Your personality on a good day: How trait and state personality predict daily well-being

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ABSTRACT

The dynamic mediation model (Wilt, Noftle, Fleeson, & Spain, 2012) explains the associations between personality traits and happiness through links between personality states and daily well-being. To test this model, and the mediators of these relations, we examined if between- and within-person variation in personality was associated with daily well-being for undergraduates ($N = 133$) and US adults ($N = 117$). The model explained the trait neuroticism and daily well-being association. Also, after controlling for traits, people were happier on days in which they were extraverted, agreeable, conscientious, emotionally stable, and open to experience. Finally, these associations were partially mediated by the satisfaction of daily psychological needs. We discuss how the operationalization of state extraversion might impact its relation with daily well-being.

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1. Introduction

Personality is important. It influences people's internal states, interactions with each other, and behaviors relevant on a larger social scale (see Ozer & Benet-Martinez, 2006). Also, while there is some uncertainty regarding specific behaviors and activities that ensure sustainable happiness, research over the past 50 years has identified two broad variables consistently related to life satisfaction: (1) life circumstances and (2) personality traits. Be it through good health, social relationships, community involvement, or psychological need satisfaction, personality traits tend to explain about 50% of the variance in subjective well-being (Schimmack, Radhakrishnan, Oishi, Dzokoto, & Ahadi, 2002; Vittersø & Nilsen, 2002).

To better understand the association between personality traits and subjective well-being (or happiness), most researchers rely on The Big Five framework (Costa & McCrae, 1992). This framework consists of five superordinate traits: extraversion (i.e., being socially outgoing), agreeableness (i.e., having compassion and willingness to cooperate), conscientiousness (i.e., being reliable and organized), neuroticism (i.e., being emotionally unstable), and

openness to experience (i.e., being broad-minded, creative, and imaginative). Decades of research demonstrate that extraversion, agreeableness, conscientiousness, and openness are positively correlated with subjective well-being, while neuroticism is negatively correlated with subjective well-being (for a complete meta-analysis see Steel, Schmidt, & Shultz, 2008). Further, these strong personality and affect correlations are consistent across several diverse cultures (e.g., the United States, Germany, Japan, Mexico, and Ghana; see Schimmack et al., 2002).

However, because personality traits assess individual differences across many situations, traits only differentiate individuals from each other. In this way, there tends to be less consideration of how within-person personality fluctuations impact important outcomes (e.g., subjective well-being; see Fleeson, 2001). Further, with more comprehensive state personality assessments we can better understand how personality traits contributes to subjective well-being (Fleeson, 2004). Specifically, Fleeson and colleagues proposed a framework which argues that the association between personality traits and subjective well-being is better understood by first linking personality states and emotions (i.e., the dynamic hypothesis; see Wilt, Noftle, Fleeson, & Spain, 2012). Quite elegantly, personality traits increase the propensity to enact specific personality states, which are associated with positive and negative emotions that ultimately influence well-being. While prior research has supported this dynamic mediation model (see Ching et al., 2014; Wilt et al., 2012), the potential mechanisms through

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which different personality states influence daily emotions remains an open question. Thus, the goal of this study is to answer two research questions: (a) how are personality traits and states associated with daily well-being (b) and does the satisfaction of different psychological needs mediate these relations?

2. How the dynamic mediation model links personality traits and global well-being

Why are the Big Five personality traits so strongly related to subjective well-being? McCrae and Costa (1991) suggest two models to explain why personality traits are strongly related to well-being: (a) the temperament model, which predicts that personality traits are linked to well-being because they are associated with consistent affective experiences (also see Heller, Watson, & Ilies, 2004) and (b) the instrumental model, which suggests that different personality traits are associated with different daily behaviors, actions, and circumstances, which in turn are associated with affective experiences.

Extending these models, Fleeson and colleagues have established the invaluable groundwork for studying the relationship between personality traits and well-being through an understanding of natural fluctuations in state personality (an individual's personality at a given moment; see Fleeson, 2001; Fleeson & Noftle, 2008). The importance of the within-person approach to Big Five research is that it can help explain phenomena, including the influence of personality on daily well-being, underexplored in trait studies (Fleeson, 2004, 2012). Specifically, the dynamic mediation model attempts to explain the robust associations between personality traits and subjective well-being through two mediators: state personality and daily positive as well as negative emotions. That is, trait personality influences well-being through dynamic mediation: (a) each personality trait results in an increased propensity to enact daily behaviors (i.e., personality states) corresponding the personality trait, (b) enacting specific behaviors associated with certain personality states (e.g., extraverted behaviors) leads to increased positive emotions and decreased negative emotions, and (c) the accumulation of positive emotions (and decreased negative emotions) in daily life contributes to one's overall well-being. An example of this model is that generally extraverted people are happier because: (a) they more often enact extraverted behaviors (i.e., state extraversion), (b) these extraverted behaviors result in positive emotions during daily life, and (c) the experience of more positive affect on a daily basis results in increased overall subjective well-being. There is growing empirical support for the dynamic mediation model.

2.1. Support for the dynamic mediation model

There is emerging evidence that personality traits increase the propensity to enact behaviors that express that trait (Ching et al., 2014; Wilt et al., 2012). Specifically, Wilt et al. (2012) consistently demonstrated that trait extraversion significantly predicted enacted extraversion (e.g., "during the previous hour, how talkative were you?" [p. 1214]). For example, an extraverted person is more likely to self-select socializing with others (i.e., enacted extraversion) than an introverted person (Emmons, Diener, & Larsen, 1986). Further, Ching et al. (2014) showed that, even after controlling for the other Big Five traits, each personality trait was significantly associated with its corresponding state personality for a US sample of college students. Moreover, if people have the goal to enact extraverted or conscientious behaviors in a social setting, they indeed report feeling more extraverted and conscientious (McCabe & Fleeson, 2016). However, another reason for short-term personality variance may be the ever-changing nature of people's daily lives (Fleeson, 2001). A person may feel highly outgoing in the midst of a social event; however, that same person may feel that he or she is not outgoing during leisure in social isolation. Indeed, Fleeson (2001) found that people report greater extraversion when surrounded by others. Additionally, individuals are more conscientious on a given day if they set goals at work on the day prior (Judge, Simon, Hurst, & Kelley, 2014). That said, people's broad personality traits influence their personality states in the corresponding domain through the course of a day.

In turn, there is robust support that personality states (e.g., enacted extraversion) are associated with daily well-being as well as positive and negative emotions. Specifically, there is emerging work showing that the contribution of state personality to daily well-being conceptually mirrors the larger literature on the association between personality traits and well-being. For example, just as trait extraversion is positively associated with global subjective well-being whereas trait neuroticism is negatively correlated with global subjective well-being (e.g., extraversion is the strongest predictor of positive affect and neuroticism is the strongest predictor of negative affect, see Steel et al., 2008), enacted extraverted states increase current positive emotions (e.g., McCabe & Fleeson, 2012; McNiel & Fleeson, 2006; McNiel, Lowman, & Fleeson, 2010) while enacted neurotic states increase current negative emotions (McNiel & Fleeson, 2006). Even introverted people experience a well-being boost when they act in an extraverted manner (Fleeson, Malanos, & Achille, 2002). Overall, across different cultures, the personality states of extraversion, agreeableness, conscientiousness, emotionally stability, and openness to experience are associated with the experience of greater positive affect and lesser negative affect in their daily lives (Ching et al., 2014).

Finally, a few studies have provided direct support for the dynamic mediation model. Ching et al. (2014) found that trait extraversion predicts daily positive affect through the mechanism of state extraversion. That is, generally extraverted people, compared to generally introverted people, are happier on a daily basis as a result of enacting more extraverted behaviors. Likewise, people who are generally agreeable or open to new experiences, than people who score low on these personality domains, are more likely to enact agreeable and open behaviors in their daily lives; this is one reason that agreeable and open people are also happier in their day-to-day lives (Ching et al., 2014). However, although the dynamic mediation model helps explain the associations between personality traits and subjective well-being, fewer studies have examined the processes through which state personality contributes to state well-being. For example, people who feel extraverted at a particular time also perceive themselves to be making valuable social contributions at that time, and through this feeling of social contribution state extraversion predicts state well-being (Smillie, Wilt, Kabbani, Garratt, & Revelle, 2015). Given the need to know how personality states influence daily well-being, a major goal of this study is to test the mediators of these associations.

3. How personality states influence daily well-being

At a first look, Wilt et al.'s (2012) dynamic mediation model appears to fit better within McCrae and Costa's (1991) temperament model: state personality helps explain the aggregation of affective experiences associated with trait personality. However, we argue that the state links between personality and well-being may also reflect elements of the instrumental model: state personality affects people's daily behaviors, actions, and circumstances, which contribute to recurring positive or negative emotions. We will argue that satisfied psychological needs are likely mediators of the relation between personality states and daily well-being.

