



Research paper

Affective models of depression and anxiety: Extension to within-person processes in daily life

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ABSTRACT

Background: Affective models (e.g., tripartite model) delineate shared and unique components of depression and anxiety. Specifically, negative affect is broadly associated with these symptoms, whereas low positive affect is relatively specific to depression and social anxiety. However, it is unknown how affect relates to symptoms as they occur naturalistically in daily life or as a within-person dynamic process.

Method: 135 treatment-seeking adults completed a baseline assessment of trait affect and then rated current affect and symptoms (depression, social anxiety, panic, worry) three times per day for 10 days. Multilevel structural equation modeling was used, and prospective analyses held constant current symptoms.

Results: Baseline trait negative affect and individual differences in momentary negative affect predicted all four symptoms in daily life, whereas low positive affect predicted greater depression only. Similar results were found for within-person concurrent analyses. Prospectively, momentary negative affect predicted increased depression up to 24 h later, and increased panic or worry up to 8–16 h later. Low momentary positive affect predicted greater depression only (8 h later).

Limitations: All data were self-reported, and some relevant anxiety and mood symptoms were excluded. The timing of reports was random and may have missed notable symptoms. Given the novelty of the study, replication is important.

Conclusions: Affective models of depression and anxiety derived from retrospective assessments demonstrated strong ecological validity. With the exception of PA and social anxiety, associations found at the between-person level generally applied to within-person processes, which may be amenable to tracking and targeting in therapy.

1. Introduction

Over the past several decades, many studies have examined the structure of depression and anxiety, converging upon a generally robust set of associations (see [Watson, 2005](#), for a review). Among the earliest and most influential of such models is [Clark and Watson's \(1991\)](#) tripartite model of depression and anxiety, which addressed why depression and anxiety—putatively distinct constructs—have such high rates of comorbidity. These models have generated great interest not only for their descriptive and taxonomic utility, but also because they identify etiologically-relevant factors that contribute to internalizing disorders. The current study extends the literature by assessing affect and symptoms intensively as they occur in daily life, examining short-term fluctuations within an individual over the course of hours.

1.1. Affective models of depression and anxiety

The tripartite model ([Clark and Watson, 1991](#)) focused on two core

dimensions of temperament, positing that high levels of negative affectivity (NA; negative emotions like fear, sadness, and anger) are shared among depression and anxiety disorders and contribute to their comorbidity, whereas low positive affectivity (PA; positive emotions like excitement and interest) is relatively specific to depression. Though the current study focuses specifically on these two dimensions of temperament, the tripartite model also proposed that anxious arousal is relatively specific to anxiety.

Building upon the tripartite model, the integrative hierarchical model ([Mineka et al., 1998](#)) further specified that the magnitude of associations with NA differs across disorders, such that depression and generalized anxiety disorder (GAD) have the strongest associations with NA (e.g., [Brown et al., 1998](#); [Watson et al., 2005](#); [Naragon-Gainey et al., 2016](#)). This is consistent with analyses of comorbidity data showing that “distress disorders” (e.g., depression, GAD, posttraumatic stress disorder) tend to co-occur at particularly high rates, whereas “fear disorders” (including social anxiety and panic) characterized by lower levels of NA formed a separate factor (e.g., [Kotov et al., 2017](#); [Krueger,](#)

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1999; Watson, 2005). The integrative hierarchical model also acknowledged heterogeneity within anxiety disorders, noting that low PA appears to be associated with social anxiety (as well as with depression) but not with other anxiety disorders (e.g., Brown et al., 1998; Naragon-Gainey et al., 2009; Watson et al., 2005; but cf. Kotov et al., 2010).

Numerous explanatory models for the associations of temperament (i.e., NA and PA; a parallel literature includes related personality traits neuroticism and extraversion) with psychopathology have been proposed. A full discussion of this complex literature is beyond the scope of this article. However, in broad terms, temperament can contribute to subsequent symptoms, symptoms can lead to changes in temperament, or both may be caused by a third variable or fall along a single continuum (e.g., Clark et al., 1994; Kotov et al., 2010; Klein et al., 2011). All of these models have received some support (see Watson and Naragon-Gainey, 2014), suggesting that no single explanation is likely to be sufficient. Nonetheless, vulnerability models, wherein pre-existing tendencies contribute to the development and maintenance of internalizing disorders, are of particular interest for their implications regarding prevention and intervention of psychopathology (Clark et al., 1994; Klein et al., 2011). Consistent with the vulnerability model, a recent meta-analysis of longitudinal studies found that NA and neuroticism strongly predicted subsequent symptoms or diagnoses of depression and various anxiety disorders ($d_s = 0.50\text{--}0.70$), with substantial associations remaining even after accounting for baseline symptoms ($d_s = 0.20\text{--}0.40$) (Jeronimus et al., 2016). Similarly, but with weaker effects, a meta-analytic review found that low PA (and related constructs such as extraversion) predicted later depression and anxiety ($r_s = -0.26, -0.19$, respectively), with significant associations remaining after controlling for baseline symptoms (Khazanov and Ruscio, 2016).¹

