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Naturalistic Studies of Positive Emotions, Relationships and Mental Health

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Naturalistic Studies of

Positive Emotions, Relationships and Mental Health

A dissertation submitted in partial satisfaction

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Doctor of Philosophy in Psychology

by

Galen Daley Blake McNeil

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ABSTRACT OF THE DISSERTATION

Naturalistic Studies of

Positive Emotions, Relationships and Mental Health

by

Galen Daley Blake McNeil

Doctor of Philosophy in Psychology

University of California, Los Angeles, 2021

Professor Rena L. Repetti, Chair

Positive emotions broaden our thinking and help us build resources (Fredrickson, 1998, 2001), and different specific positive emotions appear to have unique adaptive functions (e.g. Stellar et al., 2017). Yet, clinical science has typically focused on the reduction of negative emotions in treatment (Carl et al., 2013). Expanding the study of positive emotions, especially specific ones like compassion and gratitude, in relationship and clinical science can reveal new processes that support healthy relationships and improve individual well-being (Repetti & McNeil, 2018).

This dissertation asked how positive emotions are linked to relationship functioning and mental health, by investigating daily expressions of compassion and gratitude, and increases in positive emotions, in the contexts of marriage and psychotherapy. The question is addressed in three studies which encompass two samples of married couples and one clinical sample, cross-sectional and longitudinal designs, and observational and participant-report methodologies.

Using intensive repeated measures collected over 5 weekdays, Study 1 found evidence of daily synchronization of spouses' expressions of gratitude, and compassion synchrony was moderated by marital quality. Compassion may require more effort to express than gratitude and therefore its reciprocation is only characteristic of higher quality marriages. In Study 2, naturalistic observations of couples from the Center on Everyday Lives of Families (CELF) were coded for expressions of everyday compassion. Couples offered compassion frequently, on average twice per hour. Husbands who perceived their marriages as lower quality offered more compassion; wives offered more compassion when their perceived marital quality was high but their spouses' was low. Higher rates of compassion were also expressed by both husbands and wives in couples where wives reported more depressive symptoms and husbands reported more neuroticism. Personal distress appeared to be associated with more frequent expressions of marital compassion. Study 3 examined the trajectories of positive and negative emotions as well as treatment outcomes over the course of psychotherapy in a psychology training clinic. Both increases in positive emotions and decreases in negative emotions independently predicted concurrent declines in symptom distress and improvement in relationship functioning, suggesting both are indicators of therapeutic change. However, changes in positive emotions were also predictive of future improvements in symptoms and relationship functioning, suggesting they may be precursors to therapeutic change.

The dissertation of Galen Daley Blake McNeil is approved.

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DEDICATION

First and foremost, this dissertation is dedicated to my advisor, Dr. Rena Repetti, for her endless patience, high standards, keen observations, and shocking ability to tell me exactly what I needed to hear – praise, encouragement, belief in the work or a frank "get to work." I hope that as a mentor I can carry on her legacy of scientific curiosity, compassionate support, and a lot of printed out drafts. I am grateful to Drs. Ted Robles, Tom Bradbury and Jen Silvers for their support and guidance across many years of lab meetings, research and class work. Deep in the trenches with me, my cohort deserves a huge thank you for all the positive emotions they evoked and emotion validation they provided. Many thanks to my family – the Daley-McNeil-McCraw-Waters-Pierson clan – for their love and especially to Mom who picked up the phone every time whether it was to tears, complaints or celebrations of small successes. And finally, thank you to my husband, Connor Pierson, for riding the highs and lows of writing a dissertation with me and finding the joy in every day.

TABLE OF CONTENTS

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McNeil, G. D. & Repetti, R. L. (in revision). Increases in positive emotions as precursors to therapeutic change. *Clinical Psychology & Psychotherapy.*

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Study 1: Daily Synchrony of Gratitude and Compassion Behaviors in Married Couples

In our daily lives, emotions rarely occur in a vacuum. Instead they are continually sparked and shaped by our social interactions, especially with those whom we share our most intimate connections (Butler, 2015; Larson & Almeida, 1999; Schoebi & Randall, 2015; Sels, Ceulemans, & Kuppens, 2018). Gratitude may emerge from a spouse making the bed; compassion may occur after hearing your partner's work presentation went poorly. One partner's expression of positive emotion may encourage a reciprocal expression from the other.

How emotions unfold between people over time is often referred to as interpersonal emotion dynamics (Randall & Schoebi, 2018). A growing body of research on interpersonal emotion dynamics over the last three decades has shed light on how emotion is coordinated over time in couples (e.g. Butner, Diamond, & Hicks, 2007; Larson & Almeida, 1999; Saxbe & Repetti, 2010; Song, Foo, & Uy, 2008; for a review, see Butler, 2015). However, the focus has been on internal phenomena such as affect (e.g. Butner et al., 2007; Saxbe & Repetti, 2010; Schoebi, 2008), physiology (e.g. Helm, Sbarra, & Ferrer, 2014; Sbarra & Hazan, 2008) and biochemistry (e.g. Liu, Rovine, Cousino Klein, & Almeida, 2013; Schoebi, Way, Karney, & Bradbury, 2012). We do not yet know whether couples experience daily synchrony of emotional behaviors such as stating one's appreciation for a spouse or trying to cheer a spouse up.

At the same time as interpersonal emotion dynamics research has thrived, researchers who focus on emotion in the individual have begun differentiating among specific positive emotions, such as gratitude and compassion (Shiota et al., 2017). These studies have revealed the unique adaptive functions of each of these emotions. To date though, little work has integrated advances in the two fields to examine the interpersonal emotion dynamics of specific positive emotions, such as how gratitude and compassion behaviors occur over time and if they

synchronize daily in romantic relationships. Furthermore, studies of specific positive emotions are rarely conducted within the context of marriage. Coupling these two literatures will grow our basic science understanding of how emotions function as well as our understanding of emotional dynamics that are characteristics of thriving relationships (Repetti & McNeil, 2018).

Diary Studies of Interpersonal Emotion Dynamics

Studies of couples' emotion coordination over time highlight how our internal affective state – often labeled affect or mood – is intertwined with those closest to us (Butler, 2015). We are beginning to understand synchrony in couples' internal experiences of positive and negative affect. Several investigations have found that couples experience synchrony of negative affect, that is when one spouse reports negative mood the other is more likely to report negative mood as well. Findings about positive affect synchrony are less consistent. For example, a diary study, in which married couples described their positive and negative mood four times a day on three weekdays, found that husbands' and wives' negative moods were synchronized though couples' positive moods were not (Saxbe & Repetti, 2010). In a 90-day study of young couples' daily mood, positive affect was more stable over time than negative affect, suggesting that perhaps positive affect is less sensitive to partner fluctuations than negative affect (Steele & Ferrer, 2011). On the other hand, a 21-day daily study of married or cohabitating couples found that couples experienced synchrony of both negative and positive affect (Butner, Diamond, & Hicks, 2007). The inconsistency of findings for positive affect may be explained by its multidimensional nature, with moods such as calm and contentment rooted in individual experience but interpersonal emotions such as gratitude and compassion evoked from social experiences. Differentiating among positive emotions may clarify when couple synchrony occurs.

In addition to studying specific positive emotions, it is critical to highlight the importance studying couples' everyday behavior as it plays out repeatedly in their home environment. Much of the marital communication literature derives from laboratory studies (Baucom & Elderidge, 2013). Laboratory studies of couples in the 1970s and 1980s focused on negative behavior and its reciprocity in conflict discussions (e.g. Gottman, Markman, & Notarius, 1977; Gottman, 1980). For example, one study analyzed the time sequencing of negative behaviors of couples participating in conflict resolution role plays in the laboratory (Billings, 1979). This study revealed that distressed couples as compared to nondistressed couples engaged in greater reciprocation of negative emotional behaviors. However, this type of laboratory study sets up a structured situation – the conflict resolution – and focuses the couples' attention on it. Diary studies allow for a more naturalistic view into couples' behavior, assess the behaviors that spontaneously occur and expand the time course over which behavior can be studied (Repetti, Reynolds & Sears, 2015). These studies can tap into the repeated behaviors that make up the fabric of day-to-day life capturing them as they occur each day, rather than focus on memories of one off grand gestures or examine behavior in an unfamiliar setting. Bringing the attention back to behavior with repeated intensive measures and a new focus on specific positive emotions will help us recognize the everyday emotion dynamics that thriving couples engage in.

Expressions of Specific Positive Emotions

It may be that we see daily synchrony with some positive emotion behaviors, but not others. For example, an expression of gratitude may trigger reciprocity and a returned "thank you," making both partners feel positive in the same moment. However, an expression of compassion may occur when one's partner is struggling and the struggling partner may not make the effort to recognize the other partner's need for compassion that same day. Measures of

positive affect, such as the Positive and Negative Affect Schedule (PANAS: Watson, Clark, & Tellegen, 1988), often contain a combination of these emotions and therefore the unique effects of specific emotions might be nullified. Differentiating among emotions and a focus on emotional behavior may help to clarify the conditions under which positive emotion synchrony is observed in couples.

Positive emotions are considered adaptive in that they broaden attention and help build social and emotional resources (Fredrickson, 2001). Distinguishing among positive emotions reveals unique cognitions, attentional biases and judgments associated with each emotion (Shiota et al., 2017). Though there are many positive emotions to select from, gratitude and compassion are two critical emotions to begin with as they are often labeled as prosocial emotions (Mikulincer & Shaver, 2010) meaning that they drive altruistic behavior toward another person. More recently further categorized as self-transcendent emotions, these two emotions share other-focused appraisals and the ability to bond people together (Stellar et al., 2017). Given the interpersonal nature of these specific emotions, it makes intuitive sense to study them in the context of couples. The similarities of these two emotions, in their prosocial action tendencies and low self-interest (Haidt, 2003), make them a good pair of emotions to compare in terms of their temporal dynamics and whether these dynamics are moderated by relationship quality. Differences in synchrony would emphasize the importance of parsing among even similar positive emotions.

Gratitude. Commonly defined as the emotion that arises when one receives a benefit from another (Lambert & Fincham, 2011), gratitude helps us recognize when a person has provided a thoughtful benefit and encourages us to provide future assistance (Algoe, Haidt, & Gable, 2008). Gratitude is a particularly important positive emotion to study in couples as it is

not only pleasant (Fredrickson, 2004), but it also serves as a "booster shot" for relationships (Algoe, Gable, & Maisel, 2010). A partner's perceived responsiveness to an expression of gratitude predicts relationship quality 6 months later (Algoe, Fredrickson, & Gable, 2013). Evidence indicates that a reciprocity of gratitude in relationships exists such that those who feel appreciated by their partners also appreciate their partners more (Gordon, Impett, Kogan, Oveis, & Keltner, 2012). This relationship characteristic also may be observed at the level of a couple's day-to-day interactions, but we are not aware of any tests of daily synchrony of gratitude expressions.

Compassion. Compassion is a feeling of concern about another's distress accompanied by the motivation to help or alleviate that person's burden (Stellar et al., 2017). Compassion is also sensitive to the likelihood of reciprocity from the recipient (Stellar, Feinberg, & Keltner, 2014), suggesting that, like gratitude, it may pull for a later expression of compassion in relationships. Though compassion is typically categorized as a positive emotion because of its prosocial nature (Shiota, Keltner, & John, 2006; Shiota et al., 2017), it is not necessarily pleasant as it is evoked in response to another's suffering (Cassell, 2009).

Key to the current study is the conceptualization of compassion behavior as it can be expressed daily. Rather than a one-off grand gesture in response to great suffering, everyday compassion behaviors can be brief, subtle demonstrations that a partner is attuned to the other's daily stressors or pain and wants to help reduce them. There has been very little research on compassion in daily couple interaction. A recent exception is a 14-day diary study that focused on acts of compassion in newlywed couples and their effect on emotional well-being as measured by affect and daily satisfaction with life. Reis, Maniaci, and Rogge (2017) found that more compassionate acts by the donor – the person who performed the compassionate act –

predicted higher positive affect, lower negative affect and greater daily life satisfaction in the donor. More compassionate acts did not predict the recipient's positive affect, though they did predict lower negative affect and greater daily life satisfaction. Unfortunately, this study did not examine the effects of one partner's compassionate acts on the likelihood of the other engaging in reciprocal compassionate acts.

Synchrony as a Characteristic of Thriving Relationships

Colloquial wisdom suggests that synchrony with a partner (e.g. "being on the same wavelength " or "being in sync") is tantamount to relationship well-being. However, the research literature contradicts this assumption and encourages us to consider the contexts in which synchrony occurs. In laboratory studies of couples' conflict discussions, more distressed couples engaged in greater negative reciprocity than happily married couples (e.g. Levenson & Gottman, 1983). The effect of marital quality on emotion synchrony may depend on the valence of the emotion.

Recent studies of gratitude in romantic couples highlight the reciprocity of gratitude and its association with relationship satisfaction. One found support for a dyadic model of gratitude in close relationships in which one partner's feelings of gratitude led to the performance of relationship maintenance behaviors, which in turn inspired gratitude in the other partner and increased the likelihood of that partner also engaging in relationship maintenance behaviors study (Kubacka, Finkenauer, Rusbult, & Keijsers, 2011). Feelings of gratitude and relationship satisfaction were moderately correlated, and the cyclical pattern observed was unique to gratitude and its reciprocity (Kubacka et al., 2011). A study of long-term marriages found that an individual's daily feelings of gratitude and daily expressed gratitude were associated with self-reported marital satisfaction (Gordon, Arnette, & Smith, 2011). Surprisingly though, whereas

one's own feelings of gratitude were associated with one's partner's marital satisfaction, one's expressed gratitude was not. It remains unknown if couples covary in their daily expressions of gratitude and how relationship quality may be associated with this type of synchrony.

Compassion is likely associated with relationship quality. Spouses who report higher levels of empathic concern have partners who report higher levels of marital satisfaction, and this association is mediated by warm acts (Davis & Oathout, 1987). In a study of newlyweds, acts of "compassionate love" from both the donor and recipient were associated with greater feelings of daily marital satisfaction (Reis, Maniaci, & Rogge, 2014). Though the study of compassion specifically in couples is new, the long history of studies on social support receipt find that the effects are mixed such that at times social support from one spouse is beneficial to the other partner – more often when the providing spouse demonstrates empathic accuracy. At other times the provision of social support may be associated with an increase in anxiety and depression in the recipient (Baucom & Elderidge, 2013). Little is known about whether same-day synchrony of compassion behaviors occurs in couples and if relationship quality plays a role. Perhaps couples with greater marital quality do not experience daily synchrony of compassion as the partner with more distress that day receives all the compassion and the lack of concern offered to the other partner that day is not important. But it is also possible that daily synchrony of compassion is a characteristic of high-quality marriages because in those marriages even when one partner has expressed enough distress to receive compassionate behavior that person is still able to recognize the other's distress and offer compassion in return.

The Current Study

The present investigation contributes to our understanding of interpersonal emotion dynamics by examining the synchrony of daily expressions of two specific positive emotion

behaviors in married couples – expressions of gratitude and compassion. It further explores these emotion processes by testing relationship quality as a moderator of emotional behavior synchrony.

The lack of research on specific positive emotions in couples may be due in part to the lack of scales available to measure emotions like gratitude and compassion. Two commonly used scales to study gratitude and compassion are respectively, the Gratitude Resentment and Appreciation Test (GRAT; Thomas & Watkins, 2003) and the Dispositional Positive Emotions Scale (DPES; Shiota et al., 2006). However, these scales measure dispositional gratitude and compassion not daily expressions of these emotions and not as expressed in couples. Thus, our first task was to devise psychometrically sound self-report and spouse-report measures of behavioral expressions of gratitude and compassion within couples. With daily measures of gratitude and compassion expressions, our study addresses two specific aims.

The first aim is to test whether couples experience daily synchrony of gratitude and compassion expressions. Given the reciprocal nature of gratitude as described by Kubacka et al. (2011), we expected that when one spouse expressed gratitude the other would be more likely to return it with an expression of gratitude that day. Compassion is likewise theorized to be a reciprocal emotion (Stellar, Feinberg, & Keltner, 2014) though, given the circumstances under which compassion is elicited, it is not clear whether those expressions are synchronized in couples' daily lives.

The second aim is to test relationship quality as a moderator of behavioral synchrony. We expected gratitude synchrony to be greater in higher quality marriages. An expression of gratitude from one spouse may serve as a reminder and an opportunity for a reciprocal expression. In higher quality marriages the other spouse may be more likely to capitalize on the

opportunity. In lower quality marriages, the gratitude expression might also be seen as an opportunity, but the partner might be less likely to capitalize on it. We also hypothesized that compassion synchrony would be moderated by marital quality. We expected that in happy marriages more synchrony exists because the compassionate behaviors have been perceived as helpful and worthy of returning. The compassion behavior may effectively alleviate the distress and make that partner more able to recognize, and offer compassion towards, the other partner's daily stressors and pain. In lower quality marriages, compassionate behavior from one spouse may be less appreciated or effective and the partner might be less likely to recognize an opportunity to reciprocate.

Method

The present analysis utilizes diary measures of marital behavior completed by husbands and wives each day over 5 consecutive weekdays, as well as measures of individual relationship quality collected the same year as part of the UCLA Family Development Study (see Story & Repetti, 2006 for details).

Participants

Participants were fifty-three heterosexual married couples (husband age: $M = 44.70$, $SD = 3.71$; wife age: $M = 41.67$, $SD = 4.12$), who were recruited as part of a larger longitudinal study of families. All couples were cohabiting and had at least one child in 5th or 6th grade. Participants had been married an average of 15.53 years ($SD = 4.65$) and were both employed at least part time. They lived in the Los Angeles area and were primarily middle and upper-middle class. 82% identified as European American, 5% as Latino, 3% as Asian/Pacific Islander, 1% as Native American, 9% as other or did not specify. Families were first recruited for the 3-year longitudinal study through flyers distributed in 4th grade classrooms in three Los Angeles area

schools. The Institutional Review Board of the University of California, Los Angeles approved all procedures and all couples provided informed consent.

