**Using experience sampling to examine links between**

**compassion, eudaimonia, and prosocial behavior**

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**Abstract**

**Objective:** Compassion has been associated with eudaimonia and prosocial behavior, and has been regarded as a virtue, both historically and cross-culturally. However, the psychological study of compassion has been limited to laboratory settings and/or standard survey assessments. Here, we use an experience sampling method (ESM) to compare naturalistic assessments of compassion with standard assessments, and to examine compassion, its variability, and associations with eudaimonia and prosocial behavior.

**Methods:** Participants took a survey which included standard assessments of compassion and eudaimonia. Then, over four days, they were repeatedly asked about their level of compassion, eudaimonia, and situational factors within the moments of daily life. Finally, prosocial behavior was tested using the Dual Gamble Task and an opportunity to donate task winnings.

**Results:** Analyses revealed within-person associations between ESM compassion and eudaimonia. ESM compassion also predicted eudaimonia at the next ESM time point. While not impervious to situational factors, considerable consistency was observed in ESM compassion in comparison with eudaimonia. Further, ESM compassion along with eudaimonia predicted donating behavior. Standard assessments did not.

**Conclusion:** Consistent with virtue theory, some individual’s reports displayed a probabilistic tendency toward compassion, and ESM compassion predicted ESM eudaimonia and prosocial behavior toward those in need.

**Keywords:** virtue, empathic concern, happiness, experience sampling, ecological momentary assessment

Over the past 20 years, there has been a growing interest in the psychological study of empathic concern*,* operationalized as a sympathetic other-oriented emotional response to someone perceived to be in need, which motivates altruistic responsiveness (e.g., Batson, 1987, 1991, 2009a; FeldmanHall et al. 2015; Winczewski et al. 2016). Empathic concern – a form of empathy – is generally equated with compassion (e.g., Batson 2009a; Goetz et al. 2010; Cameron & Payne, 2011; Weng et al., 2013). Thus, both are defined as a set of emotional responses, including warmth, tenderness, and sympathy toward someone thought to be in need, which promote helping behavior (e.g., Batson 2009a; Goetz et al. 2010; Cameron & Payne, 2011). These responses are distinguished from empathic distress, or being distressed by seeing another suffer, which is associated with sharing the negative emotions of a person perceived to be in need and does not promote helping behavior (cf. Batson 2011).

To date, studies on empathic concern, or compassion, have largely been conducted in laboratory settings and/or using standard, often retrospective, survey assessments. While these approaches are useful, they have limitations. In laboratory settings, questions about ecological validity arise (Mehl & Conner, 2012; Shiffman et al. 2008;), and relying on retrospective assessments can introduce recall biases (Schwarz, 2012; Shiffman, Stone & Hufford, 2008; Mehl & Conner, 2012). Also, neither laboratory studies nor standard assessments provide a way to examine consistency and variability throughout the situations of daily life (Runyan & Steinke, 2015). To illustrate the importance of measuring consistency, inconsistently high levels of self-esteem have been associated with anger and hostility in naturalistic settings (Kernis et al. 1989). Moreover, measuring consistency is crucial for the psychological study of character strengths, or virtues, understood as temporally and situationally stable moral dispositions, or tendencies, the consistent expression of which promotes eudaimonia and prosocial behavior (Aristotle 2000; Miller 2013; Peterson & Seligman, 2004; Timpe & Boyd, 2014). Virtues are operationalized as consistent in the sense of tending to persist over time, and across a range of morally-relevant situations, which serve as opportunities for their expression (Miller, 2013; Timpe & Boyd, 2014). For example, courage can only be expressed in a fear-evoking situation.

Traditionally and cross-culturally, compassionate care of others has been considered a foundational moral virtue. Because compassion is operationalized in terms of a responsiveness to the needs of others, seeing someone in need provides an opportunity to express compassion; and consistently high compassionate responding—over time and across situations—has been widely thought of as the expression of a virtue. This is true in Western thought, and particularly in Western religious traditions in which compassion is understood as a type of love (e.g., Augustine 2006, 3.II.3; Aquinas 1947, II-II.30.1). Further, Peterson and Seligman (2004) list love, as well as kindness and altruistic love, among 24 dispositions widely regarded as character strengths across cultures. In support of this, Park and colleagues (2006) conducted a survey indicating that love and kindness were highly ranked as character strengths across 54 nations.

