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The Big Five, Everyday Contexts and Activities, and Affective Experience

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Abstract

Prior research shows that personality traits predict time spent with different people and frequency of engagement in different activities. Further, personality traits, company, and activity are related to the experience of affect. However, little research has examined personality, context, and affect together in the same study. In the current study, 78 people described their Big Five traits and took part in a 1-week experience sampling study using mobile phones as a means for data collection. Participants indicated their current company, activity, and momentary affect along the dimensions of energetic arousal (EA), tense arousal (TA), and hedonic tone (HT). Poisson regressions revealed that traits predicted higher frequencies of trait-consistent contexts: for example, extraversion was related to more frequently being with various types of company. Results predicting contexts from multilevel logistic regressions were sparser. Multilevel models revealed that traits and contexts had main effects on affect, yet there were relatively few interactions of traits X contexts predicting affect. We discuss more specific implications of these findings.

Keywords

Big Five; everyday context; affect; experience sampling methodology; Poisson regression; multilevel modeling

Personality may be conceptualized as an abstraction to describe and explain patterns of affect, behavior, cognition, and desire - the “ABCDs” of personality- over time and space (Ortony, Norman, & Revelle, 2005; Revelle, 2008). Modeling such patterns is a concern of theories of personality with a dynamic focus (DeYoung, 2015; Read, Smith, Drouman, & Miller, 2016; Revelle & Condon, 2015) and theories of personality variation (Fleeson & Jayawickreme, 2015; Heller, Perunovic, & Reichman, 2009). More specifically, these theories attempt to integrate across the constructs of personality traits, environmental

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contexts, and psychological states (i.e., ABCD states). Considerable research has examined pairs of these types of constructs (e.g., traits and affect; traits and situations), yet, little work has examined the relations between variables from all three types of constructs over time in the same study. The current study employs experience sampling methodology (ESM) to examine the relations between Big Five traits, social and behavioral contexts, and affect over time.

The current study tested whether traits predict naturally occurring contexts in daily life, specifically focusing on present company (e.g., alone, with friends, with family) and activities (e.g., working, studying, leisure). Company and activity have typically been lumped together as situational contexts (e.g., Wagerman & Funder, 2009; Wood, Tov, & Costello, 2015; Wrzus, Wagner, & Riediger, 2016). However, we see company only as purely situational (i.e., a feature of the external environment) and conceptualize activities as a behavioral context (Rauthmann, Sherman, & Funder, 2015). This approach, sometimes referred to as an environmental context approach, is commonly employed in studies of daily life (Mehl, Gosling, & Pennebaker, 2006; Parrigon, Woo, Tay, & Wang, 2017; Saucier, Bel-Bahar, & Fernandez, 2007). We adopted the environmental context approach in our study due to its potential advantages for distinguishing effects of personality and context on outcomes (Wrzus et al., 2016). There have been a few studies investigating the relations between the Big Five, social company, and behavioral contexts, which we review next.

Predicting Social Company and Behavioral Contexts from Traits

Most results relating traits to social company and behavioral contexts can be interpreted from the perspective of trait-consistency, that is, people may prefer to be in situations that provide opportunities for expressing their traits (Emmons & Diener, 1986b; Furnham, 1981). For instance, extraversion is positively associated with spending more time in social contexts (Diener, Larsen, & Emmons, 1984; Emmons, Diener, & Larsen, 1986). Extraversion is negatively related to being alone, positively related to spending time in conversation (Mehl et al., 2006), and positively related to spending time with various company such as friends, colleagues, and strangers (Wrzus et al., 2016). Agreeableness is positively related to reporting being with friends (Wrzus et al., 2016). Emotional stability (reverse neuroticism) is negatively related to how much time people spend being alone, doing chores, and watching TV (Wrzus et al., 2016). Conscientiousness is positively related to spending more time in class (Mehl et al., 2006), engaging in non-leisurely pursuits (Barnett, 2006), and working (Wrzus et al., 2016). Finally, openness is positively related to being around strangers and negatively related to being with family, watching TV, or doing “nothing” (Wrzus et al., 2016).

One limitation of these studies, is that they relied on self-reports, with the exception of Mehl et al. (2006). Thus, they were not able to distinguish between objective contexts and subjective construals of context (Rauthmann, Sherman, Nave, & Funder, 2015). This limitation should be kept in mind for the present study, which also relied on self-report.