Sample size is larger than or comparable to other relevant studies of dyadic synchrony (Saxbe & Repetti, 2006: 30 couples; Butner, Diamond, & Hicks, 2007: 48 couples).

Measures

Measures of daily marital behaviors were collected each evening before bedtime. To encourage daily compliance, the research team met with participants immediately prior to their daily report week, provided participants with watches that beeped at the appropriate reporting times, and scheduled daily evening reminder calls with participants each night of the daily report week. The individual measures of relationship quality used in this study were completed the same year as the daily report measures (n = 47 in Year 2; n = 6 in Year 3).

Specific Positive Emotion Behaviors. Each evening, husbands and wives completed 39 items about a range of marital behaviors that their spouse might have enacted. They were then asked 43 items about a similar range of marital behaviors that they might have enacted. Spouses were also asked the amount of time they had spent together that evening. Marital behavior items were only administered if spouses had spent more than 30 minutes together that evening to reduce low base rates of marital behavior based on lack of opportunity rather than lack of expression. Measures of gratitude behaviors and compassion behaviors were developed from these items.

Gratitude. Two items assessed self-reports of gratitude behaviors – "I thanked my partner for doing something" and "I expressed appreciation for something my partner did well" – and two parallel items described their spouse's gratitude behaviors – "My partner thanked me for doing something" and "my partner expressed appreciation for something I did well." The

response scale options were True, False or Not Applicable, with True responses scored as 1 and False and Not Applicable responses as zero. Responses to the two items were averaged together to create one self-reported gratitude behavior score per day (husbands' self-report: M = .43, SD = .43; wives' self-report: M = .52, SD = .46) and one spouse-reported gratitude behavior score per day (husbands' description of spouse: M = .37, SD = .42; wives' description of spouse: M = .40; SD = .44).

Compassion. Several marital behavior items described situations in which one spouse faced some type of problem or emotional difficulty and the partner might have responded with compassion by trying to alleviate that burden. Husbands and wives described their own compassion behaviors each day through seven items – "I listened sympathetically to my partner's problems," "I calmed my partner down when he/she was being unreasonable," "I comforted my partner when he/she was upset," "I acted patient when my partner was cross," "I tried to cheer my partner up," "I was tolerant when my partner made a mistake," and "I talked to my partner about problems she was having at work." Additionally, husbands and wives reported on their spouse's behavior with seven parallel items (e.g. "My spouse listened sympathetically to my problems"). As above, the items were rated True, False or Not Applicable; True responses were scored as 1 and False or Not Applicable responses as 0 and the scores were averaged. Each participant therefore provided a daily measure of their own compassion behavior per day (husbands' self-report: M = .23, SD = .23; wives' self-report: M = .22, SD = .24) and a daily score for their spouse's compassion behavior (husbands' description of spouse: M = .19, SD = .22; wives' description of spouse: M = .25; SD = .26).

Relationship Quality. The Dyadic Adjustment Scale (DAS: Spanier, 1976) was completed by husbands and wives to assess individual perceptions of marital quality based on

dyadic satisfaction, cohesion, consensus and affectional expression. This scale is a 32-item measure that is has been widely used in the study of marital relationships and is well validated (Graham, Liu, & Jeziorski, 2006). Items are presented on a range of scales, and scores are summed with a range of 0 – 151; a higher total indicates greater marital quality. Researchers have used a variety of clinical cutoff scores from 92 to 107 to distinguish between distressed and nondistressed couples (Sabourin, Valois, & Lussier, 2005). Husbands' average score (107.21, *SD* = 18.16) was not significantly different compared to wives' (112.05, *SD* = 18.94; $t(29) = -.77$, $p = .448$, *NS*), and spouses' ratings were correlated ($r(28) = .677$, $p < .001$). In order to simplify analyses and because the ratings were highly correlated, husbands and wives scores were averaged together to form a couple-level DAS score (*M* = 110.03, *SD* = 17.56). The couple-level DAS score was the measure of relationship quality tested as the moderator.

Analytic Strategy

Multilevel modeling in SAS Studio Version 9.4 using the proc mixed procedure was employed to analyze: (1) inter-rater agreement, (2) daily synchrony in married couples' expressions of gratitude and expressions of compassion, and (3) marital quality as a moderator of daily synchrony. For each analysis, we specified a two-intercept model for distinguishable dyads with repeated daily assessments (days nested within dyads; Raudenbush, Brennan, & Barnett, 1995; Bolger & Laurenceau, 2013). Between-couples variability across male and female partners was therefore represented at the upper, couple level, and within-individuals variability for male and female partners was represented at the lower, daily level. To allow for two intercepts, we used the NOINT option to prevent a traditional intercept and created two dummy coded variables to stand in for intercepts, one for wives and one for husbands. All time-varying predictor variables were person mean centered. All synchrony analyses were conducted with self-report

measures of daily behavior, allowing input from both spouses and eliminating respondent bias as a contributor to estimates of daily synchrony. An example equation is below.

Gratitude Synchrony:
Level 1: Day

$$OwnGratitude_{ij} = \pi_{wife0i} + \pi_{husband0i} + \pi_{1i}(Partner's\ Gratitude)_{ij} + e_{ij}$$

Level 2: Couple

$$\pi_{wife0i} = b_{wife00} + u_{wife0i}$$
$$\pi_{husband0i} = b_{husband00} + u_{husband0i}$$
$$\pi_{1i} = b_{10} + u_{1i}$$

The couple DAS score was then added at Level 2 to test relationship quality as a moderator. An example equation is below:

Gratitude Synchrony:
Level 1: Day

$$OwnGratitude_{ij} = \pi_{wife0i} + \pi_{husband0i} + \pi_{1i}(Partner's\ Gratitude)_{ij} + e_{ij}$$

Level 2: Couple

$$\pi_{wife0i} = b_{wife00} + CoupleDAS_{wife01} + u_{wife0i}$$
$$\pi_{husband0i} = b_{husband00} + CoupleDAS_{husband01} + u_{husband0i}$$
$$\pi_{1i} = b_{10} + CoupleDAS_{11} + u_{1i}$$

Results

The psychometric properties of the daily self-report and spouse-report measures of gratitude and compassion were evaluated by tests of internal consistency and inter-rater reliability. Our first aim – synchrony of specific positive emotional behaviors – was examined with two-intercept multilevel models. We tested whether an increase or decrease above one partner's average daily gratitude was associated with a likewise fluctuation above the mean for the other's gratitude expressions, and similarly tested whether couples experience compassion synchrony. Our second aim – to examine marital quality as a moderator of gratitude and compassion synchrony – was tested by including couple marital quality at level 2 of the synchrony models and examining whether couples with higher marital quality experienced more synchrony than couples with lower marital quality.

Daily Gratitude and Compassion Measures

Internal Consistency. For the two-item gratitude scales, internal consistency was assessed with Spearman-Brown formula (Eisinga, Te Grotenhuis, & Pelzer, 2013). The mean Spearman-Brown coefficient across the 5 days was .61 and .80 for husband and wife self-report, and .67 and .77 for husband and wife descriptions of spouse. The internal consistencies of the 7-item compassion scales were assessed with Cronbach's Alpha; the mean value across the 5 days were .63 and .68 for husband and wife self-reported compassion scales, and .65 and .73 for husband and wife descriptions of spouse. Because the items inquired about a range of situations that could provide opportunities for a spouse to express compassion, but that were not necessarily expected to co-occur on the same day (e.g. problems at work, making a mistake), high inter-item reliabilities were not expected.

Inter-Rater Reliability. Because each spouse's behavior was described by self-report and by the partner, we were able to assess spouse agreement (i.e., inter-rater reliability) about daily gratitude and compassion behaviors. Two-intercept multilevel modeling (days nested within dyads) was used to estimate spouse agreement at the day level. For the daily gratitude scale, an individual's self-reported gratitude behavior predicted the spouse's description of their behavior that day; there was evidence for agreement about both husband's gratitude behavior ($b_{HusbGrat}$ = .22, *SE* = .07, *p* = .002) and wives' gratitude behavior ($b_{WifeGrat}$ = 0.15, *SE* = 0.06, *p* = .016). Similarly, for the daily compassion scale, self-reported compassion behavior predicted the spouse's report. We found evidence for significant agreement at the day level about both husbands' behavior ($b_{HusbComp}$ = .20, *SE* = 0.07, *p* = .006) and wives' behavior ($b_{wifeComp}$ = .24, *SE* = .07, *p* < .001).

Gratitude and Compassion Synchrony

Two-intercept multilevel models allowed us to test synchrony of married couples' positive emotion behavior by examining associations between one partner's expressions of positive behavior and one's own expressions of positive behavior at the daily level. For gratitude, the fixed effect coefficient of partner's gratitude was statistically significant (see Table 1, Model 1, Partner Behavior), suggesting that on a given day when one partner expressed more or less gratitude toward the partner than average, the other partner likewise fluctuated above or below their own mean. For compassion, the fixed effect coefficient of partner's compassion was not significant (see Table 1, Model 2, Partner Behavior), suggesting that on average couples did not synchronize expressions of compassion. However, the random effect coefficient of partner's compassion was significant, which indicates between-couple differences in how daily variability in one partner's compassion is associated with daily variability in the other partner's compassion.

Marital Quality as a Moderator of Gratitude and Compassion Synchrony

To address our second aim, the role of marital quality in the synchronization of daily gratitude and compassion was examined by adding marital quality and its interaction with partner's positive behavior as predictors in the synchrony models. For gratitude, the interaction between marital quality and partner's gratitude was not significant (see Table 1, Model 3), suggesting that marital quality does not moderate gratitude synchrony. For compassion, the interaction between marital quality and partner's compassion was significant (see Table 1, Model 4). As shown in Figure 1, higher marital quality was associated with more compassion synchrony, that is the higher a couple's perception of their marriage the more likely it was that when one partner expressed more compassion on a given day, the other likewise expressed more compassion that day.

Discussion

This study examines whether married couples synchronize in their daily expressions of two specific positive emotions – gratitude and compassion – and tests whether this synchrony is moderated by relationship quality. We found support for our hypothesis that on average couples experience daily synchrony of gratitude behaviors, but we did not find that couples on average experienced synchrony of compassion behaviors. In contrast to our hypothesis that couples with higher marital quality would experience more gratitude synchrony than couples with lower marital quality, we found that the gratitude synchrony findings were robust no matter the degree of marital quality. Though we did not find synchrony of compassion for the average couple, the compassion models were consistent with our hypothesis that couples with higher marital quality would experience more compassion behavior synchrony. Couples in higher quality marriages experienced more synchrony of compassion than those in lower quality marriages did.

Given the reciprocal nature of both gratitude (Gordon, Impett, Kogan, Oveis, & Keltner, 2012) and compassion (Stellar, Feinberg, & Keltner, 2014), it is likely that an expression of either one on a given day by one partner serves as a cue to reciprocate with a matching expression for the other partner. Why then would we not see synchrony for both emotions? Gratitude may be easier to express than compassion. Little effort is needed to say a quick "thank you," especially when one is already feeling a pleasant emotion. The barrier to reciprocity for gratitude is low, and therefore, when cued by receiving a sign of appreciation, a partner may easily return the expression of gratitude, even if the quality of their relationship is not particularly high. That barrier may be higher for compassion. In this study, the compassion items all indicated that the partner expressing compassion was responding to the spouse's perceived stressor or pain and attempting to alleviate that burden. It is likely more costly to try to

alleviate another's distress or assist with a problem than to express thanks. The extra effort required to reciprocate compassion – which requires both noticing a partner's distress and offering support – may be why synchrony of compassion associated with higher quality marriages. An expression of compassion from one partner may serve as a cue to offer compassion that same day, but only the partners in high quality marriages make the effort to do so especially when they are facing their own stressors.

It is also possible that only in higher quality marriages is the compassionate behavior effective at alleviating the other partner's distress. Once that partner's distress is alleviated, that person can give attention to the other partner's daily stressors and offer a reciprocal compassionate behavior. In lower quality marriages it is possible that the compassion offered is not effective at alleviating distress and therefore the distressed person remains too self-focused to attune to the other partner's daily stressors or pain.

A strength of our design was that we collected daily measures of gratitude and compassion behavior – reports of one's own behavior and reports of one's spouse's behavior – from both partners. For our synchrony analyses, we utilized self-reports of own behavior from both spouses in order to reduce respondent biases. But, our self-report scales were supported by the inter-rater agreement we found with the spouse-report scales. In devising these measures, we were able to assess the frequency at which gratitude and compassion are expressed in marital couples. These expressions are common and occur daily. On average husbands endorsed either thanking their partner or expressing appreciation each day. Wives similarly endorsed expressing one of the two gratitude items each day. In terms of compassion, on average both husbands and wives reported expressing 1.5 compassion behaviors each day. These findings suggest that expressions of compassion and gratitude are daily occurrences in couples' everyday lives, yet

they have been largely overlooked in the marital literature. Given the quotidian nature of these marital behaviors and the reciprocity they engender, the effects they have on relationships likely compounds and should be further studied.

Differences in the interpersonal dynamics of these two emotions – on average couples experienced synchrony of gratitude but not compassion – argue for a specific emotion approach in the couples' synchrony literature. Though compassion and gratitude share similarities in their prosocial action tendencies and low self-interest (Haidt, 2003), their temporal dynamics differed. Our findings support the theory that the inconsistent findings about positive mood (e.g. Saxbe & Repetti (2010) verses Butner, Diamond, & Hicks (2007)) may be due to the amalgamation of different positive emotions. Differentiating among positive emotions and positive emotion behaviors will help researchers continue to uncover the unique role each emotion may play in supporting or hindering relationships. Our findings that compassion synchrony is characteristic of thriving relationships may also provide insights about possible interventions. Though greater empirical support is needed, it is possible that a target of intervention for distressed couples could be to more frequently and effectively engage in compassionate behaviors taking care to offer compassion even on days when experiencing one's own distress.

Limitations & Future Directions

One limitation to our study is that the sample is all heterosexual couples who are predominately White/Caucasian and from middle to upper middle socioeconomic backgrounds. The demographics of this sample limit the generalizability of these results. These couples likely experience fewer stressors than couples from lower socioeconomic backgrounds and may have more time to interact with their partners, which may increase the likelihood of emotional

synchronization. Cultural factors may also make this group of participants more or less prone to outward expressions of emotion than participants from other ethnic backgrounds and cultures.

Our study focused on gratitude and compassion behaviors – two key positive emotions that are rooted in relationships. However, there are many other positive emotions worth exploring in interpersonal relationships that we were unable to assess with the existing dataset. Expressions of love, happiness and pride may all have unique patterns of synchrony and specific associations with marital quality. A greater understanding of the interpersonal emotion dynamics of other specific positive emotions would help contextualize gratitude and compassion synchrony.

In addition to studying more positive emotions, more comprehensive scales need to be developed for capturing couples' daily positive emotional behavior. Though the scales developed from the available items in this study give us a strong first entry into the examination of daily gratitude and compassion synchrony, there may be additional aspects of how compassion and gratitude are expressed in couples daily lives that were not able to be captured.

Alongside the study of more positive emotions, further investigation should test emotional behavior as a possible mediator of mood synchrony. Expressions of compassion may explain some negative affect synchrony, especially in happily married couples. In a study of older married couples (average age 70-73), Michalowski, Hoppmann, and Gerstorf (2014) found that spousal support moderated negative affect synchrony such that couples who reported greater spousal support experienced more negative affect synchrony. One possible explanation is that expressions of compassion may allow for the shared burden of sadness or anger. Though negative affect synchrony is often viewed as detrimental, in cases that involve compassion it may

be beneficial. Studying positive emotion behaviors, like compassion, in conjunction with affect may shed light on why synchrony is occurring.

Tables

Table 1. *Two-Intercept Multilevel Models of Daily Marital Gratitude and Compassion Synchrony with Days Nested Within Dyads*

	Model 1: Gratitude Synchrony	Model 2: Compassion Synchrony	Model 3: Gratitude Synchrony with DAS	Model 4: Compassion Synchrony with DAS
Fixed Effects	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Husband Intercept	.43*** (.05)	.23*** (.02)	.14 (.35)	.31** (.13)
Wife Intercept	.52*** (.05)	.22*** (.02)	.21 (.35)	.31** (.13)
Partner Behavior	.14* (.61)	.11 (.07)	.69 (.51)	-1.99**(.48)
Couple DAS	--	--	.00 (.00)	-.00 (.00)
Interaction (Partner Behavior and DAS)	--	--	-.01 (.01)	.02** (.00)
Random Effects	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Husband Intercept	.08*** (.02)	.02*** (.01)	.09** (.03)	.02** (.01)
Wife Intercept	.09*** (.03)	.02*** (.01)	.10** (.04)	.02** (.01)
Intercept Covariance	.05* (.02)	-.00 (.00)	.05* (.03)	-.00 (.01)
Partner Behavior	.02 (.03)	.08* (.05)	0.06 (0.06)	.01 (.04)

Note. DAS denotes Dyadic Adjustment Scale. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

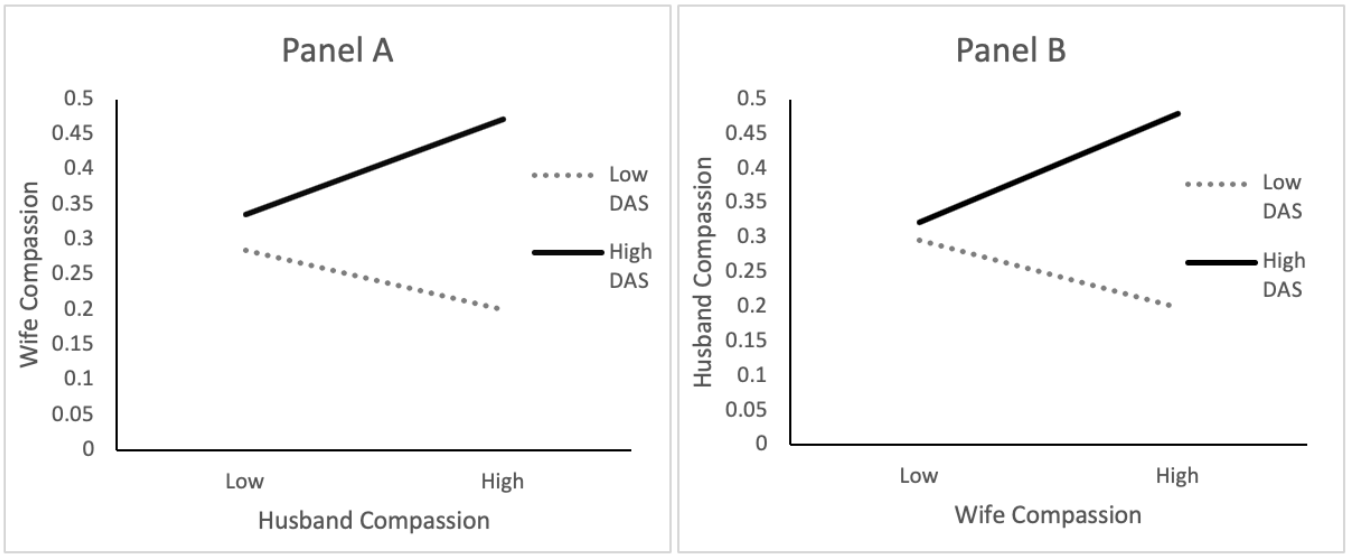

Figure 1. Panel A presents husbands' expressions of compassion predicting wives' expressions of compassion as moderated by couples' marital quality. Panel B presents wives' expressions of compassion predicting husbands' expressions of compassion as moderated by couples' marital quality. DAS = Dyadic Adjustment Scale. High = 1 SD above the mean. Low = 1 SD below the mean.

