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Day-to-Day Variability in Empathy as a Function of Daily Events and Mood

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Despite broad agreement that understanding a personality construct requires integrating trait and state levels of analysis, few studies have explicitly attempted such an integration. The present study did this by examining the relationships between trait and state measures of empathy. State measures were taken daily, with a focus on the day level (within-person) covariation between empathy and daily mood and events. Twice a week for up to 10 weeks, 103 participants provided measures of their daily empathy and mood (NA and PA) and described the events that occurred each day. Multilevel random coefficient modeling analyses found that daily empathy covaried positively with the impact of daily positive and negative social events and with daily positive and negative affect. Empathy did not covary with achievement-related events. Analyses that simultaneously included empathy, mood, and events suggested that daily NA mediated relationships between daily empathy and daily negative social events. Although mean daily empathy was positively related to trait empathy, trait empathy did not moderate relationships between daily empathy and events nor between daily empathy and mood. Moreover, daily empathy did not covary with daily depressogenic thinking, need for cognition, nor self-esteem, suggesting that empathy is distinct from these constructs. Possible mechanisms linking social events and empathy, such as emotional contagion, are discussed.

Distinctions between state and trait level analyses of individual differences have been one of the defining issues in the study of personality. During the middle and latter parts of the 20th century, much research and theory debated whether personality characteristics should be conceptualized as states *or* traits (Block, 1977; Epstein, 1979; Kenrick & Funder, 1988; Mischel, 1968; Nisbett & Ross, 1980), and researchers studying particular constructs often assumed that it was best to study a construct as either a trait or a state but not

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both. In contrast to an emphasis on states versus traits, more contemporary approaches to the study of individual differences have emphasized the need to think of constructs simultaneously as traits *and* states and to consider how states and traits interact (Funder, 1991; Magnusson, 1990; Mischel & Shoda, 1999).

Despite this broad agreement that personality constructs should be considered as both traits and states, the preponderance of studies on individual differences in empathy, defined as the ability to experience the feelings of others and the vicarious experience of emotion, have concerned only trait variability. That is, data are typically collected for many individuals across relatively few situations (Davis, 1983; Greif & Hogan, 1973; Grover & Brockner, 1989; Mehrabian, Young, & Sato, 1988). Little research has concerned the state variability of empathy, and the present study was intended to complement existing research by examining the state variability of empathy while taking into account trait levels of empathy.

There are various reasons to study the state variability of empathy. First, it seems reasonable to assume that, similar to other constructs, empathy can also be considered to be a state or state-like construct. For example, the expression of empathy, like sociability, is contingent upon changes in social contexts, a state-like characteristic (cf. Funder, 1991; Greif & Hogan, 1973). Second, although research on trait empathy may provide some sort of starting point for understanding state empathy, it cannot be assumed that state level (within-person) relationships will parallel trait level relationships (between-person). Third, it would seem that the field in general benefits from examining a construct at the state and trait levels simultaneously (e.g., Tennen, Affleck, Armeli, & Carney, 2000).

For empathy (and any other construct) it is critical to distinguish state and trait levels of analysis and to recognize the independence of the variance (and possible covariance with other constructs) at each of these levels. When data are collected simultaneously at two levels of analysis (i.e., within- and between-persons) the variances of measures of a construct at these two levels are theoretically independent. Relationships between constructs at one level of analysis involve different sources of variance than relationships at another, and theoretically, any type of relationship at one level can coexist with any type of relationship at another. Consistent with this, it cannot be assumed that within- and between-person covariation reflect the same psychological processes. Relationships between traits may parallel relationships between the same constructs measured as states, but they may not. The validity of conceptualizing empathy as both a trait and a state makes it an ideal topic to study how state and trait level approaches can be combined, and the present study did this by examining day-to-day and trait level variations in empathy simultaneously.

In addition to providing a basis for studying states and traits per se, the

present study focused on empathy because of its centrality to the construct of emotional intelligence, a topic that has generated considerable interest in recent years. People's sensitivity to and skill at recognizing the affective states of others and people's ability to respond accordingly are hallmarks of social and emotional intelligence, which in turn is a marker of psychological health (Gardner, 1983; Mayer & Salovey, 1997; Salovey & Mayer, 1990). Emotional and social intelligence involves the ability to perceive, understand, monitor, and regulate one's own and other's affective states. Central to the recognition of affective states of others is the concept of empathy, which focuses on the perception of affective states and is defined as the capacity to recognize, comprehend, and reexperience another person's emotions.

The present study focused on empathy because of the critical role it plays in social and emotional intelligence and because it is a construct that has been almost completely ignored by researchers who examine both within- and between-person variability simultaneously. From a state (i.e., within-person perspective), empathy is a socially oriented construct that should covary with interpersonal interactions. Moreover, there are tremendous individual differences in its expression, differences that are fairly normally distributed, and therefore empathy also needs to be considered as a trait-like (i.e., between-person perspective) construct. This combination makes empathy an ideal construct for a multilevel analysis of state and trait variation.

The design of the study was similar to that used in a growing body of research on the within-person variation in daily psychological states, much of which concerns the covariation between daily psychological states and daily events. In such studies, data are collected across enough days to provide a basis to estimate within-person coefficients representing relationships between states and events. Although much of this research has focused on the within-person covariation between events and moods (e.g., Affleck, Tennen, Urrows, & Higgins, 1994; Bolger & Schilling, 1991; Marco & Suls, 1993), some research has focused on the within-person covariation between events and constructs that have traditionally been conceptualized primarily in trait terms such as self-esteem (Butler, Hokanson, & Flynn, 1994) and self-concept clarity (Nezlek & Plesko, 2001).