Predicting Affective Experience from Traits and Contexts

Predicting Affect from Traits

Two of the more robust findings in personality psychology are the positive relation between extraversion and positive affect, and the negative association between emotional stability and negative affect (e.g., Kuppens, Van Mechelen, Nezlek, Dossche, & Timmermans, 2007; Lucas & Fujita, 2000; Meyer & Shack, 1989; Wilt, Nofle, Spain, & Fleeson, 2012; Zautra, Affleck, Tennen, Reich, & Davis, 2005). Additionally, agreeableness and conscientiousness show positive associations with positive affect and inverse associations with negative affect (DeNeve & Cooper, 1998; Komulainen et al., 2014; Leger, Charles, Turiano, & Almeida, 2016; Steel, Schmidt, & Shultz, 2008; Watson, 2000), and openness is positively related to positive affect (Steel et al., 2008).

Relatively fewer studies have looked at the associations between the Big Five and the affective dimensions of energetic arousal (EA; ranging from energetic to sluggish), tense arousal (TA; ranging from tense to relaxed), and hedonic tone (HT; ranging from pleasant to unpleasant). Theoretically, EA and TA concern approach of reward and avoidance of punishment, respectively, whereas HT concerns receiving reward or receiving punishment (Schimmack & Grob, 2000; Schimmack & Reisenzein, 2002; Thayer, 1989). This approach has been used in studies of situational tasks and thus may be preferable for our purposes (Matthews et al., 2002). One study (Stolarski & Matthews, 2016) found that extraversion, emotional stability, agreeableness, and conscientiousness were positively related to EA and HT; extraversion, emotional stability, agreeableness were negatively related to TA. Openness was not related to any affective dimension. Additionally, a study of achievement-related affect (Goryska, Winiewski, & Zajenkowski, 2015) showed similar associations between the Big Five and the dimensions of EA, TA, and HT across a number of academic contexts (e.g., lecture, exam, grading).

Predicting Affect from Company and Activity

Studies have also shown that company and activity relate to daily affective experience. In an early experience sampling study, more time spent in social/recreation activities related to higher positive affect, whereas more time spent in work/study activities related to higher negative affect (Emmons & Diener, 1986a). One study (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) using the retrospective Day Reconstruction Method (DRM), found that more frequently being with friends and relatives was related to higher positive affect and lower negative affect, whereas more frequently being alone was related to lower levels of both positive affect and negative affect. Romantic and social activities were related to higher positive affect and lower negative affect, watching TV was more neutral (i.e., relatively low levels of positive and negative affect), and working was rated low for positive and high for negative affect. Another recent study (Howell & Rodzon, 2011) used the DRM and found that socializing was related to higher levels of enjoyment and lower levels of stress; eating and watching TV had more neutral ratings; and academic and work activities showed a more negative affective profile.

Interactions between Traits and Contexts Predicting Affect

There is some evidence that personality and contextual factors interact to predict affective experience. Experimental studies have shown that extraversion is positively related to EA (but not pleasant affect) more strongly in goal-oriented, rewarding situations (Smillie, Cooper, Wilt, & Revelle, 2012; Smillie, Geaney, Wilt, Cooper, & Revelle, 2013). This finding has received initial support in a study of affect in natural environments (Oerlemans & Bakker, 2014). Neuroticism is related more strongly to negative affect in stressful situations (Bolger & Zuckerman, 1995; Leger et al., 2016; Mroczek & Almeida, 2004). There is also preliminary evidence that extraversion, conscientiousness, and openness may buffer the effects of stress on daily negative affect (Leger et al., 2016).

Aims of the Research

From the literature review, we can conclude that Big Five traits are relevant to types of company and activity experienced in daily life, and that both traits and daily contexts are relevant to affective experience. Yet, few (if any) naturalistic studies have examined all constructs together over time. The present study is an exploratory, descriptive investigation meant to build on prior research in these domains. This is in line with the view that this type of research is important and underutilized in personality and social psychology (Funder, 2009; Rozin, 2001). This study has the potential to provide data relevant to fundamental questions of dynamic models of personality (e.g., Read et al., 2016; Revelle & Condon, 2015). Over time, what company do people keep, what activities do they participate in, and how do they feel in different types of company and activity?

We assessed Big Five traits, present company, behavioral contexts, and affect (EA, TA, and HT) multiple times per day over one week. We examined relations between each construct, and we examined interactions of traits and contexts predicting affect. Though exploratory, we expected to find evidence for effects noted in the existing literature. We expected trait-consistency effects when predicting context. We expected that socially desirable poles of traits would positively relate to more positive affective profiles (i.e., higher EA and HT, lower TA), that social contexts would also positively relate to more positive affective profiles, and that activities such as eating, watching TV, and surfing the net would relate to more neutral affective experiences. Tests of interactions of traits and contexts predicting affect were purely exploratory.