3.1. Role of psychological need fulfillment

People's personality states affect how they behave at a given time (e.g., Wilt et al., 2012), and thus, may influence psychological phenomena that are relevant to well-being. To propose these possible mediators, we draw from Self-Determination Theory (e.g., Deci & Ryan, 2000), which posits that the fulfillment of three psychological needs (i.e., relatedness [connectedness with others], autonomy [control in one's life], and competence [efficacy in one's actions]) contributes to people's well-being. Importantly, the satisfaction of psychological needs is a promising and widely-applicable mediator between what people do and how happy they feel (Deci & Ryan, 2000).

For example, social engagement contributes to well-being (e.g., Watson, Clark, McIntyre, & Hamaker, 1992), be it through spending time with friends (Csikszentmihalyi & Hunter, 2003) or participating in extracurricular activities (Gilman, 2001). Also, as a parallel in state-level research, daily well-being fluctuates as a function of daily psychological need satisfaction (Howell, Chenot, Hill, & Howell, 2011; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). On a day-to-day basis, experiences such engaging in meaningful conversations, pursuing activities purely out of intrinsic motivation, and feeling as though one had pursued those activities with effectiveness and success contribute to people's well-being (through relatedness, autonomy and competence, respectively).

Because particular behaviors (e.g., enacted state personality) should differentially affect the fulfillment of these psychological needs and in turn contribute to well-being (Lyubomirsky & Layous, 2013; Sheldon et al., 2010), we propose that state personality influences state well-being through the fulfillment of psychological needs. Also, as "theoretical knowledge on the part of the researcher is critical to the successful application of path analysis," (Stage, Carter, & Nora, 2004), we inform our proposed mediation models with theory developed in previous literature. Thus, below we examine associations between personality traits (and, when available, personality states) with daily behaviors that contribute to relatedness, competence, or autonomy.

3.1.1. Extraversion and agreeableness contribute to relatedness

There is evidence that trait-extraverts select social situations and behaviors that include others. Extraversion is associated with friendship satisfaction (Wilson, Harris, & Vazire, 2015), quality of social interactions (Berry & Hansen, 2000), and social involvement (Diener, Larsen, & Emmons, 1984; Eaton & Funder, 2003). Across four different measures of the Five Factor model, extraverts are more likely to attend parties, be rated as popular and attractive, and date a large number of individuals (Paunonen, 2003). Further, social connectedness partially mediates the relationship between extraversion and subjective well-being (e.g., Lee, Dean, & Jung, 2008). Like extraversion, agreeableness is also positively associated with friendship satisfaction (Wilson et al., 2015). Similarly, agreeable individuals are less likely to report angry affect and behavioral aggression during social interactions than non-agreeable people (Martin, Watson, & Wan, 2000). Furthermore, supervisor ratings of helping behaviors have also been positively correlated with agreeableness (King, George, & Hebl, 2005). More directly, Church et al. (2013) examined daily variation in perceived relatedness satisfaction in relation to daily variation in personality. They found relatedness to be positively associated with state extraversion and agreeableness. Additionally, the extent to which people are extraverted and agreeable around their friends is positively related to their friendship satisfaction (Wilson et al., 2015).

3.1.2. Conscientiousness contributes to competence

The instrumental model proposes that conscientious individuals experience positive affect because they spend more time pursu-ing attainment of important personal goals. On a trait level, conscientious people value achievement, meaning they aspire to be successful, influential, and competent by the merits of their culture and society (Roccas, Sagiv, Schwartz, & Knafo, 2002). Further, this value of achievement translates into achievement itself, as conscientious people enjoy greater academic success (Busato, Prins, Elshout, & Hamaker, 2000; Paunonen, 2003) and job performance (for a meta-analysis see Barrick, Mount, & Judge, 2001). Finally, increased self-esteem helps explains why conscientious people are happier than unconscientious ones (Kwan, Bond, & Singelis, 1997). One link from people's conscientiousness to their self-esteem and happiness may be a sense of productivity. In investigating the relationship between conscientiousness and positive affect, Watson and Clark (1992) found that the achievement facet of conscientiousness (i.e., disposition for hard goal-directed work) is a more powerful influence on positive affect than facets of dependability or orderliness. Finally, state conscientiousness is associated with state competence (Church et al., 2013), which shows that enacted conscientious on a given day corresponds feeling competent.

3.1.3. Openness and emotional stability contribute to autonomy

On a trait level, openness correlates positively with valuing self-direction and negatively with valuing conformity and tradition, meaning that individuals high in openness prefer to make decisions for themselves rather than rely on existing structures and norms (Roccas et al., 2002). Additionally, trait-level neuroticism may lead individuals to experience more negative affect across situations, and thus, to avoid those situations where negative affect was previously experienced (Magnus, Diener, Fujita, & Pavot, 1993). Importantly, when people feel authentic, they report feeling creative, intellectual, and philosophical (Fleeson & Wilt, 2010). Similarly, state openness is positively associated with perceived autonomy (Church et al., 2013), regardless of trait openness levels (Ching et al., 2014). Likewise, people experiencing emotional stability (i.e., low neuroticism) also perceive having greater autonomy (Ching et al., 2014; Church et al., 2013). Importantly, prior work has not defined the direction of such relationships with certainty. For instance, Ching et al. (2014) and Church et al. (2013) remain open to the possibility that people's personality may influence their perception of autonomy need fulfillment (compared to the relationship taking place in the reverse direction). Thus, because Self-Determination Theory assumes that psychological needs are the mediators between behaviors and well-being, we test autonomy as a mediator from state openness and emotional stability to daily well-being.

4. Current research

Many important questions concerning the relationship between state personality and well-being remain unanswered. The dynamic mediation model has linked personality traits to daily well-being through the influence of corresponding personality states (e.g., Ching et al., 2014). However, the independent contribution of state personality in each Big Five domain for daily well-being is unclear, as are the mechanisms of how state personality influences well-being. Moreover, we do not know if the variability in state extraversion or neuroticism is most important in predicting daily well-being, paralleling their trait-level relationships. Consequently, the current research examines how fluctuations in Big Five traits and states differentially (and interactively) predict changes in daily well-being, as well as the degree to which psychological needs mediate these relationships. We do this by assessing daily reports of personality (i.e., state Big Five) and well-being (daily psychological need satisfaction, happiness, and emotions).

Because of the hierarchical structure of this data (daily personality and well-being observations are nested within persons), multilevel modeling (MLM) is the ideal procedure to account for the between-person variation in personality traits (i.e., individual deviations from personality traits) and within-person variation in personality states (i.e., an individual's daily deviation from typical personality states). In addition, by modeling both between- and within-person variation, we can test for cross-level interactions of personality traits and states on daily well-being. For example, an analysis accounting for both trait and state personality will reveal whether the relation between daily extraversion and daily well-being is moderated by trait extraversion. In two studies, we test four basic hypotheses: (H1) supporting the dynamic mediation model: personality traits will be associated with their corresponding personality states within the same domain (e.g., trait extraversion will be significantly related to average levels of state extraversion); (H2) supporting the dynamic mediation model: personality traits will be associated with daily well-being, only *before* controlling for state personality; (H3) state personality will predict daily well-being for individuals high and low on each corresponding personality trait (e.g., the expected positive relation between state extraversion and daily well-being will be of the same magnitude for both trait-level introverts and extraverts); and (H4) the relations between state personality and daily well-being will be mediated by daily psychological need satisfaction.

5. Study 1: Predicting daily well-being from personality traits and states

5.1. Method

5.1.1. Participants

The sample included 133 undergraduate students recruited from a large public university on the West Coast (M_{age} = 25.40, SD = 8.44, range = 19–89; 76.5% female), who participated in a two-week personality study in exchange for course credit. We recruited participants via short in-class presentations inviting them to participate in a two-week study regarding "personality fluctuations." Participants completed a total of 1266 nightly diaries (M = 8.91, S = 3.21, Mdn = 10.00) with 19.5% of participants completing the maximum of 12 diaries, 34% of participants completing 10–11 diaries, and 18% completing 8–9 diaries.

5.1.2. Procedure

Participants completed the entire study online. After providing implied consent, participants registered with BeyondThePurchase. org, an educational psychology website which has previously been used as a source for empirical research (see Ksendzova, Iyer, Hill, Wojcik, & Howell, 2015), to take a pre-survey. We used the personalized feedback features of BeyondThePurchase.org in order to encourage completion. Specifically, we provided all participants with graphic feedback depicting their personality that day.

After participants completed the pre-survey, they agreed to take part in the diary portion of the study. Every night, we sent diaries via an automated email service to protect each participant's anonymity. These daily diaries could be completed any time after at 8:00 pm Pacific Standard Time and were automatically date/time stamped. Each diary consisted of a modified BFI-10 survey (Rammstedt & John, 2007; i.e., "Today, I...") to measure state personality as well as a modified version of the UK Happiness Index (i.e., reflecting a daily unit of measure) and a daily assessment of emotions using the Scale of Positive and Negative Experience (Diener et al., 2010). Participants typically completed the diary in less than 5 min. After completing up to 12 nightly surveys, participants completed an exit survey and were debriefed.