In the present study, each day participants provided measures of their state empathy, state mood, and the positive and negative events that occurred that day. In addition, various trait measures were collected as potential moderators of day level relationships. These data allowed hypotheses to be tested about daily covariation (e.g., Does daily empathy covary with daily mood?) and about individual differences in these relationships (e.g., Is the day level, within-person covariation between empathy and mood stronger for some people than it is for others?).

Although we could not assume that the state level covariation between

empathy and other constructs would parallel trait level relationships, research on trait level empathy did provide a basis for hypothesizing about state level relationships, and the study was guided by the following hypotheses. First, state empathy was expected to covary positively with both positive activated mood (PA) and negative activated mood (NA). Compared to days when NA was lower, empathy would be higher on days when NA was higher, and similarly, compared to days when PA was lower, empathy would be higher on days when PA was higher. Second, empathy was expected to covary positively with both negative and positive daily events, although such covariation was expected to be stronger for social events than for achievement events. A third hypothesis was that daily empathy would covary more strongly with daily social events than with daily achievement events. Although achievement events may make people think about others and their feelings, by definition, social events focus on or concern other people more directly than achievement events, and daily changes in social events should be associated more closely with changes in empathy than daily changes in achievement events.

The hypothesized relationships between empathy and mood were based on research on correlates of trait empathy. Anxiety is an important component of NA, and empathy has been found to be positively related to trait anxiety (e.g., Deardorff, Kendal, Finch, & Sitarz, 1977; Eysenck & Eysenck, 1978; Eysenck & McGurk, 1980; Rim, 1974; Sheldon, 1996). According to Eysenck (1990), differences in trait anxiety reflect differences in arousability, and consistent with this position, people high in empathy (compared to those low in empathy) tend to be more easily aroused by stimulation, especially social stimulation (Mehrabian, 1997; Mehrabian et al., 1988; Wiesenfeld, Whitman, & Malatesta, 1984).

Another body of research, most of it on the interpersonal correlates of trait empathy, suggested that empathy and PA should covary. For example, people high in empathy tend to be more pleasant and warmer toward others than those low in empathy (Mehrabian et al., 1988), they tend to be more tolerant parents (Barnett, Howard, King, & Dino, 1980; Lounsbury & Bates, 1982), they tend to be more helpful and altruistic (Barnett, Feighny, & Esper, 1983; Batson et al., 1988), and they tend to be more satisfied with their romantic relationships (Davis & Oathout, 1992; Krauss & Fussell, 1991). Moreover, each of these predispositions and states is associated with increased positive affect.

Conceptually, we expected empathy to covary positively with both positive and negative mood because higher scores on the PA and NA scales of the PANAS (Watson, Clark, & Tellegen, 1988), which were used to measure daily mood, indicate greater arousal. The PA and NA scales of the PANAS measure specific components of the mood circumplex (Feldman Barrett & Russell, 1998). The PA scale measures positive activation, and the NA mea-

sures negative activation. On days when people are more aroused (either positively or negatively), affect should be more salient, and people should be more empathic. Although this argument is stated in a way that implies that arousal leads to empathy, no casual sequence is intended. It is also possible that greater empathy leads to increased arousal. Nevertheless, the expected covariation is the same for both causal sequences. Causal relationships between empathy and affect are discussed later.

The present study examined the covariation between empathy and daily events under the assumption that events represent a necessary but not sufficient condition for the experience of empathy. Empathy requires some sort of target (the feelings of other people), and people are less likely to be empathic when they are alone or if nothing is happening around them compared to when they are with people or events are occurring that make the feelings of others more salient. On the other hand, people are not empathic simply because they are with others or something is happening. This assumption highlights an important difference between conceptualizing empathy as a trait, some sort of cross-situational ability or potential to experience the emotions of others, and conceptualizing it as a state, the extent to which people experience the emotions of others at specific points in time. Also, given that people can be empathic regarding both positive and negative emotions (and by implication, in response to both positive and negative events), we expected that empathy would covary positively with both positive and negative events.

Daily events can be conceptualized along a variety of dimensions, and for present purposes, events were differentiated on the basis of whether they were social or achievement related. This distinction not only recalls such classic dichotomies as Freud's ''Arbeit und Liebe'' (Work and Love), it also distinguishes events that are more likely to provide a basis for experiencing empathy (social events) from those that are less likely to provide such a basis (achievement events). Differences in the strength of the covariation between empathy and social events and empathy and achievement events were also suggested by the research on the correlates of trait empathy. As noted above, this research suggests that relationships between empathy and anxiety are due in part to individual differences in people's tendencies to be aroused, particularly in social situations. The hypothesis about the relationship between empathy and PA was based largely on research concerning interpersonal phenomena, suggesting that the covariation between empathy and social events is stronger than that between empathy and achievement events.

An important focus of research on state variability has been the relationship between state variability and adjustment. In some studies, state variability per se has been examined, whereas in other studies, state variability has been examined in relationship to daily events, with an emphasis on the covariation between events and states (sometimes referred to as reactivity).

Although not all studies have found relationships between trait adjustment and state variability or reactivity (e.g., Affleck et al., 1994; David, Green, Martin, & Suls, 1997), those studies that have found such relationships have generally found that poorer adjustment is associated with greater variability per se (e.g., Butler et al., 1994; Gable & Nezlek, 1998) or greater reactivity (e.g., Bolger & Schilling, 1991; Marco & Suls, 1993; Suls, Green, & Hillis, 1998). Accordingly, we examined how within-person relationships between empathy and other constructs varied as a function of trait adjustment. Given the relative lack of theory and research on state variability in empathy and the inconsistency of studies on trait moderation of reactivity to events, these analyses were done on an exploratory basis.