Methods

Participants and procedure

People were recruited by an advertisement placed on the university paid participant pool listserv. Participants were given informed consent and completed a personality survey online. They then completed the text-messaging portion of the study over the following week. The text-messaging protocol (described in more detail below) entailed sending a text message including numerical indicators of current affect, social company, and behavioral context to a secure e-mail address.

One hundred one participants (relationship, employment, and student status were not collected) completed all procedures in the study; of these, 78 (63 women) with a mean age 26.6 ($SD = 7.9$) completed at least five text-messaging responses and were retained for analyses.¹ Self-identified ethnicities, were White ($n = 52$), Asian-American ($n = 15$), Black ($n = 6$), Hispanic or Latino ($n = 3$), Multiracial ($n = 1$), and Some other race ($n = 1$). Participants who were included in analyses completed a total of 1,827 out of 2,184 possible responses (84%): 30/78 participants were 100% compliant and 58/78 had at least a 75% rate of compliance. Sixty-three participants responded at least once on all days, and 74 participants responded at least once on 5 different days; on days when at least one response was provided, participants responded an average of 3.2 times per day ($SD = 1.3$). These rates indicate good compliance overall and are similar to what is reported in other experience sampling studies (Wilt, Condon, & Revelle, 2011). Participants were compensated for their text messaging expenses and received up to \$30 based on the number of complete text message responses. All methods were approved by the university IRB.

ABCD Assessment of the Big Five

The Big-Five were assessed using scales developed to contain balanced amounts of ABCD (affect, behavior, cognition, and desire) content for each trait (Wilt & Revelle, 2015). Each trait domain scale contains 28 items, with 7 items representing each ABCD component. Example items for extraversion are: “Love excitement” (A), “Make some noise” (B), “Come up with a solution right away” (C), and “Demand to be the center of interest” (D). Participants rated items on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree) indicating their agreement with the item “in general.” Scores were calculated by averaging across items.

Text-messaging Methodology: Company, Activity, and Affect

Participants completing the online survey received an e-mail containing instructions on how to complete the text-messaging portion of the study as well as the electronic document including text-messaging cards (see <https://osf.io/3va4t/>). These cards are small (6.4 cm × 8.9 cm) documents containing a total of 44 items, including items assessing company, activity, and affect. Participants were instructed to carry their cards with them during for the duration of the study. Participants received a text message on their cellphones requesting that they respond to items on their card (items only appeared on the cards, not in the text message). Participants replied by sending a text message back to the e-mail account containing a string of numbers, one corresponding to each item printed on the questionnaire. For example, if the adjectives “energetic”, “tense”, and “pleasant” occurred in that order, the number string “613” would indicate responses to those items, respectively. Text-messages were sent four times per day for one week at fixed times four hours apart (10 A.M., 2 P.M., 6 P.M., and 10 P.M.). Fixed schedules were chosen to increase the ease of compliance (Klasnja et al., 2008).

¹The distribution of responses showed a clear break at 5 total responses between people who were generally non-compliant and those who were somewhat compliant. See <https://osf.io/3va4t/> for a graph of the distribution.

Participants indicated their company type over the previous 30 minutes (“Please indicate which category best describes your company over the past 30 minutes”): alone, with family, friends, romantic, with a crowd. Participants reported their type of activity (“Please indicate which category best describes your activity over the past 30 minutes”): work, travel, sport, amusement, running errands, reading, eating, studying, watching television, cooking, exercising, drinking alcohol, surfing the internet, in a lecture, praying, talking on the phone, socializing. Most of these categories were based on descriptions of possible contexts in a narrative review of empirical research on situations (Yang, Read, & Miller, 2009). Many have been used in prior studies of traits and contexts, as reviewed previously.

Items assessed affect over the 30 minutes previous to each text-message (participants were prompted to respond to the question “How were you feeling over the previous 30 minutes?”). Items from the Motivational State Questionnaire (Revelle & Anderson, 1998) assessed affect along the dimensions of EA, TA, and HT. Participants responded to the prompt, “How were you feeling over the past 30 minutes?”, with respect to the following adjectives on a scale indicating how well the adjective (adjectives with (r) following them were reverse-scored with respect to their parent scale) described their affect, ranging from 1 (“not at all”) to 6 (“very well”). EA – energetic, alert, and sluggish (r); TA – calm (r), relaxed (r), and tense; HT – cheerful, pleased, and irritable (r). Scores were calculated by averaging across items.

Results

We present selected results that are most pertinent to our investigation in the following sections. For complete results, data, and code, see <https://osf.io/3va4t/>.

Descriptive Statistics and Correlations

Descriptive statistics and correlations were computed using the *psych* package (Revelle, 2017), the *multilevel* package (Bliese, 2013), and the base functions in R (R Core Team, 2016). Table 1 shows means, standard deviations, various measures of reliability, and intercorrelations for the Big Five traits computed as composites of their respective ABCD scales.² With the exception of ω_g estimates,³ each showed high reliability based on these indices (Revelle & Condon, in press). Consistent with previous research, traits had small to moderate positive intercorrelations with each other.