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Study 2: Marital Quality and Mental Health as Correlates of Couples' Everyday Expressions of Compassion in Naturalistic Video

The word "compassion" in marriage may trigger thoughts of major events such helping a spouse elevate a broken ankle or sharing in the disappointment after a job layoff. Yet, compassion between spouses may also be expressed in daily life – a quick "are you okay?" after hearing pots clang in the kitchen. These subtle, repeated expressions make up the fabric of our daily experience. The invention of wearable technologies (e.g. the Electronically Activated Recorder (EAR), Mehl & Robbins, 2012), the growing ease of pinging research participants on their phones throughout their day (e.g. Killingsworth & Gilbert, 2010), and an increasing comfort with allowing video cameras into the home (e.g. Nelson & Allen, 2018) place researchers at the threshold of a naturalistic revolution. Recordings of couples in their homes and communities can offer insight into interpersonal dynamics, not as they optimally play out in contained scientific spaces, but as they occur subtly, unpredictably, and repeatedly in our hectic home environments (Nelson & Allen, 2018). With a lens on these at-home interactions, there is much we can learn about specific emotional behaviors – such as verbal expressions of compassion – in couples' everyday lives. By pairing these daily observations with self-reports of marital quality, depression and neuroticism we can understand the relationship and mental health contexts in which compassion is expressed.

Naturalistic Methodology

Though the structure of a laboratory study can help isolate a variable of interest, it can also increase the gap between the phenomenon of interest and the one that is produced in the lab (Repetti, Wang, & Sears, 2013; Reis, 2012). Inviting a couple to discuss one member's personal problem in a social support task increases the likelihood that the researcher will capture the supportive behaviors that the couple is capable of enacting (e.g. Pasch & Bradbury, 1998).

However, it may not be the best approximation of how the couple actually offers support in daily life. For example, though a husband may be able to empathize with his wife's work problems when they are alone in a room in the laboratory, the same husband might be too distracted to pay attention to his wife's distress after a long work day or while also attending to children's needs at home. Likewise, his wife may rarely share her distress about her work problems if she is not prompted to do so by an experimenter. Studying unprompted expressions of emotion as they occur in daily life increases the ecological validity of research findings (Nelson & Allen, 2018).

Bringing the cameras out of the laboratory and into the home presents new analytic challenges such as locating when an unprompted emotional expression occurs – if it even occurs (Repetti, Wang, & Sears, 2013), and new methodology is required to tackle the sheer quantity of data collected. Though a focus on verbal expressions sacrifices nonverbal emotional behaviors from the analysis, a word-search approach provides a reliable entryway into the dataset flagging moments of interest. Human coding then allows us to parse among these moments based on context to determine which represent the phenomenon of interest. Despite the analytic challenges, unlike laboratory studies, continuous recordings allow us to investigate the frequency with which relevant situations arise in daily life. The present study capitalizes on transcripts from a naturalistic video archive collected by the Center on the Everyday Lives of Families (CELF) in which families were followed by ethnographic videographers and recorded in their homes and communities on four days. The naturalistic observational methodology employed here allows for a window onto spontaneous expressions of emotion that occur in everyday life.

Compassion is defined as a feeling of concern about another's distress coupled with a desire to alleviate it (Goetz, Keltner, & Simon-Thomas, 2010; Stellar et al., 2017). Compassion is often used synonymously with sympathy and empathic concern (Goetz & Simon-Thomas,

2017). However, the brief verbal expressions that communicate compassion in daily life, words like “I’m sorry” and “what’s wrong?,” may not capture all components of this definition. A compassionate expression is presumed to be an observable indicator that a partner is feeling compassion toward the other. In a laboratory setting, a film can be selected to elicit this exact emotion (e.g. Stellar, Cohen, Oveis, & Keltner, 2015) or a participant can be asked if they are feeling the emotion (e.g. Van Kleef et al., 2008). It is more challenging to locate the phenomena of interest within naturalistic observational data (Repetti, Wang, & Sears, 2013; Mehl & Robbins, 2012). Rather than the defined construct of compassion being probed, these data require a bottom-up approach to identifying instances of compassion and a more inclusive conceptualization. Though not all instances of compassion expressions captured are necessarily heartfelt and meaningful, they are part of the fabric of everyday life and the frequency of even quick perfunctory expressions of compassion to one’s partner may be an indicator of relationship quality.

Compassion in Couples

Social support. Despite the inherently interpersonal nature of the emotion compassion, the study of it has primarily been confined to the individual, and its study in couples is relatively new (Fitness, 2013). However, the study of supportive behaviors in couples has a rich history in the marital and social support fields, and there is a budding literature on compassionate love. Broadly defined as any supportive behavior provided between partners that fulfills the basic needs of another toward well-being or in times of stress (Cutrona, 1996), social support is considered in general both beneficial to the relationship and to each partner’s physical and mental health (Taylor, 2011; Feeney & Collins, 2015). Social support has been divided into many subcategories such as informational support, instrumental support and emotional support

(Cutrona, 1996). Emotional support distinguishes itself from other forms of social support like informational or instrumental support in that it focuses on expressions of caring and concern (Taylor, 2011). Verbal expressions of compassion in daily life may overlap with emotional support as compassion includes expressions of caring and concern. However, expressions of compassion also distinguish themselves from emotional support as they can include the simple check-ins that suggest a feeling of compassion may have occurred and the expression is a probe to see if the situation requires the need for emotional support. The quick "I'm sorry! You okay?" after bumping into one's partner in the kitchen signals that one partner has felt a tinge of compassion in not wanting to hurt the other, but unless the partner is actually hurt the situation might not turn into one that calls for an expression of emotional support. Furthermore, such brief compassion expressions might not be acknowledged or responded to, but it is possible that the exposure to an accumulation of these expressions contribute to one's sense of being cared about in a relationship.

Compassionate love. A newer line of research on positive emotional communication in couples focuses on compassionate love, which is broadly defined as an attitude that is focused on caring, concern, tenderness and helping others, especially those in need (Sprecher & Fehr, 2005). Compassionate love is not synonymous with compassion as it is a form of altruistic love with a longer-lasting orientation rather than a time limited emotion toward someone in need, but it can incorporate compassionate behaviors (Underwood, 2009; Collins, Ford, Guichard, Kane, & Feeney, 2010). For example, in a study of couples, compassionate love toward one's partner was measured with questionnaire items such as "I tend to feel compassion toward my partner" and "I try to understand rather than judge my partner" (Collins et al., 2014; Compassionate Love Scale: Sprecher & Fehr, 2005). Other studies have measured compassionate love in terms of the number

of compassionate love acts directed toward ones' partner on a daily basis (Reis, Maniaci, & Rogge, 2014; 2017), some of which resemble expressions of compassion. For example, Reis et al. (2014) asked newlyweds to report on whether or not ten compassionate love acts occurred that day. These items included wording such as "I went out of my way to "be there" for my partner" and "I really tried to understand my partner's thoughts." Married couples reported enacting each behavior on more than half of the days that were studied: Wives on 45-76 percent, and husbands on 49-80 percent of the diary days. The self-reported enactment of compassionate love behaviors was positively associated with daily relationship satisfaction.

Gender Differences

Research on gender differences in couples' supportive behavior paints a complex picture. There is evidence supporting common stereotypes that women express sympathy more often than men (Brody & Hall, 2008). Some studies suggest that men rely on marriage relationships more heavily for social support than women do because women maintain other close relationships that provide support (Cutrona, 1996). This perspective has given rise to a support gap hypothesis which proposes that wives provide more support than they receive from their husbands (Belle, 1982). However, more recent studies of marital behavior contest aspects of this presumed gap. In a naturalistic study of social support in couples using the same dataset as the present study (Wang & Repetti, 2014), husbands provided more social support than did wives. These differences, though, were driven by provision of instrumental support rather than emotional support. In a couples diary study, men reported enacting more compassionate love behaviors than wives did (Reis et al., 2014). However, for husbands' actions there was a discrepancy between the behaviors that husbands reported enacting and that wives reported perceiving, a discrepancy that did not exist for wives' actions (Reis et al., 2014). The authors suggest that a

discrepancy may exist for descriptions of husbands' behavior, but not for wives' behavior, because of a gender difference in empathic accuracy – the ability to accurately recognize and understand another's thoughts and emotions (Ickes, 1993; Ickes, Gesn, & Graham, 2000). Wives may be more accurate in their empathic judgments and therefore display compassionate love when needed. Men, on the other hand, may display compassionate love more often but at times or in ways that shield the acts from wives' awareness; they go unnoticed. This mixed bag of findings suggests that a close examination of compassion expressions in daily life will provide greater clarity about how husbands and wives may differ in supporting one another emotionally.

Relationship Quality

The association between everyday expressions of compassion and relationship quality has not been explored. Ratings of a higher quality of marriage are associated with reports of more spousal support, and provisions of social support as newlyweds predicts long-term marital quality (Julien & Markman, 1991; Pasch & Bradbury, 1998; Sullivan, Pasch, Johnson, & Bradbury, 2010). In cohabiting couples, one's level of empathic concern is positively associated with one's own relationship satisfaction, but, surprisingly, not with the partner's relationship satisfaction (Levesque, Lafontaine, Caron, Flesch, & Bjornson, 2014). These findings suggest that the association between compassion expressions and relationship quality is likely positive. However, as described above, social support is a broadly defined construct that encompasses a range of behaviors and emotions and so a similar association cannot be assumed. Expressions of compassion, more than other social support behaviors such as instrumental support, may rely more on empathic accuracy. A spouse needs to identify a partner's negative affect or a situation that might elicit distress in them in order consider expressing compassion. Empathic accuracy is associated with higher relationship satisfaction (Verhofstadt, Buysse, Ickes, Davis, & Devoldre,

2008), and therefore those in happier marriages may also be more likely to recognize when an expression of compassion is warranted and be more likely to provide it. Relationship quality may be more strongly associated with expressions of compassion than with social support. Discrepancies in spouses' ratings of their marital quality should also be considered. When one spouse rates their marriage quality as high but the other rates it as low, the happier spouse may offer compassion frequently in an attempt to ease the other's distress and improve the other's perception of the marriage's quality.

Mental Health

Each spouse's mental health, particularly levels of depression and neuroticism, may also factor into the rates at which compassion is expressed in couples.

Depression. The interpersonal theory of depression (Coyne, 1976) and the stress generation hypothesis (Hammen, 1991) suggest that depression is taxing on relationships because of cognitive, affective and social deficits which strain the depressed individual's interpersonal connections. The reverse causal direction may also be at play inasmuch as an unhappy marriage and relationship discord may trigger depressive symptoms (Beach, Sandeen, & O'Leary, 1990). Laboratory studies have found that marital interactions when one partner is depressed are characterized by more expressions of negative emotions and fewer expressions of positive emotions, as compared to interactions in which neither spouse is depressed (for a review see Rehman, Gollan, & Mortimer, 2008). These findings suggest that couples might express compassion less frequently when one spouse experiences relatively high levels of depression.

It is also possible though that depression fosters expressions of compassion from the non-depressed spouse. Depressed individuals are prone to being self-focused (Hinchliffe, Hooper, Roberts, & Vaughan, 1975), they are less emotionally reactive to daily situations (Bylsma,

Morris, & Rottenberg, 2008) and they are less attuned to the emotions of others (Papp, Kouros, & Cummings, 2010). Those experiencing depression are likely less prone to express compassion. At the same time though, people with depression tend to seek reassurance (Joiner, Metalsky, Katz, & Beach, 1999) and experience more negative affect (Hautzinger, Linden, & Hoffman,1982), both of which may encourage what is sometimes called a "partner effect," whereby the partner's symptoms of depression predict more expressions of compassion from the spouse. A study of social support in the CELF recordings (Wang & Repetti, 2014) found that that wives' depressive symptoms were associated with husbands' increased provisions of support, though husbands' depressive symptoms were not associated with wives' provisions of support. These findings align with the hypothesis that depressive symptoms in one spouse may be associated with greater compassion in the other. However, it is important to note that the Wang and Repetti (2014) social support findings were driven by instrumental support rather than emotional support, which was rarely detected with the coding system used in that analysis of the CELF couples' interactions. Instrumental support may be provided out of necessity – a husband offering to complete a task his wife seemed unable to accomplish – rather than from a feeling of compassion.

Neuroticism. A personality trait, neuroticism is the dispositional tendency to experience negative affect, which includes anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability (Widiger, 2009). As with depression, we might expect to see low levels of compassion, a positive emotion, from individuals with high neuroticism given their propensity for negative emotion. Neuroticism can also strain marriages; there is robust research demonstrating the association between neuroticism and marital dissatisfaction (Karney & Bradbury, 1997; for a review see Heller, Watson & Ilies, 2004). These associations suggest that

little compassion may be expressed by couples when high levels of neuroticism are present. Unlike depression, which is often episodic, neuroticism is a stable personality trait in adulthood (Hampson, & Goldberg, 2006). Given neuroticism's permanence, spouses may not increase their compassion in response to neuroticism as they are not responding to a new level of distress. Because neither spouse's mental health exists in isolation from the other spouse's experience, interactions of spouses' depression and neuroticism should also be considered.

The Current Study

This naturalistic observational study using data collected by the Center on the Everyday Lives of Families (CELF) examines verbal expressions of compassion between married partners over the course of four days. Families were video recorded in their homes and communities, and each spouse completed questionnaire measures of relationship quality, depression and neuroticism. All video was transcribed, and then coders studied keywords in the transcript context to determine if a marital compassion expression occurred. The current study had three major aims: The first aim was to understand the dynamics of expressing compassion in couples' everyday lives including who expresses the emotion and how often the expressions occur; the second aim was to examine how the frequency of compassion expressions are associated with relationship quality; and the third aim was to test how spouses' mental health, specifically depression and neuroticism, relates to their rates of compassion.

To address the first aim of this study, I capitalized on CELF's unique naturalistic video archive to assess the daily frequency of husband and wife verbal expressions of compassion toward each other. In a diary study, couples reported engaging in compassionate love acts quite regularly; each act was described on 45- 80% of days over a two-week period (Reis et al., 2014). Because the present study's naturalistic methodology captured brief and subtle verbal

expressions that may not have been memorable enough to be reported in a questionnaire, I expected rates of compassion in the CELF couples to be even higher. Though the findings regarding possible gender differences in expressions of social support and compassionate love are mixed, I expected that wives in this study would express more compassion than husbands would because compassion is more akin to emotional support and findings suggesting men's greater expressions of social support are driven by acts of instrumental support (Wang & Repetti, 2014).

A second aim of this investigation was to examine the mutual influence of husbands' and wives' relationship quality on their expressions of compassion. Because highly satisfied couples are more likely to have high empathic accuracy (Verhofstadt et al., 2008), I expected that higher marital quality would be correlated with compassion from both members of the couple such that those in happier marriages would recognize opportunities for compassion and therefore express compassion more often. I also expected that when there was a discrepancy in a couple's marital quality ratings the spouse with greater marital quality would express compassion at higher rates than the unhappy spouse.

The third aim was to explore the association between mental health – specifically depression and neuroticism – and compassion rates in couples. Given that depression is associated with being more self-oriented, I expected compassion to be expressed less often by the individual experiencing more symptoms of depression. Though depression is taxing on relationships, in this non-clinical sample, I hypothesized a partner effect such that spouses would express more compassion when their partners reported more depressive symptoms because of the depressed partner's negative affect and reassurance seeking. For neuroticism, I expected a similar negative association between neuroticism and own compassion rates. Unlike with

depression, I did not expect to see an association between neuroticism and spouses' compassion rates as neuroticism tends to be more stable rather than fluctuate in response to episodic distress.

Method

Participants

Thirty-two families were recruited through newspaper advertisements and schools to participate in an interdisciplinary, larger "week in the life" study conducted by the UCLA Center on the Everyday Lives of Families (CELF). Each family was headed by a married or co-habiting couple and had two or three children, at least one of whom was between the ages of 7 and 12. Eligibility requirements included living in the greater Los Angeles area, both adults working full-time (at least 30 hours per week) and holding a mortgage on the home in which they were living.

