative Affect was associated with higher Dysphoria, and Positive Affect and Decentering were associated with lower Dysphoria (|βs|=.11-.43). Decentering moderated the effects of Negative Affect (β=−.07, CI: −.10, −.04) and Positive Affect (β=.16, CI: −18, −.13) on Dysphoria concurrently within-persons, but the interaction effects were not statistically significant in lagged analyses. In addition, between-person Decentering moderated the effect of between-person Positive Affect on Dysphoria (β=.20, CI: .12, .27), but not the Negative Affect-Dysphoria association (β=.03, CI: −.08, .13). The patterns of these interactions revealed that, consistent with hypotheses, Decentering attenuated the association of within-person Negative Affect with Dysphoria (Figure 2, Panel A), of within-person Positive Affect with Dysphoria (Figure 2, Panel B), and of between-person Positive Affect with Dysphoria (Figure 3, Panel A).

Idiographic Symptoms.—When predicting participants' Idiographic Symptoms, main effects were generally significant as expected: higher Negative Affect, less Positive Affect, and less Decentering were associated with more Idiographic Symptoms (|βs|=.04-.51). However, between-person Positive Affect did not significantly predict between-person Idiographic Symptoms (β=.06, CI: −.02, .14). In addition, there was a significant interaction

[5]For comparative purposes, we also tested the baseline Decentering factor as a predictor of inertia of affect, dysphoria, wellbeing, and idiographic symptoms. Baseline Decentering only significantly predicted Dysphoria inertia (β=−.16, CI: −.30, −.02).

between Affect and Decentering for all concurrent within-person and between-person models (2s=.04 to .18), except for between-person PA predicting Idiographic Symptoms (β=.01, CI: −.07, .10). No moderation effects were evident in lagged models. The patterns of the interactions were mixed, with Decentering *strengthening* the positive association between Negative Affect and Idiographic Symptoms, at the within-person (Figure 2; Panel C) and between-person (Figure 3, Panel B) levels, counter to hypotheses. On the other hand, and consistent with hypotheses, Decentering attenuated the negative association between concurrent Positive Affect and Idiographic Symptoms (Figure 2, Panel D).

Wellbeing.—Turning to analyses predicting Wellbeing, there was a significant main effect of higher Positive Affect and lower Negative Affect for concurrent, lagged, and between-person analyses (|βs|=.06-.90). Greater Decentering predicted greater Wellbeing for all three Positive Affect moderation analyses, but it was a significant predictor for only the within-person concurrent Negative Affect moderation analysis. With regard to Decentering as a moderator of affect, the interaction term was significant only for Negative Affect in the within-person concurrent model (β=−.06, CI: −.08, −.04); its effect did not persist to the next report in the lagged models. Probing this interaction revealed that Decentering *strengthened* the inverse association between Negative Affect and Wellbeing (Figure 2; Panel E), counter to predictions.

Moderating Effects of Trait Decentering

Last, we examined the Decentering latent variable formed from three baseline measures (MAS-D, CFQ, EQ) to test if it moderated the concurrent association between affect and outcomes during the EMA study (i.e., cross-level interaction). Results are presented in Table 3. The baseline Decentering factor prospectively significantly predicted less Dysphoria, less Idiographic Symptoms, and greater Wellbeing throughout the EMA study (|βs|=.26-.45). Baseline Decentering significantly moderated the associations between Negative Affect and Dysphoria (β=−.20, CI: −.32, −.07), but not Idiographic Symptoms (β=.00, CI: −.15, .14) or Wellbeing (β=−.10, CI: −.25, .05). Slope analyses revealed that higher Decentering predicted a weaker momentary association between Negative Affect and Dysphoria (Figure 3; Panel C). Further, Decentering moderated the momentary associations between Positive Affect and each outcome (|βs|= 14-.34). Specifically, higher Decentering predicted a weaker relationship between momentary Positive Affect and Dysphoria (Figure 3; Panel D), Idiographic Symptoms (Figure 3; Panel E), and Wellbeing (Figure 3; Panel F). Each of the significant effects was consistent with predictions. [6]

[6]Two supplementary analyses were conducted related to trait decentering as a moderator of affect and clinical outcomes. The first analysis examined whether the between-level decomposition of decentering (i.e., decentering averaged across all EMA assessments) was predictive of the momentary slope of symptoms/wellbeing with affect. Thus, this analyses answers a conceptually comparable question to the primary analysis, but it uses between-person variance of momentary decentering as the moderator rather than a trait measure. Results were mostly similar to the models using baseline decentering as a moderator, with the exception of between-level decentering having a statistically non-significant association with the wellbeing-positive affect slope (β = .01, 95% CI = −.14, .15). The second supplementary analysis tested baseline decentering as a moderator within the RDSEM framework. Primary analyses used MSEM because this was required for the within-person moderation analyses and was consistent with our preregistration, and MSEM is recommended currently when examining interactions. But for the sake of completeness we also ran these analyses in RDSEM, which accounts for autoregressive effects. Results are reported in full in the online supplement Table B. In these analyses, only the association between dysphoria and positive affect was significantly moderated by trait decentering (β=.24, CI: .11, .37).