5.1.3. Instruments
5.1.3.1. Pre-survey questionnaire. Participants completed several scales including: (a) the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), (b) the Flourishing Scale (Diener et al., 2010), (c) the 6-item Gratitude Questionnaire (McCullough, Emmons, & Tsang, 2002), (d) the UK-Happiness Index, (e) a Psychological Need Satisfaction Questionnaire (Sheldon & Gunz, 2009), (f) the Scale of Positive and Negative Experience (Diener et al., 2010), (g) the Michigan Organizational Assessment Questionnaire (Bowling & Hammond, 2008), (h) the Job Affect and Well-Being Scale (Van Katwyk, Fox, Spector, & Kelloway, 2000), and (i) a measure of Organizational Citizenship Behavior (Lee & Allen, 2002). For the purposes of this study, we only examine the relationships of Big Five traits and states with daily well-being.

5.1.3.2. Trait personality. We used the BFI-10 (Rammstedt & John, 2007) to measure the Big Five personality traits. When answering the BFI-10, participants indicate how much they agree with specific phrases that describe personality characteristics on a five-point scale ranging from 1 (disagree strongly) to 5 (agree strongly). For example, to measure trait extraversion, participants rate their level of agreement with two statements: "*I see myself as someone who is outgoing, sociable*" and "*I see myself as someone who is reserved*" (reversed scored). Finally, replicating past research, the Big Five personality trait were mostly orthogonal with the only significant correlations between: (a) neuroticism and extraversion (r = −0.25, p < 0.01), (b) neuroticism and agreeableness (r = −0.22, p < 0.05), and (c) conscientiousness and agreeableness (r = 0.24, p < 0.01).

5.1.3.3. State personality. To measure Big Five personality states, participants completed a nightly version of the same BFI-10. Participants indicated the extent to which each of the 10 statements described their personality during that day. For example, to measure state extraversion, participants rated their level of agreement with two statements on a scale of 1 (disagree strongly) to 5 (agree strongly), "*Today, I was outgoing, sociable*" and "*Today, I was reserved*" (see Fleeson, 2001, for similar methodology).

5.1.3.4. Daily well-being. To measure participants' daily well-being, we asked about daily happiness, as well as positive and negative emotions. For the daily UK-Happiness Index, we adapted the four items to reflect the current day (e.g., "*How happy did you feel today*?"), and participants' responses ranged from 0 (e.g., not happy at all) to 10 (e.g., extremely happy). Additionally, we adapted the Scale of Positive and Negative Experience (Diener et al., 2010) to reflect emotions experienced during the current day (i.e., "*Please think about what you have been doing and experiencing today. Then report how much you experienced each of the following feelings using the scale below.*"). On a scale of 1 (very rarely or never) to 5 (very often or always), participants indicated the extent to which they experienced 12 different emotions (e.g., happy, sad, etc.) during that day.

5.1.4. Analytic strategy
In Study 1, we tested the support for hypotheses 1–3 (see current study section). To test the support for H1, we used MLM to predict each of the five personality states from an empty model (Model 1, see Table 1 for the fixed and random effect estimates), allowing us to estimate both the intercept (i.e., the grand average of the personality state) and the interclass correlation coefficient (i.e., the ICC—the percent of variance in the personality state which is attributed to individual differences). Next, we added the Big Five traits to Model 2 (again see Table 1), after the traits were grand-mean centered, to (a) predict state personality and (b) determine

Table 1
Study 1: Using personality traits to predict personality states.

	State extraversion		State agreeableness		State conscientiousness		State neuroticism		State openness	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects										
Intercept	3.28*	3.26*	3.60*	3.59*	3.53*	3.50*	2.48*	2.50*	3.18*	3.17*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
Trait E		**0.14***		0.03		0.02		0.08		−0.02
		(0.05)		(0.04)		(0.05)		(0.05)		(0.05)
Trait A		0.02		**0.32***		−0.07		−0.12*		−0.11*
		(0.05)		**(0.05)**		(0.06)		(0.05)		(0.05)
Trait C		0.11*		−0.00		**0.30***		−0.14*		0.11*
		(0.05)		(0.05)		**(0.06)**		(0.05)		(0.05)
Trait N		−0.11*		−0.07		−0.04		**0.31***		−0.04
		(0.05)		(0.04)		(0.05)		**(0.04)**		(0.04)
Trait O		−0.02		−0.02		0.05		0.03		**0.28***
		(0.05)		(0.04)		(0.06)		(0.05)		**(0.05)**
Random effects										
Intercept	0.157*	0.114*	0.160*	0.090*	0.196*	0.148*	0.242*	0.113*	0.183*	0.131*
	(0.028)	(0.024)	(0.017)	(0.018)	(0.031)	(0.027)	(0.037)	(0.022)	(0.027)	(0.021)
Residual	0.520*	0.530*	0.400*	0.402*	0.513*	0.520*	0.480*	0.490*	0.319*	0.317*
	(0.022)	(0.023)	(0.025)	(0.023)	(0.022)	(0.022)	(0.021)	(0.022)	(0.014)	(0.013)
ICC	0.23		0.29		0.28		0.34		0.36	
Model fit statistics										
−2 Log Likelihood	$\chi^2_{(3)}$ = 2872.85	$\chi^2_{(8)}$ = 2731.06	$\chi^2_{(3)}$ = 2580.47	$\chi^2_{(8)}$ = 2411.92	$\chi^2_{(3)}$ = 2880.72	$\chi^2_{(8)}$ = 2732.03	$\chi^2_{(3)}$ = 2829.20	$\chi^2_{(8)}$ = 2646.37	$\chi^2_{(3)}$ = 2340.30	$\chi^2_{(8)}$ = 2189.90

Note. To test the support for H1, we used MLM to predict each of the five personality states from an empty model (Model 1), allowing us to estimate both the intercept (i.e., the grand average of the personality state) and the interclass correlation coefficient (i.e., the ICC—the percent of variance in the personality state which is attributed to individual differences). Next we added the Big Five traits (Model 2), after they have been grand-mean centered, to predict state personality and test the improvement in these models. The strongest trait predictors of state personality are highlighted in bold for each model.
* $p < .05$.

the improvement in the models. To test H2 and H3, we conducted four MLM models (see Table 2 for the fixed and random effect estimates). Model 1 was an empty model to estimate the intercept and the ICC for each well-being outcome. In Model 2, we added the Big Five personality traits. Then, in Model 3, we added the Big Five personality states and examined the magnitude of changes in the associations between personality traits and daily well-being. Because of concerns with forced orthogonality between personality traits and states when personality traits are grand-mean centered and personality states are group-mean centered (i.e., because group-mean centered level-1 variables will be necessary uncorrelated with level-2 variables), and our desire to examine the support for the dynamic mediation model (which assumes correlations between personality traits and states), both personality states and traits were grand-mean centered. In Model 4 we added personality trait × state interaction terms to determine if personality traits moderate the relations between personality states and daily well-being. All multilevel models were estimated using maximum likelihood for repeated measures and SPSS 23 software.

5.2. Results

5.2.1. Personality traits predict personality states

The first set of MLMs predict average personality states from personality traits (see Table 1), allowing us to test H1. In Model 1, the intercept of the empty model is always equal to the overall average of the predicted personality state (e.g., the intercept for state extraversion is 3.28, which is the grand average across the entire diary study). Also reported in Model 1 are the variance components for the intercept and level-1 error which partition the variance across levels (i.e., the ICCs). For example, the ICC for state extraversion is 0.23, indicating that 23% of the variance in state extraversion is attributed to individual differences. In sum, the variance in state personality that is attributed to individual differences ranged from a low of 0.23 (extraversion) to a high of 0.36 (openness to experience). Thus, by entering personality traits into

Model 2, we can attempt to explain the variance in state personality attributed to trait personality.

As shown in each Model 2, personality traits predicted personality states and reduced the variance in state personality attributed to individual differences. For example, trait extraversion was the strongest significant predictor of state extraversion (B = 0.14, SE = 0.05, p < 0.05). That is, being one point higher than the average on trait extraversion was associated with an average state extraversion score of 3.40, whereas being one point lower than average on trait extraversion was associated with an average state extraversion score of 3.12. Importantly, the variance component of the intercept was significantly reduced in Model 2 ($\chi^2_{(5)}$ = 141.79, $p < 0.001$). This pattern of results was repeated when predicting all five personality states (see Table 1), indicating that Big Five personality traits explained a significant amount of the variance in Big Five personality states. Overall, supporting H1, the strongest predictor of state personality was the corresponding personality trait within the same domain (e.g., trait extraversion was the best predictor of state extraversion). The coefficients ranged from a low of 0.14 (trait extraversion predicting state extraversion) to 0.32 (trait agreeableness predicting state agreeableness).