1.2. Affect and symptoms assessed in daily life

Overall, there is reasonable evidence that affective dimensions concurrently and prospectively predict depression and anxiety symptoms. Although the longitudinal studies described above are informative for identifying affective risk factors for disorders, it is important to note that they generally include relatively few assessments (typically two assessments, though some have more) that are months or years apart. NA and PA have a stable component, but they also fluctuate substantially over short time intervals and across situations for individuals (e.g., Merz and Roesch, 2011; Rush and Hofer, 2014), including individuals with current psychopathology (e.g., Dunkley et al., 2017; Kendall et al., 2014). Thus, the design of most existing studies is not optimal for examining affect and symptoms as dynamic psychological processes that vary from moment-to-moment, given limited resolution to detect quick changes in affect or symptoms and their mutual effects.

In addition, cross-sectional and longitudinal studies of affect largely have relied on retrospective measures that ask the participant to summarize their affect and symptoms over the past week, month, or “in general” in a single rating, rather than assessing momentary or very recent experiences repeatedly in naturalistic settings. Retrospective assessments are subject to numerous response biases (e.g., recency, peak effects), and may have relatively poor ecological validity due to difficulty remembering and summarizing across many specific and variable past experiences (e.g., Shiffman et al., 2008; Stone et al., 2005). Therefore, examining these processes in daily life as they occur—which minimizes recall biases that may yield inaccurate reports—is necessary to establish whether affective models of depression

and anxiety are reflective of people's actual experiences.

Very few studies have intensively assessed both affect and symptoms over a relatively short time period. Kashdan et al. (2013) measured social anxiety and affect repeatedly in daily life, but they did not report within-person analyses (concurrent or lagged) for these variables. As such, it remains unknown whether the affect-symptom associations described in the tripartite and related models translate into dynamic within-person processes. That is, when a given individual experiences relatively high levels of NA or low levels of PA, is s/he more likely to subsequently experience heightened internalizing symptoms in a manner consistent with affective models? If so, increases in NA (relative to one's typical levels of NA) would be most strongly predictive of increased depression and worry in the near future, and less strongly predictive of increased panic and social anxiety. In contrast, when one has lower than average levels of PA, increases in depression and social anxiety specifically would be likely.

An examination of the within-person influence of momentary affect on subsequent symptoms and its time course is valuable, as it could have direct implications for identifying potentially causal intradividual variables that may maintain or exacerbate symptoms for those with current disorders, consistent with the idiographic focus of personalized psychological treatment (e.g., Fisher, 2015). Importantly, associations of variables observed between-persons are not necessarily the same when observed intensively within-persons over time, such that equivalency cannot be assumed without empirical testing (Hamaker, 2012; Molenaar, 2004). To give one striking yet intuitive example, there is a negative association at the between-person level between typing speed and number of errors while typing, but a positive association at the within-person level (Hamaker, 2012). If affect does systematically predict symptoms within-persons, it will also be informative to examine the persistence and decay of these effects, as it is currently unknown whether changes in affect may influence subsequent symptom states for minutes, hours, or days. Such information could be helpful when delivering real-time interventions and identifying periods of high risk for self-harm or relapse.

1.3. The current study

The current study aims to extend models relating affect to symptoms into the within-person domain, while also evaluating the ecological validity of affective models in daily life. Specifically, I examine the associations of NA and PA with four internalizing symptoms (depression, social anxiety, panic, worry) as assessed in daily life in a treatment-seeking sample, using an intensive longitudinal design. These four symptoms were selected based on their frequent inclusion in affective models and the range of differential predictions they generate. Namely, prior findings (reviewed above) suggest that all four symptoms should be positively related to NA, but the associations should be strongest for depression and worry. In contrast, low PA should be specific to depression and social anxiety.

I first examine whether the above predictions, generated in studies using retrospective measures, hold when symptoms are assessed in real-time and in the context of one's naturalistic daily experiences. Specifically, individual differences in daily symptoms are predicted prospectively from baseline measures of trait affect, as well as from momentary ratings of affect. Next, I test whether experiencing extreme affect levels at one moment increases the likelihood of symptom changes in the upcoming hours, in the symptom-specific manner specified by affective models. These prospective lagged analyses hold constant concurrent symptoms when affect was rated, reducing confounding due to shared momentary influences, mood-state distortion, and stability of symptoms over time. Finally, examining several different lags allows for an exploration of the persistence and duration of the influence of affect on symptoms in daily life.

¹ Contrary to the tripartite model, low PA did not appear to be specific to depression in this meta-analysis, but note that individual anxiety symptoms/disorders (i.e., social anxiety) were not analyzed separately due to inadequate numbers of studies at this level.

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