The preceding discussion has focused primarily on mood, but there seems to be broad agreement that empathy, at least at the trait level, has a cognitive component (Davis, 1983; Leith & Baumeister, 1998; Mehrabian, 1997). Within a cognitive framework, empathy is conceptualized in terms of how people imagine themselves being in someone else's position and experiencing what that person is experiencing. This suggests that individual differences in empathy may reflect individual differences in how cognitively active people are. People who are less cognitively active may be less empathic because they think less about other people, which itself reflects the fact that they think less about things in general. Such relationships have not received much empirical or theoretical attention, so it was difficult to form strong hypotheses about them. Nevertheless, to examine such possibilities, need for cognition (Cacioppo & Petty, 1982) was measured at the state (daily) and trait levels.

METHOD

Participants

Participants were 112 introductory psychology students (86 women and 26 men) attending the College of William & Mary who received credit in partial fulfillment of class requirements.

Measures

Empathy was measured at both the trait and state levels. Trait empathy was measured using the Balanced Emotional Empathy Scale (BEES; Mehrabian, 1996). Daily (state) empathy was measured using variants of four items from the BEES trait scale reworded for daily administration (The sadness of a close one easily rubs off on me, I don't get overly involved with friends problems, I am not affected easily by the strong emotions of people around me, and Another's happiness can be very uplifting for me). Items were selected based on factor loadings reported by Mehrabian (1997, personal communication), appropriateness for daily administration, and their link to the focus of the study, the vicarious experience of emotions and emotional contagion. Specific instructions for the daily BEES measure were, ''For each of the following statements, please indicate the extent to which the statement applied to you TODAY. Use the scale provided.'' Consistent with the scoring of the trait measure, daily empathy was operationalized as the sum of these four responses. These and all other daily responses were made using a 1 to 7 scales with 1 labeled *strongly disagree* and 7 labeled *strongly agree.*

Positive and negative affect were measured at both the trait and the state levels with the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Standard instructions were used for the trait measure. Daily (state) PA and NA were measured with the same 20 adjectives, and instructions for the state measure included the phrase ''Indicate to what extent YOU HAVE FELT THIS WAY TODAY.'' Trait and state self-esteem were measured with the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965), and participants completed trait versions of the scale at the beginning and end of the study. Daily self-esteem was measured using items 3, 6, 7, and 10 from the trait scale reworded to refer to how participants felt about themselves that day (Today, all in all, I was inclined to feel like a failure; I have a positive attitude toward myself; Today, on the whole, I was satisfied with myself; and I think I am no good at all), and daily self-esteem was operationalized as the mean response to these items.

Trait depressogenic adjustment was measured using the Beck Depression Inventory (BDI; Beck, 1967) and the Center for Epidemiological Studies Depression scale (CESD; Radloff, 1977). Daily depressogenic adjustment was measured using three items based on Beck's Cognitive Triad (Beck, 1967), negative view of self, ''Overall, how positively did you feel about yourself today''; negative view of life in general, ''Thinking of your life in general, how well did things go today''; and negative view of the future, ''How optimistic are you about how your life (in general) will be tomorrow?'' Daily depressogenic adjustment was operationalized as the mean response to these three items.

Trait need for cognition was measured using the Need for Cognition Scale (NFC; Cacioppo & Petty, 1982). Daily need for cognition was measured using four items from the trait measure (I would prefer simple to complex problems; I like to have the responsibility of handling a situation that requires a lot of thinking; Thinking is not my idea of fun; I would rather do something that requires little thought than something that is sure to challenge my thinking abilities), with instructions worded for daily assessment. Daily need for cognition was operationalized as the mean response to these four items.

Daily events were measured using 22 of the 40 events on the Daily Events Survey (DES; Butler et al., 1994). Previous research had suggested that all 40 events items did not need to be measured to obtain a valid summary of daily events (Nezlek & Gable, in press). These events included ''Went out to eat with a friend/date'' (social positive), ''Tried to do homework and couldn't understand it'' (achievement negative), ''Did well on a school or work task (e.g. test, assignment, job duty)'' (achievement positive), and ''Had plans fall through to spend time with someone special'' (social negative). In addition to items from the DES, four items, each representing a combination of positive–negative and social–achievement, were created to measure other events that may have occurred. For example, other positive social events were measured using the item ''Had other type of pleasant event (not listed above) with friends, family, or date.'' A total of 26 events were measured, 7 positive-social, 7 positive-achievement, 6 negative-social, and 6 negative-achievement.