As already noted—in addition to being temporally and situationally consistent—virtues are also operationalized as dispositions which promote eudaimonia and prosocial behavior (Aristotle, 2000; Miller, 2013; Timpe & Boyd, 2014). Eudaimonia is well-being analyzed in terms of life purpose, meaning, a sense of personal growth, and contribution to the lives of others (e.g., Deci & Ryan, 2008). Consistent with its conception as a virtue, numerous studies have linked compassion to eudaimonia (e.g., Espin et al. 2016; Law & Staudinger 2016; Seppala et al. 2013). However, this association has yet to be examined within the situations of daily life, or using methods other than standard assessments. Additionally, virtue theory has been called into question by numerous studies showing that situational factors can have a substantial influence on peoples’ responses (e.g., Darley & Batson, 1973; Haney et al. 1973; Welsh & Ordóñez, 2014; Zhong et al. 2010;). On the basis of such studies, some have argued that situational factors influence peoples’ responses to such an extent as to render virtue theory obsolete (e.g., Doris, 2002; Harmon, 1999; Ross & Nisbett, 1991). This position has been called situationalism.

Support for situationalism largely rests on studies that take place in isolated situations atypical of everyday life (e.g., asking a person to shock someone for not learning as part of a “scientific study”). Virtue theory, however, is not contingent on certain dispositions being expressed in any and every situation which serves as an opportunity to do so. Even though situational factors often influence us in substantial ways, whether compassion is ever expressed as a virtue at least partially depends on whether some individuals show probabilistic tendencies toward a compassionate response across everyday situations (e.g., Fleeson, 2007; Jayawickreme & Chemero, 2008; Miller, 2013; Rushton, 1984); or, in other words, whether they are *consistent* in being compassionate. Thus, examining whether compassion might function as a virtue requires cross-situational assessment—something missing in the existing literature, yet possible with experience sampling methods (ESM).

ESM refers to a range of methods characterized by repeated and intensive sampling throughout the situations of daily life in (or close to) real-time (e.g., Hektner, Schmidt & Csikzentmihalyi 2007; Larson & Csikszentmihalyi, 1983; Laurenceau & Bolger, 2013). In addition to providing a way of assessing cross-situational consistency, this form of assessment provides a way of overcoming several limitations of laboratory studies and standard assessments (e.g., Laurenceau & Bolger, 2013; Mehl & Conner, 2012). First, because it asks about events in or close to real-time, ESM decreases recall biases and the use of heuristics. Second, ESM increases ecological validity because it takes place in peoples’ everyday situations. Third, ESM enables the detection of fluctuations, or variability, over short periods of time (i.e., microprocesses) because it involves repeated and intensive sampling.

Recent advances in smartphone technology, and the integration of smartphones into daily life, have made ESM feasible to an unprecedented degree (e.g., Conner & Mehl, 2015; Miller, 2012). In the present study we take advantage of this feasibility to examine compassion across everyday situations. We believe this is the first study to do so. As a result, our primary aims are to: (1) compare ESM assessments of compassion with standard assessments; (2) examine ESM compassion consistency across everyday situations; (3) examine whether compassion predicts eudaimonia in daily life; and, finally, (4) examine whether ESM and/or standard compassion, along with eudaimonia, predicts future helping behavior specifically toward those in need.

This examination will shed light on associations between compassion, eudaimonia, and helping behavior in daily life. It will also shed light on the comparative value of ESM versus standard assessments. Further, it will allow insights into whether some individuals may have a probabilistic tendency to respond with compassion. In this regard, it has been theorized that being overwhelmed interferes with compassion—whether by the needs of others (e.g., empathic distress) or more *generally* by life situations (e.g., Cameron & Payne, 2011; Eisenberg & Miller, 1987; Gleichgerrcht & Decety, 2013). This general theory, however, has not been examined within daily life. Therefore, in addition to testing whether ESM compassion is negatively associated with certain everyday contexts, we also test whether it is negatively associated with being generally stressed or overwhelmed. This will provide insight into compassion consistency across daily situations, and thus into whether compassion may function as a virtue for some people. Finding evidence that some individuals have a probabilistic tendency toward compassion, and that compassion predicts eudaimonia and prosocial behavior, would be consistent with virtue theory.

**Methods**

**Participants**

The study was conducted on the residential campus of Indiana Wesleyan University, a Midwestern liberal arts university, which had approximately 3,000 residential undergraduate students registered at the beginning of the semester. All participants were liberal arts undergraduate students, ages 17 to 24 (M=19.5, SD=1.25), who were recruited from general education courses as an option for course credit. Other options included participation in other studies and alternative assignments involving comparable amounts of time. Participants provided written informed consent, and were informed they would have the opportunity to win between $0-10 by participating in the study (see Procedure for more details). To reduce disruptions to participants’ everyday lives, participants who owned an iPhone or Android device were allowed to use their smartphones for the study. We loaned iPod Touches to 10 participants who did not have a device.