Moving to daily reports, we estimated predicted probabilities of responses that fell within the categories of company type and activity type by fitting unconditional logistic multilevel

²The α statistics reflect the *average inter-item correlation* and the length of the scale; the *average inter-item correlation* is a measure of how closely related the items are in any test and is taken as an estimate of the reliable variance for each item (Guttman, 1945). The ω_g estimate represents that percentage of the variance of a test which is due to a general factor that is common to all of the items, and the ω_t represents the total reliability of the test (Condon & Revelle, 2014). The ω_g statistic was previously referred to as ω_h (Zinbarg, Revelle, Yovel, & Li, 2005), with the h subscript indicating “hierarchical.” The notation has been changed to g (Condon & Revelle, 2014) to reflect that the statistic is an estimate of the percentage of the variance of a test due to a “general” factor. The signal to noise ratio (S/N) indicates the ratio of reliable variance in a scale to the unreliable variance in the scale (Cronbach & Gleser, 1964).

³Relatively low ω_g scores suggest low levels of general factor saturation. In combination with high levels on other indices of reliability, these results suggest that our trait measures may comprise multiple group factors, which is consistent with the ABCD framework. Future research should explore this possibility. Further, as this statistic is not typically reported in studies of personality traits (Revelle & Wilt, 2013), we encourage future research to employ this measure in order to detect opportunities for more precise measurement.

regressions with the *lme4* package (Bates, Maechler, Bolker, & Walker, 2015), using maximum likelihood estimation. We first dummy-coded the company and activity variables; this resulted in five dummy coded company variables and 17 dummy-coded activity variables. Each dummy coded variable was entered in a separate multilevel logistic regression.

In our data, occasions (responses) were nested within days, and days were nested within persons. This is a three-level structure. However, there are not enough occasions within days to estimate occasion level variance, and therefore we treated the data as having a two-level structure, with occasions nested within persons. We allowed effects in the multilevel logistic regressions to vary randomly across individuals.

The log odds of a given category was predicted as a function of the overall intercept and random intercepts specifying person specific effects. Log odds were then transformed to predicted probabilities. In decreasing order of frequency, predicted probabilities of company types were: alone (.40), family (.13), friends (.11), crowd (.07), and romantic (.00).⁴ In decreasing order of frequency, the top six activity types were: work (.22), eating (.14), watching television (.11), studying (.08), surfing the internet (.08), and socializing (.07). These activities were retained in order to balance among the following goals: limiting the number of predictors for multilevel models, maintaining good coverage of the most common activities in daily life (1,257/1,827, or 69% reports included one of these activities), and including a similar number of company and activity predictors.

Table 2 shows descriptive statistics for the affective states. Between-person means were highly reliable. This is necessary for examining covariation between aggregate mean levels of affect and Big Five trait scales. Each affect showed substantial between-and within-person variation, similar to previous studies of psychological states (Heller, Komar, & Lee, 2007). Within-person reliabilities for fixed assessment occasions (Nezlek, 2017; Shrout & Lane, 2012) were computed using the *psych* (Revelle, 2017) and *lme4* (Bates et al., 2015) packages. Affects showed moderately high within-person reliabilities, and thus we were able to model systematic changes in mood over measurement occasions as a function of situational experience. Affects were highly correlated at the between-person and within-person levels, with the exception of EA and TA, which were uncorrelated within-persons.⁵ These results are similar to findings from previous research (Matthews et al., 2002; Wilt, Funkhouser, & Revelle, 2011).

⁴Predicted probabilities from multilevel logistic regressions do not necessarily have to match the observed proportions and thus cumulative predicted probabilities may not total 1.00. A primary reason for a mismatch is that multilevel models take into account each person's reports separately, whereas observed proportions do not. For example, in the current data, the proportion of company responses in the romantic category was 57/1827 (3%). Yet, many of the reports of romantic company came from three participants who reported romantic company at the following rates: 15/39, 10/32, and 9/36. Additionally, only 16 people reported one or more instances of romantic company. Multilevel logistic regression algorithms are able to incorporate this information. In the current study, the typical participant was estimated to have a very low predicted probability of reporting romantic company (.0005, rounded to .00).

⁵As criteria for inclusion allows for participants with a low number of responses ($n = 5$), some participants were expected to have extreme within-person correlations (e.g., $> .9$). Multilevel modeling analyses weight within-person associations by their reliabilities, so these values should not overly influence the results (Bliese, 2009; Bryk & Raudenbush, 1992; Hox, 2002).