For each day they contributed data, participants rated each event using the following scale: 0 = *did not occur*, 1 = *occurred and not important*, 2 = *occurred and somewhat important*, 3 = *occurred and pretty important*, 4 = *occurred and extremely important*. For each day, ratings of the seven positive social events were averaged to create a positive social event score, ratings of the six negative social events were averaged to create a negative event score, and similar scores describing achievement events were created.[1]

[1] In most previous research on daily events, data have been collected on a daily basis. To determine if the twice-weekly recording schedule leads to different distributions of event scores than a daily schedule, the distributions of event scores from this study were compared to the distributions from Nezlek and Gable (in press), a study in which the same set of events were recorded on a daily basis. The Nezlek and Gable data are presented below and can be compared to the data presented in Table 1. The distributions of scores (means with between-

Positive and negative frequency scores, the number of events occurring each day, were also created. Analyses using composite scores were presented because there was less heterogeneity of variance for composite scores than for frequency counts and because composite scores incorporate differences in the importance of events, whereas frequency counts assume all events are equally important. Moreover, such weighting is consistent with the scoring of the Life Experiences Survey (Sarason, Johnson, & Siegel, 1978), a widely used measure of life events, and it is consistent with the procedures used by many researchers who study relationships between life events and psychological adjustment (e.g., Hammen, Mayol, deMayo, & Marks, 1986; Hokanson, Rubert, Welker, Hollander, & Hedeen, 1989). Nevertheless, the results of analyses using frequency counts were very similar to the results presented in this article.

Procedure

At the beginning of the study participants came to a laboratory and received instructions and a computer disk containing the data collection programs. They were told that they would be using a computer to answer questions twice a week for 10 weeks and to complete questionnaires on the first and last days of the study. Data collection programs were written using the Micro-Analytic Experimental Laboratory software package (MEL; Schneider, 1988), and participants were able to run these programs and provide data using any IBM-compatible personal computer.

Instructions for each measure were included in three programs which participants ran on the days described on a written list given to them. One program was run on the first day of the study and collected the BDI and a trait RSE. A second program was run twice a week and collected the various daily measures. Participants were told to run the program twice a week (on Wednesdays and Sundays) at night just before going to sleep. The third program was run on the last day of the study and administered another trait RSE, the trait PANAS, the trait NFC, the CESD, and the study evaluation questions. The trait BEES measure was administered at the introductory session.

The research team maintained regular contact with participants via electronic mail. They were told to contact the experimenter should problems arise, such as disk failure and computer viruses, and when such problems occurred, participants were given replacement disks within 48 h and continued the study. At the end of the study, participants answered questions about their participation. Their responses suggested that participating in the study had not changed their daily routine meaningfully. Most participants (92%) reported spending 15 min or less per day running the program, and they reported that participation did not disrupt their daily lives dramatically, a mean of 3.2 on a scale where 1 = *very disruptive* and 5 = *not at all disruptive.*

The data collection programs recorded the date and time responses were recorded, allowing us to determine when participants had entered their data and if they had entered multiple days of data simultaneously. All the data provided by three participants were eliminated because they had entered most of their data at one sitting. Twelve days of data provided by 4 other participants (3 days each) were also eliminated because the data were not entered on separate

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and within-person variances in parentheses) from the two studies were very similar, suggesting that the twice-weekly reporting schedule did not produce different distributions of event scores than a daily schedule.

	Positive	Negative
Social	1.40 (.44, .48)	.39 (.14, .24)
Achievement	.91 (.26, .40)	.58 (.15, .26)

days. To be included in the analyses, participants had to provide at least 6 days of data. The previously mentioned problems, combined with computer viruses, disk failures, and the theft of data from one of the authors' cars, left 103 participants (79 women and 24 men) who provided at least 6 daily measures. These participants provided 1330 days of data (an average of 12.9 days per participant, $SD = 2.8$), and 81% provided at least 10 daily measures.

RESULTS

The present data comprised what is referred to as a multilevel (or hierarchically nested) data structure in that observations at one level of analysis (days) were nested within another level of analysis (people). Accordingly, the data were analyzed with a series of multilevel random coefficient models (MRCM) using the program HLM (Bryk, Raudenbush, & Congdon, 1998; Version 4.04). MRCM was chosen over ordinary-least-squares methods such as using within-person correlations to measure within-person relationships because MRCM provides better parameter estimates than OLS methods (Bryk & Raudenbush, 1992; Kenny et al., 1998; Kreft & de Leeuw, 1998). Descriptions of the advantages of MRCM over comparable OLS techniques and using MRCM to analyze daily diary data are presented in Nezlek (2001).

The superiority of MRCM over comparable OLS analyses is due to various factors. First and foremost, MRCM models within-person coefficients (such as those that were the subject of this study) as random, not fixed effects. In the present study, the exact days over which data were collected were not critical. In essence, the days comprising the study were sampled from a population of days and were meant to represent participants' typical lives. Presumably, coefficients based on samples of other days would have been just as valid (although not exactly the same) as those based on the sample collected, and so within-person coefficients were random in that they were sampled from each participant's population of possible coefficients. This sampling of coefficients constitutes a prima facie case for treating (modeling) coefficients describing such within-person relationships as random, not fixed.

Procedures that do not model such coefficients as random, such as OLS analyses that treat days as a repeated-measures factor in an ANOVA or analyze within-subjects coefficients as dependent measures, may provide misleading parameter estimates because they do not account for this additional source of variance. Within an OLS framework, errors at different levels of analysis are mathematically independent. For example, the reliability of within-person coefficients does not contribute to tests of individual differences in these coefficients. One of the advantages of MRCM is its ability to model errors at all levels of analysis simultaneously. That is, the reliability of within-person coefficients does contribute to tests of individual differences in these coefficients. This simultaneity has implications for significance tests of fixed effects (Is an effect significantly different from 0?) and for estimates of the variance of effects.