**Materials**

**Pretest measures*.*** A demographics questionnaire was used to ask about age, gender, race, family income, and political affiliation. Participants were then given standard measures of eudaimonia, empathy, and compassion.

*Eudaimonia*. Prestest eudaimonia was measured using Diener et al.’s (2009) Psychological Well-Being (PWB) scale, which conceptualizes optimal human functioning as involving meaning and purpose; supportive of rewarding relationships; being engaged and interested; contributing to others’ well-being; involving personal competency, self-acceptance and optimism; and being respected (Diener et al., 2009). The PWB scale consists of eight items and respondents rate their level of agreement with each using a 1-7 Likert-type scale. Item scores are summed to provide an overall measure of flourishing, which can range from 8 to 56. The PWB was designed as a unidimensional and broad assessment of PWB. In the original validation study, factor analysis demonstrated a single factor structure, with that factor explaining 50% of the variance in responses (Diener et al., 2009). Psychometric data gathered by Diener et al. (2009) from students attending four U.S. colleges and one university in Singapore reveal that the PWB is internally consistent (α=.86) and has good temporal stability (*r*=.71).

*Empathy*. The Questionnaire for Cognitive and Affective Empathy (QCAE) was used to measure general pretest cognitive and affective empathy (Reniers, Corcoran, Drake, Shryane & Völlm, 2011). The QCAE consists of 31 items, and respondents are asked to rate their level of agreement with each item using a 4-point Likert scale. Reniers et al. (2011) first identified, then used confirmatory factor analysis to support, five subscales for the QCAE. Cronbach’s alpha’s for the five subscales ranged from .65 to .85. Further model testing revealed two moderately correlated, higher level factors: cognitive and affective empathy (Reniers, Corcoran, Drake, Shryane & Völlm, 2011). To gain a more reliable and broad assessment of empathy, we calculated QCAE scores by taking the mean response to all 31 items. We also calculated cognitive (19-items) and affective empathy (12-items).

*Compassion*. Pretest compassion was measured using Cameron and Payne’s (2011) compassion scale. This 9-item instrument was adapted from Batson’s empathic concern index (e.g., see Batson, 1987, 1991, for review), and asks respondents to rate their feelings and attitudes toward someone in need. Four items are emotion-oriented and the other five are intention-oriented. Response options range from “Not at all” (1) to “Extremely” (7). Evidence suggests the scale has an acceptable level of internal consistency (α = .81).

**Experience sampling measures.** To assess compassion in the context of everyday life, it was necessary to first identify situations that called for a compassionate response. Experience sampling involved asking participants whether, over the past several hours, they had been with anyone going through a tough time. If not, they were instructed to think of someone they personally knew who was going through a tough time. Because this was the first ESM study on compassion, we focused on examining compassion in response to people participants personally knew (as opposed to public figures, for example). In order to keep participation demand within acceptable levels (cf. Mehl & Conner, 2012), and to help ensure acceptable response rates, we limited the number of questions in each sampling to 11 (see Table 1 for all experience sampling questions). This forced us to focus on basic and general questions concerning situational factors (e.g., alone vs. with someone, general situational context, general feelings of being overwhelmed).

ESM compassion was measured using items from Cameron and Payne’s (2011) scale. The common practice of selecting top loading items from the scale, modifying them to fit an experience sampling context, and using the response options from the validated scale was followed (see Conner & Mehl, 2015; Conner, Brookie, Richardson & Polak, 2015). The four top-loading items from Cameron and Payne’s compassion scale—two emotion-oriented items and two intention-oriented items—were adapted and used for this study. The mean from these four items at a given assessment point was used to measure ESM compassion, and data gathered in the present study suggested high internal consistency (Cronbach’s α = .93).

The three top-loading items from Diener et al.’s (2009) PWB scale were adapted and, again, the mean from these items at a given assessment point were used to measure ESM eudaimonia. This same approach was recently used by Conner et al. (2017). Further, this shortened version demonstrated a level of internal consistency, Cronbach’s α = .83, that was nearly as high as that reported for the 8-item version in the original validation study (α = .86; Diener et al., 2009). Our intent, by selecting the three items with the highest factor loadings, was to accurately represent the original unidimensional construct. That all three items were internally consistent at a level similar to the original measure supports this approach.

