Inside the Happy Personality: Personality States, Situation Experience, and State Affect Mediate the Relation Between Personality and Affect

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This manuscript has been accepted for publication in the Journal of Research in Personality on January 24, 2020. The final official version is available at https://doi.org/10.1016/j.jrp.2020.103929.

Supplemental material for this manuscript is available at https://osf.io/wavxe/.

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Abstract

Personality traits are strongly related to affect, but the mechanisms accounting for this association remain mostly unclear. We test a new theoretical model that proposes that personality states, situation characteristics, and affective states mediate the relation between personality traits and trait affect. Data from an experience sampling study (*N*=206; 4,381 observations) indicate that personality traits are associated with personality states and experienced situation characteristics, personality states and experienced situation characteristics are associated with state affect, state affect is associated with trait affect, and that these variables indeed mediate the relation between personality traits and trait affect. These results emphasize the importance of daily experiences for trait-level variables and call for further research on the interplay between personality, behavior, situations, and affect.

Keywords: personality traits, personality states, situation characteristics, affect, mediation, experience sampling

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1. Introduction

One of the most robust and important findings of personality psychology is that personality is associated with affect (DeNeve & Cooper, 1998; Hayes & Joseph, 2003; Soto, 2015; Steel, Schmidt, & Shultz, 2008): Persons high in extraversion report on average more positive affect than persons low on extraversion. Similarly, emotional stability is negatively associated with negative affect, and both agreeableness and conscientiousness are positively associated with positive affect. However, the underlying mechanisms that drive these associations remain unclear. Over the years, different theories have been proposed and tested (e.g., McCrae & Costa Jr, 1991; Srivastava, Angelo, & Vallereux, 2008; Wilt, Noftle, Fleeson, & Spain, 2012), yet none of these has been able to explain the relationship between personality and affect completely. It has, for example, been shown that "at least part of the reason why extraverts are happier in general is because they act extraverted in daily life, which produces feelings of happiness" (Wilt et al., 2012, p. 1207). However, this so-called dynamic mediation only explained part of the association between trait extraversion and trait affect. We propose that incorporating situational effects into this model might help to better explain the association. In other words, another reason why rather extraverted persons, for example, report on average more positive affect than introverted persons might be that they experience more situations that produce positive affect. In this paper, we describe and test a new model of the personality–affect relation that considers mediating effects of both behaviors and situations.

1.1. Existing Models of the Personality–Affect Relation

Traditionally, models of the relation between personality and affect have been categorized into temperamental and instrumental models (McCrae & Costa Jr, 1991). Temperamental models predict personality to be directly associated with trait affect independent of situations and behaviors (Howell, 2005; Lucas & Diener, 2009; McCrae & Costa Jr, 1991) and they often take the form of dispositional or neurobiological explanations. Personality is, for example, thought to determine a set point for positive affect (Gross, Sutton, & Ketelaar, 1998), influence affective reactivity (Carver, Sutton, & Scheier, 2000), or affect the threshold for experiencing positive and negative affect (Gross et al., 1998; Rosenberg, 1998).

Instrumental models predict personality to be indirectly associated with trait affect by predisposing individuals to certain behaviors and circumstances (Howell, 2005; Lucas & Diener, 2009; McCrae & Costa Jr, 1991) and they often take the form of moderation or mediation models. Moderation models propose, for example, that extraversion is related to the enjoyment of social situations (e.g., Diener, Larsen, & Emmons, 1984; Lucas, Le, & Dyrenforth, 2008; Pavot, Diener, & Fujita, 1990; Srivastava et al., 2008). That is, extraversion is thought to moderate the association between social situations and positive affect such that higher extraversion is related to a more positive association between social situations and positive affect.

Mediation models such as the social participation hypothesis (Srivastava et al., 2008) propose that extraversion is not related to how much people prefer social interactions over being alone, but rather to how frequently people participate in social situations, which is in turn associated with increased positive affect (e.g., Argyle & Lu, 1990; Lucas et al., 2008; Pavot et al., 1990; Srivastava et al., 2008). That is, social situations are thought to mediate the relation

between trait extraversion and trait positive affect. Another version of an instrumental mediation is the dynamic mediation hypothesis (Wilt et al., 2012). This hypothesis builds on evidence showing that just like personality traits are associated with trait affect, personality *states* are associated with state affect (Fleeson, Malanos, & Achille, 2002; McNiel & Fleeson, 2006). Whereas personality traits describe long-term, inter-individual differences in how people perceive and react to situations, personality states describe short-term, intra-individual expressions of trait contents in a person's behavior (Fleeson, 2001). Personality states thus do not represent specific behaviors but certain aspects of behaviors, namely the manifestations of trait contents in behavior. The dynamic mediation hypothesis combines these findings and posits that the trait-level association between trait extraversion and trait affect is mediated by the state-level association between extraverted states and state affect. That is, extraverted behaviors are thought to mediate the relation between trait extraversion and positive affect.

Empirical tests of these models have yielded no support for a moderation effect (Lucas et al., 2008; Srivastava et al., 2008) but partial support for both the dynamic mediation hypothesis and the social participation hypothesis. Wilt et al. (2012), on the one hand, showed in a series of six experience sampling studies that aggregated extraverted and affective states indeed mediated the relation between trait extraversion and trait positive affect. Lucas et al. (2008) and Srivastava et al. (2008), on the other hand, showed that social participation mediated the relation between trait extraversion and trait positive affect. However, each of these models only explained part of the relation.

Thus, both situations and behaviors have been shown to mediate the relation between extraversion and trait positive affect and explain part of this relation. Surprisingly, no study that we are aware of has integrated these two approaches. In this paper, we therefore tested the

hypothesis that including both situations and behaviors as mediators in a model provides a promising account to explaining a greater portion of the extraversion–positive affect relation. Additionally, we made two important modifications: We extended the model to all Big Five personality traits and we assessed situations in a more systematic, comprehensive, and subjective way. Existing theories of the personality–positive affect relation almost exclusively focus on extraversion, and the dynamic mediation hypothesis and social participation hypotheses are no exception. We propose that these models should apply not only to extraversion but also to other personality traits. Indeed, the dynamic mediation hypothesis has recently been shown to at least partially apply to agreeableness, openness and neuroticism (Ching et al., 2014; Howell, Ksendzova, Nestingen, Yerahian, & Iyer, 2017). We also propose that these models — particularly when including other personality traits — should not only apply to social situations but also to other types or aspects of situations. Conscientiousness, for example, might not be associated with social participation but with the frequency of experiencing task-related, dutiful situations (Fleeson, 2007; Rauthmann, Sherman, Nave, & Funder, 2015).

Additionally, situations have so far been assessed rather unsystematically in research on the personality-affect link. Sociality of situations, for example, has been operationalized as the number of interaction partners, amount of time spent with friends or family, amount of time spent leading and helping others, or as rather broad categories such as “social”, “semi-social” and “alone” (e.g., Diener et al., 1984; Emmons, Diener, & Larsen, 1986; Lucas et al., 2008; Srivastava et al., 2008). However, the diversity of these operationalizations decreases comparability among studies. We therefore used a validated taxonomy of situation characteristics: the Situational Eight DIAMONDS taxonomy (Rauthmann et al., 2014; Rauthmann & Sherman, 2016a, 2016b). This taxonomy allows a comprehensive and reliable

assessment of eight dimensions of situation characteristics: *Duty* (Does work need to be done?), *Intellect* (Is deep cognitive processing necessary?), *Adversity* (Is someone being threatened?), *Mating* (Is there an opportunity to attract mates?), *pOsitivity* (Is the situation enjoyable?), *Negativity* (Can negative feelings taint the situation?), *Deception* (Is someone deceptive?), and *Sociality* (Is meaningful social interaction possible?).

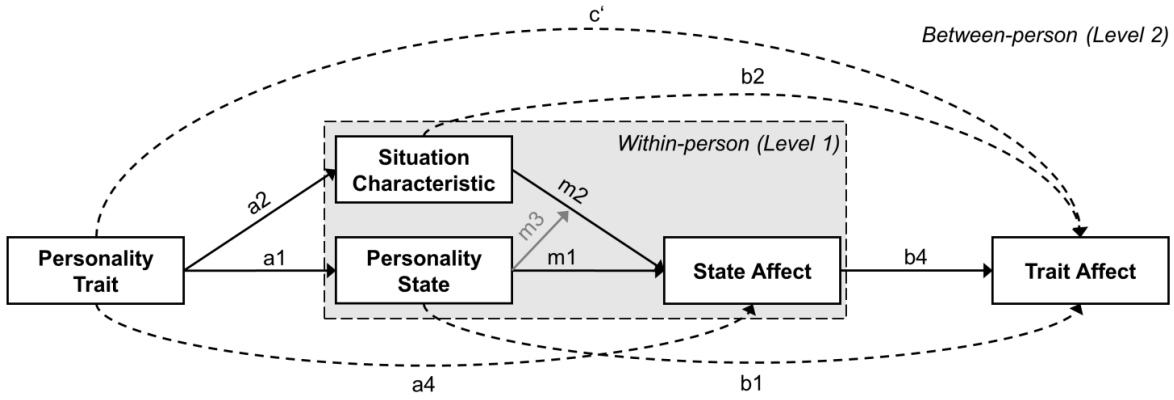

Figure 1. Hypothesized mediation model explaining the personality–affect relation through personality states, situation characteristics, and state affect. The path displayed in grey (m_3) represents the tentatively included interaction between personality state and situation characteristic.