5.2.2. Personality traits and states as predictors of daily well-being

The second set of MLMs predict daily well-being (i.e., happiness, positive emotions, negative emotions) from Big Five personality traits, states, and their interactions (see Table 2). These models directly test H2 and H3. Again, Model 1 displays the overall average of the daily well-being variable as well as the ICC. The ICCs suggest that the average variance attributed to individual differences is greater for daily well-being (ICCs ranged from 0.44 to 0.49) than personality states (which, again, ranged from 0.23 to 0.36).

Next, we examined each personality trait as a single predictor of daily well-being. Many of the raw associations demonstrate significant associations between personality traits and daily well-being. For example, when entered into the MLM as a single variable, trait extraversion predicted daily happiness (B = 0.28, p < 0.05) and

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Table 2
Study 1: Using personality traits and states to predict daily well-being.

	Daily happiness index				Daily positive emotions				Daily negative emotions			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Fixed effects												
Intercept	6.42* (0.11)	6.37* (0.10)	6.46* (0.07)	6.48* (0.04)	2.50* (0.05)	2.49* (0.05)	2.53* (0.04)	2.55* (0.04)	1.13* (0.05)	1.13* (0.05)	1.10* (0.04)	1.09* (0.04)
Trait E		0.11 (0.13)	0.13 (0.08)	0.13 (0.09)		0.08 (0.06)	−0.00 (0.04)	−0.01 (0.04)		−0.00 (0.05)	0.09* (0.04)	0.09* (0.04)
Trait A		0.36* (0.15)	0.05 (0.10)	0.05 (0.10)		0.14* (0.07)	−0.00 (0.05)	0.01 (0.05)		−0.15* (0.06)	−0.00 (0.05)	−0.02 (0.05)
Trait C		0.17 (0.15)	−0.05 (0.10)	−0.10 (0.08)		0.03 (0.07)	−0.04 (0.05)	−0.04 (0.05)		−0.10 (0.06)	−03 (0.05)	−03 (0.05)
Trait N		−0.43* (0.12)	−0.15 (0.09)	−0.11 (0.08)		−0.11 (0.06)	0.02 (0.04)	0.02 (0.04)		0.25* (0.06)	0.14* (0.04)	0.13* (0.04)
Trait O		−0.20 (0.13)	−0.15 (0.09)	−0.15 (0.09)		−0.05 (0.06)	−0.07 (0.04)	−0.07 (0.05)		0.10 (0.06)	0.09* (0.04)	0.09* (0.04)
State E			0.31* (0.06)	0.31* (0.06)			0.18* (0.02)	0.18* (0.02)			−0.07* (0.02)	−0.07* (0.02)
State A			0.59* (0.06)	0.59* (0.06)			0.23* (0.03)	0.22* (0.03)			−0.28* (0.03)	−0.28* (0.03)
State C			0.22* (0.06)	0.22* (0.06)			0.08* (0.02)	0.08* (0.02)			−0.02 (0.02)	−0.02 (0.02)
State N			−0.73* (0.06)	−0.73* (0.07)			−0.22* (0.03)	−0.22* (0.03)			0.27* (0.03)	0.28* (0.03)
State O			0.14* (0.05)	0.14* (0.05)			0.09* (0.03)	0.09* (0.03)			−0.02 (0.02)	−0.02 (0.02)
E × E				0.01 (0.06)				0.01 (0.03)				−0.01 (0.02)
A × A				−0.06 (0.07)				−0.06 (0.04)				0.06 (0.03)
C × C				−0.09 (0.07)				−0.01 (0.03)				0.02 (0.03)
N × N				−0.07 (0.07)				0.00 (0.03)				−0.02 (0.03)
O × O				0.06 (0.06)				−0.01 (0.03)				−0.01 (0.03)
Random effects												
Intercept	1.50* (0.210)	1.18* (0.180)	0.512* (0.081)	0.518* (0.083)	0.304* (0.042)	0.276* (0.041)	0.131* (0.018)	0.136* (0.020)	0.297* (0.042)	0.213* (0.033)	0.129* (0.021)	0.131* (0.021)
State E			0.191* (0.054)	0.192* (0.055)			0.023* (0.009)	0.022* (0.009)			–	–
State A			0.067 (0.039)	0.067 (0.039)			0.034* (0.011)	0.034* (0.012)			0.010 (0.009)	0.009 (0.009)
State C			0.165* (0.048)	0.157* (0.048)			0.014 (0.008)	0.015 (0.008)			–	–
State N			0.260* (0.066)	0.262* (0.067)			0.037* (0.012)	0.037* (0.012)			0.027* (0.011)	0.026* (0.011)
State O			0.029 (0.033)	0.032 (0.035)			0.021 (0.011)	0.020 (0.011)			–	–
Residual	1.89* (0.081)	1.88* (0.082)	0.658* (0.031)	0.662* (0.032)	0.317* (0.013)	0.318* (0.013)	0.137* (0.006)	0.141* (0.007)	0.316* (0.013)	0.321* (0.014)	0.186* (0.009)	0.186* (0.009)
ICC	0.44				0.49				0.48			
Model fit statistics												
−2 Log Likelihood	$\chi^2_{(3)}$ = 4563.74	$\chi^2_{(8)}$ = 4298.85	$\chi^2_{(33)}$ = 3512.03	$\chi^2_{(38)}$ = 3523.54	$\chi^2_{(3)}$ = 2378.85	$\chi^2_{(8)}$ = 2257.50	$\chi^2_{(33)}$ = 1690.19	$\chi^2_{(38)}$ = 1707.47	$\chi^2_{(3)}$ = 2372.88	$\chi^2_{(8)}$ = 2239.60	$\chi^2_{(18)}$ = 1713.01	$\chi^2_{(23)}$ = 1734.74

Note. To test H2 and H3, we conducted four MLM models. Model 1 was an empty model to estimate the intercept and the ICC for each well-being outcome. In Model 2 we added Big Five personality traits. In Model 3, we added Big Five personality states and examined magnitude changes in the prediction from personality traits. In Model 4 we added personality trait × state interaction terms to examine if the relations between personality states and daily well-being are moderated by personality traits. For daily negative emotions the final Hessian matrix was not positive definite. We therefore assumed the redundant covariance parameters were due to the slopes for extraversion, conscientiousness, and openness not differing across individuals and estimated these slopes as fixed effects; we therefore only estimate the variance of the slopes for state agreeableness and neuroticism when predicting daily negative emotions.
* $p < .05$.

daily positive emotions (i.e., B = 0.13, p < 0.05), but not daily negative emotions (B = −0.10, p < 0.10). In sum, trait agreeableness significantly predicted daily happiness, positive emotions, and negative emotions (i.e., B = 0.57, B = 0.20, B = −0.25, respectively), trait conscientiousness significantly predicted daily happiness and negative emotions (i.e., B = 0.32, B = −0.16, respectively), trait neuroticism significantly predicted daily happiness, positive emotions, and negative emotions (i.e., B = −0.53, B = −0.15, B = 0.29, respectively), whereas trait openness did not predict any measure of daily happiness.

When examining the coefficients for Model 2 (where all five personality traits are entered simultaneously), we only found trait agreeableness to be consistently associated with daily well-being when controlling for the other personality traits (i.e., B = 0.36 for daily happiness; B = 0.14 for daily positive emotions; B = −0.15 for daily negative emotions; all ps < 0.05). Thus, on average, agreeable individuals reported more daily well-being (and less ill-being) than disagreeable people. Also, the strongest association between a personality trait and daily well-being (controlling for the other personality traits) was between neuroticism and daily happiness (B = −0.43, p < 0.05); additionally, even when controlling for the other personality traits, neuroticism predicted decreased positive emotions (B = −0.11, p = 0.07) and increased negative emotions (B = 0.25, p < 0.05). No other personality trait predicted daily well-being after controlling for the other personality traits.

When examining the coefficients for Model 3 (where all five personality traits and states are entered simultaneously), none of the personality traits predicted daily happiness nor daily positive emotions after entering personality states into the model. In contrast, each of the five personality states predicted daily happiness and daily positive emotions. Specifically, for each daily well-being outcome, state agreeableness and neuroticism were the strongest predictors. Further, it appears that the unique relations between trait agreeableness and neuroticism with daily well-being were at least partially mediated by their association with their corresponding personality states. For example, trait neuroticism significantly predicted state neuroticism (B = 0.31, p < 0.05), and state neuroticism strongly predicted reduced happiness (B = −0.73, p < 0.05), even after controlling for all other personality traits and states. Finally, the strong relation between trait neuroticism and daily happiness (B = −0.43, p < 0.05) was non-significant when controlling for state neuroticism (B = −0.15, ns). These results support the dynamic mediation model.