Predicting company and activity

Multilevel logistic regressions were conducted using maximum likelihood estimation with the *lme4* package (Bates et al., 2015). As with the unconditional models, we conducted two-level models and allowed effects to vary randomly across people. We conducted separate models predicting each of the five company variables and each of the six activity variables individually from all traits simultaneously (11 models were conducted in all). Traits were grand-mean centered. All models converged normally. Estimates reported next are odds ratios (*OR*) from effects achieving statistical significance. The *OR*s may be interpreted as the relative odds of reporting a given category associated with an increase of one point in each trait (as with unstandardized regression coefficients, the *OR* is of course dependent on the scale variance of the predictor).

The odds of being alone were negatively related to agreeableness ($OR = .50, p < .001$). This means that, for a participant scoring one point above the mean level of agreeableness, the likelihood of being alone is about half that of a participant at the mean level of agreeableness. For other company variables, being with friends was positively associated with extraversion ($OR = 1.98, p < .05$) and agreeableness ($OR = 1.77, p < .05$), and negatively associated with openness ($OR = .46, p < .05$). There were no other significant associations between company variables traits. Moving to activity variables, watching TV was positively associated with openness ($OR = 1.72, p < .05$). Surfing the net was also positively associated with openness ($OR = 1.92, p < .01$). Socializing was positively associated with agreeableness ($OR = 1.63, p < .05$) and negatively associated with openness ($OR = .63, p < .05$).

We also conducted Poisson regressions predicting counts of company type aggregated across participants from all Big Five traits simultaneously, centering traits around their grand mean and controlling for compliance. These analyses are limited, as they treat the data at the person-level only. However, they may provide useful and unique data because they test the relations between traits and cumulative frequency of company and activity types (rather than relations between traits and momentary company and activity, as was done in multilevel logistic regressions). Regression coefficients, presented next for significant effects, indicate changes in frequency for a one point increase in traits (df for all models = 71).

Extraversion was positively related to being with friends ($b = .52, p < .001$) and negatively related to being with family ($b = -.37, p < .001$). For activity, extraversion was positively related to studying ($b = .85, p < .001$) and negatively related to surfing the internet ($b = -.72, p < .001$). Agreeableness was positively related to being with friends ($b = .62, p < .001$) and family ($b = .65, p < .001$), and negatively related to being alone ($b = -.51, p < .001$). For activity, agreeableness was negatively related to surfing the internet ($b = -.39, p < .05$). Conscientiousness was not related to any company variable. For activity, conscientiousness was positively related to studying ($b = .60, p < .001$). Emotional stability was positively related to being alone ($b = .13, p < .01$) and negatively related to being with friends ($b = -.16, p < .05$). For activity, emotional stability was positively related to working ($b = .29, p < .001$) and studying ($b = .34, p < .05$), and negatively related to watching television ($b = -.49, p < .001$). Openness was positively related to being alone ($b = .21, p < .05$) and negatively related to being with friends ($b = -.80, p < .001$). For activity, openness was positively

related to watching TV ($b = .57, p < .01$) and surfing the internet ($b = .66, p < .01$), and negatively related to studying ($b = -.96, p < .001$).

Predicting affective experience

We predicted EA, TA, and HT with two sets (one for traits, one for contexts) of two-level multilevel models (MLMs) using the *nlme* package (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2016). Responses were nested within persons. All models included random intercepts and controlled for compliance.

Predicting affect from traits—We first conducted MLMs predicting affect from traits. Traits were grand-mean centered, and models predicted affect from each trait separately and then all traits simultaneously. Table 3 shows bivariate and unique associations between traits and each type of affect. All traits except for extraversion showed positive, bivariate associations with EA. Agreeableness, emotional stability, and openness were negatively related to TA and positively related to HT at the bivariate level. The only unique association was between agreeableness and HT (positive). However, models entering all traits simultaneously explained a substantial portion of between-person variance for each affect: for EA (27%), TA (18%), and HT (14%).⁶ These findings, taken together with the lack of unique effects, suggest that the shared variance among traits (in comparison to the unique variance of individual traits) was related to affective states in this study (these findings are addressed in more detail in the discussion).