1.2. The Extended Dynamic Mediation Model

Our model provides an instrumental explanation of the personality–affect relation by integrating and extending the dynamic mediation and social participation hypotheses. We propose that personality states, situation experience, and state affect mediate the relation between personality traits and trait affect. Figure 1 shows our mediation model, consisting of six main paths:

(1) Personality traits are associated with average levels of personality states (path a_1). The density distributions approach proposes that personality traits can be thought of as density distributions of personality states and are, for example, related to the mean of these distribution

(Fleeson, 2001). Indeed, a meta-analysis of 15 experience sampling studies (Fleeson & Gallagher, 2009) as well as tests of the dynamic mediation hypothesis (Ching et al., 2014; Howell et al., 2017; Wilt et al., 2012) found personality traits to be strongly associated with mean levels of their respective personality states.

(2) Personality traits are associated with average levels of experienced situation characteristics (path a_2). Research on person–situation transactions indicates that personality predisposes people to select or create certain situations or to perceive these situations differently (e.g., Geukes, Nestler, Hutteman, Küfner, & Back, 2017; Rauthmann et al., 2015; Rauthmann, 2017; Sherman, Nave, & Funder, 2013; Wrzus, Wagner, & Riediger, 2016). However, it is important to mention here that our model does not differentiate between different types of these person–situation transactions but simply refers to the situation as it is experienced by the subject. Rauthmann et al. (2015) reported that openness was positively associated with experienced Intellect, agreeableness was negatively associated with experienced Deception, and Neuroticism was positively associated with experienced Negativity and negatively associated with experienced pOsitivity. Conscientiousness and extraversion showed no consistent associations with subjective situation experience, but they were associated with the more objective contact with dutiful situations and romantic and social situations, respectively (Rauthmann et al., 2015). Additionally, Emmons et al. (1986) reported selectiveness of the situation (i.e., whether a situation was chosen or imposed) to be an important moderator of the relation between personality and situations such that extraversion, for example, correlated significantly with time spend in chosen social situations but not with overall time spend in social situations.

(3) Personality states are associated with state affect (path m_1). There are several proposed mechanisms linking personality states to affective experiences: Personality states may

serve to reach a goal (Wilt, Bleidorn, & Revelle, 2017), fulfill psychological needs (Howell et al., 2017), or decrease effort (Gallagher, Fleeson, & Hoyle, 2011), each of which would in turn be related to affect. Indeed, a compelling body of evidence has linked all Big Five personality states to more positive or less negative affective experiences (e.g., Ching et al., 2014; Fleeson et al., 2002; Howell et al., 2017; McNiel & Fleeson, 2006; Wilt et al., 2012), although research exploring mechanisms of this relation is rare. However, our model also does not distinguish among these mechanisms but is merely concerned with the relation between personality states and state affect.

(4) Experienced situation characteristics are associated with state affect (path m_2). Situations provide circumstances that can be relevant to reaching goals, fulfilling needs, and many more (Horstmann & Ziegler, 2019; Parrigon, Woo, & Tay, 2017). Therefore, by means of these evaluations, situations should also be related to state affect. Consistent with this notion, Horstmann and Ziegler (2019) analyzed associations between the Situational Eight DIAMONDS and state affect. They found that Duty and pOsitivity were positively related to state positive affect, that Duty and Sociality were negatively related to state negative affect, and that Adversity and Negativity were positively related to state negative affect.

(5) State affect is associated with trait affect (path b_4). A global evaluation of how one typically or frequently feels should take into account the course of momentary feelings (Kahneman, 2003), thus state affect should be related to trait affect. Surprisingly, this association has been tested only sparsely throughout experience sampling studies. Wilt et al. (2012), for example, showed that aggregated positive affective states correlated with trait positive affect. They additionally found that this relation was stronger when assessing trait affect with reference to the same period as state affect.

(6) Personality traits are initially associated with trait affect, and this association decreases when controlling for personality states, situation characteristics, and state affect (path *c*'). The path from personality traits to trait affect is supported by a compelling body of evidence linking all Big Five personality traits to well-being outcomes (DeNeve & Cooper, 1998; Soto, 2015; Steel et al., 2008). The mediation of this relation is the main hypothesis of this work and has not yet been tested in this form. In the case of extraversion, for example, our model posits that rather extraverted persons report on average more positive affect because they enact more extraverted states and experience more social and positive situations that are associated with more positive affective states. These positive affective states accumulate to increased trait positive affect and thus cause rather extraverted persons to report more positive affect than rather introverted persons.

Additionally, it is possible that personality states and experienced situation characteristics interact in predicting state affect. As described earlier, a moderation effect has been tested as an explanation for the trait extraversion–positive affect relation, but in these earlier studies, trait extraversion did not or only to a very small degree moderate how people reacted to social situations (e.g., Lucas et al., 2008; Srivastava et al., 2008). We propose that the crucial influence on how someone reacts to a certain situation is not how they typically behave (i.e., personality traits) but how they behave in this particular situation (Fleeson et al., 2002; Whelan, 2013). The relation between social situations and positive affect, for example, might depend on how extraverted a person behaves in these situations. Therefore, our model is supplemented by a tentative 7th path that symbolizes the interaction between personality states and experienced situation characteristics (path m_3). We do not, however, include any paths linking personality states and situation characteristics. Although personality states and situation characteristics are

related (e.g., Geukes, van Zalk, & Back, 2018; Lewin, 1936; Mischel & Shoda, 1995), the direction of this relation remains mostly unclear. Additionally, our model is not concerned with the relation between these two variables but rather with how they are related to personality traits and to state affect. For these reasons, personality states and situation characteristics are not linked in our model.

We are aware that other relationships than the ones proposed in our mediation model, especially among the Level 1 variables, are conceivable. However, because our model was theoretically derived from two existing mediation models and was preregistered, we do not explore alternative associations.

1.3. Overview of the Present Study

The present study was designed to test our model of the personality–affect association (see Figure 1). Previous studies have provided support for each of the paths in our model and have tested components in two separate mediation models. Our study is the first to integrate these approaches and test the joint mediating effects of daily behaviors and situations on the personality–affect association. Our model yields the following five general hypotheses. First, we expected personality traits to be associated with the enactment of their respective personality states (H1, path a_1 in Figure 1). Second, we expected personality traits to be associated with experienced situation characteristics, and we expected selectiveness of the situation to moderate this relation such that these associations are stronger if the situation was selected than if it was imposed (H2, path a_2). Third, we expected personality states and experienced situation characteristics to be associated with state affect (H3a, paths m_1 and m_2). Additionally, we expected personality states to moderate the situation–affect relation such that higher levels of a

personality state are associated with a stronger association between a situation characteristic and state affect (positive interaction effect, indicated by '+' in Table 1) or with a weaker association between a personality state and state affect (negative interaction effect, indicated by '-' in Table 1; H3b, path m_3). Fourth, we expected state affect to be associated with trait affect (H4, path b_4). Finally, we expected that these variables mediate the relation between trait personality and trait affect (H5). The hypothesized pairs of personality traits/states and situation characteristics were mostly adopted from Rauthmann et al. (2015) and are shown in Table 1. All hypotheses were preregistered (https://osf.io/vyd4s/).

Table 1
Hypothesized pairs of personality traits/states and situation characteristics

Big Five	Situational Eight DIAMONDS							
	D Duty	I Intellect	A Adversity	M Mating	O pOsitivity	N Negativity	D Deception	S Sociality
O Openness		+						
C Conscientiousness	+							
E Extraversion			+	+	+			+
A Agreeableness			–				–	+
ES Emotional Stability			–		+	–		

Note: + and – indicate hypothesized pairs of person and situation characteristics. We expected a positive interaction effect for pairs marked by + and a negative interaction effect for pairs marked by –.