In our analysis of Models 3 and 4, because the relation between state personality and daily well-being may vary across individuals (i.e., the relation may be stronger for some and weaker for others), we treated state personality variables as random effects. First, the variance components for the random slopes between personality states and daily happiness as well as positive emotions were significant for both state extraversion and neuroticism (see the Random Effects of State E and N for Model 3 in Table 2). Further, the variance component for the random slope between state neuroticism and daily negative emotions was also significant. Thus, these associations between state personality and daily well-being differed in magnitude across individuals. To determine if personality traits could account for this significant slope variation, which is a direct test of H3, we examined the cross-level interactions between personality traits and states to predict daily well-being. However, none of the 15 cross-level trait × state interactions were significant. For example, the trait × state extraversion cross-level interaction was not significant in predicting daily happiness (B = 0.01, SE = 0.06, ns): therefore, the positive relation between state extraversion and daily happiness is significant and positive for both generally extraverted and introverted individuals. Similarly, the trait × state neuroticism cross-level interaction was not significant in predicting daily happiness (B = −0.07, SE = 0.07, ns):

therefore, the negative relation between state neuroticism and daily happiness is significant and negative for both generally neurotic and emotionally stable individuals. These results suggest there may be unexplained variation in the state personality and daily happiness slopes (especially, the slopes including state neuroticism).

5.3. Brief discussion

Study 1 replicated many of the expected relationships between state personality and daily well-being. Specifically, on days in which people are more extraverted, agreeable, conscientious, emotionally stable, and open to experience (controlling for both personality traits and their cross-level interactions), they experience more daily happiness and more frequent positive emotions. In addition, these results partially support the dynamic mediation model (e.g., Ching et al., 2014) by suggesting that association between specific personality traits (in this case agreeableness and neuroticism) and daily well-being is due to the influence personality traits have on their corresponding personality states. Finally, our results complement the previous findings of positive relations between (a) state extraversion and positive affect, regardless of trait extraversion (McCabe & Fleeson, 2012; McNiel et al., 2010) and (b) state neuroticism and negative affect, regardless of trait neuroticism (McNiel & Fleeson, 2006). However, while these relations corroborate and extend previous research on the influence of personality traits and states on daily well-being, the mechanisms of these relationships are not well understood. Therefore, the major goal of Study 2 was to replicate the findings from Study 1 while also testing for the mechanisms between personality states and daily well-being.

6. Study 2: Testing possible mechanisms of the association between personality states and daily well-being

6.1. Method

6.1.1. Participants

The sample included 117 US adults recruited from Amazon's Mechanical Turk (M_{age} = 37.18, SD = 11.50, range = 19–70; 56.4% female; 80.3% Caucasian/White). We recruited participants via an Mturk announcement inviting them to participate in a month-long study regarding "personality fluctuations" in which they would take 3-min diaries each night for 30 days in exchange for $0.15 per diary. Participants were not required to complete all 30 diaries; however, those who did complete all 30 diaries received a $2.00 bonus. Participants completed a total of 2395 nightly diaries (M = 20.42, SD = 11.38, Mdn = 27.00) with 38.5% of participants completing the maximum of 30 diaries, 17.1% of participants completing 25–29 diaries, and 9.4% completing 21–24 diaries.

6.1.2. Procedure

Participants completed the entire study online. After providing implied consent, participants completed a pre-survey measuring their Big Five personality traits and well-being. We informed participants that, by completing the pre-survey, they would be enrolling in a 30-day dairy study and each night they would be emailed a link to take a 3-min survey. On each night of the study, diaries were sent via TurkPrime, an add-on component to Amazon's Mturk service, using worker identification numbers to protect each participant's anonymity. Daily diaries could be completed any time after 5:00 pm Pacific Standard Time and were automatically date/time stamped. As in Study 1, each diary consisted of a modified BFI-10 survey (Rammstedt & John, 2007; i.e., "Today, I...") to measure state personality and an assessment of daily emotions using

the Scale of Positive and Negative Experience (Diener et al., 2010). After completing up to 30 nightly surveys, participants completed an exit survey and were debriefed.

6.1.3. Instruments

6.1.3.1. Trait personality.
We used the BFI-44 (John, Donahue, & Kentle, 1991) to measure the Big Five personality traits. When answering the items, participants indicated how much they agreed with specific phrases describing personality characteristics on a scale ranging from 1 (disagree strongly) to 5 (agree strongly). The BFI-44 includes the 10 statements used in the BFI-10 and additional items to more fully measure each trait. For example, to measure trait extraversion, participants rated their level of agreement with eight statements: "*I see myself as someone who*…(1) *is talkative*, (2) *is reserved* [reversed scored], (3) *is full of energy*, (4) *generates a lot of enthusiasm*, (5) *tends to be quiet* [reversed scored], (6) *has an assertive personality*, (7) *is sometimes shy, inhibited* [reversed scored], (8) *is outgoing, sociable.*" Notice that there are two overlapping items in Study 1 and Study 2: *I see myself as someone who*…*is reserved* [reversed scored] and *is outgoing, sociable*. Finally, though some of the Big Five personality trait were significantly correlated with other traits (e.g., neuroticism and agreeableness were negatively correlated [$r = -0.40$, $p < 0.001$], neuroticism and conscientiousness were negatively correlated [$r = -0.55$, $p < 0.001$], conscientiousness and agreeableness were positively correlated [$r = 0.41$, $p < 0.001$]), most of the intercorrelations among the traits were modest (i.e., the remaining *r*s ranged from 0.13 to 0.35 in absolute magnitude).

6.1.3.2. State personality.
The nightly measure of Big Five personality states was identical to the measure used in Study 1. Participants completed a daily version of the BFI-10. As before, participants indicated the extent to which each of the 10 statements described their personality during that day. For example, to measure state extraversion participants rated their level of agreement with two statements on a scale of 1 (disagree strongly) to 5 (agree strongly): "*Today, I was outgoing, sociable*" and "*Today, I was reserved.*"

6.1.3.3. Daily well-being.
Because daily happiness and daily emotions had similar relationships with state personality in Study 1, and to minimize time demand for participants, we measured only positive and negative emotions from the current day in Study 2. We used the same adapted Scale of Positive and Negative Experience (Diener et al., 2010): on scale of 1 (very rarely or never) to 5 (very often or always) participants indicated the extent to which they experienced 12 different emotions (e.g., happy, sad, etc.) during that day.

6.1.3.4. Daily satisfaction of psychological needs.
In order to test H4, we measured daily psychological needs as potential mediating variables between state personality and daily emotions. In line with self-determination theory (Deci & Ryan, 2000), the three psychological needs we measured were: relatedness/social connectedness (e.g., "*I felt close and connected with other people who are important to me*"), personal competence (e.g., "*I took on and mastered hard challenges*"), and freedom or autonomy (e.g., "*I was free to do things my own way*"). Participants were told to rate their level of agreement with nine items, on a scale of 1 (strongly disagree) to 5 (strongly agree), "bearing in mind what you did today." We measured each psychological need with three positively scored items (see Sheldon, Elliot, Kim, & Kasser, 2001 and Sheldon, Abad, & Hinsch, 2011 for items; also see Church et al., 2013 for use of one item per need).

6.1.4. Analytic strategy

Because one of the major goals in Study 2 was to replicate the results from Study 1 using a well-powered and diverse adult sample as well as a longer period of assessment to increase the reliability of our effect estimates, we tested the support for hypotheses 1–3 using the same analytic strategies as in Study 1. Specifically, (a) we tested the support for H1 by predicting each of the Big Five personality states from the Big Five traits after estimating the grand average and ICCs and (b) we tested H2 and H3 by predicting daily well-being from Big Five personality traits, Big Five personality states, and their interaction after estimating the grand average and ICCs. Most importantly, to test H4, we examined the support for five mediation models (generically, state personality -> daily need satisfaction -> daily well-being). We examined the support for mediation by testing the five indirect effects for level-1 mediators (see Bauer, Preacher, & Gil, 2006) using the MIXED procedure in SPSS as well as an excel calculator developed by Mathiowetz and Bauer (2008). As is with traditional tests of mediation, we argue that our specified daily need satisfaction variable mediates the association between state personality and daily well-being when paths a, b, and c are all significant, path c′ drops in magnitude after the mediating variable is entered into the model, and there is a significant indirect path through the mediator (Baron & Kenny, 1986).

6.2. Results

6.2.1. Personality traits predict personality states

As in Study 1, the first set of MLMs predict average personality states from personality traits (see Table 3), which tests H1 and partitions state personality variance across levels to determine the ICCs. In sum, these models support H1. Overall, the variance in state personality that is attributed to individual differences was somewhat greater than in Study 1 as ICCs ranged from a low of 0.30 (conscientiousness) to a high of 0.49 (neuroticism); however, replicating the results from Study 1, the strongest predictor of state personality was the corresponding personality trait within the same domain. The coefficients of these relationships ranged from a low of 0.18 (trait extraversion predicting state extraversion) to 0.62 (trait openness predicting state openness). This pattern demonstrates that Big Five personality traits explain a significant amount of the variance in Big Five personality states.

6.2.2. Personality traits and states as predictors of daily well-being

As is Study 1, in order to test H2 and H3, the second set of MLMs predict daily well-being (positive emotions and negative emotions) from Big Five personality traits, states, and their within-domain interactions (see Table 4). Again, Model 1 displays the overall grand average of the daily emotion variables, as well as the ICCs. Replicating the findings from Study 1, the ICCs suggest that the average variance attributed to individual differences is greater for daily well-being (ICCs ranged from 0.54 to 0.63) than personality states (which, again, ranged from 0.30 to 0.49).