Moreover, the advantages of HLM over comparable OLS techniques are

more pronounced when the number of observations per unit of analysis (e.g., days provided by different people) are small or vary considerably across units (e.g., different people provide different numbers of days). HLM uses a combination of precision weighting (units of analysis contribute to parameter estimates as a function of their reliability and the number of observations within the unit) and Bayesian modeling to estimate measures of central tendency and variances. As the number of observations within each unit increases and become similar across units (e.g., all participants provide many days of data), the results of sequential OLS and HLM analyses begin to converge. In the present study, the number of observations per unit was small ($M = 12.9$) and varied across participants ($SD = 2.8$), exactly the type of situation in which the advantages of HLM over OLS techniques are maximized.

Models and analyses are described using the nomenclature standard to multilevel modeling, and within this terminology, the primary analyses were two-level models. First, coefficients representing day level (within-person) phenomena were estimated for each person, and individual differences in these coefficients were then analyzed at the next level of analysis (the person). Two types of day level coefficients were estimated, intercepts (representing mean levels of a measure) and slopes (representing within-person relationships between empathy, daily events, and mood). These analyses addressed two types of questions. For example, did daily empathy covary with the mood states and events that occurred each day and did within-person relationships such as those between events and empathy vary as a function of trait empathy (that is, do traits moderate these relationships)?

Descriptive Statistics and Validity and Reliability of State Empathy and Other Daily Measures

The first set of analyses examined the reliability and validity of the day level measure of empathy and other daily measures. The preliminary analyses were what is referred to as ''totally unconditional'' because daily empathy was not modeled as a function of other day or person level variables. These analyses provided parameter estimates (e.g., estimates of between- and within-person variances) that were valuable in and of themselves and that served as the bases for evaluating results of other analyses. The basic level 1 (within-person or day level) model is as follows:

$$y_{ij} = \beta_{0j} + r_{ij}.$$

In this model, β_{0j} is a random coefficient representing the mean of y (daily empathy) for person j (across the i days for which each person provided data), r_{ij} represents the error associated with each measure of empathy, and the variance of r_{ij} constitutes the day level residual (or error) variance. The basic level 2 (or person level) model is as follows:

$$\beta_{0j} = \gamma_{00} + u_{0j}.$$

In this model, γ_{00} represents the grand mean of the person level means (β_{0j}s) from the day level model, u_{0j} represents the error of β_{0j}, and the variance of u_{0j} constitutes the level 2 residual variance.

This analysis estimated the mean daily empathy score to be 16.0. The variance in empathy across days was 10.7 ($SD = 3.3$), and the between-person variance was 9.3 ($SD = 3.1$). This meant that between-day variance represented approximately 54% of the total variance of 21.0, suggesting that there was ample day level variability in empathy to model. Reliabilities of coefficients are also routinely provided by HLM. For each person a reliability coefficient was estimated, with reliability defined as true variance divided by total variance. These reliabilities were then combined to create an overall estimate (Bryk & Raudenbush, 1992; pp. 43–44). The analysis indicated that mean daily empathy was highly reliable (.92). The validity of the daily measure of empathy was determined by examining relationships between the trait measure of empathy and person level means of daily empathy.[2] This was done with a model in which person level means of daily empathy (β_{0j}) were modeled as a function of trait empathy (BEES) as follows:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{BEES}) + u_{0j}.$$

The maximum-likelihood procedures used by HLM provide separate estimates of fixed parameters (significance tests of coefficients) and random parameters (error variances). The fixed effect part of this analysis found that daily and trait empathy were positively related. The γ_{01}(BEES) coefficient of .05 was significantly different from 0 ($t = 5.2$; $p < .001$). This coefficient is functionally equivalent to an unstandardized regression coefficient and is interpreted as such. For every 1.0 increase in trait empathy ($M = 48.1$; $SD = 30.1$), mean daily empathy increased .05. This meant that the predicted daily empathy score for a person 1 *SD* above the mean on trait empathy was 17.05 [16.0 + (30.1 × .05)], and the predicted daily mean for a person 1 *SD* below the mean was 14.95.

The strength of this relationship was also examined by comparing random parameter estimates, and strength was operationalized as the between-person variance in daily empathy accounted for by trait empathy, a procedure discussed in Bryk and Raudenbush (1992, p. 65). The residual variance of β_{0j} (mean daily empathy) from an analysis in which trait empathy was not included at the person level was 9.65, and the residual variance from a second analysis in which trait empathy was included was 7.34, a reduction of 24%.

[2] Of the 103 participants who provided at least 6 days of data, only 93 completed the trait version of the BEES. Therefore, the validity analyses of the state BEES are based on only these 93 participants.

TABLE 1
Summary Statistics of Daily Measures

	Mean	Between-person variance	Within-person variance	Reliability	Validity
Empathy	16.04	9.30	10.68	.91	.49
Depressogenic thinking	5.09	.66	.89	.90	.53
Need for cognition	4.69	.91	.38	.97	.77
Self-esteem	5.14	1.65	.47	.98	.92
Daily PA	3.92	.60	.75	.91	.74
Daily NA	2.49	.80	.71	.93	.86
Positive social events	1.28	.39	.43	.92	
Negative social events	.42	.12	.22	.87	
Positive achievement events	.95	.31	.38	.91	
Negative achievement events	.66	.17	.28	.89	

This corresponds to a .49 correlation (the square root of .24) between mean daily empathy and trait empathy, an acceptable level of agreement.

The validity and reliability of the other daily measures were examined with a similar set of procedures. Mean daily need for cognition scores were compared to trait need for cognition scores, mean depressogenic adjustment scores were compared to BDI scores, and so forth. Descriptive statistics for all daily measures and a summary of the analyses of the validity and reliability of these measures are presented in Table 1.