Discussion

The present work sought to test three aims relating to the processes of decentering states as experienced naturalistically in daily life. Our first aim examined the dynamic temporal relationships of decentering with negative affect, positive affect, dysphoria, idiographic symptoms, and wellbeing. Consistent with hypotheses, we found that decentering and these variables appear to be mutually reinforcing – each predicting subsequent levels of the other —with positive relationships of decentering observed with wellbeing and positive affect, and negative relationships observed with dysphoria, idiographic symptoms, and negative affect. Second, we examined whether decentering predicted reduced inertia in participants' experiences of negative affect, dysphoria, and idiographic symptoms, and whether and how decentering related to the inertia of positive affect and wellbeing. Higher levels of decentering were associated with less inertia (i.e., quicker return to baseline) of negative affect and dysphoria over time, consistent with hypotheses. Decentering did not predict inertia of positive affect, idiographic symptoms, and wellbeing. Third, we examined whether decentering weakens the associations of negative and positive affect with three clinically-relevant outcomes—one of which has been tested before (i.e., dysphoria), and two others that are novel (i.e., idiographic symptoms, wellbeing). This hypothesis received mixed support, depending on the level of analysis (within-person concurrent, within-person lagged, between-person using EMA variables, and between-person using baseline trait decentering) and on the outcome. Overall, the most consistent effects in the expected direction were for dysphoria in within-person concurrent analyses, between-person using EMA (PA only), and between-person using baseline decentering. None of the lagged/prospective analyses indicated significant moderation, and support for the other two outcomes was inconsistent and sometimes in the opposite direction from hypotheses.

Temporal Dynamics of Decentering

Naturalistic instances of decentering predicted more positive and less negative affective states several hours later, and decentering was more likely to occur following positive states and less likely after negative states. As described in the introduction, both of these patterns have support in the existing literature in regard to affect (e.g., Brockman et al., 2017; Du et al., 2019; Gotink et al., 2016; Tschacher & Lienhard, 2021). However, we believe this study offers the finest grained temporal analyses of these relationships to date, focuses specifically on decentering as opposed to mindfulness more broadly, and provides a novel examination of associations with idiographic symptoms and wellbeing. It is noteworthy that these effects were found using conservative statistical models that accounted for stability over time, individual differences in associations, and individual differences in how strongly variables predicted one another. As such, confidence is enhanced that the observed effects are truly bidirectional and are not specious due to a failure to account statistically for other aspects of temporal dynamics.

Our results are consistent with the idea that decentering might be a mechanism underlying changes in a range of outcomes, including affect, symptoms, and wellbeing in daily life (e.g., Bernstein et al., 2015; Hayes et al., 2012). Furthermore, lower decentering was predictive of more persistent negative affect and dysphoric states, aligned with theory that

decentering may interrupt ruminative processes that prolong negative moods (Lebois et al., 2015; Yasinski et al., 2016). Though these data cannot speak directly to clinical applications, these findings suggest the potential import of teaching decentering from both positive and negative states in therapy and preventative programs, and provide support with regard to its ecological validity based upon momentary experiences. In addition, they extend the literature by indicating that momentary naturalistic decentering states are predictive not only of subsequent affective changes and general distress, but also of each person's self-identified most bothersome symptom and sense of vitality/meaning in life, which are increasingly foci of treatment.

Little is known about the real-time impact of decentering from positive mood states. One could argue that the decentering should interrupt any perseverative thinking, whether of positive or negative valence, thereby shortening mood states, and there is some support for this (e.g., Verduyn et al., 2012). However, our results indicate that a distanced perspective consistent with decentering does not reduce positive mood states at that time, but on the contrary tends to increase them subsequently. Thus, it appears that decentering may have asymmetrical short-term effects on positive vs. negative emotional states, at least when decentering is observed naturalistically in a sample that is not highly trained in meditation. Nonjudgmental psychological distance may facilitate differential engagement with thoughts and feelings over time depending upon valence: selectively engaging with and savoring positive experiences (Garland et al., 2015), and disengaging from rumination over negative emotional experience (Yasinski et al., 2016). It may also enhance several stages of the emotion regulation process, including attentional deployment and cognitive change (Gross, 2015; Whitmer & Gotlib, 2013), contributing to more successful and adaptive emotion regulation attempts.

While decentering was predictive of subsequent outcomes, at the same time, momentary levels of decentering were predicted by one's prior feelings, symptoms, and sense of wellbeing. For negative variables (i.e., negative affect, dysphoria, and idiographic symptoms), effects in this latter direction (i.e., predicting later decentering) appear to be even stronger, given non-overlapping confidence intervals of the regression paths. These findings suggest that current symptoms and affective states may either facilitate (positive affect, wellbeing) or impede (negative affect, symptoms) the subsequent use of decentering; in other words, one's current emotional state is an important contextual influence for later engagement in decentering in naturalistic settings. For individuals with high levels of decentering, this is consistent with the idea of an "upward spiral" that is mutually reinforcing and connects mindfulness to wellbeing (Garland et al., 2015). However, the other side of the coin reflects a potential vicious cycle for many individuals who are currently struggling with emotional disorders: as people feel experience more distress and reduced wellbeing, they tend to remain fused with these painful experiences, which subsequently predicts an increase in symptoms and unpleasant experiences. Perhaps the reduced endorsement of decentering is because aversive experiences are inherently more immersive and "sticky" (Hayes et al., 2012), such that it is more difficult to remember or want to engage in decentering, as well as more challenging and effortful to do so successfully.