At the completion of each experience sampling session, participants were asked to report their general situational context, whether they were with the person experiencing the tough time or with someone else, and their general sense of being overwhelmed. Concerning this last item, participants were instructed to simply report *any general feelings* of beingoverwhelmed, or stressed, as a result of life events and/or the events of the day.

**Posttest measures.** Compassion should be most closely associated with helping behavior specifically in response to those seen as being in need (Eisenberg & Miller, 1987; Goetz et al., 2010). Thus, we examined helping behavior toward (a) those not expressly in need, and (b) those in need.

To test helping behavior toward (a) those not expressly in need, participants played a brief version of the Dual Gamble Task (Arbuckle & Cunningham, 2012). In this task, participants were informed that they would be presented with a series of dual gambles—gambles for them and an anonymous partner—that they can take or pass. They were informed that the quality of the gambles (i.e., the probability of winning and amount of winnings) would vary independently for them and their anonymous partner. Some of these gambles would be high quality for them but low quality for their partner, some would be high quality for their partner but low quality for them, and others would either be high quality or low quality gambles for both. Participants were also told they had a chance of winning between $0 and $10 depending on whether they won or lost gambles, and whether their partner took gambles that caused them to win or lose. Participants were then given a series of 18 gambles. This allowed us to investigate the tendency to help those who are *not* expressly in need by examining the tendency to take gambles that are good, and pass on those that are bad, for one’s partner. Participants were not informed of their winnings until after the ESM part of the study.

To test helping behavior toward (b) those in need, each participant was informed they had won a specific dollar amount between $5 and $10 in the Dual Gamble Task. This amount was based on task performance; however, we adjusted the increments to make it so that everyone won between $5 and $10. Participants were then given the option of keeping their winnings or donating them to a local homeless charity. Making it so all participants won between $5 and $10 ensured that every participant had money which they could donate. Participants were not aware of this adjustment.

**Delivery systems.**Qualtrics online survey software (www.qualtrics.com) was used to deliver standard, pretest surveys. Qualtrics was also used to deliver a posttest question asking participants whether they wanted to donate or keep their winnings. The LifeData system (www.lifedatacorp.com), a smartphone app-based ESM system, was used to gather experience sampling data and deliver the Dual Gamble Task. Participants were automatically given a participant ID and informed that their responses would not be personally traced back to them. Additionally, all responses were given remotely.

**Procedure**

After a brief in-class orientation, participants downloaded the LifeData mobile application (“app”; RealLife Exp), and ESM study protocol, onto their mobile devices. They were informed they would receive an email containing a hyperlink to an initial survey, which they would need to complete before answering any questions delivered through their device. After the orientation, the study was conducted remotely through Qualtrics and the LifeData system.

Starting the next day, for four days, participants received three ESM notifications at random times: one between 10am and 12pm; one between 3 and 5pm; and one between 8 and 10pm (see Table 2). Participants received notifications—analogous to text message notifications—when they had ESM questions to answer. Depending on their settings, their device would either vibrate, ding, or both. A banner also appeared on their screen indicating they had questions awaiting their response. Participants could access these questions by swiping the banner. In order to prevent a convenience sampling of responses, participants were given a 30-minute time window to respond, after which the notification and questions disappeared. They were told not to respond if it was dangerous (e.g., if they were driving). Table 1 lists the ESM questions in the order they were presented.

At the end of the ESM schedule, participants received a notification instructing them to take the Dual Gamble Task, and given access to the task through the LifeData mobile application. They were allowed to take it at their convenience over the next week. To examine whether compassion and/or eudaimonia predicted future helping behavior toward those in need, participants were informed via email how much they had won at the end of the semester—two months later. A hyperlink was embedded in the email, which took participants to a question asking whether they wanted their winnings mailed to them or donated to a local charity. They were informed that their decision would be kept confidential, and would not be personally traced back to them.

**Statistical Analysis**

Pearson product-moment correlation coefficients—or where appropriate, a point-biserial correlation coefficient—were calculated with SPSS (v.23) and used to measure associations among standard survey measures. Also in SPSS, differences between aggregated ESM assessments and standard assessments were analyzed using repeated measures ANOVA. We used a split-half test to assess ESM compassion consistency. In keeping with common practice (e.g., Bleidorn & Deniseen 2015; Fleeson 2007), each participant’s ESM compassion scores were randomly split into two halves and mean compassion scores were calculated for each half. The correlation between the means of each half provided a consistency index.