Due to the present study's examination of gender differences in expressions of compassion, this analysis is limited to the 30 families headed by heterosexual couples. Of these 60 adults, husbands' and wives' median age was 41 years old (husbands' range = 32-58 years; wives' range = 28-50 years). These couples had been married a median of 13 years (range = 3 to 18 years) and had a family income in the $51,000 to $196,000 range in 2002-2005 U.S. dollars. Participants' ethnicities included non-Hispanic White (65%), Asian (16%), Hispanic (10%), and African American (9%). The Institutional Review Board of the University of California, Los Angeles approved all procedures and all couples provided informed consent.

Procedure

The larger CELF study took a multi-method approach to capturing families' everyday lives, which included ethnographic video recordings, scan sampling, self-report questionnaires, self-guided home tours, diary methods and saliva sampling (for details see, Ochs, Graesch,

Mittman, Bradbury, & Repetti, 2006; Ochs & Kremer-Sadlik, 2013). This analysis focuses on the transcripts of the video recordings and the questionnaire measures.

Video Recordings and Transcripts. Two videographers were assigned to each family and directed to follow each adult in their home, car and community settings during two weekdays and two weekend days. On weekdays, the cameras caught morning routines and then afternoon to bedtime activities. On weekends, families were filmed from wake-up to bedtime. Over 1,200 hours of film were recorded. Research assistants trained in linguistic anthropology transcribed all video into word searchable transcripts.

Time Onscreen. Across the four days of filming, husbands and wives spent on average four hours together onscreen ($M = 4.29$, $SD = 1.88$). All couples were onscreen together for at least one hour across filming days (range = 1.05 - 8.60).

Compassion Coding. A two-step coding approach was used (for further details see McNeil & Repetti, in press). First, a team of research assistants flagged *possibl*e instances of marital compassion by conducting a keyword search of the transcripts for compassion related terms (e.g. “better,” “poor,” “hurt,” “good,” “help,” “wrong”) as spoken by the husband or wife to the other partner. Second, the research assistants then determined if, based on the conversation surrounding the keyword in the transcript, compassion had indeed been expressed. The expression of compassion needed to convey concern about the partner’s distress and the desire to alleviate it or for it to be alleviated. For example, the word “sorry” might occur in a compassionate moment where a husband is describing a difficult work meeting and a wife says “I’m sorry you had a bad day, I hope tomorrow is better” or it might occur in a conversation between spouses when compassion does not occur, “my intern just keeps saying sorry and it’s getting annoying.” This methodology improves upon the use of a simple word count application,

like the Linguistic Inquiry and Word Count software (LIWC; Pennebaker, Francis, & Booth, 2007), which would include both instances of "sorry." The compassion terms and criteria were developed and applied to one day of filming as part of an earlier study of families' expressions of compassion, gratitude, pride and amusement (McNeil & Repetti, in press). For the present study, the remaining three days of recordings were also coded to allow for analyses based on all four days of filming. Two coders independently located and rated each expression of compassion. After inter-rater reliability was calculated (Percent Agreement = 90%, Cohen's Kappa = .60, $p <$ .001), the coders met to resolve all disagreements. Thus, the data in the analyses presented here consist of expressions of compassion between husbands and wives across all four days of filming that were agreed-upon by two coders.

Rate Variables. Three variables – husband compassion rate, wife compassion rate and couple compassion rate – were then calculated. The numerator was the sum of compassion expressions across the 4 days. The denominator was the couples' time onscreen together across the 4 days.

Self-Report Questionnaires. Before the week of video recording began, couples completed self-report measures of relationship quality, depression symptoms and neuroticism.

Relationship Quality. The members of each couple completed the Marital Adjustment Test (MAT; Locke & Wallace, 1959), a 16-item widely used measure of relationship satisfaction and closeness (Freeston & Plechaty, 1997). Higher scores on this measure indicate better relationship quality, with average scores around 115 and scores below 100 indicating marital distress. Of the 30 couples included in this study, husbands (M = 115.14, SD = 20.23, range = 67-150) and wives (M = 108.09, SD = 24.42, range = 64 – 153.42) did not differ in their average marital adjustment scores ($t(29) = 1.66$, $p = .107$, *NS*). Their MAT scores were significantly

correlated ($r(28) = .47$, $p = .008$). The large standard deviations and wide ranges indicate that the CELF couples showed considerable variability in marital quality. In fact, six husbands and twelve wives reported scores below the cutoff score of 100, suggesting these individuals experienced relationship distress.

Depression Symptoms. Husbands and wives also completed the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), a well-validated 20-item measure of depression commonly used with the general population to assess a range of depressive symptoms experienced over the past week. Participants rated each item on a scale of 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Scores were then summed with a possible range of 0 – 60; the conventional clinical level cutoff is 16. Of the 30 couples included in this study, husbands ($M = 8.30$, $SD = 6.35$, range = 0 – 25) and wives ($M = 8.40$, $SD = 6.91$, range = 0 – 25) did not differ in their depression symptomology scores ($t(29) = -.06$, $p = .951$, *NS*). Their CES-D scores were not significantly correlated ($r(29) = .103$, $p = .590$, *NS*). There was significant variability in depressive symptomology as indicated by the large standard deviations and wide ranges; nine spouses (four husbands and five wives) reported scores above the cutoff score of 16, suggesting those individuals were at clinical levels of distress.

Neuroticism. Both husbands and wives completed the neuroticism subscale (NEO-N) of the NEO Personality Inventory Revised (Costa & McCrae, 1992), a well-validated 12-item measure of negative affect, which includes anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability. Participants rated each item on a 5-point Likert scale from *Strongly Disagree* to *Strongly Agree*. Scores were then summed with a possible range of 0 – 48. Among the 30 couples included in this study, there was a significant difference between husbands and wives, such that wives' scores ($M = 24.27$, $SD = 4.98$, range = 11 – 34)

were higher than husbands' (M = 15.47, SD = 7.81, range = 2 – 34) ($t(29) = -4.607$, $p < .001$). Their NEO-N scores were not significantly correlated ($r(29) = -.305$, $p = .102$, *NS*).

Results

My first aim, to examine daily frequency of husbands' and wives' expressions of compassion, was addressed with means, standard deviations, ranges and dependent sample t-tests. Pearson correlations, Actor-Partner Interdependence Models (APIMs; Cook & Kenny, 2005), and linear regressions addressed my second and third aims to test relationship quality, depressive symptoms and neuroticism as potential correlates of compassion expressions.

Frequency and Gender Differences

Analyses of the transcripts representing all 30 couples revealed that, on average, husbands and wives expressed compassion to one another 2.42 times per hour the couple spent together (SD = 1.96, range = 0 – 9.52). After removal of one outlier (more than 3 SDs above the mean)[1], couples expressed compassion on average 2.18 times per hour (SD = 1.46, range = 0 – 5.78). All analyses were conducted on data from this sample of 29 couples.

Husbands expressed compassion to their wives on average 1.14 times per hour together on screen (SD = .96, range = 0 – 3.56) and wives expressed compassion to their husbands on average 1.04 times an hour (SD = .75, range = 0 – 2.63). A dependent t-test revealed that husbands and wives did not differ in the rates at which they expressed compassion to one another ($t(28) = .616$, $p = .543$, *NS*). Additionally, a Pearson correlation tested the association between husbands' and wives' rates of compassion expression and revealed that husbands whose wives

[1] Individually, both the husband and the wife of the outlying couple each expressed compassion at the highest rates of all couples. The outlying couple's scores on the self-reported measures were all close to the mean values for the other 29 couples. Husband's MAT = 113; Wife's MAT = 101; Husband's CES-D = 27; Wife's CES-D = 23; Husband Neuroticism = 16; and Wife's Neuroticism = 20.

expressed compassion frequently were likely to also express compassion frequently ($r(27) = .445$, $p = .016$).

Relationship Quality

Relationship quality was tested as a potential correlate of compassion expression with Pearson correlations, Actor-Partner Interdependence Models (APIMs; Cook & Kenny, 2005), and linear regressions. Pearson correlations revealed that husbands' marital quality was negatively associated with their rate of compassion expression ($r(27) = -.385$, $p = .039$) but not significantly associated with wives' rate of compassion expression ($r(27) = -.293$, $p = .123$, *NS*). A wife's marital quality was not associated with her own rate of compassion expression ($r(27) = -.086$, $p = .657$, *NS*), nor with her husband's rate of compassion expression ($r(27) = -.099$, $p = .610$, *NS*).

APIMs account for dyadic interdependence; they are able to address the simultaneous influence of a husband's relationship quality on his compassion expressions (actor effect) and his wife's compassion (partner effect) as well as the wife's relationship quality on her compassion expressions (actor effect) and her husband's compassion expressions (partner effect). APIMs were estimated in SAS Proc Mixed. As shown in Figure 1, even when accounting for the shared variance of wives' marital quality and wives' rate of compassion, the actor effect of husbands' marital quality on their own rates of compassion expression continued to be significant and negative, suggesting that husbands with lower marital quality express compassion to their wives more frequently. The partner effect of husbands' marital quality on wives' compassion rates, the actor effect of wives' marital quality on wives' compassion rates, and the partner effect of wives' marital quality on husbands' compassion rates were not significant.

Linear regressions were then used to test the interaction of husbands' and wives' marital quality on husbands' and wives' rates of compassion. All variables were centered prior to running interaction analyses. A linear regression with three predictors variables – husbands' marital quality, wives' marital quality and the interaction between the two – did not predict husbands' compassion (Adjusted R^2 = .059, $F(3, 25) = 1.585$, p = .218, *NS*), and the beta associated with the interaction term was not statistically significant (β = -.266, p = .793, *NS*). However, a linear regression with the same three marital quality variables did predict wives' compassion rates (Adjusted R^2 = .249, $F(3, 25) = 4.087$, p = .017); the interaction of husbands' and wives' marital quality scores was a significant predictor (β = -2.988, p = .006). As shown in Figure 2, tests of simple slopes showed that when wives' marital quality was high and their husbands' marital quality was low they expressed significantly more compassion than when both their own and their husbands' marital quality was high. When wives' marital quality was low, husbands' marital quality did not change the rate at which wives expressed compassion.

Mental Health

Depression. Depression was also tested as a potential correlate of compassion expression rate using Pearson Correlations and APIM. Pearson Correlations revealed that neither husbands' nor wives' depression was associated with their own rates of compassion expression (husbands: $r(27) = .322$, p = .088, *NS*; wives: $r(27) = .274$, p = .151, *NS*). Husbands' depression was also not associated with wives' compassion rates ($r(27) = .056$, p = .773, *NS*). However, wives' depression was positively associated with husbands' rates of expressing compassion, suggesting that husbands whose wives are experiencing more symptoms of depression express compassion at higher rates ($r(27) = .432$, p = .019).

These associations were further tested in an APIM, which allows for the simultaneous influence of a husband's depression on his compassion expressions (actor effect) and his wife's compassion (partner effect) as well as the wife's depression on her compassion expressions (actor effect) and her husband's compassion expressions (partner effect). As shown in Figure 3, this analysis revealed that, even when accounting for the shared variance of husbands' depression and wives' compassion rates, the positive partner effect of wives' depression on husbands' compassion rates continued to be significant. The actor effects of husbands' and wives' depression on their own compassion rates and the partner effect of husbands' depression on wives' compassion were not significant.

Neuroticism. Neuroticism was tested as another potential correlate of compassion expression using Pearson correlations and APIMS. Husbands' neuroticism was positively correlated with their own compassion rates ($r(27) = .524$, $p = .004$), but husbands' neuroticism was not associated with their wives' compassion rates ($r(27) = .040$, $p = .835$, *NS*). Wives' neuroticism was not correlated with their own compassion rates ($r(27) = .041$, $p = .832$, *NS*), nor with their husbands' compassion rates ($r(27) = -.288$, $p = .130$, *NS*). As shown in Figure 4, an APIM revealed that the positive actor effect of husbands' neuroticism on their own compassion rates remains significant even when taking into account the simultaneous influence of husbands' neuroticism on wives' compassion (partner effect) as well as wives' neuroticism on their own compassion expressions (actor effect) and on husbands' compassion expressions (partner effect).

Exploring Interactions of Depression and Neuroticism

Linear regression analyses explored how the interaction between each member of the couple's mental health was associated with their everyday expressions of compassion. The first pair of linear regression models tested husbands' and wives' depression scores; the interaction

term was not a significant predictor of either partner's rate of compassion. In a second pair of models, the interaction between husbands' and wives' neuroticism scores was also not a significant predictor of compassion. A final set of analyses examined interactions between one partner's depression and the other partner's neuroticism. The models testing wives' neuroticism and husbands' depression were not significant. However, there were significant interactions in both linear regression models that included husbands' neuroticism, wives' depression, and the interaction between the two. Figure 5 depicts the interaction with husbands' compassion rate as the outcome ($\beta = .535$, $p < .001$; Adjusted $R^2 = .587$, $F(3, 25) = 14.273$, $p < .001$), and Figure 6 depicts the interaction with wives' compassion rate as the outcome ($\beta = .009$, $p = .004$; Adjusted $R^2 = .264$, $F(3, 25) = 4.341$, $p = .014$). For both husbands and wives, the highest rates of compassion occurred among couples in which wives reported more symptoms of depression and husbands reported more neuroticism.

Discussion

This multi-method study capitalizes on the transcripts from naturalistic, continuous video recording of couples as they interact in their homes and communities as well as self-reports from both spouses of relationship quality, depression and neuroticism. With extensive coding that incorporates human judgment, it assesses the frequency at which couples express everyday compassion in daily life. I found that compassion was not reserved for rare occasions of deep distress but offered frequently. As predicted, husbands, whose wives reported experiencing more depressive symptoms, expressed compassion more frequently. However, surprisingly, for both husbands and wives, frequency of verbal compassion expression toward a spouse was largely associated with their own personal distress instead of their spouse's distress. Husbands' compassion rates were higher when their marital quality was low, when their wives reported

more depressive symptoms, and when they reported higher neuroticism. Wives expressed compassion more frequently when they saw their marriages as high in quality but their husbands perceived low marital quality. The highest compassion rates for both husbands and wives were observed among couples in which husbands had high neuroticism scores and wives reported more depressive symptoms.

Everyday Compassion Expressions in Naturalistic Data

On average, couples expressed compassion verbally approximately twice an hour. Husbands and wives expressed compassion at similar rates, each offering compassion to the other approximately once an hour. The frequency of this phenomenon suggests that it should be studied as a daily behavior and not only as a rare behavior that occurs in response to one-off adverse events. The methodology used here, both the continuous recordings in homes and communities and the keyword approach, allowed me to observe the frequency of spontaneous verbal emotional expression. This type of question cannot be answered by laboratory studies or even naturalistic studies based on events like dinner time, bedtime or parent-child reunions (e.g. Boyum & Parke, 1995; Teti, 2017; Repetti & Wood, 1997). When asking a question that is not situation specific, a creative approach is needed to cull the data and locate the moments of interest. The keyword approach was the tool that allowed me to scan hundreds of hours of recordings to identify when a compassion expression may have occurred. Layering on a coding team to the approach rather than relying on just the word count improved the validity of the final set of compassion moments. For example, across three days of recordings the word count approach alone yielded 3,693 instances of possible compassion. The coding team reviewed each of these moments and judged that only 248 keywords (6.7%) of them were indeed indicative of a

compassion moment. Relying on word-count software would have allowed for a great deal of error to be included.

The naturalistic method of data collection allowed me to study both moments that fit familiar images of couples expressing compassion as well as more subtle offerings that are likely less memorable situations that diary data would not have captured. For example, a moment of compassion that is similar to a situation that might be created in a laboratory study of couple interaction occurred when a wife demonstrated care and concern regarding her husband's work problems. The word "wrong" helped identify such a moment in a transcript. One of the husbands received a work call from his company's corporate office and his wife asked immediately after the call, "What happened, babe? What's wrong?" Another example is when the word "pain" helped identify a caregiving interaction with an ill spouse: A wife explained she was sick and needed Advil. Her husband then found it for her and said, "there's pain reliever right here." There were many more subtle compassion moments that also met the criteria of conveying concern about the partner's distress and a desire to alleviate the distress. One was flagged by the word "sorry" when a wife, knowing that her husband was struggling to entertain the children before dinner, said "I don't know when the fish is going to be ready. I'm sorry." In another example, the word "help" located a moment in which a wife said "you need help?" and then helped her husband untangle some wires. Though husbands and wives on average expressed compassion frequently, there was significant between-couple and individual variability, as evidenced by the wide ranges and large standard deviations in the rate variables. One couple expressed no compassion at all across four days of filming, while another expressed compassion five times an hour. Three husbands expressed no compassion whereas one expressed compassion 3 times more than average; similarly, two wives expressed no compassion and another expressed

it at twice the average rate. Correlates of this variability may contribute to psychologists' understanding of important individual and between-couple differences.

Psychological Distress and Compassion Expressions

Husbands offered compassion more frequently when their wives reported more symptoms of depression. This hypothesized partner effect was observed even when wives' compassion rates and husbands' own depression were accounted for in the analysis. It is likely that husbands offered compassion more frequently to wives with more depressive symptoms because depression is often associated with greater reassurance seeking (Joiner, Metalsky, Katz, & Beach, 1999) and more negative affect (Hautzinger, Linden, & Hoffman,1982). While the transcripts suggested that husbands offer compassion in response to their wives' increased distress, there was no comparable evidence for an effect of partner depression on wives' compassion expressions.

An unexpected pattern that emerged in this study's naturalistic data was a link between personal distress and increased rates of compassion. Husbands in particular tended to react to their own distress with more expressions of compassion toward their wives. Husbands who self-reported more neuroticism were observed expressing compassion at higher rates. Though neuroticism is defined by negative affect and a tendency toward anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability (Widiger, 2009), I saw an increased rate of expressing this positive emotion from husbands with high scores on the neuroticism scale. Both husbands and wives expressed the highest rates of compassion in couples where the husband reported high neuroticism and the wife reported more depressive symptoms. Similarly, in contrast to my hypothesis that relationship quality and compassion would be positively associated, I found that husbands who experienced lower marital quality expressed

compassion more frequently, even when their wives' rates of compassion and marital quality were included in the analysis. Husbands' rates of compassion did not appear to be influenced by their wives' perceptions of marital quality.