In conjunction with the findings of increased persistence of negative affective symptoms for individuals with low levels of decentering, it is easy to see how people could get stuck in this cycle as symptoms worsen. Importantly, however, this process is only describing average tendencies, across people and occasions, and the associations are far from perfect. There are certainly specific instances where a person experiences strong negative affect and nonetheless engages in decentering afterwards. Thus, the downward spiral illustrates a challenge in the application of decentering, but this process is not determinative or inevitable. One potential application is that it may not be sufficient for clients to practice decentering when in a neutral or positive mood in the therapist's office. Rather, perhaps decentering should also be practiced when *currently* distressed or feeling disengaged (perhaps following a mood induction or imaginal exposure), so that clients are better prepared to utilize decentering during difficult times in their daily lives. In addition, troubleshooting their specific barriers (e.g., hopeless thoughts, confusion and feeling overwhelmed, forgetting about it) to applying decentering at home is critical if learning is to be translated outside of the therapy room.

Decentering as a Moderator of Affective Outcomes

Theory and some initial empirical work suggests that decentering should disrupt the link between high negative affect/low positive affect and subsequent feelings of distress (e.g., Bernstein et al., 2015; Naragon-Gainey & DeMarree, 2017a). We also conducted an exploratory examination of whether this extends to novel related variables: 1) self-identified most bothersome symptom (idiographic symptoms), in order to personalize and ensure relevance to each individual's typical aversive experiences, and 2) eudaimonic wellbeing, a common treatment target that improves quality of life but is not dependent upon particular affective states. We start by examining our primary outcome—dysphoria—and then turn to the others. The current study demonstrates for the first time that decentering *in the moment* weakens the link between positive and negative affect and dysphoria at that time. While we cannot draw causal conclusions, these findings are critical in demonstrating that the application of decentering at moments of aversive affective states is associated with a reduced likelihood at that time of feeling dysphoric. However, it is important to note that lagged analyses, where the outcome was assessed at the next report several hours later, were not significant. As such, it may be that any beneficial impact of decentering is quite fleeting and immediate. If this finding is supported in clinical settings, clients could be taught that it may be helpful and necessary to repeatedly engage in decentering throughout the day (particularly during prolonged periods of distress), rather than expecting a one-off practice to have sustained effects.

Although within-person effects were of primary interest, we also examined between-person effects, both from EMA decentering states and from baseline measures of decentering. Between-person decentering predicted a weaker effect of positive affect, but not negative affect, on between-person dysphoria. This null result for negative affect could be due in part to very strong between-person associations among the three variables ($|rs| > .75$). In addition, higher baseline decentering predicted weaker associations of positive and negative affect with dysphoria, replicating Naragon-Gainey and DeMarree (2017a). Thus, these results generally suggest that decentering reduces risk for dysphoria, both in the moment

and as individual differences (i.e., average EMA reports across the study or baseline trait decentering).

Turning to idiographic symptoms and wellbeing, neither has been assessed before with regard to decentering in daily life. As described previously, although there were bidirectional associations in the expected direction between these variables and decentering, decentering did not predict their inertia/persistence. Furthermore, moderation analyses were mixed for these variables, with most interactions not reaching significance, some significant and in the hypothesized direction, and some indicating that decentering *strengthened* the association between affect and idiographic symptoms or wellbeing. Given the inconsistency in patterns, we are hesitant to draw strong conclusions from results for these variables without further study.

Nonetheless, there are several possible (and not mutually-exclusive) considerations that can help make sense of these findings. First, idiographic symptoms and wellbeing were both assessed with novel EMA items whose properties are therefore not well-understood, and it is possible that they did not capture the intended constructs well. Overall, there was reasonable endorsement of the idiographic symptoms items: 69% of reports rated the presence of the symptom as mild or greater, and 50% of reports rated interference from the symptom as mild or greater. However, some participants selected idiographic symptoms that are situationally-bound and therefore may be fairly infrequent (e.g., particular interpersonal interactions, compulsions, specific worries), leading to potential floor effects for some individuals. It may also have been difficult for the subset of healthy participants with minimal symptoms to identify a "most bothersome symptom," and their selections may therefore have been somewhat arbitrary or based upon a transient stressor that did not persist throughout the EMA period. A clinical sample who can all clearly identify a strong symptom may yield results more aligned with expectations. For wellbeing, rating one's current sense of meaning in life requires more cognitive processing and abstraction (i.e., reflecting on one's current experience of meaning and comparing that to one's own standards for what it is to feel engaged and vital), as compared to assessing current feeling states or simple thoughts that are more accessible and superficial (Steptoe, 2019). This may have resulted in less accurate measurement for wellbeing relative to the other EMA variables, particularly in situations or among participants for whom such abstract reflection is more effortful. Taken together, given this is the first moderation examination of decentering with these two outcome variables, further study is needed to reconcile these mixed results and determine whether decentering is protective, detrimental, or unrelated to the relationship between affect and idiographic symptoms and wellbeing.