Predicting affect from company and activity—We conducted MLMs predicting affect from context variables. We entered the five dummy-coded company categories uncentered into three separate zero-intercept MLMs predicting each affect individually, and we entered the six dummy-coded activity categories uncentered into three separate zero-intercept MLMs predicting each affect individually. Zero-intercept models, in which the intercept is dropped, avoid a singular matrix and allow for estimation of all categorical effects (Nezlek, 2003). Affects, which were the dependent variables, were group-mean centered to allow for null hypothesis testing of coefficients relating contexts to affect.⁷ Coefficients from the models represent the unique, within-person effects of each context (df for coefficients from the company models = 1,745; df for coefficients from the activity models = 1,175). Results showed that EA was positively associated with being with friends ($b = .36, p < .01$) and negatively associated with watching television ($b = -.43, p < .01$) and surfing the net ($b = -.44, p < .001$). TA was negatively associated with watching television ($b = -.28, p < .05$). HT was negatively associated with surfing the net ($b = -.27, p < .05$). No other effects were statistically significant.

⁶These estimates were obtained by comparing variance estimates from unconditional models predicting affect (from the mean level of each affect, respectively) and the models predicting affect from traits simultaneously (Bliese, 2009).

⁷Coefficients relating dummy-coded predictors (entered uncentered) to outcomes in zero-centered models reflect the value of the dependent variable (in our case, affective variables) for the dummy-coded value of 1 (e.g., alone, with friends, etc.) for each respective variable. By group-mean centering the dependent variable, coefficients represent deviations from the typical participant's mean at the dummy-coded value of 1. These values would be expected to be 0 under the null hypothesis. The value of uncentered dependent variables would not be expected to be 0 under the null hypothesis.

Predicting affect from traits and contexts—Finally, we conducted MLMs predicting each affect from each trait individually, each context variable type individually, and the interactions of each respective trait and context variable. A total of 30 models were conducted (df for coefficients from the company models = 1,741; df for coefficients from the activity models = 1,170). Alone was set as the reference level for company, and eating was set as the reference level for activity.⁸ These categories were chosen due to their neutrality as compared to the other situations (Howell & Rodzon, 2011; Kahneman et al., 2004), which is supported by the lack of main effects for each situation in the current study. Interaction coefficients therefore represent the relation between trait and affect in the given situation as compared to the reference situation.

Relatively few statistically significant interaction effects (16 out of a possible 135) were observed (see Table 4). Notably, the emotional stability-EA relationship and emotional stability-TA relationships were moderated by several context variables. The emotional stability-EA relationship was more negative with family, friends, and romantic company (as compared to being alone). The emotional stability-TA relationship was more negative with romantic company (as compared to being alone), and in the activities of work and surfing the net (as compared to eating).

Discussion

Personality, everyday contexts, and the experience of momentary affect are complexly intertwined. Our results suggest that traits relate to differences in social and behavioral contexts, and also that traits and contexts predict affect individually and interactively. Broadly speaking, these findings are relevant to emerging frameworks for personality that consider dynamic integrations of traits, contexts, and momentary psychological states (DeYoung, 2015; Fleeson & Jayawickreme, 2015; Read et al., 2016; Revelle & Condon, 2015). We next discuss more specific implications of our findings.

Findings relating traits to contexts differed across analytic strategies. The results from multilevel logistic models were sparse. Results from between-person Poisson regressions were largely in line with previous research (for a review, see Wilt & Revelle, in press): for example, extraversion and agreeableness were broadly related to contexts that could be thought of as social settings, whereas conscientiousness predicted studying, and emotional stability related to more work activities and less watching television. In sum, personality predicted aggregated social company and activity contexts (in Poisson regressions) well but did not fare well when predicting single instances of these contexts (in multilevel logistic regressions).

This divergence is reminiscent of debates regarding the relation between personality and behavior from the standpoint that traits predict aggregated behavior more strongly than they predict single behaviors (Epstein, 1979; Fleeson, 2001). It may be that the personality

⁸We also attempted the analytic strategy of conducting zero-intercept MLMs entering as predictors each trait individually, dummy-coded categories (for company and activity variables separately), and the interactions of the trait and each dummy-coded variable. However, these models produced singular matrices and therefore could not be estimated. It was possible to estimate models by dropping one dummy-coded category, however, we preferred the approach reported in the main text (using the multinomial categorical variable) as it includes information from all categories.

associations with company and activity are quite subtle and thus will be more likely to be observed in data that is aggregated over time. Additionally, the findings observed using aggregated data may be taken to support the trait-consistency viewpoint. However, to avoid the tautology inherent in this view (e.g., extraverted people prefer situations in which they are able to act more extraverted), future work is needed to specify the psychological mechanisms, such as goals or desired affect, that mediate the relations between traits and trait-congruent situations (Wilt & Revelle, in press).