There was also some evidence that wives may have offered compassion in response to their own personal distress. However, wives may be more attuned to the couple context as the source of their distress. Because women tend to have greater empathic accuracy (Ickes, Gesn, & Graham, 2000), they may be more sensitive to their husbands' thoughts and emotional experiences. Wives' expressed more compassion when they perceived the marriage as high quality but their husbands perceived it as low. It is possible that wives are more attuned to the state of their marriage as perceived by both partners, and adjust their compassion behavior accordingly. When both partners described a low quality marriage, wives offered relatively little compassion – perhaps due to limited interest in repairing the relationship. When both partners perceived the marriage as high quality, wives also offered little compassion. But wives expressed more compassion when they described a high quality marriage and their husbands described their relationship in less positive terms. With higher empathic accuracy, wives may be more aware of their husbands' perceptions of the relationship and experience distress at a discrepancy between the two evaluations of the relationship. According to this logic, they may offer extra expressions of compassion in an effort to repair the relationship and reduce their own distress.

Compassion Emotion versus Compassion Behavior. The pattern of findings observed in both women and men suggest that much of what may appear, at least to outside observers, as an expression of compassion deriving from a desire to alleviate a spouse's suffering (Goetz, Keltner, & Simon-Thomas, 2010) may at times reflect the individual's own distress. A key conceptual difference to consider here is the emotion compassion as compared to the verbal

behaviors assessed in this study. Much of the research on compassion has centered on the internal experience of the emotion (Goetz & Simon-Thomas, 2017) and on spouses' subjective recall of compassionate expressions. My hypotheses assumed that the verbal expressions we measured reflect an experience of the emotion compassion. However, the association of high rates of compassion expressions with psychological distress may suggest that compassionate behavior has other triggers as well, including anxiety and hypervigilance. Some portion of the compassion expressions captured in the transcripts, such as checking if a spouse is alright after saying "Ouch," may derive from hypervigilance. The association between husbands' neuroticism and the rate at which they verbally express compassion may be attributable to the amount of threat they detect in the partner relationship. That is, in some cases an attempt to alleviate another's pain or distress may reflect sensitivity to threat more than it reflects an accurate perception of the partner's experience of pain or distress. Rather than simply functioning as a marker of the degree to which individuals care about their spouses or a response to one's partner's true distress, high rates of the everyday behaviors measured in this study may be linked to feelings of worry or a compulsive need to help.

Anxious Attachment and Compulsive Caregiving. Another possible theoretical explanation for these findings has its roots in the attachment literature (Bowlby, 1973, 1982). Compassionate behavior, as a component of caregiving, is likely influenced by attachment style. Evidence suggests that those who are securely attached offer responsive caregiving and those who are fearfully attached are likely to engage in "compulsive caregiving" (Feeney, 1996). Coined by Kunce and Shaver (1994), compulsive caregiving refers to an individual's tendency to become over-involved in their partner's problems and to experience disproportionate personal distress in reaction to them. Individuals who are high in neuroticism are also likely to have

fearful or insecure-anxious attachment styles in their adult relationships (Crawford, Shaver, & Goldsmith, 2007), and they are more likely to engage in compulsive caregiving (Mikulincer & Shaver, 2017). For husbands who are unhappy in their marriages and husbands who are high in neuroticism there may be excessive expressions of compassion in daily couple interactions that represent compulsive caregiving rather than a response to an accurate appraisal of partner need. Because men rely on marriage more for social support than women do (Cutrona, 1996), they may make greater efforts to offer compassion in order to repair the marriage when they are anxious or perceive the marriage as low quality.

Both husbands and wives expressed compassion the most frequently in the couples where wives reported high depressive symptoms and husbands reported high neuroticism. In these high distress couples, compassion may be elicited due to hypervigilance and compulsive caregiving. For example, in one couple where the husband was high in neuroticism and the wife high in depressive symptoms, he asked her how she was doing and when she responded that she was fine he asked again, "You good, are you not?" The wife affirms that she is fine. Here, the husband is checking in out of concern that there is distress even when his wife has already made it clear that there is no distress. An example from another couple in which the husband was high in neuroticism and the wife high in depressive symptoms occurred when the wife said "ow" and indicated that the bottom of her foot hurt. The husband immediately responded with, "you okay? you okay?" The wife did not respond to his questions. Her depressive symptoms may have made her more self-focused (Hinchliffe, Hooper, Roberts, & Vaughan, 1975) or less attuned to her husband's emotions (Papp, Kouros, & Cummings, 2010). The husband then followed up with, "is something wrong with it? Ouch." His reaction, which met the coding criteria as a compassion

expression, may have been be out of proportion to the amount of distress his wife was experiencing.

Limitations & Future Directions

At the same time that naturalistic methodologies offer many advantages to psychologists, the intensiveness of the collection and processing of the data can preclude a large sample size. In this study, I was able to scan transcripts of over 1000 hours of couple interaction to identify 278 instances in which a husband or wife verbally expressed compassion to the other. Though I was able to capture a high number of spontaneously offered compassion in couples' everyday lives, these expressions were drawn from a sample of only 30 couples. Furthermore, the CELF recruitment procedures specified that couples needed to be dual-earner, in middle-income families with 2-3 children living in the Los Angeles area. The sample size and characteristics may limit the generalizability of these results. Evidence that people from lower socioeconomic backgrounds enact more prosocial and compassionate behavior (Piff & Moskowitz, 2017) may mean that the frequency at which couples express compassion to one another also varies by class. Additionally, there are likely to be cultural differences in the propensity to outwardly express emotion, especially for men, as well as cultural differences in disclosing difficulties with mental health. The novel patterns between compassion, relationship quality and mental health revealed here require replication in larger and more diverse samples.

Due to the large volume of recordings to scan and the availability of transcripts, this study adopted a verbal approach to identify expressions of compassion. The couples were not prompted to express compassion; instead I focused on spontaneous, naturally occurring expressions. Because there were no indicators of when these expressions may occur, my keyword search approach allowed for the scanning of the entire archive and facilitated the

identification of these moments of expression. However, compassion can also be expressed nonverbally through facial expression, gaze, touch and posture (Goetz, Keltner, & Simon-Thomas, 2010). Future work on compassion should examine additional modes of expression as well as delve into the contexts in which compassion expressions occur in marriage. In this study, personal distress was associated with a relatively high volume of compassion expressions. The research literature would benefit from further identification of sources of distress that can trigger expressions of compassion to gain deeper insight into the circumstances under which these behaviors occur. Further studies are also needed to understand if compassion behaviors largely spring from internal experiences of compassion or whether they are triggered by a range of emotions such as fear and worry.

Conclusion

This study highlights the importance of capturing behavior, not as it is optimally displayed in time-limited laboratory settings, but as it unfolds spontaneously in the home environment. This type of study provides the unique ability to examine the frequency at which a behavior occurs in daily life. The frequency of compassion expressions seen here demonstrates that this emotional behavior is woven into the fabric of daily life. Some of these brief expressions may not be memorable enough to report even in a daily diary study, but may help to set the tone of a household – be it a disconnected one, a responsive one, or an anxious one. This study provides evidence that it is possible to capture spontaneous emotional behaviors over continuous recordings of daily life and that in doing so we can gain greater access to the phenomena of interest - life as it as lived.

The multi-method nature of this study allowed me to pair observations of spontaneous behavior with spouses' perception of their own marital quality and mental health. This pairing

provided insight into how emotional behavior may differ from the emotional state it derives from. There was evidence of a partner effect such that husbands expressed more compassion if their wives reported more depressive symptoms. However, the contrast between my hypotheses, that compassionate behavior would occur in response to partner distress, and the bulk of my findings, that compassionate behavior was associated with personal distress, highlights the importance of studying the experience of emotion and behavioral expressions of emotion as two distinct variables. Interventions that promote the simple increasing of compassionate behavior as an indicator of caring in marriage may be ineffective if the behavior reflects personal distress rather than partner need.

Figures

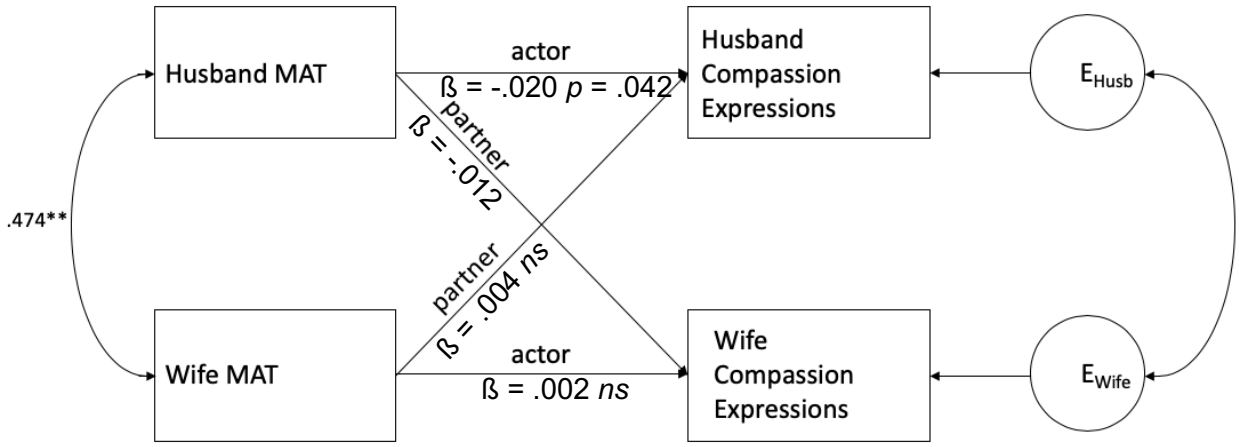

Figure 1. Actor-Partner Interdependence Model testing the effects of husband and wife marital quality (MAT) on their rates of expressing compassion and showing the significant and negative actor effect of husband's marital quality and husbands' compassion rate. $^{**}p < .01$

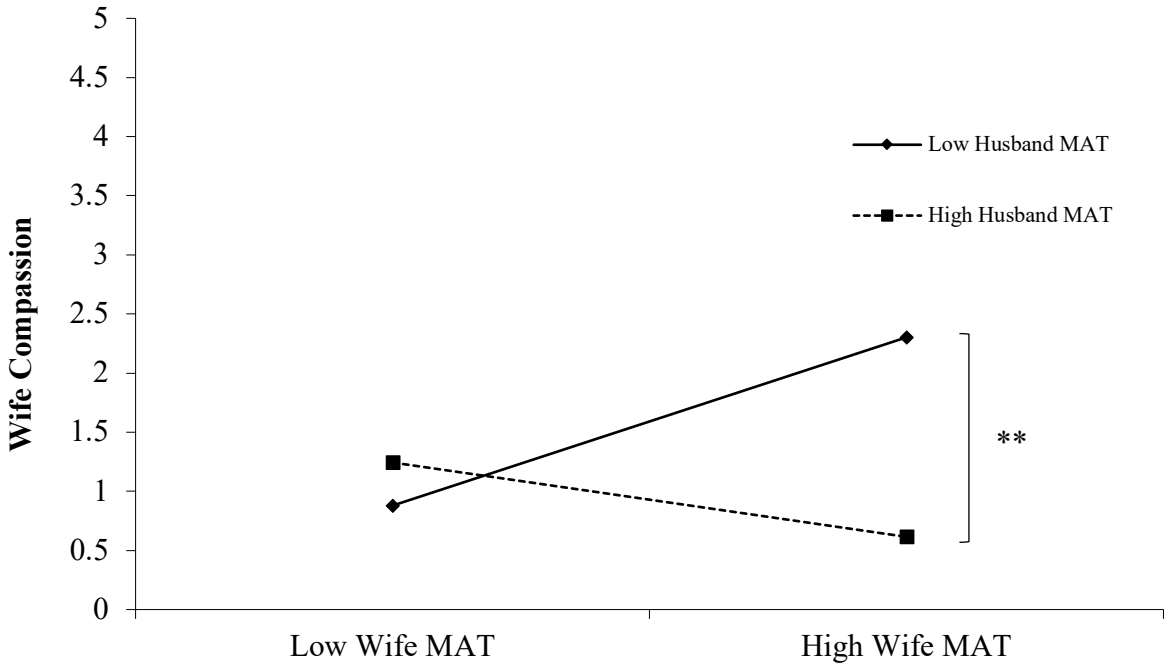

Figure 2. Interaction of husbands' marital quality (MAT) and wives' marital quality on wives' rate of compassion showing a significant difference in wives' rate of compassion when her marital is high depending on husbands' marital quality. Low indicates value at one standard deviation below the mean and High indicates value at one standard deviation above the mean. $^{**}p < .01$

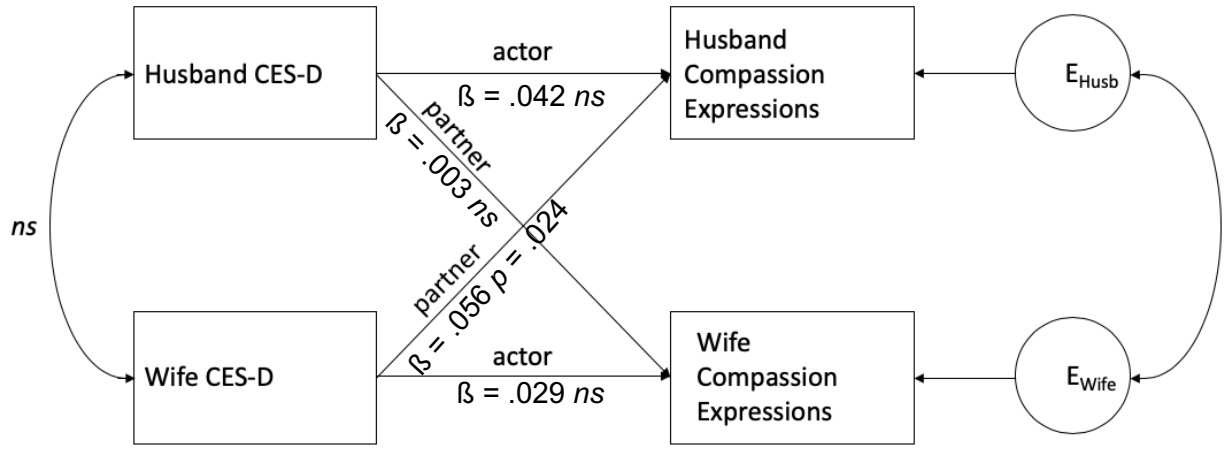

Figure 3. Actor-Partner Interdependence Model testing the effects of husband and wife depression (CES-D) on their rates of expressing compassion showing a significant partner effect of wives' depressive symptoms on husbands' rate of compassion.

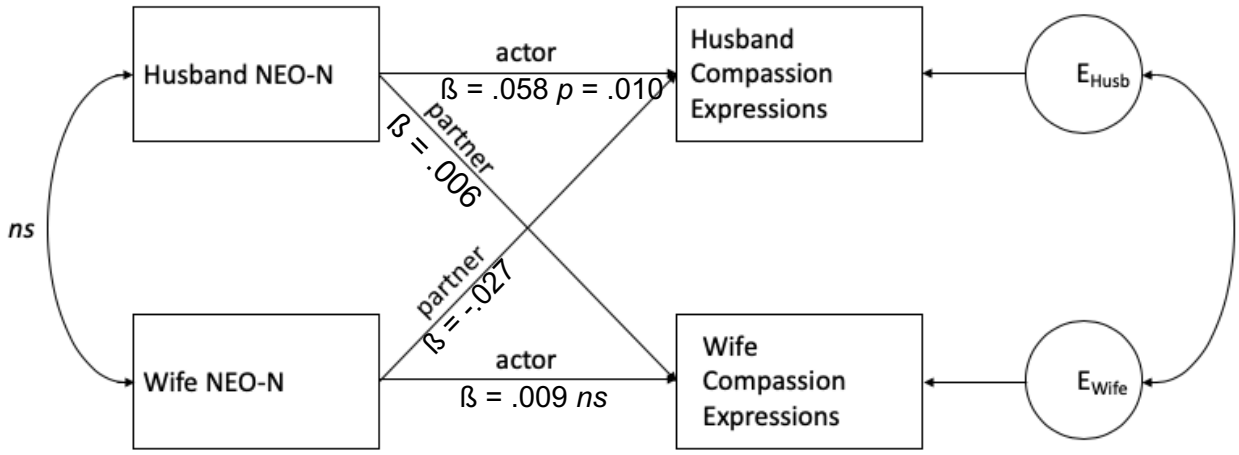

Figure 4. Actor-Partner Interdependence Model testing the effects of husband and wife neuroticism (NEO-N) on their rates of expressing compassion showing a significant actor effect of husbands' neuroticism on his rate of compassion.