2. Methods

We tested our hypotheses in a study using experience sampling methodology (ESM; Larson & Csikszentmihalyi, 1983). The data and analysis scripts needed to reproduce our results as well as supplementary materials and analyses are open and available for download (https://osf.io/wavxe/). The procedure, hypotheses, and analytic strategy for this study were

preregistered. However, we were forced to deviate in some points from this preregistration for methodological and theoretical reasons. We transparently report all deviations in a supplementary document (https://osf.io/74cpw/).

2.1. Procedure

Upon registering for the study through an online survey, participants were informed about the participation, compensation and data security. Next, they provided informed consent and confirmed that they were at least 18 years old. They then received information on how to access the experiment on the mobile phone app Expimetrics (Tay, 2015), on which all surveys were completed. On the first day of the study, participants completed trait measures of personality and affect and provided demographic data and data for other research projects. The experience sampling phase began on the next day. Over a period of seven days, participants completed measures of experienced situation characteristics, personality states, and state affect on five random occasions in the waking hours (10 a.m. to 9 p.m.) of the day. Participants received a reminder 30 minutes after the signal and were allowed to complete the questionnaire up to 60 minutes after the initial signal. Following the experience sampling phase, participants filled out a trait affect questionnaire that was rephrased to assess a retrospective rating of the past week.

2.2. Power Analysis and Participants

Power analyses for multilevel modeling are difficult to perform (Mathieu, Aguinis, Culpepper, & Chen, 2012; Scherbaum & Ferreter, 2009). However, the greater consensus is that higher-level sample sizes are more important than lower-level sample sizes (Maas & Hox, 2005) and that higher-level sample size generally should be as big as possible (Snijders, 2005). Based on results from Schönbrodt and Perugini (2013) indicating that correlations — on which multilevel regression models rely — stabilize at about 250 measurements, we aimed to recruit

250 participants. However, because we were restricted by a predetermined timeframe, we did not reach the goal of 250 participants but managed to collect data from 206 German participants. Post-hoc simulations showed that our data were sufficiently powered to detect even very small Level 1 effects and small Level 2 effects (i.e., βs of 0.05 and 0.1, respectively; Funder & Ozer, 2019) with a power of 80% (see supplementary materials).

In the final sample of $N = 206$ participants, 164 (79.61%) were female, 31 were male, and the remaining participants did not indicate their gender. The participants were on average 25.17 years old ($SD = 8.03$) and predominantly students (75.73%) who received partial course credit for participation.

2.3. Measures

2.3.1. Trait and state personality

Participants completed the German translation (Muck, Hell, & Gosling, 2007) of the 10-Item Personality Inventory (Gosling, Rentfrow, & Swann, W. B., Jr., 2003) as a measure of personality. This questionnaire assesses the Big Five personality traits with two items each. The items consist of the statement "I see myself as…" followed by two trait-descriptive adjectives. Participants indicated on a scale from 1 (*disagree strongly*) to 7 (*agree strongly*) how much they agreed with that statement (e.g., "I see myself as extraverted, enthusiastic."). The same questionnaire was also used to assess personality states. For this purpose, the instructions and items were rephrased such that participants were told to indicate to what extent the adjectives described their behavior in the current situation (e.g., "In the current situation, I am extraverted, enthusiastic.").

2.3.2. Trait and state affect

Participants completed the German translation (Berend & Vogt, 2015) of the Scale of Positive and Negative Experience (Diener et al., 2009) as a measure of trait and state affect. For trait-level affect, participants indicated on a scale from 1 (*very rarely or never*) to 5 (*very often or always*) how often they had experienced certain feelings described by twelve adjectives in the last four weeks ("global trait affect" assessed before the ESM assessments, e.g., "During the past four weeks, I felt positive.") or in the last week ("retrospective trait affect" assessed after the ESM assessments, e.g., "During the last week, I felt positive."). For state-level affect, participants indicated on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*) how intensely they experienced certain feelings in the moment (e.g., "In the current situation, I feel positive."). To decrease participant burden, state affect was assessed with only four out of twelve items (i.e., "positive", "negative", "happy", and "sad"). Positive affect and negative affect were highly negatively correlated at the state level and at the trait level (r_{state} = -.62, r_{trait} = -.70). We therefore calculated bipolar affect indices by reverse-coding negative affect items and then averaging across all affect items. Higher values thus represent more positive affect for these indices. In supplementary analyses (https://osf.io/83ua2/), we found that our findings were robust against alternative calculations of the affect variables (e.g., treating positive and negative affect as separate variables).

2.3.3. Experienced situation characteristics

Participants completed the German version (Rauthmann, n.d.) of the S8-II (Rauthmann & Sherman, 2016b) as a measure of situation experience. This questionnaire assesses the subjective experience of the Situational Eight DIAMONDS dimensions (Rauthmann et al., 2014) with one item each, but provides sufficient convergent and discriminative validity to make it

particularly suitable for experience sampling studies (Rauthmann & Sherman, 2016b). Participants indicate on a scale from 1 (*not at all*) to 7 (*totally*) to what extent the current situation contains certain characteristics (e.g., "The situation contains communication, interaction, social relationships."). Additionally, one self-constructed item assessed the selectiveness of the situation (Emmons et al., 1986). Participants indicated on a scale from 1 (*not chosen myself*) to 5 (*chosen myself*) whether the current situation was chosen or imposed on them (i.e., "Did you choose this situation yourself or not?").

2.3.4. Data quality

We included two instructed response items in the baseline questionnaire and two items in the follow-up questionnaire to identify careless responders (e.g., "To secure data quality: Please choose 'no' as your answer."; Meade & Craig, 2012). As an additional data quality check, we asked participants to truthfully indicate whether their data should be used or not at the very end of the study (Meade & Craig, 2012). The question was "This question is intended to ensure a high quality in our data. Please honestly indicate whether you carefully read and answered the questions. Choosing 'no' will not cause you any disadvantages."

2.4. Analytic Strategy

All analyses were conducted in R (R Core Team, 2019). Prior to any analyses, the data were scanned for participants or reports that had to be excluded from the analyses. We examined indicators of careless responding (Meade & Craig, 2012): We excluded the baseline or follow-up questionnaire if participants answered one of the respective instructed response items incorrectly and excluded participants completely if they either answered more than one item incorrectly or indicated careless responding in the question on the usefulness of their data. Overall, three participants were fully excluded from all analyses, and data from nine additional participants had

to be partially excluded. Inspecting the pattern of missing data, we noticed that participants frequently did not respond to complete ESM measurement occasions, yielding a compliance rate of about 61%. However, within the occasions that participants responded to, all state-level variables were missing less than 1%. Trait-level variables, in contrast, were missing between 10% and 26% of the data points. Therefore, we employed pairwise deletion for missing data of state-level variables and multiple imputation for missing data of trait-level variables[1]. Multiple imputation was conducted using the R package MICE (van Buuren & Groothuis-Oudshoorn, 2011) with five imputations. The imputed data tracked the original data well (see supplementary materials). All subsequent analyses were conducted with the imputed datasets, and results were pooled from the five imputed datasets. Apart from missing data and careless responders, we did not exclude any other participants, nor did we identify and exclude outliers.

Analyses for Hypotheses 1, 2 and 3 were conducted using multilevel modeling with the lme4 and lmerTest packages (Bates, Mächler, Bolker, & Walker, 2015; Kuznetsova, Brockhoff, & Christensen, 2017). Hypothesis 4 and Hypothesis 5 were tested using (multilevel) structural equation modeling with the lavaan package (Rosseel, 2012). In addition to unstandardized regression coefficients, we report standardized regression coefficients as effect sizes. For the multilevel regressions, these standardized coefficients were obtained by estimating the same model with standardized variables (Level 1 predictors were person-mean centered after standardizing) as recommended by Lorah (2018). Level 1 predictors were person-mean centered as recommended for multilevel models primarily interested in effects of Level 1-variables or cross-level interactions (Enders & Tofighi, 2007).

[1] The results mostly did not change substantially when employing multiple imputation. Relevant differences were only found for the mediation models (H5), which makes sense because the dependent variable retrospective trait affect had the highest percentage of missing data. In the mediation models, the general pattern of results remained the same but some of the inferences changed. For example, the relation between trait Extraversion and retrospective trait affect was not statistically significant in the original data but is (barely) significant now.