Next, we examined each personality trait as a single predictor of daily emotions. Replicating the results from Study 1, many of the raw associations demonstrate significant associations between personality traits and daily well-being. For example, when entered into the MLM as a single variable, trait extraversion predicted daily positive emotions (i.e., B = 0.41, $p < 0.001$), but not daily negative emotions (B = −0.10, ns). These results are consistent with Study 1. Also, trait agreeableness significantly predicted daily positive emotions and negative emotions (i.e., B = 0.37, B = −0.25, respectively), trait conscientiousness significantly predicted positive emotions and negative emotions (i.e., B = 0.40, B = −0.32, respectively), trait neuroticism significantly predicted positive emotions and negative emotions (i.e., B = −0.45, B = 0.36, respectively),

Table 3
Study 2: Using personality traits to predict personality states.

	State extraversion		State agreeableness		State conscientiousness		State neuroticism		State openness	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects										
Intercept	2.98*	2.98*	3.60*	3.59*	3.53*	3.52*	2.35*	2.37*	3.18*	3.17*
	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)
Trait E		**0.18***		−0.01		0.06		0.00		−0.02
		(0.06)		(0.06)		(0.06)		(0.06)		(0.05)
Trait A		0.09		**0.41***		0.05		0.01		−0.07
		(0.08)		**(0.08)**		(0.08)		(0.08)		(0.08)
Trait C		−0.07		−0.03		**0.20***		0.01		−0.15
		(0.09)		(0.09)		**(0.09)**		(0.09)		(0.09)
Trait N		−0.02		−0.23*		−0.15*		**0.54***		−0.08
		(0.07)		(0.07)		(0.07)		**(0.06)**		(0.06)
Trait O		0.07		−0.07		0.05		0.03		**0.62***
		(0.08)		(0.08)		(0.08)		(0.08)		**(0.08)**
Random effects										
Intercept	0.277*	0.235*	0.396*	0.225*	0.262*	0.197*	0.423*	0.218*	0.348*	0.202*
	(0.041)	(0.036)	(0.058)	(0.036)	(0.041)	(0.032)	(0.061)	(0.034)	(0.051)	(0.031)
Residual	0.557*	0.557*	0.430*	0.430*	0.614*	0.613*	0.435*	0.435*	0.427*	0.427*
	(0.016)	(0.016)	(0.012)	(0.013)	(0.018)	(0.022)	(0.012)	(0.013)	(0.012)	(0.013)
ICC	0.33		0.48		0.30		0.49		0.45	
Model fit statistics										
−2 Log Likelihood	$\chi^2_{(3)}$ = 5651.70	$\chi^2_{(8)}$ = 5638.06	$\chi^2_{(3)}$ = 5093.38	$\chi^2_{(8)}$ = 5052.43	$\chi^2_{(3)}$ = 5871.96	$\chi^2_{(8)}$ = 5856.65	$\chi^2_{(3)}$ = 5132.13	$\chi^2_{(8)}$ = 5079.58	$\chi^2_{(3)}$ = 5065.67	$\chi^2_{(8)}$ = 5023.35

Note. To test the support for H1, we used MLM to predict each of the five personality states from an empty model (Model 1). Next we added the Big Five traits (Model 2), after they have been grand-mean centered, to predict state personality and test the improvement in these models. The strongest trait predictors of state personality are highlighted in bold for each model.
* $p < .05$.

whereas trait openness only predicted daily positive emotions ($B = 0.29$, $p < 0.05$), but not daily negative emotions ($B = −0.12$, *ns*).

When examining the coefficients for Model 2, we found trait neuroticism to be consistently associated with daily emotions (i.e., $B = −0.34$ for daily positive emotions; $B = 0.31$ for daily negative emotions; both $ps < 0.05$). These results are consistent with Study 1. Thus, on average, emotionally stable individuals report more daily well-being (and less ill-being) than neurotic individuals. However, the strong links between trait agreeableness and daily emotions found in Study 1 did not replicate in Study 2. Additionally, the only other predictor of daily emotions was trait extraversion, which had a strong and significant association with daily positive affect ($B = 0.33$, $p < 0.05$).

When examining the Model 3 coefficients, the only personality trait to predict daily well-being after controlling for personality states was extraversion, which uniquely predicted daily positive emotions controlling for personality states ($B = 0.27$, $p < 0.05$). In contrast, each of the five personality states predicted daily positive emotions. Replicating Study 1, state agreeableness and neuroticism were the strongest predictors of daily well-being. Additionally, replicating Study 1, state neuroticism appeared to mediate the negative relationship between trait neuroticism and well-being. Specifically, trait neuroticism significantly predicted state neuroticism ($B = 0.54$, $p < 0.05$), and state neuroticism strongly predicted negative emotions ($B = 0.34$, $p < 0.05$), even after controlling for all other personality traits and states. Further, the strong relation between trait neuroticism and negative emotions ($B = 0.31$, $p < 0.05$) was non-significant when controlling for state neuroticism ($B = −0.00$, *ns*). This pattern of results was mirrored when examining the relations between trait and state neuroticism with positive emotions (see Table 4); again, these results support the dynamic mediation model.

Finally, because the relation between state personality and daily well-being varied across individuals in Study 1, we treated state personality variables as random effects in Models 3 and 4. Replicating Study 1, the variance components for the random slopes between personality states and positive emotions were

significant for state extraversion and neuroticism (see the Random Effects of State E and N for Model 3 in Table 4) as well as the other states. Also replicating Study 1, the variance component for the random slope between state neuroticism and daily negative emotions was significant; however, the corresponding variance components between state extraversion and agreeableness with negative emotions were also significant. To determine if personality traits could account for this variation, a direct test of H3, we again examined the cross-level interactions between personality traits and states to predict daily well-being. None of the 10 cross-level interactions were significant; further, the variance components for these random slopes remained significant even after we entered the interaction terms into the model. Thus, Study 2 confirms the results from Study 1—there remains unexplained variation in the state personality and daily happiness slopes (especially, the slopes including state neuroticism).

6.2.3. Daily psychological needs mediate the relation between personality states and daily well-being

Having demonstrated that each of the Big Five personality states are uniquely associated with daily positive affect even after controlling for all personality traits and states (directly replicating Study 1), the final goal of Study 2 was to examine the support for H4: daily satisfaction of psychological needs mediates the consistent relations between personality states and positive affect. To test the support for H4, we examined the significance of five indirect effects for level-1 meditators (see Bauer et al., 2006). Table 5 shows the coefficients for paths a (state personality -> daily need satisfaction), b (daily need satisfaction -> daily positive affect, controlling for daily personality), and c (the raw association between state personality -> daily positive affect), as well as the significance of the indirect path. To test our mediation hypothesis, we selected the psychological need most likely to be the mediator of the relation between each personality states and positive affect based on theory and past literature. Therefore, the mediators we tested were: (a) relatedness/social connectedness as the mediator of the relations of state extraversion and agreeableness with positive

Table 4
Study 2: Using personality traits and states to predict daily well-being.

	Daily positive emotions				Daily negative emotions			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Fixed effects								
Intercept	2.03* (0.08)	2.02* (0.07)	2.03* (0.07)	2.03* (0.06)	0.65* (0.06)	0.65* (0.05)	0.58* (0.04)	0.56* (0.04)
Trait E		0.33* (0.08)	0.27* (0.07)	0.26* (0.07)		−0.02 (0.06)	0.01 (0.04)	0.02 (0.04)
Trait A		0.13 (0.11)	−0.05 (0.10)	−0.04 (0.10)		−0.06 (0.08)	−0.02 (0.05)	−0.04 (0.05)
Trait C		−0.01 (0.13)	0.04 (0.11)	0.03 (0.11)		−0.06 (0.09)	−0.03 (0.06)	−0.04 (0.04)
Trait N		−0.34* (0.10)	−0.11 (0.08)	−0.11 (0.08)		0.31* (0.07)	−0.00 (0.04)	0.02 (0.05)
Trait O		0.02 (0.11)	0.04 (0.10)	0.03 (0.10)		0.01 (0.08)	0.03 (0.05)	0.03 (0.02)
State E			0.16* (0.02)	0.16* (0.02)			−0.02 (0.02)	−0.02 (0.02)
State A			0.27* (0.02)	0.26* (0.02)			−0.18* (0.02)	−0.18* (0.02)
State C			0.08* (0.02)	0.08* (0.02)			0.00 (0.01)	0.00 (0.01)
State N			−0.30* (0.03)	−0.30* (0.03)			0.34* (0.02)	0.34* (0.02)
State O			0.10* (0.02)	0.10* (0.02)			−0.06* (0.02)	−0.06* (0.02)
E × E				0.02 (0.03)				−0.01 (0.02)
A × A				−0.02 (0.03)				0.03 (0.03)
C × C				0.01 (0.02)				0.01 (0.02)
N × N				0.00 (0.03)				0.05 (0.03)
O × O				0.05 (0.03)				0.01 (0.02)
Random effects								
Intercept	0.724* (0.104)	0.499* (0.074)	0.371* (0.059)	0.371* (0.059)	0.344* (0.049)	0.253* (0.038)	0.118* (0.022)	0.118* (0.020)
State E			0.028* (0.007)	0.028* (0.007)			0.022* (0.007)	0.022* (0.006)
State A			0.014* (0.006)	0.014* (0.006)			0.028* (0.008)	0.028* (0.008)
State C			0.008* (0.003)	0.008* (0.003)			0.007 (0.004)	0.007 (0.004)
State N			0.055* (0.013)	0.055* (0.013)			0.028* (0.007)	0.024* (0.008)
State O			0.018* (0.006)	0.018* (0.006)			0.007 (0.005)	0.008 (0.005)
Residual	0.428* (0.012)	0.428* (0.013)	0.181* (0.006)	0.181* (0.006)	0.291* (0.008)	0.291* (0.008)	0.132* (0.004)	0.132* (0.004)
ICC	0.63				0.54			
Model fit statistics								
−2 Log Likelihood	$\chi^2_{(3)}$ = 5154.00	$\chi^2_{(8)}$ = 5123.04	$\chi^2_{(33)}$ = 3447.79	$\chi^2_{(38)}$ = 3469.73	$\chi^2_{(3)}$ = 4189.49	$\chi^2_{(8)}$ = 4170.33	$\chi^2_{(33)}$ = 2709.30	$\chi^2_{(38)}$ = 2732.72