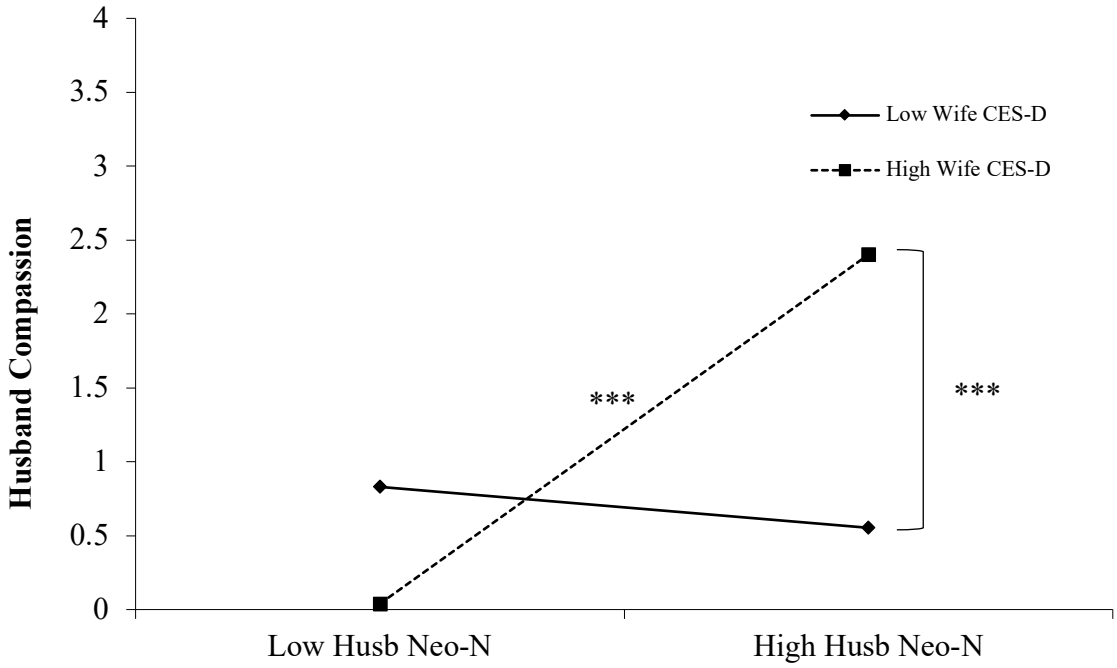

Figure 5. Interaction of husbands' neuroticism (NEO–N) and wives' depression (CES-D) on husbands' rate of compassion, showing a significant difference in husbands' compassion rates when husbands have high neuroticism depending on wives' depression and a significant difference in husbands' compassion rate when wives' depression is high depending on husbands' neuroticism. Low indicates value at one standard deviation below the mean and High indicates value at one standard deviation above the mean. ***$p < .001$

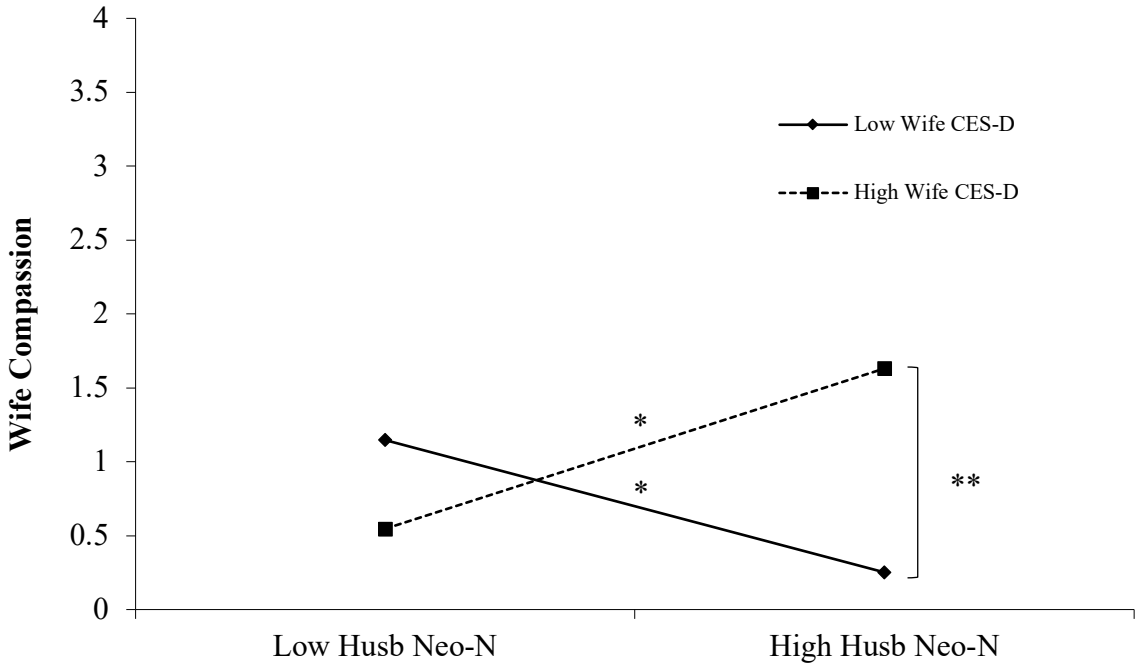

Figure 6. Interaction of husbands' neuroticism (NEO-N) and wives' depression (CES-D) on wives' rate of compassion. Low indicates value at one standard deviation below the mean and High indicates value at one standard deviation above the mean. * $p < .05$, ** $p < .01$

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Study 3: Increases in Positive Emotions as Precursors to Therapeutic Change

A growing body of research is illuminating the adaptive role positive emotions can play in psychotherapy and the call for interventions that highlight positive emotions is loudening (e.g. Carl, Soskin, Kerns, & Barlow, 2013; Dunn, 2012; Ehrenreich, Fairholme, Buzzella, Ellard, & Barlow, 2007). Characterized by positive valence and approach behavior, positive emotions spur upward spirals toward emotional wellbeing (Fredrickson & Joiner, 2002). The experience of positive emotions generates an attentional broadening and resource enhancement that encourage additional experiences of positive emotions (Garland et al., 2010). These upward spirals may be able to counteract the spirals of negativity that are characteristic of disorders such as depression and anxiety (Garland et al., 2010). Though research on positive emotions is flourishing, the experience of them in the context of psychotherapy remains understudied (Carl et al., 2013). Due to the often overwhelming and uncontrollable experience of negative emotions in disorders such anxiety and depression, the field's attention has historically focused on downregulating negative emotions to provide relief (Carl et al., 2013). However, an emphasis on upregulating positive emotions may allow for therapeutic change where traditional inventions have not succeeded (Carl et al., 2013). To encourage these developments, basic foundational questions of how positive emotional experiences shift over the course of psychotherapy and how these shifts correspond with symptom reduction and relationship functioning need to be addressed.

Theory of Emotion

A common assumption in psychological theory is that emotion is bipolar with negative emotions on one end of a single dimension and positive emotions on the other (Feldman Barrett & Russell, 1998). For instance, emotion is often measured on a single rating scale from pleasant to unpleasant, and a reduction in negative emotions is considered akin to an increase in positive

emotions. Though there is evidence supporting the bipolarity of negative and positive affect assumption (for a review, see Russell & Carroll, 1999), it rests on the study of emotion in a single instance rather than as a set of emotional experiences over time. When a longer period of time is considered, even one of intense stress, both positive and negative emotions are likely to co-occur (Folkman & Moskowitz, 2000).

Growing research in both the emotion and clinical literatures demonstrates that positive and negative emotions should be assessed separately as they do not behave similarly in models of resilience or clinical outcomes. For example, positive emotions predict increases in resilience and in life satisfaction, whereas negative emotions do not (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Additionally, lower levels of both state and trait positive emotions predict a worse course of depression, whereas state and trait levels of negative emotions differ from one another in predictions of depression (Morris, Bylsma, & Rottenberg, 2009). Rather than representing two ends of a single continuum, positive and negative emotions, when tracked over time, appear to have unique functionally adaptive roles.

Broaden-and-Build Theory

Negative emotions are thought to focus attention and increase physiological reactivity in order to respond to an immediate threat and in an effort to enhance survival. Positive emotions on the other hand allow for a broadening of perspective that promotes opportunity for building resources. Proposed by Fredrickson (1998, 2001) and supported by empirical findings (e.g. Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), the Broaden-and-Build Theory posits that the experience of positive emotions, including discrete emotions such as joy, interest and love, broaden the thought-action repertoire, which in turn creates opportunity for building personal and psychological resources. For example, an experience of happiness might trigger a smile and

the urge to connect to others present; getting to know this other person might lead to hearing new ideas and thoughts. This simple openness to another person can build multiple resources. Experiences of positive emotions encourage the growth of personal, social, emotional and intellectual resources that can facilitate coping in the future.

Resilience

Studied in nonclinical populations, the "building effect" of positive emotions leads to heightened resilience and coping. For example, in a study of non-depressed undergraduates, Cohn et al. (2009) measured positive and negative emotions daily for a month, with the modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh, & Larkin, 2003), and measured trait resilience and life satisfaction before and after the month. They found that positive emotions predicted increases in both life satisfaction and resilience, whereas negative emotions had weak or null effects. Furthermore, experiences of positive emotions mediated the association between earlier and later measures of resilience, whereas life satisfaction did not. Similarly, in a randomized controlled trial with a nonclinical sample of workers, Fredrickson et al. (2008) found that when positive emotions were induced through a Loving-Kindness meditation workers experienced a reduction in depressive symptoms and an increase in personal resources such as purpose in life and social support. In a clinical population, experiences of positive emotions, as they broaden perspectives and enhance socioemotional resources, may be key to triggering and sustaining symptom reduction and preventing relapse (Ehrenreich et al., 2007).

Positive Emotions and Relationship Functioning

Positive emotions, such a love and gratitude, play critical roles in relationships, yet research on emotional experience in relationships has been lopsided with greater emphasis put on

emotions like contempt and anger (Yee, Gonzaga, & Gable, 2014). In line with the broaden-and-build theory, one key resource that positive emotions build is social connectedness. When positive emotions were heightened through the Loving-Kindness meditation described above, participants reported an increase in received social support and positive relations with others (Fredrickson et al., 2008). In a study of budding friendships, Waugh and Fredrickson (2006) found that higher levels of positive emotions were associated with increased perceptions of self-other overlap between participants and their freshmen roommate. Positive emotions may be responsible for initial feelings of openness and connectedness. In a study of long-term marriages, couples in happy marriages expressed more positive emotions during a discussion about marital conflict (Carstensen, Gottman, & Levenson, 1995). The differences in positive affect were significant between couples with high verses low marital satisfaction even when the conversation was focused on a negative topic. Experiences and expressions of positive emotions may be key to relationship functioning.

In a meta-analysis of happiness and success, Lyubomirsky, King and Diener (2005) found that happiness, which they define as the frequent experience of positive emotions, was correlated with success in a range of relationships from romantic partners to friendships and coworkers. Happy people tended to have more fulfilling marriages and to report greater satisfaction with those marriages. They reported having a greater number of friends. The authors also found that happy individuals experience greater work success; they were more likely to obtain a job interview, receive high performance ratings and experience greater job satisfaction. Possibly this was because people with higher dispositional positive affect reported higher levels of emotional and tangible support from coworkers and supervisors. However, there is little

research that describes how changes in positive emotions relate to changes in relationship functioning, especially during therapeutic treatment.

Positive Emotions in Psychopathology

Depression. To meet criteria for Major Depression Disorder (MDD), a person must demonstrate either depressed mood or anhedonia, the loss of pleasure in activities once previously enjoyed (DSM-5; American Psychiatric Association, 2013). Anhedonia is a critical component of depression that represents a marked reduction in a person's experience of positive emotions. Unfortunately, anhedonia often proves resistant to improvements in current treatments (Carl et al., 2013; Brown, 2007). Heller et al. (2009) found that people with MDD had difficulty sustaining fronto-striatal brain activation when upregulating positive emotions, suggesting that anhedonia influences the ability to maintain and enhance experiences of positive emotions. In a systematic review of the literature, Morris et al. (2009) examined both positive and negative emotions as predictors of the course of MDD. They found the effects of both trait and state positive emotionality were consistent such that lower positive emotionality was associated with a worse course of MDD. However, the negative emotionality findings suggested opposite effects for trait and state measures. A worse course of MDD was associated with higher trait negative emotionality but with lower state negative emotionality.

Anxiety. Though reduced positive affect is not a criterion of anxiety disorders, the elevated avoidance behavior that is characteristic of anxiety can lead to reduced engagement in pleasurable activities (Carl et al., 2013). Anxiety also creates an attentional bias toward threatening stimuli (MacLeod, Mathews, & Tata, 1986), which suggests that those with anxiety might not attend to positive stimuli as often. A meta-analysis on social anxiety and positive affect found an inverse relationship such that increased social anxiety symptoms were related to

diminished positive experiences (Kashdan, 2007). This negative association was stronger in clinical samples than in college populations. Taylor et al. (2017) found that in a treatment study of individuals with panic disorder and generalized anxiety disorder those with higher dispositional levels of positive emotions at pre-treatment experienced greater decrease in anxiety symptoms at over time.

Poor Relationship Functioning. To meet criteria for a DSM diagnosis, the anxiety or depression experienced must cause "significant distress or impairment in social, occupational, or other important areas of functioning (DSM-5; American Psychiatric Association, 2013)." Reduced relationship functioning often accompanies these disorders. Depression is associated with poorer relationship functioning. Marital distress and poor social integration may be both antecedents and consequences of depressive symptoms (for a review, see Barnett & Gotlib, 1988). Worsening impairment in psychosocial functioning significantly increases the likelihood of reoccurrence in panic disorder and generalized anxiety disorder (Rodriguez, Bruce, Pagano, & Keller, 2005). It is not known though how positive emotions may shift alongside relationship functioning over the course of psychotherapy.

Generators of Change. Theory about the role that positive emotions might play in psychopathology is rapidly growing (e.g. Carl et al., 2013; Garland et al., 2010; Fitzpatrick & Stalikas, 2008). Yet, the empirical base in clinical samples to support the theory remains sparse. One theory of positive emotions in psychopathology suggests that positive emotions may not be simple indicators of therapeutic change, but generators of that change (Fitzpatrick & Stalikas, 2008). Studies that can parse the time sequence of therapeutic change and shifts in positive emotions are needed.

Therapeutic Interventions that Enhance Positive Emotions

Despite the field's long-standing emphasis on negative emotion reduction, there are several interventions that target positive emotion enhancement and new developments in the study of positive emotion in therapy. Behavioral activation, in which clients are encouraged to schedule pleasurable activities that provide opportunities to experience positive emotions, is a key element of Cognitive Behavior Therapy (CBT) for depression (Beck, 1995). Those with depression are likely to have disengaged from activities that bring pleasure and a sense of mastery. Behavioral activation encourages people to reengage in those behaviors and therefore promotes the experience of positive emotions. Behavioral activation alone may be as effective as CBT as a depression treatment (Ekers, Richards, & Gilbody, 2008). Findings from a recent randomized-control trial, which tested a new Positive Affect Treatment (PAT) meant to increase reward sensitivity and experience of positive emotions against a matched treatment designed to reduce negative affect, suggested that those in the PAT treatment had better outcomes including reduced depression, anxiety and suicidal ideation (Craske, Meuret, Ritz, Treanor & Dour, 2019). Mindfulness interventions are also thought to enhance positive emotions through promoting a focus on the present moment and supporting the practice of openness and curiosity about one's own mind (Geschwind, Peeters, Drukker, van Os, & Wichers, 2011). In a randomized controlled trial of Mindfulness Based Cognitive Therapy with adults who had a lifetime history of depression and current remedial symptoms, Geschwind et al. (2011) found that the therapy was associated with increased experiences of positive emotions as well as greater appreciation of and response to pleasant activities in daily life. Additional interventions, such as cognitive bias modification procedures, practicing a fuller sensory experience of positive emotions, and training to recall positive memories, are not yet considered mainstream and lack the evidence base that has been built for cognitive behavioral therapy and mindfulness interventions (Dunn, 2012).

These interventions and treatments suggest that there is an increasing interest in positive emotions as a target of intervention. Understanding the trajectory of positive emotional experience over the course of therapy in a naturalistic therapy setting will help set the groundwork for future intervention studies.

Research in a Psychology Training Clinic

Conducting research in psychology training clinics can help us build a bridge between science and practice (Neufeldt & Nelson, 1998; Borkovec, 2004; for systematic reviews of research in training clinics see Todd, Kurcias, & Gloster, 1994, and Dyason, Shanley, Hawkins, Morrissey & Lambert, 2019). Training clinics are often embedded in research universities facilitating the collection of data, and yet they also share more similarities to community clinics than randomized-control trials do (Neufeldt & Nelson, 1998; Dyason et al., 2019). Training clinics typically operate like community clinics: services are offered to clients experiencing a wide range of disorders, therapy is conducted by many therapists, the length of therapy varies greatly, the session content is not manualized and theoretical orientation is usually dictated by the supervisors available. The methodological challenges posed by this set-up deter researchers who are more accustomed to the experimental design that allows for the delimitation of the problem area (Messer & Boals, 1981). However, this real-world setting provides us with access to data that can address foundational questions of how emotional experience naturally shifts for a range of clients in a range of types of treatment. As with other studies that use naturalistic methodology, by conducting a study on emotional experience in this therapy setting, we sacrifice the standardization that allows for isolation of the phenomenon of interest to gain a more ecologically valid picture of the average clients' emotional experience during more real-world treatment.

The Current Study

The present study is an investigation of the changes in positive and negative emotional experiences over the course of psychotherapy. By examining the trajectories of how frequently these emotions are experienced and how those trajectories map onto symptom reduction and relationship functioning, this study seeks to further strengthen the foundation for research on positive emotions in psychotherapy. It advances the literature by investigating how positive emotions unfold over the course of treatment in a psychology department training clinic, with assessments taken at 5-session intervals. This study has two broad aims.

The first aim is to examine and describe the trajectory of clients' positive and negative emotions as well as symptom distress and relationship functioning over the first 20 sessions of therapy. I hypothesize that over time in therapy positive emotions will increase, negative emotions will decrease, symptom distress will decrease and impairment in relationship functioning will decrease. I also expect that there will be a significant negative association between change in positive and change in negative emotions.

The second aim is to test whether change in positive emotions has unique predictive value, independent of change in negative emotions, for improvements in symptom distress and relationship functioning. I will test associations between concurrent changes in emotions and treatment outcomes as well as prospective associations (changes in emotion predicting subsequent therapeutic outcomes). Despite an expected correlation between positive and negative emotions I do not expect those variables to act as opposite poles of a single continuum that change entirely in tandem. In particular, I predict that changes in positive emotions will have predictive value for treatment outcomes that is independent of changes in negative emotions. The results of this component of the study could provide evidence in support of assessing positive

emotions regularly during therapy and in support of interventions that specifically target positive emotion enhancement rather than only negative emotion reduction. I am particularly interested in examining whether change in positive emotions is a unique precursor of therapeutic change. Based on the idea that positive emotions trigger an upward spiral and are generators of therapeutic change, I hypothesize that changes in positive emotions will explain important variance in future symptom distress reduction and impairment in relationship functioning. As generators of change (Fitzpatrick & Stalikas, 2008), increases in positive emotions may precede decreases in symptom distress and impairment in relationship functioning.