Table 2

Means, standard deviations, reliabilities (ω), intra-class correlations (ICC), numbers of observations, minima and maxima of all relevant variables

		M	*SD*	*ICC*	ω	*n*	min	max
States	Duty	3.26	2.32	0.11	-	4,369	1.00	7.00
	Intellect	3.09	1.93	0.16	-	4,364	1.00	7.00
	Adversity	1.74	1.45	0.24	-	4,368	1.00	7.00
	Mating	2.10	1.74	0.19	-	4,368	1.00	7.00
	pOsitivity	4.29	2.00	0.36	-	4,370	1.00	7.00
	Negativity	2.25	1.65	0.14	-	4,370	1.00	7.00
	Deception	1.67	1.41	0.28	-	4,367	1.00	7.00
	Sociality	3.87	2.37	0.19	-	4,369	1.00	7.00
	Selectiveness	4.26	1.15	0.23	-	4,368	1.00	5.00
	Openness	4.46	1.33	0.29	Level 1: 0.35 Level 2: 0.33	4,362	1.00	7.00
	Conscientiousness	4.90	1.36	0.16	Level 1: 0.34 Level 2: 0.74	4,362	1.00	7.00
	Extraversion	4.18	1.45	0.37	Level 1: 0.49 Level 2: 0.51	4,362	1.00	7.00
	Agreeableness	5.11	1.37	0.42	Level 1: 0.29 Level 2: 0.80	4,367	1.00	7.00
	Emotional Stability	5.25	1.52	0.39	Level 1: 0.48 Level 2: 0.90	4,365	1.00	7.00
	Affect	3.73	0.95	0.16	Level 1: 0.69 Level 2: 0.95	4,367	1.00	5.00
Traits	Openness	4.72	1.32	-	0.43	199	1.00	7.00
	Conscientiousness	4.96	1.45	-	0.63	199	1.50	7.00
	Extraversion	4.17	1.32	-	0.85	199	1.00	7.00
	Agreeableness	4.85	1.35	-	0.48	199	1.00	7.00
	Emotional Stability	4.52	1.26	-	0.40	199	1.00	7.00
	Affect	3.35	0.67	-	0.88	199	1.08	4.92
	Affect retro	3.66	0.73	-	0.87	204	1.65	5.00

Note: ω represents composite reliabilities as recommended for multilevel data by Geldhof. Preacher. and Zyphur (2014). No reliabilities could be computed for the situation characteristics because these were single-item measures. Missing values of trait variables were multiply imputed.

3. Results

We analyzed 4381 ESM reports from 206 participants, of which 186 also completed the baseline and 154 completed the follow-up questionnaire. On average, participants completed 21.27 ESM reports (61%, *SD* = 11.30) which is — although slightly lower than typical — within the range for ESM studies (e.g., Fleeson, 2001, 2007; McCabe & Fleeson, 2016; Wilt et al., 2012; Wilt et al., 2017). Analyses showed that more open persons on average completed more reports, $b = 1.48$, $\beta = 1.94$, $t(179) = 2.19$, $p = .030$, and more extraverted persons completed fewer reports, $b = -1.64$, $\beta = -2.16$, $t(179) = -2.65$, $p = .009$. Descriptive statistics are displayed in Tables 2 and intercorrelations of all relevant variables are displayed in the supplementary materials. The highest correlations between personality states and situation characteristics were $r = .33$ for state extraversion and Sociality. Additionally, pOsitivity and Negativity correlated $r = .44$ and $r = -.41$ with state affect, respectively. Thus, all constructs were sufficiently distinct to conduct the planned analyses.

3.1. Personality Traits are Associated with the Enactment of Personality States

We regressed personality states on all personality traits separately for each personality state, yielding five separate multilevel regression models. Consistent with Hypothesis 1, each personality state was significantly associated with its corresponding trait, with regression coefficients ranging from $b = 0.13$, $\beta = 0.12$ for openness to $b = 0.29$, $\beta = 0.31$ for conscientiousness (Table 3). In addition, we found some significant cross-trait associations. Most interestingly, the relation between trait conscientiousness and average levels of state agreeableness, $b = 0.21$, $\beta = 0.23$, $t(651.35) = 5.51$, $p < .001$, and the relation between trait conscientiousness and average levels of state emotional stability, $b = 0.28$, $\beta = 0.27$, $t(416.70) = 6.14$, $p < .001$, were both stronger than their relations with the respective traits of the

same dimension.

Table 3

Results from multilevel regressions of personality states on personality traits (H1)

	b	β	95% CI	*p*
DV: State Openness				
Intercept	**4.39**	**-0.05**	**[4.30, 4.49]**	**< .001**
Trait Openness	**0.12**	**0.12**	**[0.04, 0.20]**	**.006**
Trait Conscientiousness	**0.12**	**0.13**	**[0.05, 0.19]**	**.002**
Trait Extraversion	0.01	0.01	[-0.06, 0.09]	.745
Trait Agreeableness	0.00	0.00	[-0.08, 0.09]	.963
Trait Emotional Stability	**0.10**	**0.09**	**[0.02, 0.17]**	**.016**
DV: State Conscientiousness				
Intercept	**4.80**	**-0.07**	**[4.72, 4.89]**	**< .001**
Trait Openness	**0.11**	**0.11**	**[0.03, 0.19]**	**.005**
Trait Conscientiousness	**0.29**	**0.31**	**[0.23, 0.36]**	**< .001**
Trait Extraversion	-0.03	-0.02	[-0.09, 0.04]	.467
Trait Agreeableness	0.07	0.05	[-0.03, 0.17]	.195
Trait Emotional Stability	**0.11**	**0.08**	**[0.02, 0.20]**	**.018**
DV: State Extraversion				
Intercept	**4.17**	**-0.01**	**[4.08, 4.26]**	**< .001**
Trait Openness	0.00	0.00	[-0.07, 0.08]	.936
Trait Conscientiousness	0.04	0.04	[-0.03, 0.11]	.245
Trait Extraversion	**0.17**	**0.12**	**[0.08, 0.26]**	**< .001**
Trait Agreeableness	0.05	0.04	[-0.06, 0.16]	.346
Trait Emotional Stability	**0.12**	**0.08**	**[0.02, 0.22]**	**.015**
DV: State Agreeableness				
Intercept	**4.96**	**-0.11**	**[4.87, 5.06]**	**< .001**
Trait Openness	**0.17**	**0.16**	**[0.08, 0.25]**	**< .001**
Trait Conscientiousness	**0.21**	**0.22**	**[0.14, 0.29]**	**< .001**
Trait Extraversion	-0.03	-0.02	[-0.13, 0.07]	.547
Trait Agreeableness	**0.20**	**0.15**	**[0.08, 0.32]**	**.001**
Trait Emotional Stability	**0.16**	**0.12**	**[0.05, 0.26]**	**.003**
DV: State Emotional Stability				
Intercept	**5.10**	**-0.10**	**[4.99, 5.22]**	**< .001**
Trait Openness	**0.15**	**0.13**	**[0.05, 0.26]**	**.003**
Trait Conscientiousness	**0.28**	**0.27**	**[0.19, 0.37]**	**< .001**
Trait Extraversion	0.04	0.03	[-0.07, 0.15]	.482
Trait Agreeableness	0.14	0.09	[> -0.01[a], 0.29]	.052
Trait Emotional Stability	**0.29**	**0.19**	**[0.17, 0.40]**	**< .001**

Note. Significant coefficients ($p < .05$) are printed in boldface. Horizontal lines separate different multilevel regression models. Standardized regression coefficients were obtained by employing the same model with standardized variables as recommended by Lorah (2018). Missing values of trait variables were multiply imputed.

[a] the value was smaller than zero but not small enough to be rounded to -0.01

3.2. Personality Traits are Associated with Experienced Situation Characteristics

Hypothesis 2 proposed that people typically experience situations that match their personality and that this relation is stronger for selected situations. We therefore regressed each situation characteristic in separate multilevel models on the selectiveness of the situation, the hypothesized corresponding personality traits (see Table 1), and their interaction. This yielded eight separate multilevel regression models. In all cases except Deception, $\chi^2(2) = 5.79$, $p = 0.051$, $AIC_{RI} = 14{,}130.91$, $AIC_{RS} = 14{,}129.45$, $BIC_{RI} = 14{,}161.42$, $BIC_{RS} = 14{,}170.13$, random slope models provided better fit than random intercept models (all other χ^2s > 31.37, all ps < .001), indicating that participants varied significantly in their relations between selectiveness and experienced situation characteristics. Selectiveness was significantly associated with more intellectual, romantic (referring to the situation characteristic Mating), and positive situations and with less dutiful, adverse, negative, and deceitful situations (Table 4). Only Sociality was not significantly related to selectiveness, $b = 0.01$, $\beta = 0.01$, $t(4231.88) = 0.22$, $p = .830$.

We were, however, mostly interested in the association between personality traits and experienced situation characteristics. Controlling for the person-centered selectiveness of the situation, personality traits were associated with experienced situation characteristics in several cases (Table 4): Higher openness was associated with experiencing more intellectual situations, higher conscientiousness was associated with experiencing more dutiful situations, higher agreeableness was associated with experiencing more social situations and less adverse and deceitful situations, and higher emotional stability was associated with experiencing more positive and less adverse and negative situations (see Table 4).