Note. To test H2 and H3, we conducted four MLM models. Model 1 was an empty model to estimate the intercept and the ICC for each well-being outcome. In Model 2 we added Big Five personality traits. In Model 3, we added Big Five personality states and examined magnitude changes in the prediction from personality traits. In Model 4 we added personality trait × state interaction terms to examine if the relations between personality states and daily well-being are moderated by personality traits.
* $p < .05$.

affect, (b) personal competence as the mediator of the relation between conscientiousness and positive affect, and (c) freedom or autonomy as the mediator of the relations of neuroticism and openness with positive affect.

The results demonstrate clear support for partial mediation (again see Table 5). First, each personality state is significantly associated with each proposed daily psychological need mediator (i.e., path a is significant in each model). Importantly, even though not displayed in Table 5, the association between each personality state and its proposed daily psychological need mediator is significant even when controlling for the other four personality states. Second, each psychological need is significantly associated with positive affect even after controlling for the specified personality state (i.e., path b is significant in each model). Third, there is a significant drop in magnitude when comparing the associations between personality states and positive affect without (path c) and with (path c′) the proposed mediator. Fourth, there is also a significant indirect effect in each model (i.e., the proposed ab path is significant in each model). Thus, these models support H4. That is, psychological needs are likely at least some of the mediators explaining associations between personality states and daily positive emotions.

7. Discussion

The objective of the current research was to understand how personality traits and states are associated with daily well-being and if satisfaction of different psychological needs mediates these

Table 5
Psychological needs as mediators of the associations between personality states and daily positive emotions.

	Unstandardized regression coefficients predicting PA [95% CI] (SE)				Indirect effect [95% CI] (SE)
	a	b	c	c′	
Personality					
State E	0.30*** [0.23, 37] (0.03)	0.37*** [0.31, 43] (0.03)	0.30*** [0.23, 0.37] (0.04)	0.18*** [0.13, 0.25] (0.03)	0.12*** [0.08, 0.15] (0.02)
State A	0.41*** [0.34, 0.48] (0.03)	0.30*** [0.26, 0.35] 0.02(0.02)	0.48*** [0.42, 0.55] (0.03)	0.34*** [0.28, 0.40] (0.03)	0.14*** [0.11, 0.18] (0.02)
State C	0.46*** [0.39, 0.53] (0.03)	0.23*** [0.17, 0.29] (0.03)	0.22*** [0.16, 0.28] (0.03)	0.11*** [0.06, 0.16] (0.03)	0.11*** [0.07, 0.14] (0.02)
State N	−0.37*** [−0.44, −0.30] (0.03)	0.33*** [0.28, 0.39] (0.03)	−0.49*** [−0.56, −0.42] (0.04)	−0.35*** [−0.41, −0.29] (0.03)	−0.14*** [−0.17, −0.10] (0.02)
State O	0.20** [0.14, 0.27] (0.03)	0.45*** [0.39,] 51 (0.03)	0.25** [0.19, 31] (0.03)	0.13*** [0.09, 0.18] (0.02)	0.12** [08, 15] (0.02)

Note. The following generic mediation models are tested:
State personality -> daily need satisfaction (path a).
Daily need satisfaction -> daily positive affect controlling for daily personality (path b).
State personality -> daily positive affect (path c).
State personality -> daily positive affect controlling for daily need satisfaction (path c′). Mediation is supported when paths a, b, and c are all significant as well as a drop in magnitude for c′ and a significant direct effect.
These mediation models are specifically: (1) E -> daily relatedness -> PA; (2) A -> daily relatedness -> PA.
(3) C -> daily competence -> PA; (4) N -> daily autonomy -> PA; (5) O -> daily autonomy -> PA.
** $p < .01$.
*** $p < .001$.

relations. It should be noted that, in discussing the significant results of Studies 1 and 2, we focus only on those which replicated in Study 2.

First, only in the case of trait neuroticism did we provide consistent support for the dynamic mediation model, which links personality traits to daily well-being through the influence of their corresponding personality states (e.g., Ching et al., 2014). Across both studies and for all five personality states, we supported H1 by demonstrating that the strongest trait predictor of state personality was the corresponding personality trait of the same domain. However, trait extraversion, agreeableness, conscientiousness, and openness to experience each failed to consistently predict daily well-being when all five personality traits were entered into the MLMs (failing to support H2). In contrast, across both studies (a) trait neuroticism predicted decreased daily well-being, (b) trait neuroticism predicted increased state neuroticism, and (c) state neuroticism predicted decreased state well-being. Importantly, state neuroticism reduced the association between trait neuroticism and daily well-being to non-significance in each MLM, as predicted by the dynamic mediation model.

Second, we found that people were happier and experienced more frequent positive emotions on days in which they were extraverted, agreeable, conscientious, emotionally stable, and open to experience (even after controlling for their respective personality traits). Also, on days in which people were more agreeable and less neurotic, they experienced fewer negative emotions. Further, none of the 25 personality trait × state interaction terms were significant. Therefore, the unique relationships between state personality and state well-being are consistent regardless of people's personality traits in the corresponding domains (supporting H3). Thus, these findings are consistent with previous research (Ching et al., 2014; Fleeson et al., 2002; McCabe & Fleeson, 2012; McNiel & Fleeson, 2006; McNiel et al., 2010) and extend our understanding of personality states to show that all Big Five personality states are related to daily positive affect, regardless of one's personality traits.

Finally, we support our hypothesis that satisfaction of daily psychological needs accounts for some of the association between personality states and daily well-being (i.e., supporting H4). Specifically, these mediation models suggest that, when people are more extraverted and agreeable during the day (e.g., social

and trusting, as opposed to reserved and fault-finding), they experience more frequent positive emotions in part because their relatedness needs are satisfied at the time. Additionally, on days in which people are more conscientious (e.g., responsible, as opposed to unreliable), they experience more frequent positive emotions in part because their personal competence needs are met. Finally, when people are more open to new experiences (e.g., curious, as opposed to aesthetically insensitive) and less neurotic (e.g., calm and relaxed, as opposed to anxious) over a day, they experience more frequent positive emotions in part because they perceive themselves to be in charge of their actions and decisions. However, none of these mediation models fully explain any relationship between personality states and daily well-being.

Further, some of our results appear to contradict previous research. For example, across each MLM, the strongest positive predictor of daily well-being was state agreeableness. Yet, on a trait level, extraversion is often the strongest trait predictor of positive affect (e.g., Lucas & Fujita, 2000; McCrae & Costa, 1991; see Steel et al., 2008 for a meta-analysis). Also, in Study 1 trait extraversion was not a unique predictor of daily well-being, while in Study 2 trait extraversion did influence daily positive emotions, but not through state extraversion. These results stand in contrast to previous support for the dynamic mediation model, which has shown the association between trait extraversion and positive affect to be mediated by state extraversion (Wilt et al., 2012). Thus, we begin by discussing how measuring extraversion exclusively as sociability (which is how the BFI-10 measures extraversion) may have impacted our associations of trait and state extraversion with daily positive affect.