Method

Participants

Participation in the study is offered to English-speaking adults (18+ years old) who are seeking psychotherapy at the UCLA Psychology Clinic. There are no exclusion criteria based on diagnosis, experience of therapist, length of treatment or theoretical orientation. Recruitment and data collection are currently in progress, with the exception of a pause due to the COVID-19 crisis. At present, 54 clinic clients (M_{age} = 32.43 years, range = 20 – 58, 72% female) have agreed to participate. The data presented below are from the 34 participants (M_{age} = 30.03 years, range = 20 – 46, 74% female) who attended at least the intake and 8 therapy sessions. Thirty-two of these participants completed the emotion and outcome measures on at least three occasions. Two additional participants completed one of the measures only twice. The 20 remaining participants either discontinued therapy prior to completing at least three emotion surveys and outcome measures (n = 14), had not had the opportunity to complete at least three timepoints prior to therapy disruption due to COVID-19 (n = 5), or withdrew from the study (n = 1).

Procedure

Participants are recruited to participate in the study by the clinic staff on the day of their initial visit for an intake appointment. Clinic staff read a brief recruitment script outlining the study and if participants express interest they are provided with a consent form and the opportunity to ask questions. Participants are informed that participation in the study does not influence their ability to receive treatment at the clinic and that the therapist is not be made aware of their participation. Participants receive $5 in payment at each time point they complete a survey.

Participants complete the measure of emotions at the intake appointment and at every 5th therapy session. In consenting to participate, participants also grant the researcher access to their clinical charts. As part of routine care in the UCLA Psychology Clinic, therapists administer the measure of symptom distress and relationship functioning to their clients, at the intake appointment and at every 5th session. Clients are typically seen at the clinic for 15 to 20 sessions.

The study has received approval for the procedures described here from the Institutional Review Board of the University of California, Los Angeles (IRB#18-000354).

Measures

Modified Differential Emotions Scale (mDES). Both positive and negative emotions are measured with the modified Differential Emotions Scale (Fredrickson, et al., 2003), a 20-item self-report measure of how often a participant experienced a range of discrete emotions in the past week (see Measures for the full scale). Fredrickson et al. (2003) modified the original Differential Emotion Scale (Izard, 1977) to include additional positive emotions. Each emotion is presented as a triplet with three synonyms for each emotion (e.g., glad/happy/joyful). The Positive Emotions subscale consists of 10-items that cover the following emotions: amusement, awe, contentment, desire, gratitude, happiness, hope, interest, love, and pride. The Negative

Emotions subscale contains 8-items that assess the following emotions: anger, contempt, disgust, embarrassment, fear, guilt, sadness, and shame. These scales typically yield high internal reliability, ranging from .79 – .95 (Cohn et al., 2009; Fredrickson et al. 2008). Compassion and surprise are included in the Other Emotions Subscale. Participants rate each emotion item based on their experiences in the past week on a 5-point Likert Scale (0 = never, 4 = most of the time). Responses to the mDES are then scored by averaging the 10 positive emotion items for a positive emotions subscale score between 0 and 4, and by averaging the 8 negative emotion items for a negative emotions subscale score between 0 and 4.

Outcome Questionnaire 45.2 (OQ). Symptom distress and relationship functioning are assessed with two subscales from the Outcome Questionnaire 45.2 (Lambert et al., 1996). This questionnaire is commonly used in clinical settings and is a well-validated measure of areas of functioning (Beckstead et al., 2003; Boswell, White, Sims, Harrist, & Romans, 2013). Participants rate each item based on their experiences in the last week on a 5-point (0-4) Likert Scale (*Never, Rarely, Sometimes, Frequently, Always*). Item ratings are then summed to calculate total and subscale scores. The Symptom Distress subscale consists of 25 items has a range of 0 to 100 with a clinical cut-off score of 36 and a reliable change score of 10. Some sample items include: “I blame myself for things,” “I have thoughts of ending my life,” and “I have an upset stomach.” The 11-item Interpersonal Relations subscale, which assesses relationship functioning, has a range of 0 to 44 with a clinical cut-off score of 15 and a reliable change score of 8. Some sample items include: “I have trouble getting along with friends and close acquaintances,” “I feel lonely,” and “I have frequent arguments.” Higher scores on both subscales indicate poorer functioning.

It is critical to note that the mDES and the OQ have several overlapping items. For example, the mDES asks about frequency in the past week of feeling "sad/downhearted/unhappy" and the OQ asks about frequency in the past week of "feeling blue." The majority of these items overlap from the negative emotion subscale of the mDES and the symptom distress subscale of the OQ. Associations between these two subscales will need to be interpreted with caution as stronger associations are expected.

Timepoints

Steps are taken to standardize and account for the survey administration timing. Though all efforts are made to administer the surveys at baseline and every 5 sessions, surveys are at times skipped or administered multiple times in a short period due to clients running late, therapists administering the OQ off schedule, transfer of therapists, or clinic staff technical errors. When the mDES survey is missed at the appropriate session, the clinic staff is instructed to administer another as soon as possible.

A timepoint variable was created to represent each wave of data collection (baseline, session 5, session 10 etc) and account for some of the variability in survey administration timing. Timepoint 1 (T1) includes surveys collected at intake or session 1, timepoint 2 (T2) represents surveys collected within the range of sessions 4 to 7, timepoint 3 (T3) includes sessions 8 to 13, timepoint 4 (T4) includes sessions 14 to 17, and timepoint 5 (T5) includes session 18 to 22. Though survey administration continues at 5 session intervals, subsequent timepoints (which represent data collected from participants who continued in treatment for more than 22 sessions) have been excluded from analyses due to having fewer than 10 participants at those later timepoints. (As the number of observations increases over the next year, data from these later timepoints will be included in the analyses.) For each participant, if a survey was administered

multiple times within the timepoint, the session where the mDES and OQ were administered at the same time is selected. If the measures were not administered at the same session, the sessions closest to the 5th session mark are selected. For all participants, there is at least a two-session gap between each timepoint. For 116 out of the 149 timepoints, the mDES and OQ were administered at the same session. Given the variability in the timing of data collection, I created two variables, time since intake for each OQ administration and time since intake for each mDES administration (measured in days), to be included in analyses.

Data Structure

Both the author and a research assistant input the full set of data from the mDES surveys and reliability was checked to improve accuracy. The data were structured in long format with each row representing one timepoint. Data are stored in SPSS v.26 and analyzed with SAS Studio Proc Mixed using Restricted Maximum Likelihood estimation.

Results

To address aim 1, descriptions of the trajectory of positive and negative emotions as well as the trajectory of symptom distress and relationship functioning across timepoints 1 through 5 are provided with means and standard deviations (see Figures 1 and 2). Two-level multilevel models (timepoints nested within individuals) tested change in positive and negative emotions over time as well as the association between positive and negative emotions. Aim 2, to test the predictive value of change in positive emotions on both concurrent and prospective change in symptom distress and relationship functioning, was also addressed with two-level multilevel models (see Figure 3 for model comparison).

Descriptive Statistics of Positive and Negative Emotions, and the Outcome Questionnaire Over Treatment

Figure 1 presents the means and standard deviations of the positive emotion subscale and of the negative emotions subscale of the modified Differential Emotions Scale (mDES) from timepoint 1 (T1) through timepoint 5 (T5). Figure 2 presents the means and standard deviations of the Outcome Questionnaire 45.2 (OQ) symptom distress subscale and the OQ interpersonal relations subscale – which measures impairment in relationship functioning – from T1 through T5. As described above, all analyses have been conducted with data from Timespoints 1 through 5. Multilevel models (timepoints nested within individuals) tested the linear trend of positive emotions, negative emotions, symptom distress and relationship functioning over time. A level-1 variable, EmoTimeSinceIntake, was created that counted the number of days between a participant's intake and the date each mDES was administered. In a model with EmoTimeSinceIntake predicting positive emotions, there was a significant intercept ($b_{00} = 1.84$, $p < .001$) and an expected significant increase in positive emotions each day after intake ($b_{10} = .002$, $p < .001$). In a model with EmoTimeSinceIntake predicting negative emotions, there was a significant intercept ($b_{00} = 2.10$, $p < .001$) and an expected significant decrease in negative emotions each day after intake ($b_{10} = -.002$, $p = .002$). Tests with growth modeling showed that change in positive emotions and change in negative emotions over time were both better modeled with linear functions than with quadratic or cubic. A second time level-1 variable, OQTimeSinceIntake, was created to count the number of days between a participant's intake and the date each OQ was administered. In a model with OQTimeSinceIntake predicting OQ symptom distress, there was a significant intercept ($b_{00} = 52.92$, $p < .001$) and an expected significant decrease in OQ symptom distress each day after intake ($b_{10} = -.05$, $p < .001$). In a model with OQTimeSinceIntake predicting OQ interpersonal relations, there was a significant

intercept (b_{00} = 18.88, p < .001) and an expected significant decrease in OQ interpersonal relations each day after intake (b_{10} = -.01, p = .009).

Positive Emotions and Negative Emotions Association

The association between positive and negative emotions was first examined at each timepoint and then the association between the change in positive emotions and the change in negative emotions between each timepoint was examined. In a multilevel model with positive emotions predicting negative emotions controlling for time since intake (b_{20} = -.00, p = .10, *ns*), there was a significant intercept (b_{00} = 3.20, p < .001) and a significant decrease in negative emotions for every one-point increase in positive emotions (b_{10} = -.60, p < .001). A lagged multilevel model tested the association between concurrent change in positive and negative emotions. Positive emotions predicted negative emotions controlling for negative emotions at the previous timepoint (b_{20} = .60, p < .001), positive emotions at the previous timepoint (b_{30} = .21, p = .11), and time since intake (b_{40} = .00, p = .318, *ns*); there was a significant intercept (b_{00} = 1.11, p = .002) and an expected significant decrease in negative emotions for every one-point increase in positive emotions (b_{10} = -.52, p < .001).

Predictive Value of Change in Positive Emotions

A series of 12 multilevel models with lags tested whether change in positive emotions had unique predictive value, independent of change in negative emotions, for improvements in symptom distress and relationship functioning. The first 6 models tested concurrent change: the association between the change in emotions from one timepoint to the next and the change in treatment outcomes over the same timeframe (see concurrent change model in Figure 3). These models were used to ask whether change in positive emotions explain unique variance in the simultaneous change in treatment outcomes. The subsequent 6 models tested prospective change:

the association between the change in emotions from one timepoint to the next and the change in treatment outcomes from the same starting timepoint to two timepoints later (see prospective change model in Figure 3). These models were used to ask if change in positive emotions predicted unique variance in future change in treatment outcomes.

Concurrent Change

As presented in Table 1 Model 1, a single-lag multilevel model (timepoints nested within individuals) tested whether positive emotions predicted OQ symptom distress, controlling for positive emotions at the previous timepoint, OQ symptom distress at the previous timepoint and days since intake:

Level 1: Timepoint

$$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(PositiveEmotion)_{ij} + \pi_{2i}(PositiveEmotion\_Lag)_{ij} + \pi_{3i}(OQSymptomDistress\_Lag)_{ij} + \pi_{4i}(OQTimeSinceIntake)_{ij} + e_{ij}$$

Level 2: Individual

$$\pi_{0i} = b_{00} + u_{0i}$$
$$\pi_{1i} = b_{10}$$
$$\pi_{2i} = b_{20}$$
$$\pi_{3i} = b_{30}$$
$$\pi_{4i} = b_{40}$$

Model 2 in Table 1 presents the findings from an identical model to Model 1 except with the OQ interpersonal relations subscale as the outcome, and controlling for the OQ interpersonal relations subscale at the previous timepoint. The Positive Emotion coefficients reported in the second row of Table 1 indicate that an increase in positive emotions from one timepoint to the next was a significant predictor of improvements over the same timeframe in symptom distress and relationship functioning.

As presented in Table 2 Models 3 and 4, negative emotions were then tested as a predictor of OQ symptom distress and OQ interpersonal relations, controlling for the previous

timepoint's negative emotions, the previous timepoint's OQ subscale scores and days since intake. Model 3's equation is:

Level 1: Timepoint
$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(NegativeEmotion)_{ij} + \pi_{2i}(NegativeEmotion\_Lag)_{ij} + \pi_{3i}(OQSymptomDistress\_Lag)_{ij} + \pi_{4i}(OQTimeSinceIntake)_{ij} + e_{ij}$

Level 2: Individual
$\pi_{0i} = b_{00} + u_{0i}$
$\pi_{1i} = b_{10}$
$\pi_{2i} = b_{20}$
$\pi_{3i} = b_{30}$
$\pi_{4i} = b_{40}$

As with positive emotions, change in negative emotions was a significant predictor of concurrent change in symptom distress and change in relationship functioning (see row 2 in Table 2.)

Finally, changes from one timepoint to the next in positive and negative emotions were then tested within the same model to examine whether they accounted for the same or independent variance in change over the same timeframe in OQ. Presented in Table 3 Model 5, positive emotions and negative emotions predicted scores for OQ symptom distress controlling for positive and negative emotions and OQ symptom distress at the previous timepoint and days since intake:

Level 1: Timepoint
$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(PositiveEmotion)_{ij} + \pi_{2i}(NegativeEmotion)_{ij} + \pi_{3i}(PositiveEmotion\_Lag)_{ij} + \pi_{4i}(NegativeEmotion\_Lag)_{ij} + \pi_{5i}(OQSymptomDistress\_Lag)_{ij} + \pi_{6i}(OQTimeSinceIntake)_{ij} + e_{ij}$

Level 2: Individual
$\pi_{0i} = b_{00} + u_{0i}$
$\pi_{1i} = b_{10}$
$\pi_{2i} = b_{20}$
$\pi_{3i} = b_{30}$
$\pi_{4i} = b_{40}$
$\pi_{5i} = b_{50}$
$\pi_{6i} = b_{60}$

Model 6 in Table 3 presents the findings from an identical model to Model 5 except with the OQ interpersonal relations subscale as the outcome, and controlling for the OQ interpersonal relations subscale at the previous timepoint. The significant negative coefficients reported in the second row of Table 3 indicate that increases in positive emotions was a significant predictor of concurrent improvements in symptom distress and relationship functioning, even when change in negative emotions was in the same model.

Prospective Change

Next, multilevel modeling with lags tested if change in positive emotions had unique predictive value as compared to change in negative emotions on prospective changes in symptom distress and relationship functioning. As presented in Table 4 Model 7, a multilevel model (timepoints nested within individuals) tested whether positive emotions at the previous timepoint predicted OQ symptom distress, controlling for positive emotions at the timepoint two prior, OQ symptom distress at the timepoint two prior and days since intake:

Level 1: Timepoint

$$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(PositiveEmotion\_Lag)_{ij} + \pi_{2i}(PositiveEmotion\_2Lags)_{ij} + \pi_{3i}(OQSymptomDistress\_2Lags)_{ij} + \pi_{4i}(OQTimeSinceIntake)_{ij} + e_{ij}$$

Level 2: Individual

$$\pi_{0i} = b_{00} + u_{0i}$$
$$\pi_{1i} = b_{10}$$
$$\pi_{2i} = b_{20}$$
$$\pi_{3i} = b_{30}$$
$$\pi_{4i} = b_{40}$$

Model 8 in Table 4 presents the findings from an identical model to Model 7 except with the OQ interpersonal relations subscale as the outcome, and controlling for the OQ interpersonal relations subscale at the two-lag timepoint. The significant negative coefficients reported in the second row of Table 4 indicate that an increase in in positive emotions from one timepoint to the

next was a significant predictor of improvements in symptom distress and relationship functioning assessed from the same starting point to two timepoints down the line.

Table 5 presents comparable analyses with change in negative emotion as the predictor variable. In Models 9 and 10, negative emotions from the previous timepoint were tested as a predictor of OQ symptom distress and OQ interpersonal relations, controlling for negative emotions at two timepoints prior, OQ subscale score at two timepoints prior and days since intake. Model 13's equation is:

Level 1: Timepoint
$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(NegativeEmotion\_Lag)_{ij} + \pi_{2i}(NegativeEmotion\_2Lags)_{ij} + \pi_{3i}(OQSymptomDistress\_2Lags)_{ij} + \pi_{4i}(OQTimeSinceIntake)_{ij} + e_{ij}$

Level 2: Individual
$\pi_{0i} = b_{00} + u_{0i}$
$\pi_{1i} = b_{10}$
$\pi_{2i} = b_{20}$
$\pi_{3i} = b_{30}$
$\pi_{4i} = b_{40}$

As with positive emotions, change in negative emotions between the previous timepoint and two prior significantly predicted prospective change in symptom distress. However, this same change in negative emotions did not predict prospective change in relationship functioning (see Table 5, row 2).

Lastly, changes in positive and negative emotions were then tested within the same model to examine whether they accounted for the same or independent variance in prospective change in symptom distress and relationship functioning. Presented in Table 6 Model 11, positive emotions and negative emotions at the previous timepoint predicted OQ symptom distress controlling for positive and negative emotions at the timepoint two prior, OQ symptom distress at the timepoint two prior and days since intake.