Table 4

Results from multilevel regressions of experienced situation characteristics on personality traits, selectiveness of the situation, and their interaction (H2)

	b	β	95% CI	*p*
DV: Duty				
Intercept	**3.24**	**-0.01**	**[3.11, 3.38]**	**< .001**
Selectiveness	**-0.42**	**-0.21**	**[-0.51, -0.32]**	**< .001**
Trait C	**0.12**	**0.07**	**[0.03, 0.21]**	**.012**
Selectiveness*Trait C	**-0.11**	**-0.08**	**[-0.17, -0.04]**	**.002**
DV: Intellect				
Intercept	**3.02**	**-0.04**	**[2.89, 3.14]**	**< .001**
Selectiveness	**0.15**	**0.09**	**[0.08, 0.22]**	**< .001**
Trait O	**0.14**	**0.10**	**[0.04, 0.25]**	**.006**
Selectiveness*Trait O	**0.07**	**0.05**	**[0.01, 0.13]**	**.016**
DV: Adversity				
Intercept	**1.84**	**0.06**	**[1.73, 1.94]**	**< .001**
Selectiveness	**-0.15**	**-0.12**	**[-0.20, -0.10]**	**< .001**
Trait E	0.02	0.02	[-0.07, 0.10]	.674
Trait A	**-0.20**	**-0.19**	**[-0.29, -0.11]**	**< .001**
Trait ES	**-0.13**	**-0.12**	**[-0.22, -0.05]**	**.003**
Selectiveness*Trait E	0.00	0.00	[-0.05, 0.04]	.921
Selectiveness*Trait A	-0.03	-0.03	[-0.07, 0.02]	.279
Selectiveness*Trait ES	-0.02	-0.02	[-0.07, 0.04]	.513
DV: Mating				
Intercept	**2.15**	**0.03**	**[2.03, 2.27]**	**< .001**
Selectiveness	**0.11**	**0.07**	**[0.04, 0.17]**	**.002**
Trait E	0.05	0.04	[-0.04, 0.15]	.274
Selectiveness*Trait E	0.01	0.01	[-0.04, 0.07]	.585
DV: pOsitivity				
Intercept	**4.07**	**-0.11**	**[3.89, 4.24]**	**< .001**
Selectiveness	**0.36**	**0.21**	**[0.29, 0.44]**	**< .001**
Trait E	0.05	0.04	[-0.09, 0.20]	.464
Trait ES	**0.28**	**0.17**	**[0.13, 0.43]**	**< .001**
Selectiveness*Trait E	-0.04	-0.03	[-0.10, 0.02]	.184
Selectiveness*Trait ES	0.04	0.03	[-0.02, 0.11]	.177
DV: Negativity				
Intercept	**2.28**	**0.02**	**[2.18, 2.38]**	**< .001**
Selectiveness	**-0.38**	**-0.26**	**[-0.45, -0.30]**	**< .001**
Trait ES	**-0.19**	**-0.15**	**[-0.28, -0.11]**	**< .001**
Selectiveness*Trait ES	-0.02	-0.01	[-0.09, 0.05]	.634
DV: Deception				
Intercept	**1.77**	**0.08**	**[1.66, 1.88]**	**< .001**
Selectiveness	**-0.06**	**-0.05**	**[-0.10, -0.01]**	**.010**
Trait A	**-0.23**	**-0.22**	**[-0.33, -0.13]**	**< .001**
Selectiveness*Trait A	**-0.05**	**-0.06**	**[-0.09, -0.02]**	**.004**
DV: Sociality				
Intercept	**3.76**	**-0.04**	**[3.61, 3.92]**	**< .001**
Selectiveness	0.01	0.00	[-0.08, 0.10]	.830
Trait E	0.11	0.06	[-0.01, 0.23]	.074
Trait A	**0.30**	**0.17**	**[0.16, 0.43]**	**< .001**
Selectiveness*Trait E	0.03	0.02	[-0.04, 0.10]	.398
Selectiveness*Trait A	0.05	0.03	[-0.03, 0.12]	.216

Note: O, C, E, A, and ES represent the Big Five personality traits; ES refers to Emotional Stability instead of Neuroticism. Level 1 predictors were person-mean centered. Standardized regression coefficients were obtained by employing the same model with standardized variables (Level 1 predictors were person-mean centered after standardizing) as recommended by Lorah (2018). Significant coefficients ($p < .05$) are printed in boldface. Missing values of trait variables were multiply imputed. Horizontal lines separate different multilevel regression models.

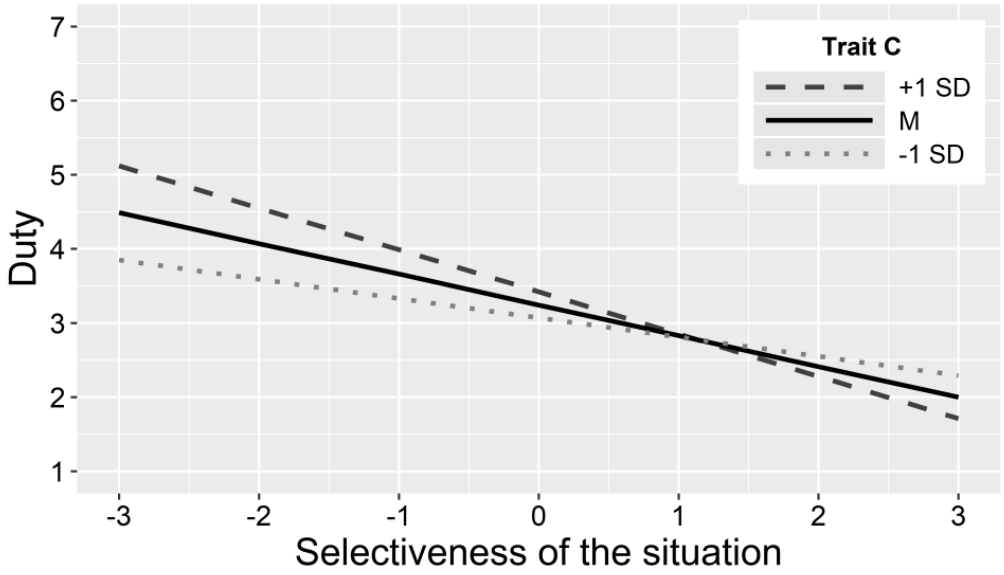

Figure 2. Interaction plot of trait conscientiousness and selectiveness of the situation predicting Duty. All variables were standardized; selectiveness was person-mean centered afterwards.

Furthermore, three personality traits also interacted with selectiveness. The relation between selectiveness and dutiful situations, for example, became more negative the more conscientious someone was, b = -0.11, β = -0.08, t(3160.83) = -3.04, p = .002 (see Figure 2). Thus, situations that were perceived as more dutiful were perceived by highly conscientious individuals (as compared to less conscientious individuals) as less likely to being chosen by themselves. Similarly, the relation between selectiveness and intellectual situations became more positive the more open someone was, b = 0.07, β = 0.05, t(1600.21) = 2.41, p = .016, and the relation between selectiveness and deceitful situations became more negative the more agreeable someone was, b = -0.05, β = -0.06, t(2590.21) = -2.89, p = .004. The remaining interaction plots are shown in the supplementary materials. Overall, Hypothesis 2 was mostly supported by our analyses as experienced situation characteristics were indeed associated with personality traits. However, we did not find the expected associations between extraversion and situation characteristics.

3.3. Personality States and Experienced Situation Characteristics are Associated with State Affect

Hypothesis 3 was concerned with the associations of personality states and experienced situation characteristics with state affect. We first regressed state affect on personality traits, personality states, and experienced situation characteristics in a multilevel regression model. Personality traits were included in this model to examine whether personality states and situation characteristics are related to state affect even when controlling for personality traits. In this model, trait openness, trait conscientiousness, and trait emotional stability were significantly related to a more positive affective state (see Table 5). Over and above that, all personality states were significantly related to a more positive affective state, the situation characteristics Intellect, Mating, and pOsitivity were related to a more positive affective state, and Duty, Adversity, and Negativity were related to a more negative affective state. Thus, Hypothesis 3a was mostly supported by our analyses.