R (v.3.3.3) was used to analyze within-person associations using LMER and GLMER packages. Generalized linear mixed effects models were used to account for both between-person and within-person variations and associations (Bates et al. 2013). Effect sizes were calculated using the method described by Xu (2003), which provides an index of explained variance that is equivalent to *R2*. R was also used to conduct multilevel logistic regression analyses to predict gambling behavior in the Dual Gamble Task and donating behavior.

Because we wanted to detect even small within-person associations between compassion and situational factors, we enrolled 244 participants and scheduled 12 observations per participant. This helped ensure our total observations exceeded the number recommended by typical power analyses for experience sampling (e.g., Bolger & Laurenceau, 2013). We also used the SIMR package in R to run a power analysis (Green & MacLeod, 2016). To be conservative, in our simulations we assumed a slope of .05 and five observations per participant, with 150 participants. The power coefficient was .986 indicating that, even with considerable dropout rates and low response rates, our study would have sufficient power to detect even small associations.

**Results**

Of those who took the pretest survey, 86.48% (n=211) completed pretest, ESM, and posttest portions of the study. 84.40% of these participants responded to at least two-thirds (8 out of 12) of the ESM assessments. Participants who responded less than four times (n=11) were excluded from analyses. However, results were not significantly affected by inclusion of these participants. The final sample size used for analyses was 200 (65.7% female; 90.5% Caucasian). The overall response rate to daily experience sampling notifications was 70.75%. Thus, our number of participants and response rates well exceeded the estimates used in our power analysis (see Statistical Analysis section).

Gender was the only demographic variable associated with standard or ESM assessments. Females reported higher levels of affective empathy, *r*(190)=.30, *p*<.001, and emotion-oriented aspects of compassion, *r*(193)=.18, *p*<.05. This was not the case for cognitive empathy, *r*(188)=.11, *p*=.14, or intention-oriented aspects of compassion, *r*(192)=.04, *p*=.61. Additionally, aggregated ESM assessments revealed that females felt slightly more overwhelmed in the moments of daily life, *r*(192)=.28, *p*<.001. Multilevel modeling further revealed an association between feeling overwhelmed and being female, when participant and ESM session number were used as random factors, *B*(SE)=.798(.197), *t*=4.047, *p*<.001, *R2*=.233. While higher levels of overall ESM compassion were also observed in females, this difference did not reach statistical significance, *B*(SE)=.233(.139), *t*=1.683, *p*>.05. Gender was not associated with any other variable.

**ESM and standard assessments**

Our first aim was to compare ESM and standard assessments (see Tables 3-4). ESM scores were significantly lower than their respective standard survey scores for compassion, *F*(1,195)=61.79, *p*<.001, *d*=.35, and eudaimonia, *F*(1,195)=175.44, *p*<.001, *d*=1.37 (see Table 3). This held true when standard scores of compassion and eudaimonia were calculated with only those items used for ESM, *F*(1,195)=91.24, *p*<.001, *d*=.46 and *F*(1,195)=171.88, *p*<.001, *d*=1.15, respectively.

Standard eudaimonia was more closely associated with standard compassion (*r*=.36) than with standard empathy (*r*=.20; see Table 4). However, the strongest association was found between ESM compassion and eudaimonia (*r*=.52). This association was significantly stronger than the association between standard measures assessing the same constructs, *z*=1.97, *p*<.05.

**ESM compassion consistency across everyday situations**

Our second aim was to examine ESM compassion consistency across the situations of daily life. A split-half test revealed considerable consistency in ESM compassion scores, *r*(199)=.83, p<.001. To put this in perspective, split-half scores for other reliable personality trait measures (such as emotional intelligence) typically range from .79-.93 (e.g., Capraro, 2002; Mayet et al., 2003).

We used multilevel modeling to examine within-person associations between ESM compassion and situational variables. Participant was used as a random effect in order to examine within-person associations. ESM session number was also used as a random effect to account for any reactivity which might have occurred from repeated sampling. As Table 5 shows, the only situational variable associated with an individual’s ESM compassion was whether they were home—individuals reported greater levels of compassion when they were at home. There was no association between ESM assessments of feeling generally overwhelmed and ESM compassion, *B*(SE)=-.013(.013), *t*=-.970, *p*>.05. There was, however, an interaction between ESM eudaimonia and feeling generally overwhelmed in predicting ESM compassion, *B*(SE)=.018(.009), *t*=2.125, *p*<.05, *R2*=.391. Among those reporting lower ESM eudaimonia, feeling overwhelmed predicted lower ESM compassion.