7.1. How operationalizing extraversion impacts its relation with well-being

One of the largest discrepancies between our results and previous research is the small and inconsistent relations we observe between extraversion (both as a trait and state) and daily positive emotions. Overall, as a personality trait, meta-analytic analyses demonstrate that extraversion is the strongest Big Five predictor of positive affect (Steel et al., 2008). However, in our models the significant raw association between trait extraversion and daily

positive emotions is reduced to non-significance in Study 1 when all five personality traits simultaneously predict daily positive affect. Further, in both Study 1 and Study 2 we find that state agreeableness is a stronger unique predictor of daily positive emotions than state extraversion. Conversely, previous research has demonstrated that state extraversion is the strongest unique predictor of daily positive emotions (especially in the United States; see Ching et al., 2014). Finally, our only model in which the extraversion and positive affect relation is similar to previous research is the significant unique relation between trait extraversion and daily positive emotions in Study 2. However, additional analyses also do not support the dynamic mediation model, as state extraversion does not reduce the association between trait extraversion and daily well-being.

We believe that these inconsistencies (both within our two studies and in comparison to previous research) can be explained by how the BFI-10 (i.e., our measure of Big Five traits in Study 1 and of Big Five states in both studies) operationalizes extraversion—as only measuring the sociability facet of extraversion without accounting for the assertiveness and high-energy facets. For example, in comparing our state extraversion items (e.g., "sociable and reserved [reverse scored]") with state extraversion items used in previous research (e.g., "extraverted, energetic, and talkative" in Ching et al., 2014; "energetic, assertive, adventurous, and talkative" in Wilt et al., 2012), it is clear that these previous measures of state extraversion directly measure the high-energy facet (if not also the assertiveness facet). Further, measures of state positive affect (e.g., "enthusiastic and happy" in Ching et al., 2014; "excited, enthusiastic, proud, and alert" in Wilt et al., 2012) have more conceptual overlap with high energy than with sociability. Perhaps, our measure of state extraversion would have had a stronger relationship with daily positive emotions if we measured the high-energy facet of extraversion.

The decision to measure energy level as facet of state extraversion continues personality science's long tradition of debating the overlap between extraversion, positive affectivity, and positive emotionality (see McCrae & Costa, 1991; Tellegen, 1985; Watson & Clark, 1984, 1997). Further, previous research has demonstrated that the high-energy facet of extraversion is important in understanding the relation between trait extraversion and positive affect. For example, Smillie, DeYoung, and Hall (2015) found extraversion predicts "activated" positive affective states better than low-arousal ones. In fact, some have noted there is a conceptual overlap between trait extraversion and general positive affect. Gray (1990) theorized that extraversion is closely linked to the behavioral activation system (BAS), which is sensitive to rewarding stimuli. Elliot and Thrash (2002), find that extraversion, positive emotionality, and behavioral activation (e.g., feeling enthusiastic about opportunities) load onto the same factor, which they conceptualized as a general approach temperament. Others have also noted the significant overlap between extraversion and positive affect (e.g., Burger & Caldwell, 2000; Watson & Clark, 1997). Ultimately, Watson and Clark (1997) hypothesized that positive affectivity is a central facet of extraversion, rather than a result of extraverted behavior. Thus, frequency and the enjoyment of social activities is not the only mechanism by which extraverts are happier than introverts, note Lucas, Le, and Dyrenforth (2008) in discussing the conceptual and statistical overlap between extraversion and positive affect constructs.

Consequently, a state measure of extraversion which is focused less on the behavioral-activation facets (i.e., being assertive and energetic) and more on its social facet should be a weaker predictor of daily well-being than a measure including these facets. Thus, our various conceptualizations of extraversion likely explain why the lone unique association observed between trait extraversion and daily positive affect occurred when we measured extraversion

with the BFI-44 (which includes items such as "I see myself as someone who" "…is full of energy" and "… generates a lot of enthusiasm"). Moreover, our state measure of extraversion may have mediated the association between trait extraversion and daily positive affect if it had captured high energy as well as sociability. Finally, measuring extraversion as sociality alone might also explain why the relation between trait extraversion and state extraversion was, comparatively, weak—there may be more fluctuations in daily sociability and comparatively less in other enacted states. Therefore, we encourage future state personality researchers to determine the degree to which each facet of extraversion (i.e., sociability, assertiveness, and energy level) contributes to the typically consistent relation between state extraversion and positive emotions.

7.2. Additional mediators of the association between state personality and well-being

Determining the complete set of mediators, as well as the full pathway through which personality states influence daily well-being, must be a goal of future research on state personality. Given that the mediators of the state personality and daily well-being relations are likely to be similar to the mediators of trait-level personality and well-being links (Fleeson et al., 2002; McNiel & Fleeson, 2006), we now review some of the evidence for important trait mediators between personality and well-being as suggestions of additional mediators to examine.

7.2.1. Self-esteem

Like personality, self-esteem can fluctuate in response to situational cues (e.g., Chang & Arkin, 2002). We expect that individuals experience more positive affect when their daily behaviors increase their self-esteem. That is, through positive goal-oriented behavior, individuals can feel good about themselves on particular days and, in turn, experience greater well-being. For example, self-esteem mediates the relationship between trait extraversion and well-being: extraverts are happier than introverts partially because they feel more confident in themselves (Benet-Martínez & Karakitapoglu-Aygün, 2003; Kwan et al., 1997). On the other hand, neurotic individuals have lower self-esteem than emotionally stable people, and this lower self-esteem mediates the negative relationship between neuroticism and well-being (Kwan et al., 1997). Finally, increased self-esteem helps explains why conscientious people are happier than unconscientious ones (Kwan et al., 1997). Thus, if self-esteem mediates the state personality and daily well-being link, then people should experience greater self-esteem on days they behave in a more extraverted, emotionally stable, and conscientious fashion.

7.2.2. Avoiding maladaptive behaviors

While approaching positive outcomes (e.g., social situations and approach-oriented goals) should improve the quality of one's day, if state personality can also minimize the number of negative daily events (e.g., through avoidance of behaviors that reduce well-being), then avoiding maladaptive behaviors could also explain why fluctuations in state personality are related to daily well-being. For example, Paunonen (2003) reports that individuals high in agreeableness consume less tobacco and drive slower than disagreeable individuals. Thus, a possible outcome of agreeableness is not only engaging in behaviors to promote connectedness with others (as demonstrated in Study 2), but also the selection of behaviors that buffer against negative interactions with others, as well as risk and negative consequences for the self. Moreover, Bogg and Roberts (2004) find that conscientious individuals avoid excessive alcohol, drunk driving, marijuana and tobacco use, risky sex, and violence. Likewise, neurotic people are more likely to

drink excessively and as a coping mechanism (Mroczek, Spiro, & Turiano, 2009), which predicts further alcohol abuse (e.g., Mezquita, Stewart, & Ruipérez, 2010). Therefore, approaching behaviors that increase positive emotions and avoiding behaviors that increase negative emotions should all be examined as future mediators of the state personality and daily well-being link.

7.3. Limitations

As with all studies there are a number of limitations of these two studies which future research can improve. Specifically, the measurements of state personality, well-being, and psychological need satisfaction used in the current research can be improved. First, not only do short personality measures (e.g., the BFI-10) fail to distinguish between facets of each of the five personality domains, extremely brief personality measures are typically less reliable than longer measures. There are trade-offs between using shorter versus longer personality measure. Some researchers have tried to measure state personality with more items but have only focused on one trait (often state extraversion). However, our models show there are clear differences in the conclusion made from examining (a) the raw associations between state personality and well-being and (b) the unique associations, controlling for the other Big Five traits or states. However, when researchers try to measure all five states, assessments tend to ignore facet-level information. Thus, future research should continue to balance the various trade-offs that come with measuring single personality traits well, while controlling for other states and testing more comprehensive dynamic mediation models. Additionally, although daily diaries asked participants to reflect on their personality and well-being over the course of particular days, thus narrowing focus on the trait-state continuum, they are still retrospective reports of personality and well-being. Future studies can measure state personality, well-being, and psychological need satisfaction in real time to confirm our models. Finally, as is common in much of personality research, data collected in the present research does not establish causality of the relationships it examines. Thus, as suggested in Ching et al. (2014) and Church et al. (2013), further research is needed to better understand the causal paths between personality and constructs relevant to well-being, such as psychological needs.

8. Conclusion

While numerous studies demonstrate that each of the Big Five traits are correlated with several measures of subjective well-being, the impact on well-being that may result from fluctuations in state personality has been, comparatively, overlooked. As we demonstrate, it is mostly these daily fluctuations in personality that are important in understanding variations in daily well-being. Though, supporting the dynamic mediation model, the relation between trait neuroticism and decreased daily well-being appears to be mediated by state neuroticism. Further, the influence state personality has on daily well-being appears to be the result of the satisfaction of psychology needs. Therefore, these results establish a foundation for future personality science to extend. That is, these results highlight the need for future studies to continue to discover the mediators of all Big Five personality states on daily well-being and better measure the facets of state personality that are associated with situation selection and daily choices. If we are ever to fully comprehend what makes people happy in day-to-day life, we need to begin by understanding how fluctuations in state personality shape daily experiences and behaviors, or we will always fall short of fully understanding the happy individual.

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