Hypothesis 3b concerned the interplay between personality states and experienced situation characteristics. We therefore included interaction terms of all hypothesized pairs from Table 1 into the model. This resulted in significantly better model fit, $D(12, 2{,}824{,}688{,}33) = 4.23$, $p < .001$, $AIC_{main} = 7{,}325.82$, $AIC_{int} = 7276.00$, and changed very little about the previously reported main effects. Merely Adversity was no longer significantly related to state affect, $b = -0.01$, $\beta = -0.01$, $t(4175.54) = -0.85$, $p = .395$, whereas Sociality became significantly associated with state affect, $b = 0.01$, $\beta = 0.02$, $t(4175.54) = 2.13$, $p = .034$. Regarding the interactions themselves, four of the hypothesized twelve interactions were significantly different from zero, one of which took the predicted direction (i.e., extraversion and Sociality) whereas the remaining took the opposite direction (see Table 5). Overall, these findings were mostly inconsistent with Hypothesis 3b.

Table 5

Results from multilevel regressions of state affect on personality traits, personality states, and experienced situation characteristics (H3)

		Model 1				Model 2			
		b	β	95% CI	*p*	b	β	95% CI	*p*
Traits	Intercept	**3.63**	**-0.10**	**[3.56, 3.70]**	**< .001**	**3.64**	**-0.10**	**[3.57, 3.71]**	**< .001**
	Trait Openness	**0.11**	**0.15**	**[0.05, 0.17]**	**< .001**	**0.11**	**0.15**	**[0.05, 0.17]**	**< .001**
	Trait Conscientiousness	**0.16**	**0.24**	**[0.10, 0.21]**	**< .001**	**0.16**	**0.25**	**[0.11, 0.22]**	**< .001**
	Trait Extraversion	0.00	0.00	[-0.05, 0.06]	.962	0.00	0.00	[-0.05, 0.06]	.956
	Trait Agreeableness	0.04	0.05	[-0.03, 0.10]	.280	0.04	0.05	[-0.03, 0.10]	.262
	Trait Emotional Stability	**0.14**	**0.19**	**[0.08, 0.20]**	**< .001**	**0.14**	**0.19**	**[0.08, 0.20]**	**< .001**
States	State Openness	**0.04**	**0.06**	**[0.03, 0.06]**	**< .001**	**0.04**	**0.06**	**[0.03, 0.06]**	**< .001**
	State Conscientiousness	**0.03**	**0.05**	**[0.02, 0.05]**	**< .001**	**0.03**	**0.05**	**[0.02, 0.05]**	**< .001**
	State Extraversion	**0.07**	**0.11**	**[0.06, 0.09]**	**< .001**	**0.07**	**0.11**	**[0.06, 0.09]**	**< .001**
	State Agreeableness	**0.10**	**0.15**	**[0.09, 0.12]**	**< .001**	**0.10**	**0.14**	**[0.08, 0.11]**	**< .001**
	State Emotional Stability	**0.15**	**0.24**	**[0.13, 0.17]**	**< .001**	**0.14**	**0.22**	**[0.12, 0.16]**	**< .001**
	Duty	**-0.02**	**-0.05**	**[-0.03, -0.01]**	**< .001**	**-0.02**	**-0.05**	**[-0.03, -0.01]**	**< .001**
	Intellect	**0.02**	**0.03**	**[0.01, 0.03]**	**.001**	**0.02**	**0.03**	**[0.01, 0.03]**	**.001**
	Adversity	**-0.01**	**-0.02**	**[-0.03, > -0.01[a]]**	**.042**	-0.01	-0.01	[-0.02, 0.01]	.395
	Mating	**0.01**	**0.02**	**[< 0.01[b], 0.02]**	**.039**	**0.01**	**0.03**	**[< 0.01[b], 0.03]**	**.014**
	pOsitivity	**0.10**	**0.21**	**[0.09, 0.11]**	**< .001**	**0.10**	**0.20**	**[0.08, 0.11]**	**< .001**
	Negativity	**-0.10**	**-0.17**	**[-0.11, -0.09]**	**< .001**	**-0.09**	**-0.16**	**[-0.10, -0.08]**	**< .001**
	Deception	0.00	0.00	[-0.01, 0.02]	.836	0.00	0.00	[-0.01, 0.02]	.781
	Sociality	0.00	0.01	[> -0.01[a], 0.01]	.263	**0.01**	**0.02**	**[< 0.01[b], 0.02]**	**.034**
State x Situation Interactions	Openness*Intellect					0.00	-0.01	[-0.01, 0.01]	.527
	Conscientiousness*Duty					0.01	0.02	[> -0.01[a], 0.01]	.085
	Extraversion*Adversity					0.00	0.01	[-0.01, 0.01]	.469
	Extraversion*Mating					0.00	0.00	[-0.01, 0.01]	.676
	Extraversion*pOsitivity					**-0.01**	**-0.04**	**[-0.02, -0.01]**	**.001**
	Extraversion*Sociality					**0.01**	**0.05**	**[0.01, 0.02]**	**< .001**
	Agreeableness*Adversity					**0.01**	**0.02**	**[< 0.01[b], 0.02]**	**.032**
	Agreeableness*Deception					0.01	0.02	[> -0.01[a], 0.02]	.103
	Agreeableness*Sociality					0.00	-0.01	[-0.01, 0.01]	.705
	Emotional Stability*Adversity					0.00	0.00	[-0.01, 0.01]	.900
	Emotional Stability*pOsitivity					-0.01	-0.03	[-0.02, < 0.01[b]]	.066
	Emotional Stability*Negativity					**0.01**	**0.03**	**[< 0.01[b], 0.02]**	**.004**

Note: Higher values of state affect (DV) represent more positive state affect. Model 1 included main effects of personality traits, personality states, and situation characteristics (H3a); Model 2 additionally included the interactions between hypothesized pairs of personality states and situation characteristics (H3b). Level 1 predictors were person-mean centered. Standardized regression coefficients were obtained by employing the same model with standardized variables (Level 1 predictors were person-mean centered after standardizing) as recommended by Lorah (2018). Missing values of trait variables were multiply imputed. Significant coefficients ($p < .05$) are printed in boldface.

[a] the value was smaller than zero but not small enough to be rounded to -0.01

[b] the value was greater than zero but too small to be rounded to 0.01

3.4. State Affect is Associated with Trait Affect

According to Hypothesis 4, state affect should be associated with trait affect. Because simply aggregating a Level 1 predictor to perform an ordinary simple regression with a Level 2 dependent variable leads to biased estimates of parameters and standard errors (Croon & van Veldhoven, 2007), we employed latent variable structural equation models. In these models, we treated the different situation reports of a person as indicators of a latent Level 2 state affect variable that represents a person's true average state affect score. This latent variable was then used as a predictor of retrospective trait affect. Consistent with our prediction, state affect was significantly associated with retrospective affect, $b = 1.21$, 95% CI [0.91, 1.51], $\beta = 0.81$, $t(332.46) = 7.90$, $p < .001$. Even when controlling for global trait affect ratings assessed before the ESM period, state affect was still strongly related to retrospective affect, $b = 0.94$, 95% CI [0.66, 1.22], $\beta = 0.69$, $t(232.88) = 6.60$, $p < .001$. Thus, Hypothesis 4 was supported well by our analyses.

3.5. Personality States, Experienced Situation Characteristics, and State Affect Mediate the Personality Trait-Trait Affect Relation

To test whether personality states, situation experience, and state affect mediate the relation between personality traits and trait affect, we employed multilevel structural equation models (MSEMs) in lavaan (Rosseel, 2012). We conducted a combined parallel and serial mediation separately for each personality trait. The corresponding personality state, experienced situation characteristics, and state affect mediated the personality trait–affect relation such that personality state and experienced situation characteristics were parallel mediators and state affect was the consecutive serial mediator of both (see Figure 1). Additionally, the parallel mediators

were allowed to interact on Level 1 but not on Level 2 because the interaction effect is hypothesized to unfold in situ but not on an aggregate level. No latent variables were included. Trait variables were grand-mean centered, state variables were person-mean centered with the person-mean centered value being used on Level 1 and the person mean being used on Level 2. MSEMs were employed to account for the multilevel structure of the data, however, because our mediation model has a 2-1-1-2 structure (i.e., the relation between two Level 2 variables is mediated by two Level 1 variables), indirect paths could only be calculated on the between-person level (Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010). All variables were standardized for the mediation analyses.

Overall, we found indirect paths via personality state and state affect to significantly mediate the personality trait–trait affect relation for all Big Five dimensions (Table 6), thereby replicating the results from the dynamic mediation hypothesis (Wilt et al., 2012). Additionally, indirect paths via experienced situation characteristics and state affect significantly contributed to explaining the personality–affect relation on the trait-level in four cases (see Table 6). The relation between trait agreeableness and trait affect, for example, was not only mediated by state agreeableness and state affect but also by deceitful situation and state affect and by social situations and state affect. Additionally, the relation between trait emotional stability and trait affect was mediated by state emotional stability and state affect, positive situations and state affect, and negative situations and state affect (see Figure 3). In addition to these hypothesized mediation paths, two other indirect paths significantly mediated the trait personality–trait affect relations: State affect, without personality states or situation characteristics, significantly mediated the personality–affect relation for openness (path estimate = 0.10, 95% Monte Carlo CI [0.05, 0.15]) and for conscientiousness (path estimate = 0.07, 95% Monte Carlo

CI [0.02, 0.12]).