As a point of comparison, multiple within-person associations were found between situational variables and ESM eudaimonia. ESM eudaimonia—while being positively associated with being outside—was negatively associated with being alone (see Table 5), and feeling generally overwhelmed, *B*(SE)=-.066(.015), *t*=-4.323, *p*<.001, *R2*=.235.

Another point of interest was whether participants felt more compassion when they had actually been with someone going through a tough time as opposed to merely thinking about someone they knew who was going through a tough time. In 30.77% (484/1,573) of the ESM sessions, participants reported having been with someone going through a tough time. However, whether the person had actually been with someone going through a tough time was not associated with their reported level of compassion, *B*(SE)=.014(.048), *t*=.285, *p*>.05. Further, excluding ESM sessions when participants had not actually been with individuals going through a tough time did not have a substantial effect on within-person associations between compassion and eudaimonia, *B*(SE)=.244(.037), *t*=6.638, *p*<.001, *R2*=.269. By contrast, actually having been with someone going through a tough time was positively associated with reported level of eudaimonia, *B*(SE)=.252(.058), *t*=4.374, *p*<.001, *R2*=.201.

**ESM compassion predicts ESM eudaimonia**

To address the third aim of our study, we used multilevel modeling to examine whether ESM compassion predicted ESM eudaimonia. Again using participant and ESM session number as random factors, we found a positive within-person association between the two, *B*(SE)=.261(.027), *t*=9.559, *p*<.001. As an individual’s compassion increased 1 unit (on a 7-point scale), eudaimonia increased .257 units (on a 7-point scale). Additionally, a person’s ESM compassion score at time *t* predicted their ESM eudaimonia score at the *next* time point (time *t*+1), even when ESM eudaimonia at time *t* was used as a covariate, *B*(SE)=.182(.030), *t*=6.039, *p*<.001. These models predicted 23.9% (*R2*=.239) and 21.4% (*R2*=.214) of the variance in eudaimonia, respectively.

Because one item in our ESM eudaimonia measure asked about prosocial behavior (see Table 1)—and thus, may have directly converged with compassion—we examined whether ESM compassion would be associated with our ESM eudaimonia measure if this item were excluded. Using only the two remaining eudaimonia items had virtually no impact on our models. There was still a within-person association between ESM eudaimonia and compassion, *B*(SE)=.247(.028), *p*<.001, and ESM compassion still predicted eudaimonia at the next ESM time point, *B*(SE)=.180(.030), *p*<.001.

**ESM compassion, standard compassion, and prosocial behavior**

Finally, we examined whether ESM compassion and/or standard compassion, along with eudaimonia, predicted helping behavior specifically toward those in need, or indiscriminately. Theoretically, together, compassion and eudaimonia—well-being analyzed in terms of a sense of life purpose and contribution to the lives of others—should be associated with helping behavior toward those in need.

First, we examined helping behavior towards *those not expressly in need* by using multilevel logistic regression to predict decisions that benefit others in the Dual Gamble Task. We set up our model to predict trial-by-trial take/pass decisions using the quality of the gambles both for the participant and for their anonymous partner, the participant’s ESM compassion and eudaimonia, and interactions among these variables, as fixed factors. Participant was used as a random factor in order to examine within-person associations. Setting up the model in this way enabled us to examine whether ESM compassion, eudaimonia, or interactions between them as associated with whether a participant took gambles that helped their partner. We found that neither ESM compassion nor eudaimonia predicted a tendency to help one’s partner. Specifically, the quality of a gamble for one’s partner did not predict taking a pair of gambles either as a main effect, *B*(SE)=.010(.007), *z*=1.29, *p*=0.20, or as an interaction with the quality of the gamble for oneself, *B*(SE)=-.002(.002), *z*=-1.03, *p*=0.31, compassion, *B*(SE)=.000(.008), *z*=-0.01, *p*=0.99, or eudaimonia, *B*(SE)=-.007(.009), *z*=0.74, *p*=0.46.

In order to determine if ESM compassion predicted helping behavior toward *those in need*, we examined participants’ donation behavior.  We did this by examining whether ESM compassion and eudaimonia predicted donating.  Amount won and household income were used as random factors because we thought these variables might influence the perceived cost of the donation.  We found that 34% (*n*=68) of our participants donated their winnings from the task.  Donating was predicted by ESM compassion, *B*(SE)=.664(.181), *z*=3.677, *p*<.001, and eudaimonia, *B*(SE)=.784(.222), *z*=3.530, *p*<.001.  Additionally, there was a negative interaction, indicating that eudaimonia contributed less to predicting donation at high levels of ESM compassion, *B*(SE)-0.142 (.038), *z*=-3.725, *p*<.001.