Further support for the validity of the daily measure of empathy came from the significant sex difference in daily empathy. Consistent with the results of considerable previous research on sex differences in trait empathy (e.g., Cohn, 1991; Eisenberg & Lennon, 1983), women had higher mean daily empathy scores than men (Ms = 16.5, 14.5 respectively; $t = 2.8$, $p < .01$). It is important to note, however, that there were no significant (or near significant) sex differences in the within-person relationships described below between daily empathy and daily mood and between daily empathy and daily events.

To examine the divergent validity of state empathy, daily empathy was modeled as a function of daily depressogenic adjustment, need for cognition, and self-esteem. Three separate models were analyzed, and each had a coefficient (β_{1j}, commonly referred to as slopes to distinguish them from intercepts) representing relationships between daily empathy and one of these three day level measures. For example, the analysis of the within-person relationship between empathy and need for cognition (NFC) relied on the following model:

$$y_{ij} = \beta_{0j} + \beta_{1j}(\text{NFC}) + r_{ij}.$$

In turn, the within-person relationships represented by these slopes were modeled at level 2 using the following models:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}.$$

In the terminology of multilevel modeling, such a model is referred to as a ''slopes as outcomes'' model because slopes from a level 1 model are being analyzed at level 2. For example, assuming NFC was the other daily measure, γ_{10} represented the mean slope (within-person coefficient) between empathy and need for cognition. None of these three measures covaried significantly with daily empathy. In each analysis, the γ_{10} coefficient was not significantly different from 0, and the results of these analyses are presented in Table 2.

Empathy and Daily Mood

The first hypothesis was that empathy would positively covary with daily PA and NA, and relationships between daily mood and empathy were examined using the following day level model:

$$y_{ij} = \beta_{0j} + \beta_{1j}(\text{PA}) + \beta_{2j}(\text{NA}) + r_{ij}.$$

In this model, β_{0j} is a random coefficient representing the intercept of *y* (daily empathy) for person *j* (across the *i* days for which each person provided data); β_{1j}(PA) is a random coefficient, a slope, representing the day level (within-person) relationship between PA and empathy for person *j;* β_{2j}(NA) represents the relationship between empathy and NA, and r_{ij} represents error. To eliminate the influence on parameter estimates of individual differences in daily mood, mood scores were group-mean centered. Thus, an individual's slopes for daily mood described relationships between deviations from his or her mean mood scores and deviations from his or her mean empathy.

To examine whether event–mood relationships were significantly different from 0 across the individuals in the study, the following person level model was examined:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}.$$

TABLE 2
Within-Person Relationships between Empathy and Depressogenic Thinking, Need for Cognition, and Self-Esteem

	Coefficient	*t* Ratio	*p* Level
Depressogenic thinking	0.14	1.2	*ns*
Need for cognition	0.17	1.0	*ns*
Self-esteem	−0.02	<1	*ns*

TABLE 3
Within-Person Relationships Between Daily Empathy and Daily Mood and Between Daily Empathy and Daily Events

Analysis	Coefficient	*t* Ratio	*p* Level
Mood			
Daily PA	0.66	5.9	.01
Daily NA	0.33	2.1	.05
Events			
Positive social	1.18	6.6	.01
Negative social	0.51	2.1	.05
Positive achievement	−0.11	<1	*ns*
Negative achievement	0.05	<1	*ns*

Note. All predictors were group-mean centered, so the intercept for this and all other analyses was the sample mean of 16.0. $N = 103$ for all analyses.

In this model, the significance of γ_{10} indicated if, on average, the within-person relationship between empathy and PA was not zero, and the significance of γ_{20} indicated if, on average, the within-person relationship between empathy and NA was not zero. In this analysis, both the γ_{10} and γ_{20} coefficients were significantly different from 0. As expected, across all participants, empathy scores tended to be higher on days when PA was higher, and they tended to be higher on days when NA was higher. These results are summarized in Table 3.

The γ_{10} and γ_{20} coefficients represent fixed effects; however, within-person relationships between mood and empathy can also be examined in terms of random error terms, the shared variance between empathy and mood. The unconditional level 1 (within-person) variance of daily empathy was 10.67. When daily empathy was modeled as a function of daily NA and PA the within-person variance of mood was 9.75, a reduction of 9% from the unconditional model. This corresponds to an estimated within-person multiple *R* of .30.[3]

Empathy and Daily Events

The second hypothesis was that daily empathy would covary with both positive and negative events. Relationships between daily events and daily empathy were examined using a model similar to that used to examine relationships between daily mood and daily empathy except that the two slopes

[3] Some authors have suggested that such estimated multiple correlations need to be viewed cautiously (e.g., Kreft & deLeeuw, 1998, p. 199). These possible problems aside, we have presented them to provide some indication of the strength of the relationships between daily empathy and other daily measures with strength operationalized in terms of shred variance.

now represented empathy-positive event and empathy-negative event relationships. As expected, the analyses indicated that empathy positively covaried with both positive and negative events. The coefficient representing the mean slope between empathy and positive events was positive and significantly different from 0 ($\gamma_{10} = 1.13$, $t = 5.3$, $p < .01$), and the coefficient representing the mean slope between empathy and negative events was also positive and approached conventional levels of significance ($\gamma_{20} = .58$, $t = 1.8$, $p < .07$).

We also expected that empathy would covary more strongly with social events than with achievement events. Such differences were examined using a day level model in which daily empathy was modeled as a function of positive and negative social events and positive and negative achievement events. As expected, these analyses found that empathy scores covaried significantly with positive and negative social events, but did not covary with either positive or negative achievement events. The results of these analyses are presented in Table 3. As hypothesized, a planned comparison of the magnitude of the social and achievement slopes indicated that the social slopes were significantly larger than the achievement slopes [$\chi^2(2) = 25.3$, $p < .01$]. Finally, the estimated *R* between daily empathy and daily social events was .35.