Limitations and Future Directions

There are a number of limitations that should be considered when interpreting these results. First, although we over-sampled for people receiving or seeking psychological treatment and about 42% met criteria for a current mood or anxiety disorder, this was a community sample that included some individuals with minimal and subthreshold symptoms. As such, it is unclear whether the results would generalize to a clinical sample with greater symptom severity, or if findings would be similar in an intervention context. Second, this sample

was drawn from a single cultural context in the United States, and might not apply to dissimilar cultural contexts. For example, there is meaningful cross-cultural variability in a host of dimensions related to affect and affect regulation (for a review, see Tsai & Clobert, 2019), including preferences for particular affective states (e.g., Tamir et al., 2016), cultural conceptions and other beliefs relating to affect (e.g., De Vaus et al., 2017), and beliefs about emotion regulation strategies (e.g., Deng et al., 2019). Consequently, the effects of decentering, and of emotion regulation more generally, may vary as a function of one's cultural beliefs, expectations, and conceptions related to emotional life. Third, the sample was likely heterogeneous with regard to training in decentering, as individuals with meditation experience or who received certain psychological interventions may have had direct instruction and practice with decentering, potentially altering their likelihood of decentered states in daily life and their understanding of the decentering items. Furthermore, individuals with meditation training may have more instruction and practice decentering from both positive and negative mood states, whereas people who learned decentering in therapy are likely to have primarily applied decentering to negative mood states. Studying naturalistic decentering in trained vs. untrained individuals would clarify if or how such training alters the application or outcomes of decentering, and our results should not be generalized to decentering during formal meditation practice, mindfulness interventions, or among highly-experienced meditators.

There are also several limitations to the study design. We used a relatively intensive sampling design (app. every two hours), but decentered states and affect may fluctuate at a faster scale, such as minutes. As such, this study may have missed some associations that are more fleeting in nature, and lab-based paradigms or very intensive EMA paradigms are needed to test shorter timescales. In addition, several of the EMA measures (decentering, wellbeing, idiographic symptoms) used novel items, given that there were not validated, brief EMA measures available for these constructs. Although it is encouraging that they showed the expected associations with similar measures at baseline and reasonable internal consistency, further testing is required to have strong confidence in their psychometric properties. Some of the constructs (i.e., decentering, negative affect, and dysphoria; positive affect and wellbeing) also demonstrated moderate to large associations with one another (particularly at the between-person level), so the outcomes and predictors tested here are not independent of one another. However, it was not computationally-feasible to include them all in a single model, and within-person analyses held constant concurrent overlap between variables (i.e., autoregressive paths) to isolate construct-specific effects. Regarding the decentering items, we included content to assess two purportedly separable components of decentering: observer perspective and reduced reactivity to thought. However, one of the observer perspective items had poor psychometric properties and was dropped, resulting in a composite more heavily weighted toward reduced reactivity. Thus, these results reflect nonreactivity decentering processes more than third-person observation of internal experiences. In addition, the two reduced reactivity items may have been perceived as more relevant to negative emotions than to positive emotions, given that the phrasing (e.g., "struggle"; "caught up") is suggestive of aversive experiences that are negatively-valenced for most individuals. It is also noteworthy that the positive affect items were all reflective of high emotional arousal, so it is unclear if results may have differed using low-arousal

positive affect terms (e.g., calm). Last, all items were self-reported, and as such they require some ability to introspect about one's current states, and mood could influence responses. However, it is important to note that lagged within-person analyses held constant one's current experiences in predicting one's future state.

Although some analyses tested temporal precedence, the design is still correlational—with possible unmeasured confounding variables—and does not allow for causal conclusions. As one example of possible confounding variables, we focused on decentering's associations with affect, but external events also impact symptoms and wellbeing. Future studies could incorporate data on daily stressors and uplifts to draw more specific conclusions about decentering's impact and to assess whether it influences reactivity to positive and negative events. Finally, although we tested decentering here, there are numerous other putative treatment mechanisms (e.g., emotion regulation, distress tolerance, self-control, reappraisal, acceptance) that are related to decentering. They would benefit from similar study in daily life, particularly with regard to the direction of their associations with clinical outcomes, and in conjunction with decentering to examine the extent to which they are similar versus distinct. We suspect that decentering is likely not unique in the bidirectional associations we observed with clinical outcomes. A better understanding of how affect and symptoms are associated with the likelihood or effectiveness of using specific therapeutic techniques in daily life could help facilitate successful implementation of techniques outside of the therapy room.