As a point of comparison, we used logistic regression to examine whether standard assessments gathered at baseline would predict donating. We found that standard compassion did not significantly predict donating, *B*(SE)=.038(.173), *z*=.220, *p*=.826. Donating behavior was also not predicted by standard eudaimonia, *B*(SE)=.088(.238), *z*=.368, *p*=.713, or by the interaction of standard compassion and eudaimonia, *B*(SE)=-.244(.262), *z*=-.932, *p*=.351.

**Discussion**

To our knowledge, this is the first experience sampling study to examine associations between compassion, eudaimonia, and prosocial behavior. We found that self-reported levels of compassion and eudaimonia were significantly lower when gathered using experience sampling method, relative to standard survey assessments. This may, at least in part, be due to a decrease in biases—including social desirability bias—as a result of reporting one’s states, naturalistically, and in close temporal proximity to their occurrence (Schwarz, 2007). Further, while an association was observed between compassion and eudaimonia using standard survey assessments, a stronger association was observed between compassion and eudaimonia using experience sampling. These associations are consistent with previous findings (cf. Seppala et al, 2013).

To add to the above, we observed within-person associations between ESM compassion and eudaimonia. Additionally, ESM compassion predicted eudaimonia at the next ESM time point, even when accounting for a person’slevel of eudaimonia at the earlier time. Though not impervious to situational factors, we also found a high level of consistency in reported compassion across the situations encountered by our participants; and ESM compassion was not influenced by the situational factors we measured to the same extent as eudaimonia. Further, ESM compassion, along with ESM eudaimonia, predicted donating behavior two months later. By comparison, standard compassion failed to do so. Thus, taken together, our findings indicate that self-reported compassion, as measured using ESM, predicted future ESM eudaimonia, and was a better predictor of future prosocial behavior than standard assessments.

It is interesting to note that—consistent with previous studies (e.g., Nisbet, Zelenski, Murphy, 2011)—within-person associations were observed between ESM eudaimonia and being outside, as well as between ESM eudaimonia and being with others. Also, while a negative within-person association was observed between feeling generally overwhelmed and ESM eudaimonia, no within-person association was found with ESM compassion. There was, however, an interaction between feeling overwhelmed and ESM eudaimonia in predicting ESM compassion. Those who felt generally overwhelmed and reported lower levels of eudaimonia tended to have lower levels of compassion. Given associations between ESM compassion and eudaimonia, and between ESM eudaimonia and feeling generally overwhelmed, this suggests that eudaimonia moderates within-person associations between being overwhelmed and being compassionate. In this case, interactions between feeling generally overwhelmed and eudaimonia may play a role in explaining the negative influence that feeling overwhelmed can have on helping (e.g., Cameron & Payne 2011; Eisenberg & Miller 1987; Gleichgerrcht & Decety 2013).

Besides ESM eudaimonia, the only factor observed to be directly associated with ESM compassion was being at home. At this point, we can only speculate as to what accounts for this relatively weak association. Perhaps many of our participants felt more comfortable and at ease while at home, which might be conducive to greater compassion. This would be consistent with the observation that compassion is negatively associated with distress and positively associated with emotional regulation (e.g., Decety & Meyer, 2008; Gleichgerrcht & Decety, 2013; Weng et al., 2013). Alternatively, it is also possible that being around close familial relationships at home might have a tendency to engender more compassion. This presents an interesting question for future study.

As noted at the outset, compassion is operationalized as a sympathetic other-oriented emotional response to thoseperceived to be in need, which promotes helping behavior (e.g., Cameron & Payne 2011; Goetz et al., 2010). Consistent with this, previous studies have shown that this emotional response increases the probability of helping behavior and altruism (e.g., FeldmanHall et al., 2015; Winczewski et al., 2016). Here, we found that—while not predicting helping behavior toward other participants in the Dual Gamble Task (i.e., other undergraduates who are *not* expressly in need)—ESM compassion along with ESM eudaimonia did predict donating to a homeless shelter; and thereby helping others who were clearly in need. We also found a negative interaction between the two indicating that at higher levels of compassion, *the combination* of compassion and eudaimonia contributed less to predicting donation. Thus, at higher levels of compassion, eudaimonia had less predictive value.