Important caveats to our findings are introduced by reliance on self-reports of company and activity (*in-situ ratings* reports), which may not be as accurate as observer-reports (*ex-situ* reports). In particular, using a forced choice option for *in-situ* ratings of context is limiting because people may have been in more than one context. Thus, the selected context may represent the most psychologically active characteristic of each context (Rauthmann et al., 2014). If so, that would mean that our company and activity ratings may be conceptualized as being composed of subjective construals in addition to objective cues (Rauthmann, Sherman, & Funder, 2015). Thus, future research should employ multiple observer ratings of these contexts in order to disentangle construal effects from actual contact with these contexts (Rauthmann, Sherman, Nave, & Funder, 2015). These caveats apply to findings relating contexts to affect as well, discussed below.

This study builds on work predicting affect from personality traits and situations over time. We replicated findings (Goryska et al., 2015; Komulainen et al., 2014; Stolarski & Matthews, 2016) showing that the socially desirable pole of each trait is related positively to positive affects (EA and HT) and negatively to negative affects (TA). Although traits together explained a relatively high percentage of between-person variance in affect, there was only one unique trait-affect association. These results suggest that it is the shared variance of traits that's driving their effects with affect rather than unique effects, which is in contrast to prominent models of personality and affect (Lucas & Fujita, 2000; Watson & Clark, 1992). There are at least three possibilities for these findings worth exploring. One is that higher-order personality factors (DeYoung, 2006; Digman, 1997) such as stability (the shared variance of agreeableness, conscientiousness, and emotional stability) and plasticity (the shared variance of extraversion and openness) are driving these effects. Another is that correlated lower-order aspects or facets of traits (DeYoung, Quilty, & Peterson, 2007; Paunonen & Ashton, 2001) are driving the effects. A third is that it is simply method variance. Future work using multiple methods to assess personality and affect, specifying hierarchical models of personality traits and their relations to daily affect, are needed to test these possibilities.

The relations of context with affect build on previous research showing that social contexts are energizing and that watching television/surfing the net are more neutral (or relatively low intensity) affective experiences (Emmons & Diener, 1986a; Howell & Rodzon, 2011; Kahneman et al., 2004). As previous studies were conducted with small sample sizes and retrospective methods, our findings using ESM may be taken as stronger validation of these results. Experimental work is needed to support claims of causality and directionality between contexts and affect.

Our interaction analyses were meant as exploratory and descriptive. Taking this into consideration with the relatively few observed effects, we are cautious about over-interpretation and rather consider that self-selection of context may have attenuated interactions. That is, people may put themselves in contexts that are affectively compatible with their dispositions and thus exhibit less affective reactivity. Experimental studies, lab-based experience sampling studies (Wilt et al., 2012), and naturalistic studies involving similar contexts (Goryska et al., 2015) may help to decrease self-selection effects. With these cautions in mind, the interactions between emotional stability and context predicting EA and TA are intriguing. The positive relation between emotional stability and EA may be attenuated in social contexts, such as with the company of family, friends, or romantic partners. The negative relation between emotional stability and TA may be more pronounced in romantic company, when working, and when surfing the net.

Limitations and strengths

The generalizability of the findings to the general population is hindered by the reliance upon a sample of predominantly young adults from the United States, an individualistic culture. East Asian populations (Schimmack, 2009) and older populations (Wilson & Gullone, 1999) may show less extreme and more complex affective responses to situations. We did not obtain data on involvement in romantic relationships, student status, or employment status. Frequency of romantic company, studying, and work contexts are dependent to some degree on these statuses, and so future studies may benefit from taking this information into account. Further, relatively low frequency of romantic company may have resulted in decreased reliability for effects concerning this category.

Our analytical strategies were limited by characteristics of the data. First, as noted previously, our data technically had three levels (occasions within days within participants); however, we treated the data as having two levels (occasions within participants) because we did not have enough occasions per day to conduct three-level models that would yield accurate results. Additionally, we would ideally enter the company and activity variables simultaneously as predictors in order to examine overlap among these contexts; however, we did not have enough observations per participant to provide accurate parameter estimates for this strategy. As this exploratory study yielded some promising findings, we encourage follow-up research employing larger sample sizes and collecting more reports per participant.

Our use of a new measure of the Big Five may also be considered a limitation, however, this inventory may add conceptual strength, as it contains relatively balanced ABCD content across the five traits (Pytlik Zillig, Hemenover, & Dienstbier, 2002; Wilt & Revelle, 2015). Self-reports of personality and affect may be subject to social desirability biases. We reiterate the limitations of self-reports of company and activity, using a forced choice option for *in-situ* ratings of context, and self-selection of situations when examining interaction effects. Notwithstanding these limitations, our results are strengthened by an ecologically valid design, collecting data on traits, contexts, and affects in the same study, and utilization of statistical approaches that have not been previously applied to our topics of investigation.