Conclusions

Decentering is important in a range of treatments and models of psychopathology, but almost nothing is known about how it works as enacted naturalistically in daily life. The current study found that decentering has bidirectional temporal associations (in an adaptive direction) with affect, dysphoria, person-specific symptoms, and wellbeing, as well as some evidence that it disrupts the persistence of negative mood states. In addition, decentering in the moment weakens the link between affective states and dysphoria symptoms, but its relevance for person-specific symptoms and eudaimonic wellbeing was mixed and requires further study. These results support the importance of decentering as a therapeutic technique and possible mechanism of change, demonstrating its ecological validity and highlighting the relevance of one's current mood state for the implementation of decentering.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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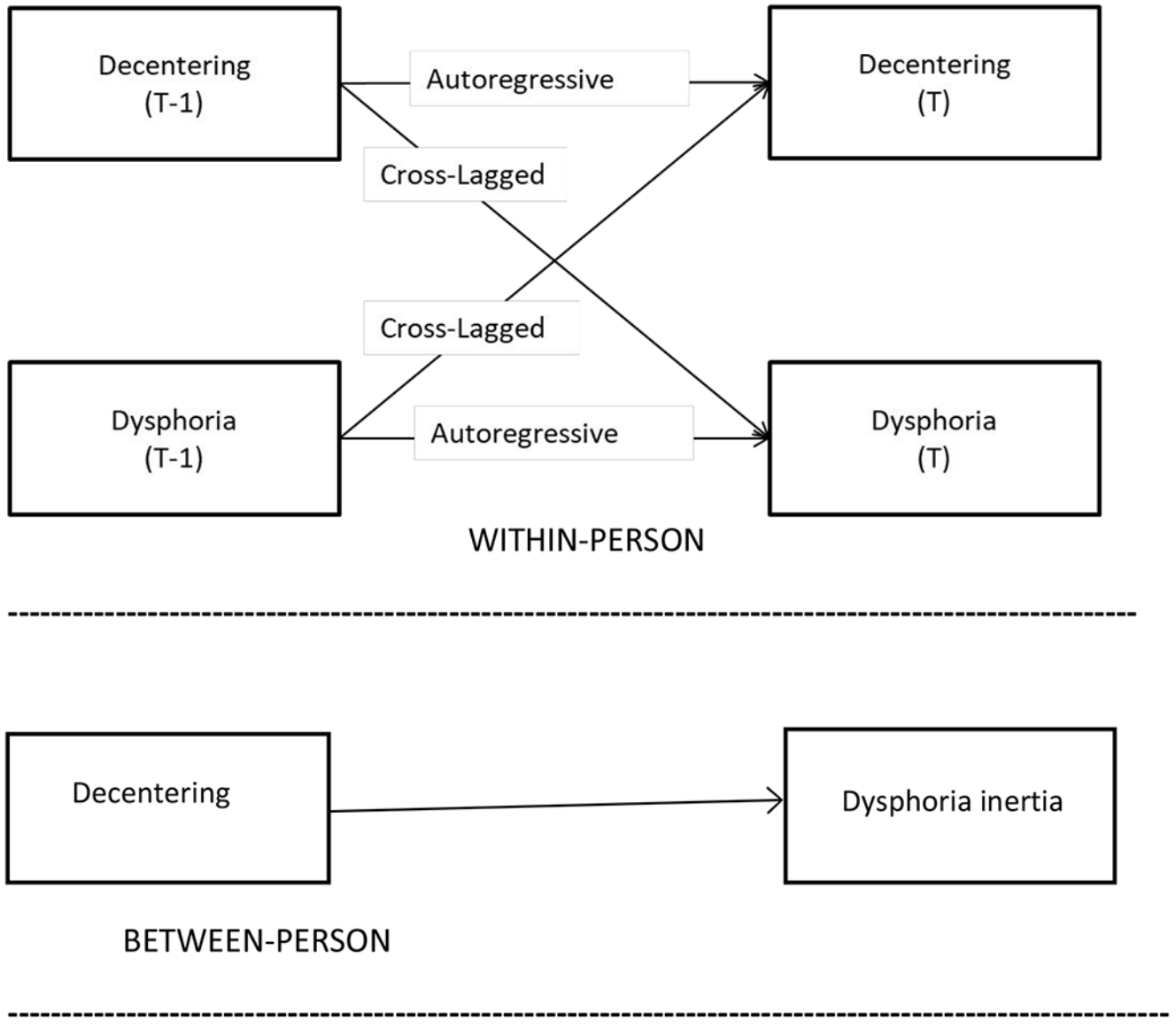

Figure 1.

Example multilevel VAR(1) model for decentering and dysphoria. Note that time trends were also included as a within-person predictor, and random intercepts, slopes, and residual variances were estimated.