The present study has a number of limitations. First, experience sampling was only conducted across four days, and our participants were mostly white undergraduate students at a Midwestern liberal arts institution. It thus remains to be seen the extent to which the present findings are generalizable. Future studies that sample over a longer period of time, and across a more diverse demographic, may further clarify our understanding of compassion and its associations in everyday life. That being said, the primary aim here was to examine whether—consistent with virtue theory—some individuals might have a tendency toward compassion across everyday situations, and whether compassion was associated with eudaimonia and prosocial behavior. While the generalizability of our findings remains to be seen, the sampling method used was sufficient to detect tendencies toward compassion, and associations with eudaimonia as well as with prosocial behavior toward those in need.

Second, as this is the first ESM study examining compassion, its scope is limited. When repeatedly sampling participants, obtaining a reasonable response rate requires limiting participant demand during each sampling session, and thus limiting the number of questions asked (cf. Mehl & Conner, 2012). Within these constraints, as a first exploration, we chose to examine ESM compassion (i) across our participants’ general situational contexts; (ii) in relation to whether they had recently been with someone going through a tough time; and (iii) in relation to their general feelings of being overwhelmed. What is still unknown—and questions our findings open up—is whether ESM compassion might be associated with (i) more specific situational factors (e.g., having recently helped others in need); (ii) characteristics of one thought to be going through a tough time (e.g., child, adult, family member, friend, stranger); and/or (iii) being, more specifically, overwhelmed by another’s needs (as one reviewer suggested). These present interesting questions for further exploration. It would also be interesting to examine ESM compassion, and compassion consistency, across differing levels of need.

Third, our compassion and eudaimonia assessments relied on self-report, and were thus, to some degree, likely influenced by social desirability bias and other biases. There is, however, reason to believe that the experience sampling assessments were less influenced by bias than the standard survey assessments. Levels of compassion and eudaimonia reported via experience sampling were significantly lower than those reported via standard survey. Of course, this might simply be because highly salient compassion evoking-events had a greater influence on standard assessments due to these events occurring infrequently during our four-day ESM sampling period. Perhaps a longer sampling period would have captured more of these events. While this remains to be tested, we would anticipate ESM scores to still be less affected by these relatively infrequent events and, as a result, provide a better representation of compassion relative to standard assessments (e.g., Shiffman, Stone & Hufford 2008). While we cannot resolve the question as to whether salient events disproportionately bias standard assessments relative to ESM assessments here, we did find that ESM-measured compassion and eudaimonia predicted donating behavior two months later whereas standard assessments did not. In this context, ESM assessments provided a level of accuracy that standard assessments did not, which is consistent with arguments for the value of real-time assessment over one-time, retrospective survey methods (e.g., Schwarz 2007).

Fourth, our finding that ESM compassion and eudaimonia predicted donating behavior, but not helping behavior in the Dual Gamble Task, calls for more thorough examination. This observation is consistent with the operationalization of compassion as motivating help specifically toward those in need since donating provided an opportunity to help others in need, while the Dual Gamble Task provided the opportunity to help others not expressly in need. However, there are several other features that differentiate these two tasks. Unlike donating, the Dual Gamble Task might be perceived as a game, or challenge, to be won. Additionally, participants had to devote more time and effort to the Dual Gamble Task than the simple act of donating. Further, participants engaged in the former task the week after experience sampling, whereas donating occurred months later. We cannot rule out the possibility of latent reactivity. Future studies might utilize tasks that are similar in every respect except for the degree to which benefactors of a participant’s helping behavior are in need. For example, before engaging in the Dual Gamble Task, participants might be given background stories on their partners, who might be described as having various degrees of need, or not being in need.

Fifth, the observation that ESM compassion predicts future eudaimonia is suggestive of a causal relationship. However, whether compassion causally contributes to eudaimonia cannot be confirmed from our experience sampling study. Future studies might, thus, take an experimental approach to examining causal interactions between compassion and eudaimonia.

Despite having limitations, this study has yielded several novel and interesting findings. The most significant may be the observation that ESM compassion predicted future ESM eudaimonia and, along with ESM eudaimonia, predicted helping behavior months later. These observations have implications concerning the interaction between the “power” of everyday situations and tendencies toward being compassionate. Consistent with virtue theory, our findings suggest some individuals may express this tendency throughout everyday situations. More broadly, our findings also indicate that ESM offers a promising way to study tendencies that may promote eudaimonia and prosocial behavior in everyday life.

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