Empathy, Events, and Mood

Given that empathy covaried with daily social events and with daily mood, we were interested in examining how these different relationships changed when daily empathy was modeled as a joint function of events and mood. To do this, a series of day level models was analyzed in which daily empathy was modeled as a function of positive and negative social events and mood, and the results of these analyses are summarized in Table 4.

As can be seen from the coefficients in Table 4, when daily empathy was modeled as a function of both mood and social events, the relationship between empathy and negative social events was not significant, whereas it was in the original analysis. Follow-up analyses which included events and only NA or events and only PA suggested that NA mediated the relationship

TABLE 4
Within-Person Relationships: Daily Empathy as a Function of Daily Mood and Daily Social Events

	Coefficient	*t* Ratio	*p* Level
Positive social	1.05	5.6	.01
Negative social	0.13	<1	*ns*
Daily PA	0.35	3.0	.01
Daily NA	0.38	2.3	.05

between negative social events and empathy. That is, when only NA was included in the model, the coefficient for negative social events was not significant and the coefficient for positive social events remained significant, whereas when only PA was included, coefficients for both positive and negative social events remained significant. These results do not suggest a specific mediational relationship between PA and positive social events; empathy significantly covaried with both measures independently.

Traits as Moderators of Within-Person Relationships

An important focus of research on the day-to-day covariation between psychological states and daily events is the extent to which within-person relationships vary as a function of trait differences. To determine whether within-person relationships between empathy and events and between empathy and mood varied as a function of traits, slopes from day level models were analyzed at the person level. For example, to determine whether within-person relationships between social events and empathy varied as a function of trait empathy, the following person-level model was analyzed:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Empathy}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Empathy}) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Empathy}) + u_{2j}.$$

In this analysis, whether trait empathy moderated empathy–event relationships was tested by the significance of the γ_{11} and γ_{21} coefficients (for positive and negative social events respectively), and a parallel analysis was done for positive and negative moods. The potential moderating effects of trait empathy, trait PA and NA, depressive symptoms (BDI and CESD), trait need for cognition, and trait self-esteem were examined. None of these variables moderated relationships between empathy and daily events or between empathy and mood.

Finally, in studies involving day-to-day measurement, it is important to know if artifacts such as fatigue contribute to day level effects and if person level effects include artifacts such as relationships involving the number of days a participant contributed data. Analyses that included day of study at level 1 found no statistically significant relationship between day of study and empathy, and analyses that included the number of days a participant contributed data found no significant relationships between this variable and the within-person coefficients discussed in this article.

DISCUSSION

As expected, empathy scores tended to be higher on days when both PA and NA were higher. When people experience stronger affect, whether positive or negative, they appear to be more receptive to and moved by the feeling

states of others. Furthermore, people also appear to have been more empathic when they were more socially active—when their environments provided more opportunities for them to be empathic. Daily empathy scores changed .78 for every 1 *SD* change in positive social event scores, and they changed .24 for every 1 *SD* change in negative social event scores. It is important to note that such changes were statistically independent of the fact that daily empathy scores changed 1.50 for every 1 *SD* change in trait empathy.[4] Moreover, relationships between daily empathy and daily events were not due to the fact that more empathic people had higher event scores. First, there were no statistically reliable (or nearly reliable) relationships between trait empathy and positive or negative event scores. Second, because event scores were group-mean centered (i.e., daily event scores for each person were adjusted for individual differences in mean event scores), individual differences in event scores did not contribute to estimates of within-person relationships between events and empathy (Nezlek, 2001).

Aside from expanding the knowledge base by examining the variability of state empathy in a naturalistic setting, the present study contributes to our understanding of the interplay of state and trait conceptualizations of individual differences. How empathic a particular person was (or at the least perceived him or herself to be) on a particular day was a function of both a trait characteristic (a global measure of empathy) and a state characteristic (the social events that had transpired during the day). Moreover, the fact that the within-person covariation between social events and daily empathy did not vary as a function of individual differences in trait empathy suggests that trait and state characteristics independently predicted an individual's empathy on a particular day.

Whether state and trait characteristics predict outcomes independently or jointly is either an explicit or implicit focus of models that seek to integrate state and trait levels of analysis (e.g., Funder, 1991; Mischel & Shoda, 1999). The present results suggesting independent prediction are consistent with the results of other research on state and trait analyses of self-concept clarity (Nezlek & Plesko, 2001) and self-focused attention (Nezlek, in press). Relationships between daily events and state measures of these constructs did not vary as a function of trait levels of these two constructs. These results are inconsistent, however, with the results of some studies of state and trait analyses of more affectively focused constructs such as self-esteem (e.g.,

[4] These illustrative scores were calculated as follows. The within-person *SD* for positive social events was .66, and so 1 *SD* increase or decrease in event scores corresponded to a raw score increase or decrease of .66. The mean coefficient for positive events was 1.18. Therefore, daily empathy increased or decreased .78 (.66 $\times$ 1.18) for every 1 *SD* positive events were above or below the mean for positive events. The corresponding figures for negative events were .47, .51, and .24.

Butler et al., 1994; Nezlek & Gable, in press) or neuroticism and NA (Bolger & Schilling, 1991; Marco & Suls, 1993) which have found that event–state covariation varied as a function of trait characteristics. Such moderating relationships suggest that trait and state characteristics interact to predict specific outcomes. Clearly, more research is needed to understand what types of traits interact with what types of states to predict what types of outcomes.