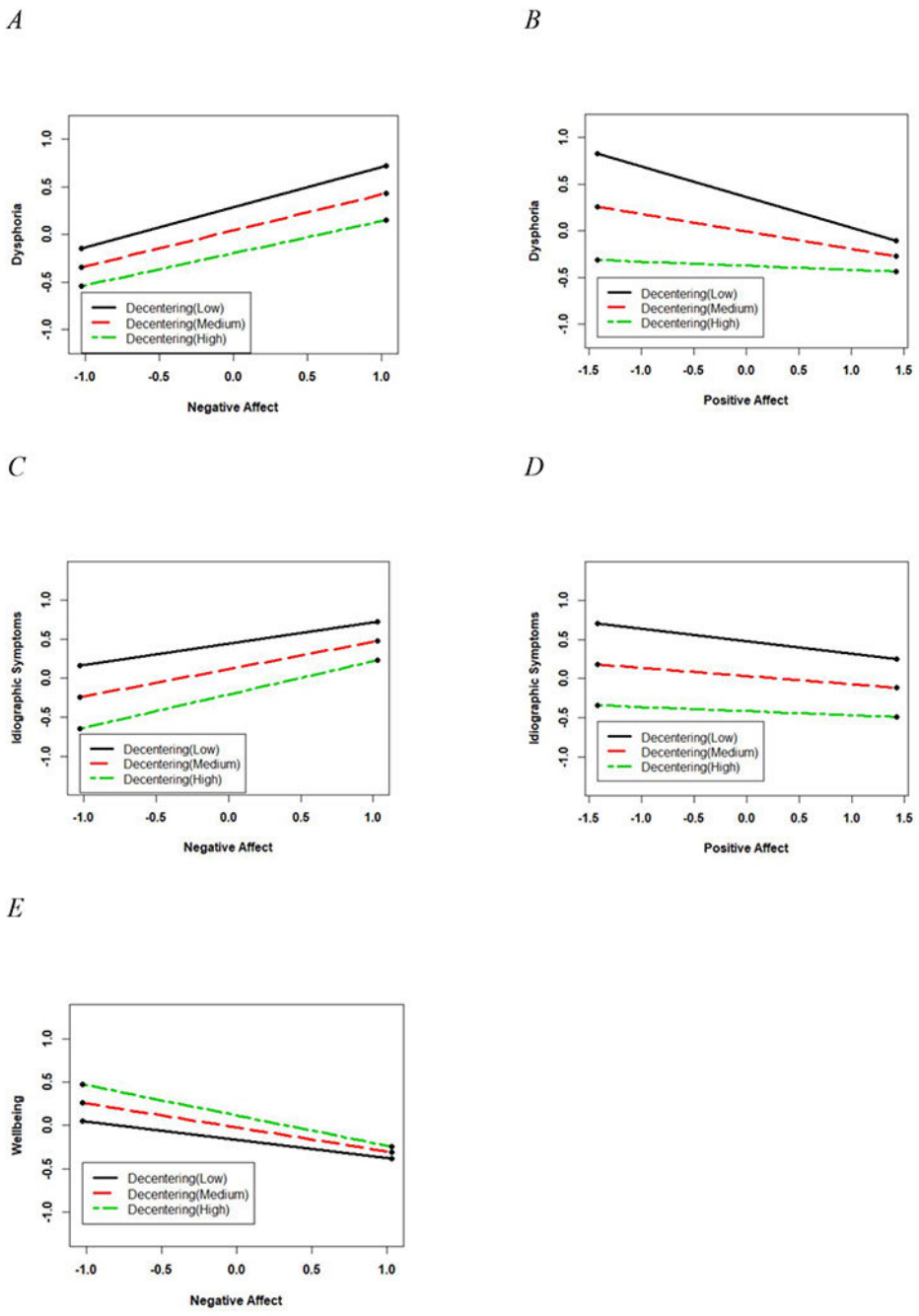

Figure 2.
Simple slope analysis for the significant concurrent within-level moderating effects of