To conclude, Hypothesis 5 was mostly supported by our analyses. Indirect paths via personality state and state affect mediated the personality trait–trait affect relation for all Big Five domains and indirect paths via situation characteristic and state affect mediated the relation in four cases.

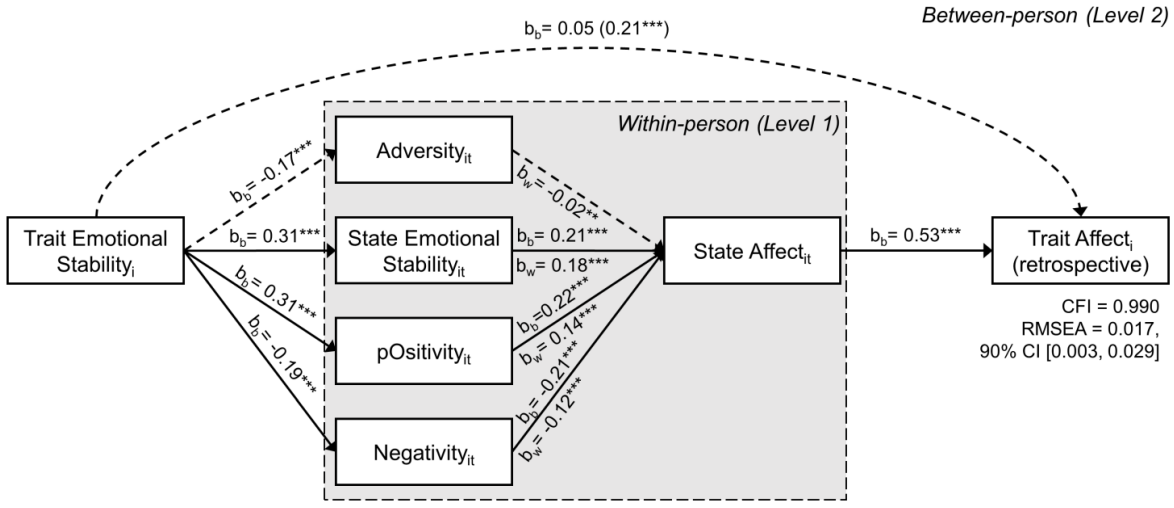

Figure 3. Path model of state emotional stability, pOsitivity, Negativity, and state affect mediating the trait emotional stability–retrospective trait affect relation. All significant ($p < .05$) regression coefficients are reported. Dashed paths indicate that the respective indirect paths were not significant.

Table 6

Estimates and confidence intervals for the hypothesized indirect paths of personality states and state affect or situation characteristics and state affect mediating the personality trait–trait affect relation (H5)

Path	Estimate	95% CI
Openness		
Trait O – State O – State Affect – Trait Affect	**0.049**	**[0.022, 0.083]**
Trait O – Intellect – State Affect – Trait Affect	0.011	[-0.001, 0.028]
Model fit	CFI: 1.000, RMSEA: 0.000, 90% CI [0.000, 0.035]	
Conscientiousness		
Trait C – State C – State Affect – Trait Affect	**0.094**	**[0.058, 0.139]**
Trait C – Duty – State Affect – Trait Affect	0.003	[-0.004, 0.013]
Model fit	-[a]	
Extraversion		
Trait E – State E – State Affect – Trait Affect	**0.010**	**[0.002, 0.021]**
Trait E – Adversity – State Affect – Trait Affect	0.002	[-0.006, 0.011]
Trait E – Mating – State Affect – Trait Affect	-0.003	[-0.010, 0.002]
Trait E – pOsitivity – State Affect – Trait Affect	0.023	[-0.010, 0.059]
Trait E – Sociality – State Affect – Trait Affect	0.002	[-0.002, 0.008]
Model fit	CFI: 0.995, RMSEA: 0.008, 90% CI [0, 0.019]	
Agreeableness		
Trait A – State A – State Affect – Trait Affect	**0.072**	**[0.038, 0.116]**
Trait A – Adversity – State Affect – Trait Affect	0.002	[-0.016, 0.022]
Trait A – Deception – State Affect – Trait Affect	**0.023**	**[0.003, 0.048]**
Trait A – Sociality – State Affect – Trait Affect	**0.018**	**[0.004, 0.038]**
Model fit	CFI: 0.956, RMSEA: 0.032, 90% CI [0.022, 0.043]	
Emotional Stability		
Trait ES – State ES – State Affect – Trait Affect	**0.035**	**[0.014, 0.064]**
Trait ES – Adversity – State Affect – Trait Affect	-0.001	[-0.007, 0.005]
Trait ES – pOsitivity – State Affect – Trait Affect	**0.037**	**[0.013, 0.069]**
Trait ES – Negativity – State Affect – Trait Affect	**0.021**	**[0.007, 0.040]**
Model fit	CFI: 0.990, RMSEA: 0.017, 90% CI [0.003, 0.029]	

Note: O, C, E, A, and ES represent the Big Five personality traits; ES represents Emotional Stability not Neuroticism. Higher values of affect represent more positive affect. Missing values of trait variables were multiply imputed. Rows printed in boldface represent significant indirect effects ($p < .05$). Indirect path estimates were computed as a1*bm1*b4 for personality states and a2*bm2*b4 for situation characteristics (see Figure 1). All paths represent between-person effects.

[a] Pooled model fit indices could not be calculated because the test statistic of the likelihood-ratio test was negative; however, model fit indices in the separate imputed datasets could be calculated

4. Discussion

We presented data from an experience sampling study that indicated that (a) personality traits are associated with average levels of personality states and situation experience, (b) personality states and experienced situation characteristics are associated with state affect, (c) state affect is associated with global and retrospective trait affect measures, and (d) that these mechanisms mediate the relations between personality traits and trait affect.

4.1. The Extended Dynamic Mediation Model

The main purpose of this study was to test an integrative theoretical model of the association between personality traits and trait affect that combined the dynamic mediation hypothesis (Wilt et al., 2012) and the social participation hypothesis (e.g., Srivastava et al., 2008). The dynamic mediation hypothesis has so far been compellingly supported for extraversion (Wilt et al., 2012) and partly supported for agreeableness, openness and emotional stability (Ching et al., 2014; Howell et al., 2017). Our data corroborate these findings and add evidence for a dynamic mediation regarding conscientiousness.

Extending the dynamic mediation model, we provided first evidence that experienced situation characteristics and state affect serially mediate the personality trait–trait affect relations. Trait emotional stability, for example, was no longer significantly associated with more trait affect when considering positive situations, negative situations, emotionally stable behaviors, and state affect as mediators. Similar results were found for agreeableness and social and deceitful situations. Therefore, the inclusion of person–situation transactions into our mediation model was justified.

Overall, each of our hypotheses was empirically supported for at least some personality domains. Only Hypothesis 3b, referring to the interactions between personality states and

situation characteristics, did not match our findings. The other hypotheses were completely (H1, H5) or partially (H2, H3a, H5) supported by our findings. However, there were also some unexpected results, for example, the cross-domain association between personality traits and states, interactions between personality states and situation characteristics having the opposite direction from what we expected, or discrepancies in the pairing between personality and situation domains. Therefore, future research is necessary to further explore this mediation model. Both in the multilevel regression analyses and in the mediation analyses, only some but not all of the predicted relations between the Big Five domains and the Situational Eight DIAMONDS domains were supported. It is particularly noticeable that most of the predicted relations that were not found in the data involved extraversion, which we discuss in more detail in the next section. We adopted these pairings between personality and situation domains from previous theoretical and empirical work (Rauthmann et al., 2014; Rauthmann et al., 2015) and preregistered and analyzed only these specific pairs. Future research might want to start from scratch again to explore the relations between personality and situation domains without any presumptions to detect relations that we have missed.

We were surprised by the finding that most personality traits were associated not only with mean levels of their respective personality states but also with mean levels of non-related personality states. In a few cases, these cross-domain associations were even stronger than the corresponding within-domain associations (i.e., both state agreeableness and state emotional stability were predicted strongest by trait conscientiousness). Possible reasons for this finding might be problems with discriminant validity due to the comparably low reliabilities of such short personality assessments (see Table 1) or correlations among the trait domains. Yet, we cannot easily integrate these findings into the literature because among the already few studies

that report associations between personality traits and personality states even fewer have included the non-corresponding traits into their models. In the only comparable study that we are aware of, Howell et al. (2017) also report significant cross-domain relations. However, in their analyses, the corresponding traits were always the strongest predictor and the associations were generally stronger than in our study. Thus, these cross-domain associations should also be further investigated in future research.