Because this is one of the first studies to demonstrate that changes in day-to-day social events covary with variability in empathy, the question of plausible causal mechanism needs to be addressed. One likely such mechanism is that of emotional contagion. Numerous studies have found that people tend to feel and express the same affective states that others are experiencing and expressing (Doherty, 1998; Gump & Kulik, 1997; Hatfield, Cacioppo, & Rapson, 1994; Lundqvist & Dimberg, 1996; Sullins, 1991). Such a relationship helps to explain the present results: When interacting with others people are likely to feel what the others around them are feeling and therefore be more likely to empathize with them. Social events—and in this study positive social events in particular—are likely to influence empathy through the contagious nature of emotions. For example, we laugh when others laugh, feel sad when others cry, and so forth.

In contrast, daily empathy was unrelated to daily achievement events. Empathy entails feeling what others are feeling, and it appears that the immediate presence of others under circumstances in which sociality is salient maximizes the likelihood that people will be empathic. Merely experiencing an event that could happen to others (e.g., doing poorly at a task) appears to be insufficient to trigger an empathic response. Although people may, or be lead to, experience empathy in reaction to achievement activities, in the natural course of daily life, the high self-relevance of succeeding or failing does not appear to be associated with increased attention toward others. This argument is consistent with the results of Nezlek (in press), who found that daily public self-consciousness (a construct that, like empathy, is other directed) covaried positively with daily social events (both positive and negative) but did not covary with daily achievement events.

Although daily empathy covaried with both daily positive and negative social events, a follow-up test found that the covariation between positive social events and empathy was greater than the covariation between negative social events and empathy [$\chi^2(1) = 27.1$, $p < .01$]. Such a difference is inconsistent with much previous research that has tended to find that negative events, stimuli, feelings, and so forth are more powerful or meaningful than corresponding positive entities (Taylor, 1991). People may have experienced greater empathy in response to positive events than in response to negative events because empathic responses to negative events would entail experi-

encing negative (unpleasant) affect, which people might want to avoid. This possibility is consistent with the fact that daily NA mediated the relationship between empathy and negative events.

The previous discussion has tacitly assumed that day-to-day changes in empathy reflected (or resulted from) daily events, an assumption that has various sources of support. Daily measures were collected at the end of a day, and so reports of empathy followed the occurrence of daily events, a sequence consistent with an assumption that events lead to changes in empathy. Moreover, such a casual relationship (rather than the reverse) is consistent with results of lagged analyses reported by Bolger and Zuckerman (1995); Gable, Reis, and Elliot (2000); and Nezlek and Gable (in press). In each of these studies, events on day *n* predicted psychological states on day $n + 1$, whereas states on day *n* did not predict events on day $n + 1$. Such lagged analyses were not possible in the present study, however, because measures were taken twice weekly. The average length of time between adjacent recording days ($M = 4.6$, $SD = 2.9$) was too long for lagged effects to appear (Marco & Suls, 1993).

Nevertheless, it is logically possible that day-to-day changes in empathy lead to different daily events. For example, people who are more aware of the feelings of those around them may behave in ways that are consistent with such feelings. Greater awareness of positive feelings may lead to more positive social events, and greater awareness of negative feelings may lead to more negative social events. Although such an explanation is inconsistent with the lack of relationships between trait empathy and daily events (if this were the case, trait empathy scores would have been positively related to event scores), a causal sequence from empathy to events cannot be eliminated out of hand. Clearly, the causal relationships among the constructs examined in this study remain to be determined. Covariation is a necessary, but not sufficient condition for establishing causation. Future research will need to collect data in ways that allow modeling more complex relationships and will need to use more complex analytic procedures (e.g., multilevel structural equation modeling) to examine these relationships.

Similar to the majority of studies about relationships between daily mood and daily events, in the present study daily mood was measured using the PANAS. Nevertheless, as suggested by Feldman Barrett and Russell (1998) and numerous others, it appears that the PANAS measures only two of the four quadrants (positive activation and negative activation) of an affective circumplex that also includes positive deactivation (e.g., relaxed) and negative deactivation (e.g., sad). Although this is not the time nor place to debate the structure of affect and its measurement, it may suffice to note that the limitations of the PANAS limit the generalizability of the present results. Empathy may very well covary with ''deactivated'' moods as it covaried

with ''activated'' moods (e.g., feeling sad when events bring to the fore that others feel sad); however, future research needs to examine such relationships explicitly.

Another possible caveat regarding the present study concerns the measure of daily empathy that was used. The daily measure consisted of four of the highest loading items from a self-report trait measure, and for a first attempt, such a measure was appropriate. It was both valid and reliable and relatively easy to administer. More items may have been unwieldy to administer on a daily basis, and behavioral assessment of daily empathy would have been complex and time-consuming if at all practical. In the long-term, however, self-report measures need to be complemented with behavioral measures, and we hope that the present study will stimulate the development of practical, behaviorally oriented measurements of state (or daily) empathy.

By sharpening the argument and leading to integrative models of state and trait influences, the debate about state and trait levels of analysis has moved the field forward over the past 30 years (Kenrick & Funder, 1988), and the current study reflects this progress. Understanding individual differences in empathy appears to require understanding how globally empathic people are and the circumstances in which they find themselves. Nevertheless, it remains to be seen how fruitful the approach used in this study is when it is applied to other constructs.

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