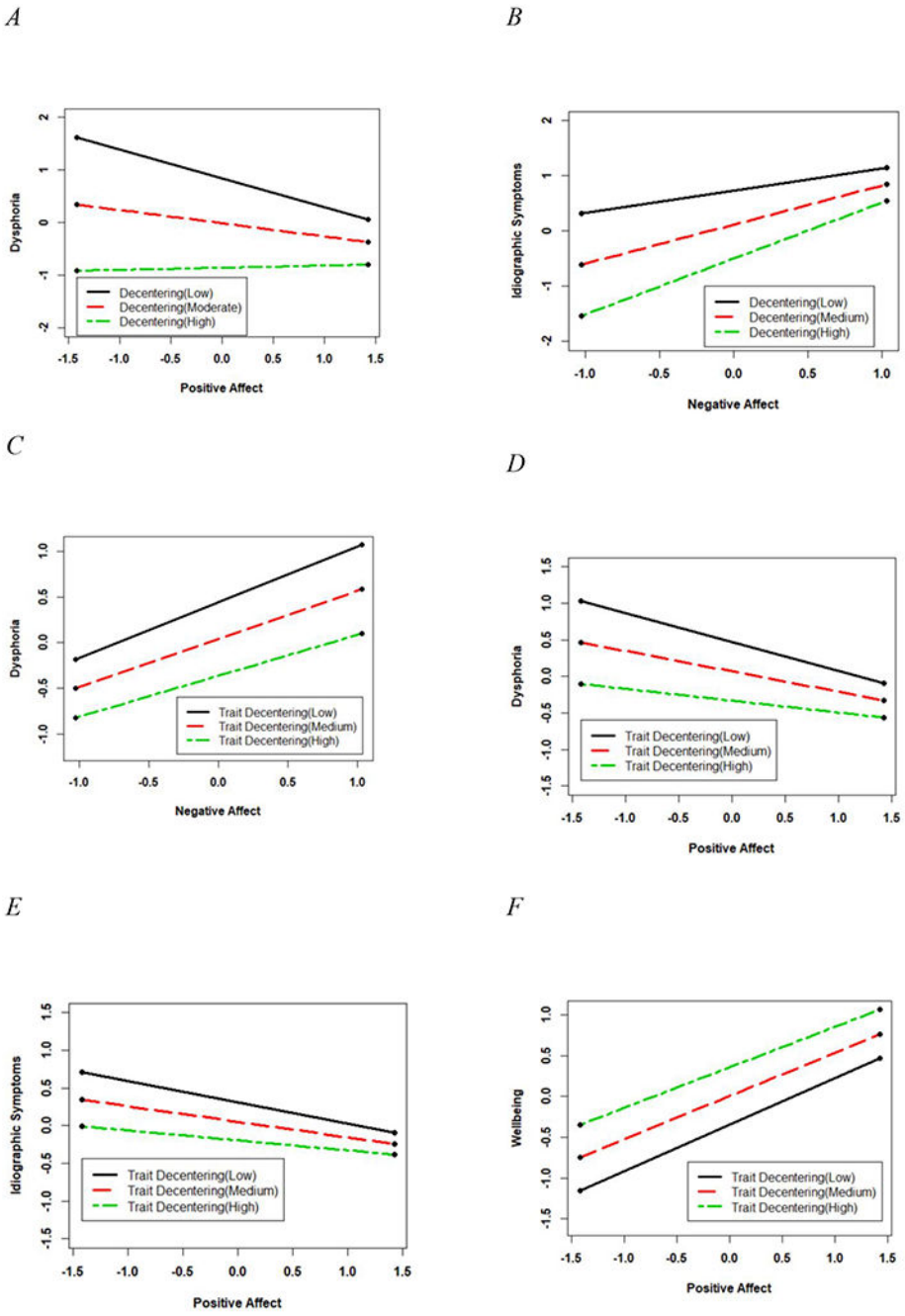

Figure 3.

Simple slope analysis for the significant between-level moderating effects of EMA decentering (Panels A, B), and significant cross-level moderating effects of baseline decentering (Panels C-F).

Table 1.

Multilevel VAR(1) Model Estimates

	Model Path (within-level = $T_0 \rightarrow T_1$)	β	95% CI
Negative Affect			
Within-Level	Time trend	**−.02***	**(−.04, −.004)**
	Decentering → Decentering	**.16***	**(.13, .18)**
	Negative Affect → Negative Affect	**.32***	**(.29, .34)**
	Decentering → Negative Affect	**−.06***	**(−.09, −.04)**
	Negative Affect → Decentering	**−.22***	**(−.25, −.20)**
Between-Level			
	Decentering → Negative Affect inertia	**−.30***	**(−.44, −.14)**
Positive Affect			
Within-Level	Time trend	**−.05***	**(−.07, −.03)**
	Decentering → Decentering	**.26***	**(.23, .28)**
	Positive Affect → Positive Affect	**.34***	**(.32, .36)**
	Decentering → Positive Affect	**.07***	**(.05, .09)**
	Positive Affect → Decentering	**.09***	**(.07, .11)**
Between-Level			
	Decentering → Positive Affect inertia	.13	(−.04, .29)
Dysphoria			
Within-Level	Time trend	**−.07***	**(−.09, −.06)**
	Decentering → Decentering	**.19***	**(.17, .22)**
	Dysphoria → Dysphoria	**.29***	**(.26, .32)**
	Decentering → Dysphoria	**−.11***	**(−.14, −.09)**
	Dysphoria → Decentering	**−.17***	**(−.20, −.15)**
Between-Level			
	Decentering → Dysphoria inertia	**−.21***	**(−.36, −.05)**
Idiographic Symptoms			
Within-Level	Time trend	**−.06***	**(−.08, −.04)**
	Decentering → Decentering	**.23***	**(.21, .26)**
	Idiographic → Idiographic	**.25***	**(.23, .28)**
	Decentering → Idiographic	**−.09***	**(−.11, −.07)**
	Idiographic → Decentering	**−.12***	**(−.15, −.10)**
Between-Level			
	Decentering → Idiographic inertia	−.08	(−.25, .08)
Wellbeing			
Within-Level	Time trend	**−.06***	**(−.09, −.04)**
	Decentering → Decentering	**.26***	**(.24, .29)**
	Wellbeing → Wellbeing	**.25***	**(.22, .27)**
	Decentering → Wellbeing	**.08***	**(.06, .10)**
	Wellbeing → Decentering	**.06***	**(.03, .08)**
Between-Level			

	Model Path (within-level = $T_0 \rightarrow T_1$)	β	95% CI
	Decentering → Wellbeing inertia	.11	(−.05, .27)

Note. CI = credibility interval; significant effects are shown with an asterisk and in bold. β = standardized regression coefficients averaged across individuals. Random autoregressive effects and random residual variances for all variables were included in the models but are not presented here.

Table 2.