4.2. Extraversion, Social Situations, and Positive Affect

The relation between extraversion, social interactions, and positive affect has always been the focus of the temperamental versus instrumental discussion. Whereas temperamental explanations argue that rather extraverted persons report more positive affect simply because they are more extraverted — causing them to react more positively to stimuli (Cohen, Young, Baek, Kessler, & Ranganath, 2005; DeYoung, Hawes, Civai, & Rustichini, 2014) or have a higher set point for positive affect (Gross et al., 1998) —, instrumental explanations mostly involve social interactions either mediating or moderating this relation (e.g., Howell, 2005). However, our results are at odds with previous findings because trait extraversion was only weakly associated with trait affect to begin with and most hypotheses were not supported for associations involving extraversion. Although extraversion is typically reported to be among the strongest correlates of trait affect (DeNeve & Cooper, 1998; González Gutiérrez, Jiménez, Hernández, & Puente, 2005; Hayes & Joseph, 2003), such a finding is not completely unheard of (Howell et al., 2017; Schimmack, Schupp, & Wagner, 2008). If anything, our data seem to favor an instrumental explanation of the extraversion–positive affect relation with social situations as a moderator. This is also at odds with previous findings reporting mostly mediation and not moderation effects (e.g., Lucas et al., 2008).

There are several possible explanations for the differences between our results and previous findings. Possibly the most important one is the operationalization of affect. Our main indicator of affect was a bipolar measure of affect with low values indicating negative affect and high values indicating positive affect. This is a rather uncommon operationalization of affect. However, we demonstrate in additional analyses (see supplementary materials) that the pattern of results is similar when positive affect and negative affect are analyzed separately. Thus, the bipolarity does not seem to explain the differences between our results and previous studies. However, the overall conceptualization of affect might be relevant. There are two major models of the structure of affect: circumplex models (e.g., Russell, 1980; Yik, Russell, & Steiger, 2011) and the factor model of affect (Watson & Tellegen, 1985). Representing affect in a circular space with valence and arousal axes, these models differ in where they locate positive affect. Circumplex models place positive affect at zero degree (i.e., high valence, average activation, e.g., "content") and include both slightly lower and slightly higher activations. The factor model, in contrast, locates positive affect at 45 degrees, that is, positive affect is thought of as a combination of positive valence and high activation (e.g., "enthusiastic"). Research on the relation between extraversion and affect has shown that extraversion is most strongly related to positive affect operationalized as positive activation, that is, located at 45° (McNiel, Lowman, & Fleeson, 2010; Smillie, DeYoung, & Hall, 2015), and most of the literature has adopted this conceptualization. Nevertheless, extraversion is also — albeit more weakly — related to the conceptualization of positive affect as positive valence (McNiel et al., 2010; Smillie et al., 2015; Yik & Russell, 2001) that we measured with the Scale of Positive and Negative Experiences (Diener et al., 2009). Therefore, our results and any differences from previous work must be interpreted in light of these different operationalizations.

Additionally, some other factors might have contributed to the difference between previous studies and our results: First, we operationalized Sociality of situations as a subjective experience instead of using objective characteristics such as the number of interaction partners. Subjective experiences can, however, differ between persons, even when evaluating the same situation (Rauthmann, 2012). Thus, we may have assessed a different aspect of Sociality than previous studies. Second, we found a moderating effect when considering the interaction between extraverted states and social situations, whereas previous studies only considered trait extraversion. Third, it is also possible that these differences are due to sample characteristics. Schimmack et al. (2008), for example, analyzed data from a nationally representative sample in Germany and reported that extraversion was not significantly related to trait affect. Our German sample — along with their sample — might thus differ in some unknowingly important cultural or demographic characteristics from the typically presented American samples that find relations between extraversion and trait affect (Schimmack et al., 2008). Fourth, we measured both trait extraversion and state extraversion with a 2-item scale. Previous studies that did not consider personality states mostly used longer scales. We might thus have used an operationalization of extraversion that was not as strongly related to positive affect as other measures (Howell et al., 2017; Margolis, Stapley, & Lyubomirsky, 2019; Marrero Quevedo & Carballeira Abella, 2011).

Overall, our results do not directly contradict previous findings but rather add new aspects to this field of research and point out questions to be investigated by future research. Because our analyses found an interaction between extraverted states and Sociality, whereas previous research did not find interactions between trait extraversion and social interactions, future research should, for example, investigate three-way interactions to better understand the relation between trait extraversion, state extraversion, social interactions, and positive affect.

4.3. Size of the Effects

We calculated standardized regression coefficients as a measure of effect sizes for most analyses (Lorah, 2018). These coefficients ranged from very small but nonetheless significant effects of about 0.01 up to effects of 0.24, which are considered typical or medium-sized effects in recent guidelines (Funder & Ozer, 2019; Gignac & Szodorai, 2016). On average, however, most of these effects were comparably small within situations. Yet, considering that every person experiences many situations each day — estimates are 10 to 30 situations per day (Sherman et al., 2013) — it becomes evident that these effects may cumulate over time to have a bigger impact (Funder & Ozer, 2019). Thus, state-level effects are important despite their comparatively small effect sizes within single occasions because they can become very influential over time.

4.4. Limitations

This study had some limitations: First, we had to deal with several types of missing data. Some participants dropped out of the study or did not complete all ESM reports, did not complete the post-ESM questionnaire, or did not complete all items included in a questionnaire. Missing ESM reports are a rather common problem in ESM research. Our compliance rate was at the lower end of the range of similar studies (Fleeson, 2001, 2007; Howell et al., 2017; Leikas & Ilmarinen, 2017; McCabe & Fleeson, 2016; Wilt et al., 2012; Wilt et al., 2017). Although one study indicated that missing reports are not be associated with ESM-relevant variables (Sun, Rhemtulla, & Vazire, 2019), the implications of missing reports in ESM research are currently not yet well understood. In our study, the number of completed ESM reports was significantly related to the personality traits openness and extraversion — but surprisingly not to trait conscientiousness — which indicates that these reports were not missing completely random. The high percentage of missing data on trait-level variables in our study in rather unusual and is

probably due to many participants missing the second trait assessment after the experience sampling phase. However, we do not have any reason to believe that this missingness had an influence on the results because the pattern of results was similar when employing pairwise deletion and when employing multiple imputation.

Second, the sample consisted mostly of female psychology students, which reduces the generalizability of the results but is also a rather common problem of psychological research. Third, the distributions of the Situational Eight DIAMONDS variables were right-skewed as participants mostly (up to two thirds of the answers) reported low values and thus provided fewer data on the higher values (see supplementary materials). Yet, there were still sufficient data for our analyses and such skewed distributions can be somewhat expected in student populations. Fourth, the situation characteristics could only be operationalized as subjective experiences of the situation measured by self-reports. Therefore, we were not able to distinguish between different types of person–situation transactions or between objective and subjective components of situation experience. However, as pointed out before, we were interested most in this subjective evaluation because we believe it to be the crucial influence on state affect.

At this point, we additionally want to emphasize that the results we report here were acquired with an observational longitudinal study design that by its nature cannot directly test for causal effects (e.g., Ching et al., 2014; Wilt et al., 2017). Although research in this field typically focuses on the causal direction from personality to affect (e.g., Wilt et al., 2012; Yik & Russell, 2001), many recognize that causality probably also flows in the opposite direction (Wilt et al., 2012). Thus, even though our model and hypotheses were formulated in a directional manner in that we mostly considered causality to flow from personality to affect, we were unable to test these directions properly. In particular, the causal directions of the interplay between personality

states, situation characteristics and state affect, which were all measured simultaneously in the ESM reports, remain unclear and subject to future research.

4.5. Conclusion

Overall, we found that personality states, experienced situation characteristics, and state affect mediate the relations between personality traits and trait affect. These findings replicate previous research regarding the mediating effects of personality states and state affect (Ching et al., 2014; Howell et al., 2017; Wilt et al., 2012) and introduce the mediating effects of experienced situation characteristics. Although the reported effects are often of small or moderate effect sizes (Funder & Ozer, 2019; Gignac & Szodorai, 2016), they may have a substantial impact on affect by accumulating over time (Funder & Ozer, 2019; Sherman et al., 2013). Altogether, this study thus emphasizes the importance of daily experiences for trait-level variables and calls for further research on the interplay between personality, behavior, situations, and affect.

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