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Table 1
Descriptive Statistics, Reliabilities, and Intercorrelations for Big Five Traits

	<i>M</i>	<i>SD</i>	<i>α</i>	<i>Avg. r</i>	ω_g	ω_t	<i>S/N</i>	<i>E</i>	<i>A</i>	<i>C</i>	<i>ES</i>
Extraversion	3.68	0.73	0.90	0.24	0.59	0.93	8.9				
Agreeableness	4.61	0.60	0.88	0.21	0.55	0.92	7.4	.33***			
Conscientiousness	4.39	0.51	0.81	0.13	0.33	0.87	4.3	.20**	.33**		
Emotional Stability	3.86	0.70	0.88	0.21	0.47	0.91	7.3	.20	.42***	.21*	
Openness	4.40	0.56	0.86	0.18	0.50	0.90	6.0	.56***	.60***	.39***	.39***

Note. Means (*M*), standard deviations (*SD*), and various measures of reliability (*α*, *Avg. r* = average interitem correlation, ω_g = omega general, ω_t = omega total, and *S/N* = signal to noise ratio.

 $p < .001$,

**
 $p < .01$,

*
 $p < .05$

Table 2
Descriptive Statistics and Reliabilities for Text-Messaging Reports of Affect

Variable	Aggregated Across Participants			Intraclass Correlations			Between- and Within-Person Correlations		
	<i>M</i>	<i>BP SD</i>	<i>WP SD</i>	<i>ICC(1,1)</i>	<i>ICC(1,28)</i>	<i>RC</i>	1.	2.	3.
1. Energetic Arousal (EA)	3.71	0.60	0.93	0.22	0.87	.74		0.02	0.42***
2. Tense Arousal (TA)	2.86	0.73	0.86	0.37	0.93	.71	-0.62***		-0.57***
3. Hedonic Tone (HT)	4.11	0.71	0.87	0.34	0.92	.62	0.70***	0.82***	

Note. The first three columns show statistics aggregated across participants: the mean of each state aggregated by participant; between-person standard deviations (*BP SD*); and pooled within-person standard deviations (*WP SD*). The *ICC(1,1)* is the amount of variance of an individual score that is attributable to between-person variance. The *ICC(1,28)* represents the reliability of between-person means. The *RC* is the reliability of within-person changes for fixed assessment occasions. Aggregated between-person correlations (below the diagonal) and pooled within-person correlations (above the diagonal) are shown in the last three columns.

p < .001,
**
p < .01,
*
p < .05

Table 3
Results from Multilevel Models Predicting Average Momentary Affect from Big Five Traits

	EA		TA		HT	
	Bivariate	Unique	Bivariate	Unique	Bivariate	Unique
Extraversion	-.08	.05	-.25	.10	.12	.00
Agreeableness	.24 ***	.08	-.30 ***	-.17	.30 ***	.24 *
Conscientiousness	.19 **	.09	-.11	.03	.12	.01
Emotional Stability	.20 **	.08	-.25 **	-.13	.21 *	.09
Openness	.28 ***	.15	-.28 ***	-.20	.22 **	.04

Note. EA = Energetic Arousal; TA = Tense Arousal; HT = Hedonic Tone. Numbers are *b* coefficients from multilevel models. Bivariate relationships are from regressions entering each trait individually as a predictor of each affect (*df* for models was 75). Unique relationships are from regressions entering all traits as predictors simultaneously (*df* for models was 71).

 $p < .001$,

**
 $p < .01$,

*
 $p < .05$

Table 4
Interaction Effects from Multilevel Models Predicting Average Momentary Affect from
Big Five Traits, Company, and Activity

	Affect	<i>b</i>	<i>p-value</i>
<i>Company models</i>			
Interaction term			
Conscientiousness × Romantic	EA	-.54	< .05
Emotional stability × Family	EA	-.25	< .01
Emotional stability × Friends	EA	-.19	< .01
Emotional stability × Romantic	EA	-.81	< .001
Openness × Romantic	EA	-.64	< .01
Agreeableness × Romantic	TA	-.38	< .05
Emotional stability × Romantic	TA	-.31	< .05
Openness × Romantic	TA	-.50	< .05
Extraversion × Crowd	HT	.19	< .05
Emotional stability × Friends	HT	-.13	< .05
<i>Activity models</i>			
Interaction term			
Extraversion × Studying	EA	-.40	< .01
Openness × Work	EA	.22	< .05
Conscientiousness × Watching TV	TA	.21	< .05
Emotional stability × Work	TA	-.21	< .05
Emotional stability × Surfing the net	TA	-.23	< .05
Openness × Watching TV	HT	.21	< .05

Note. EA = Energetic Arousal; TA = Tense Arousal; HT = Hedonic Tone.

Numbers are *b* coefficients from multilevel models. (*df* for coefficients including company categories = 1,741; *df* for coefficients including activity categories = 1,170)