Within-Person and Between-Person Moderation Analyses

	Negative Affect	Positive Affect
Outcome: Dysphoria		
Within-person (Concurrent)		
Time trend	**−.05[−.06, −.04]***	**−.07[−.08,−.05]***
Affect	**.43[.40, .45]***	**−.26[−.28, −.24]***
Decentering	**−.26[−.29, −.24]***	**−.39[−.41, −.37]***
Affect * Decentering	**−.07[−.10, −.04]***	**.16[.13, .18]***
Within-person (Lagged)		
Time trend	**−.03[−.05, −.01]***	**−.04[−.06, −.02]***
Time lag between reports	.01[−.01, .02]	.00[−.02, .02]
Dysphoria (T_0)	**.18[.16, .21]***	**.18[.16, .21]***
Affect	**.11[.08, .14]***	**−.13 [−.16, −.10]***
Decentering	**−.04[−.07,−.02]***	**−.07 [−.10, −.04]***
Affect * Decentering	−.02[−.06, .02]	−.00 [−.04, .03]
Between-person		
Affect	**.73[.62, .81]***	**−.31[−.38, −.24]***
Decentering	**−.28[−.41, −.15]***	**−.69[−.74, −.62]***
Affect * Decentering	.03[−.08, .13]	**.20 [.12, .27]***
Outcome: Idiographic Symptoms		
Within-person (Concurrent)		
Time trend	**−.02[−.04, −.01]***	**−.04[−.05, −.02]***
Affect	**.28[.25, .30]***	**−.11[−.13, −.09]***
Decentering	**−.25[−.27, −.22]***	**−.34[−.36, −.32]***
Affect * Decentering	**.06[.03, .09]***	**.04 [.02, .06]***
Within-person (Lagged)		
Time trend	**−.02[−.04, −.00]***	**−.02[−.04, −.00]***
Time lag between reports	.00[−.01, .02]	.00[−.02, .02]
Idiographic Symptoms (T_0)	**.20[.17, .22]***	**.20[.18, .23]***
Affect	**.04[.01, .08]***	**−.04 [−.07, −.02]***
Decentering	**−.04[−.06,−.01]***	**−.05 [−.08, −.02]***
Affect * Decentering	−.04[−.08, .00]	.01 [−.02, .05]
Between-person		
Affect	**.51[.35, .64]***	.06[−.02, .14]
Decentering	**−.44[−.57, −.29]***	**−.71[−.76, −.64]***
Affect * Decentering	**.18[.06, .28]***	.01[−.07, .10]
Outcome: Wellbeing		
Within-person (Concurrent)		
Time trend	**−.06[−.08, −.04]***	**−.03[−.04, −.01]***
Affect	**−.24[−.26, −.22]***	**.58[.57, .60]***
Decentering	**.11[.09, .14]***	**.10[.08, .11]***

	Negative Affect	Positive Affect
Affect * Decentering	**−.06[−.08, −.04]***	.02[−.01, .04]
Within-person (Lagged)		
Time trend	**−.04[−.06, −.02]***	**−.03[−.05, −.02]***
Time lag between reports	**−.02[−.04, −.00]***	−.02[−.03, .00]
Wellbeing (T_o)	**.19[.17, .21]***	**.12[.09, .15]***
Affect	**−.06[−.09, −.03]***	**.15[.12, .18]***
Decentering	−.02[.05, .01]	**.04 [.01, .07]***
Affect * Decentering	.01 [−.03, .05]	−.01 [−.04, .03]
Between-person		
Affect	**−.35[−.51, −.15]***	**.90[.88, .92]***
Decentering	.13[−.04, .31]	**.12[.06, .17]***
Affect * Decentering	−.14[−.28, .01]	.00[−.05, .05]

Note. CI = credibility interval; significant effects are shown with an asterisk and in bold. β = standardized regression coefficients averaged across individuals.

Table 3.

Baseline Decentering as a Cross-Level Moderator of Within-Person Affect and Outcomes

	Negative Affect		Positive Affect	
	β	**95% CI**	***β***	**95% CI**
Outcome: Dysphoria				
Within-person				
Time trend	**−.05***	**(−.06, −.03)**	**−.08***	**(−.10, −.06)**
Affect	**.56***	**(.54, .57)**	**−.35***	**(−.37, −.33)**
Between-person				
Decentering	**−.45***	**(−.54, −.36)**	**−.45***	**(−.54, −.36)**
Affect * Decentering	**−.20***	**(−.32, −.07)**	**.34***	**(.22, .45)**
Outcome: Idiographic Symptoms				
Within-person				
Time trend	**−.02***	**(−.04, −.01)**	**−.05***	**(−.07, −.03)**
Affect	**.39***	**(.37, .41)**	**−.20***	**(−.22, −.18)**
Between-person				
Decentering	**−.26***	**(−.36, −.15)**	**−.26***	**(−.36, −.15)**
Affect * Decentering	.00	(−.15, .14)	**.21***	**(.08, .34)**
Outcome: Wellbeing				
Within-person				
Time trend	**−.06***	**(−.08, −.04)**	**−.02***	**(−.04, −.01)**
Affect	**−.29***	**(−.31, −.27)**	**.61***	**(.59, .62)**
Between-person				
Decentering	**.38***	**(.28, .47)**	**.38***	**(.28, .47)**
Affect * Decentering	−.10	(−.25, .05)	**−.14***	**(.28, .00)**

Note. CI = credibility interval; significant effects are shown with an asterisk and in bold. β = standardized regression coefficients averaged across individuals.