Level 1: Timepoint
$OQSymptomDistress_{ij} = \pi_{0i} + \pi_{1i}(PositiveEmotion\_Lag)_{ij} + \pi_{2i}(NegativeEmotion\_Lag)_{ij} + \pi_{3i}(PositiveEmotion\_2Lags)_{ij} + \pi_{4i}(NegativeEmotion\_2Lags)_{ij} + \pi_{5i}(OQSymptomDistress\_2Lags)_{ij} + \pi_{6i}(OQTimeSinceIntake)_{ij} + e_{ij}$

Level 2: Individual
$\pi_{0i} = b_{00} + u_{0i}$
$\pi_{1i} = b_{10}$
$\pi_{2i} = b_{20}$
$\pi_{3i} = b_{30}$
$\pi_{4i} = b_{40}$
$\pi_{5i} = b_{50}$
$\pi_{6i} = b_{60}$

Model 12 in Table 6 presents the findings from an identical model to Model 11 except with the OQ interpersonal relations subscale as the outcome, and controlling for the OQ interpersonal relations subscale at the two-lag timepoint. Even when change in negative emotions was included in the model, an increase in positive emotions from one timepoint to the next continued to predict improvements in both symptom distress and relationship functioning from the same starting point to two timepoints in the future (see Table 6, row 2). In contrast to the concurrent change model (see Table 3, row 4), change in negative emotions (Table 6, row 4) did not predict prospective change in symptom distress or relationship functioning when in the same model as change in positive emotions.

Discussion

This naturalistic study of emotion contributes to research on the critical role positive emotions play in psychotherapy and may encourage the development of interventions focusing on increasing positive emotions. By tracking clients' experiences of emotions, symptom distress and relationship functioning over the course of therapy, this study assesses the trajectory of emotions as reported by clients in a training clinic with a range of diagnoses and across several therapeutic orientations. Associations between emotional experience, symptom distress and

relationship functioning are examined. This study assesses the independent effects of changes in positive and negative emotions on both concurrent and future improvements in symptom distress and relationship functioning. The findings contribute to the dismantling of the assumption that positive and negative emotions are poles on a single continuum and highlight the value of attending to positive emotions during therapy.

This report presents analyses conducted on data from the first 34 participants who participated in at least 8 therapy sessions. As expected, positive emotions increased over treatment while negative emotions, symptom distress and impairment in relationship functioning decreased. Positive and negative emotions were correlated, as were changes in positive and negative emotions. However, despite this association, increases in positive emotions were a significant predictor of improvements in two of the primary targets of clinical interventions, symptom distress and relationship functioning, even when decreases in negative emotions were included in the same model. Additionally, positive emotions not only predicted change in these treatment outcomes over the same time period, but they also predicted future change.

Positive and Negative Emotions Trajectories

As expected, clients in the UCLA Psychology Clinic experience an increase in positive emotions over the course of therapy. With the 5 timepoints analyzed here, this increase was linear. Though quadratic and cubic trends would be possible to observe with 5 timepoints, there was only evidence for linear trends in emotion over time. The clients also experienced a linear decline in negative emotions. Positive and negative emotions, as well as the changes clients experienced in positive and negative emotions, were significantly and negatively associated. As they described an increase in positive emotions over time, they tended to describe declines in negative emotions. However, change in positive emotions accounted for variability in

improvements in symptom distress and relationship functioning, independent of changes in negative emotions. Thus, despite a correlation between the two types of emotion, they did not function as poles on a single continuum.

Symptom Distress

Both increases in positive emotions and decreases in negative emotions predicted improvement in symptom distress when changes were examined during the same time period. Each accounted for unique variability in symptom distress change. At 5-session intervals, as clients reported feeling less distressed on items such as "I feel hopeless about the future," "my heart pounds too much," and "I have difficulty concentrating," they also reported more frequent experiences of emotions such as "content/ serene/ peaceful" and "grateful/ appreciative/ thankful" and fewer experiences of emotions such as "sad/ downhearted/ unhappy" and "embarrassed/ self-conscious/ blushing." These concurrent change findings suggest that changes in both positive and negative emotions are indicators that therapeutic change is occurring. A myopic focus on negative emotions overlooks the therapeutic improvement associated uniquely with increases in feelings such as joy, gratitude, interest, love and awe.

Even more compelling though is that this study provides evidence for increases in positive emotions also being precursors to therapeutic change. Change in positive emotions was the only significant predictor of prospective change in symptom distress when in the same model as a change in negative emotions. These prospective change findings suggest that while changes in both positive and negative emotions may be indicators of therapeutic change, an increase in positive emotions is also a precursor to therapeutic change. Assessing positive emotions, independently from negative emotions, may offer therapists early insight into whether their clients are making progress in therapy. Though this correlational study cannot determine

causation, the timing of change of positive emotion predicting future reduction in symptom distress suggests that experiences of positive emotions may even be generators of change (Fitzpatrick & Stalikas, 2008). Building assessment of positive emotions into treatment protocols will help to advance therapists' understanding of the changes that their clients are experiencing that contribute to reduced symptomology and may help with early detection of treatment efficacy.

It is important to note that there is overlap in the items between the negative emotions subscale on the modified Differential Emotions Scale (mDES; Fredrickson et al., 2003) and the symptom distress subscale of the Outcome Questionnaire 45.2 (OQ; Lambert et al., 1996). For example, the mDES has items such as "angry/ irritated/annoyed" and "scared/ fearful/ afraid" which closely resemble the OQ symptom distress items "I feel irritated" and "I feel fearful." The similarity in some of the items between the two scales increases the likelihood that there would be an association in changes on these measures, and, therefore, the similarity makes the model a more conservative test of positive emotions as a unique predictor.

Relationship Functioning

In line with the symptom distress findings, both changes in positive and in negative emotions independently predicted change in relationship functioning over the same time period. At the same time as clients experienced more positive emotions and fewer negative emotions, they also reported feeling less "concerned about family troubles" and more like they "get along well with others." These concurrent change findings suggest that changes in emotions are independently also both indicators of improvement in relationship functioning.

In terms of prospective change, change in positive emotions was again the only significant predictor of future change in relationship functioning. In contrast to the symptom

distress findings, change in negative emotions did not predict future change in relationship functioning even when it was alone in the model. Positive emotions may therefore be particularly important to assess when wanting to understand progress in clients' ability to connect well with close others. These findings align with the Broaden-and-Build Theory of positive emotions (Fredrickson, 2001) which posits that experiences of positive emotions lead to openness and the gathering of resources, especially social connections. More frequent experiences of positive emotions may encourage a willingness to engage with others and strengthen relationships. It may be particularly important for therapists focusing on relationship functioning to monitor changes in positive emotions. These findings also such that positive emotions may be a key target of intervention for clients struggling with their interpersonal connections.

Limitations & Future Directions

This naturalistic study examining the trajectories of positive and negative emotions over the course of therapy in a training clinic provides valuable insight into the emotional experience of clients in community-type treatment. The structure of this correlational study though precludes me from making causal inferences about whether changes in positive emotion lead to therapeutic change or whether therapeutic change makes room for the experience of more frequent positive emotions. The minimal exclusion criteria allowed for an accurate portrayal of the range of clients seen in a psychology training clinic and increased the sample size. However, the time course of change in emotional experience as well as in therapeutic change may differ by the chronicity of clients' symptoms. Clients suffering from more episodic conditions such as a depressive episode may experience earlier improvements in symptom distress and may suffer from less relationship impairment. Clients suffering from more chronic conditions such as personality disorders or persistent depressive disorder may not experience significant changes in

their emotions, symptom distress or relationship functioning within the first 20 sessions of therapy. Including clients with all diagnoses likely made some associations more difficult to detect. As the sample size grows for this study, a key future direction will be to examine differences in the patterns of change in emotion and symptoms among individuals who presented with different diagnoses.

Because this study did not involve manualized treatment or limit participation based on therapeutic orientation, the impact of specific interventions known to enhance positive emotions on changes in emotional experience and on therapeutic change was not able to be assessed. A compelling future direction though would be to analyze clients' charts to determine whether or not an intervention geared at enhancing positive emotions such as behavioral activation or Loving-Kindness mindfulness was practiced. Differences in positive emotions and treatment outcomes could then be assessed based on whether or not a positive emotions intervention was administered at some point in therapy.

In order to reduce the burden on the participants as well as the clinic staff, the modified Differential Emotions Scale was administered every 5th session at the same interval as the Outcome Questionnaire is typically administered. However, the length of these intervals may have been too large to detect more subtle timing differences. It also makes examining types of interventions used in therapy and their association with emotion change more challenging to detect.

Despite these limitations, this study, to this author's knowledge, is the first to monitor changes in both the positive and negative emotional experiences of clients engaging in treatment as it is typically practiced in a clinic setting. The findings here highlight the value of assessing

positive emotions independently of negative emotions in therapy and suggest that clinical psychology's developing interest in positive emotions is a productive new direction.

Figures & Tables

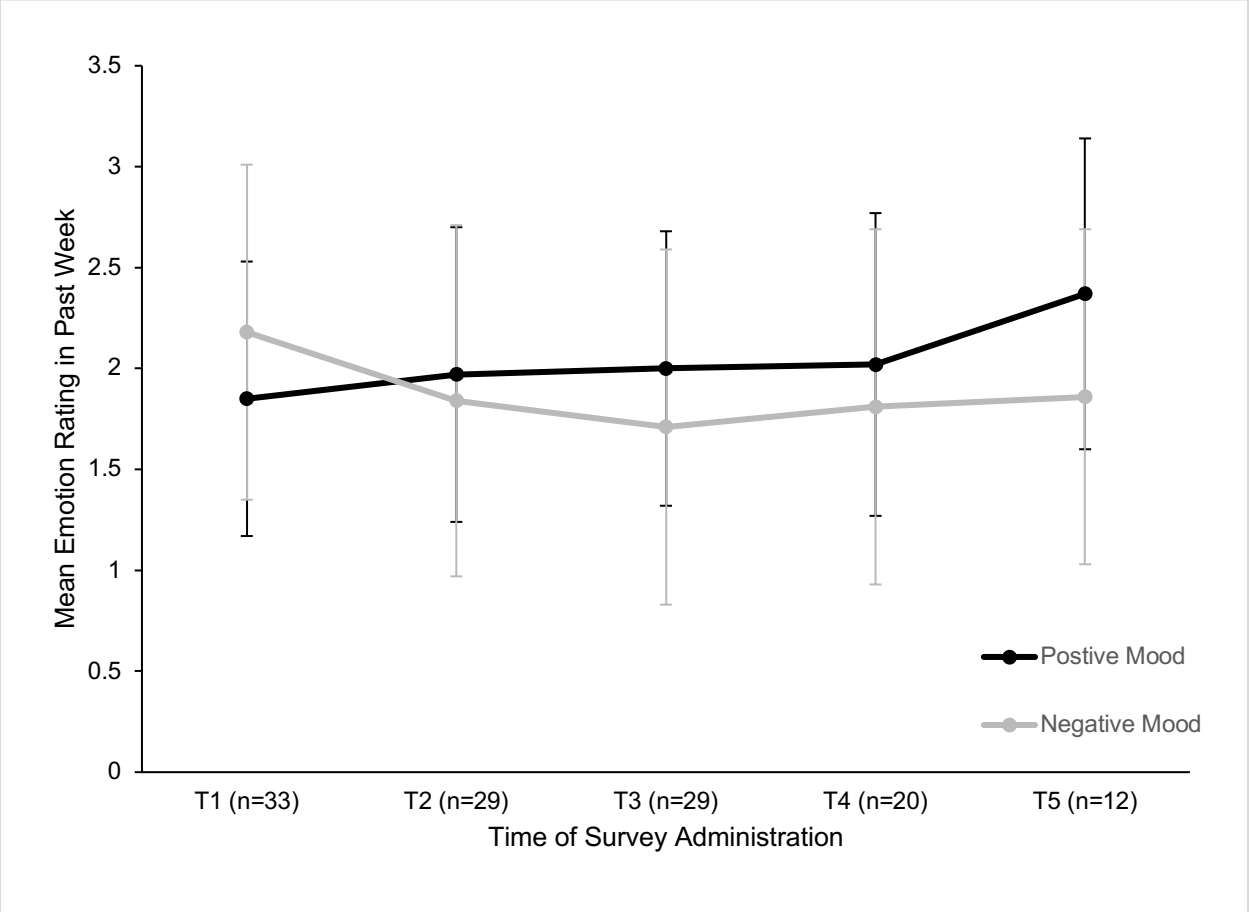

Figure 1. Mean positive and negative emotion ratings over the course of psychotherapy for participants with at least 3 time points.

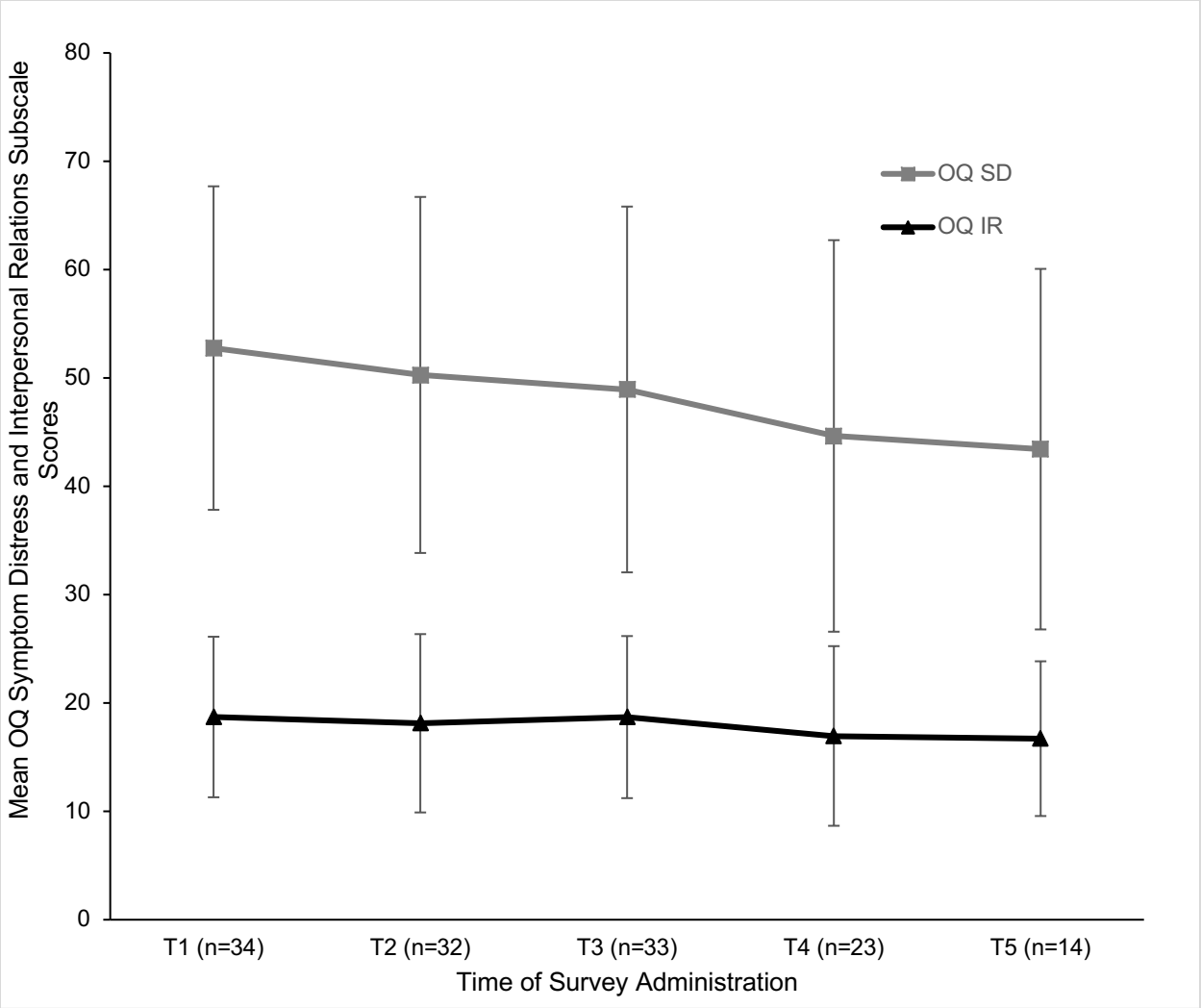

Figure 2. Mean and standard deviations for OQ symptom distress subscale score and OQ relationship functioning subscale score over the course of psychotherapy for participants with at least 3 time points.

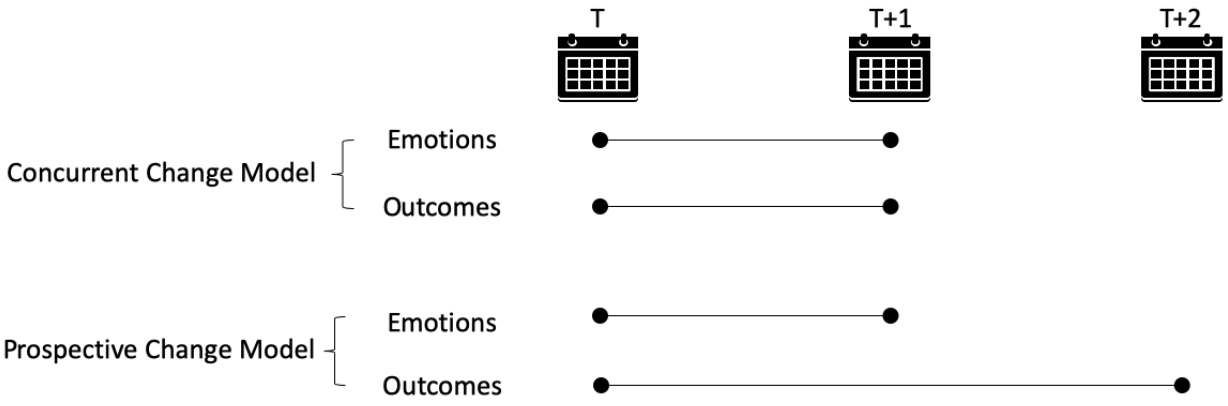

Figure 3. Timeframe differences for emotion predictors and treatment outcomes in the concurrent change multilevel model with a single lag and the prospective change multilevel model with two lags.

Table 1. Concurrent Change: Positive Emotion

	Model 1: OQ Symptom Distress	Model 2: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	10.82 (5.68)	4.65 (2.48)
Positive Emotion	-11.73*** (1.55)	-4.74*** (.80)
PE One Lag	8.28*** (1.74)	3.49*** (.88)
OQ One Lag	.83*** (.07)	.82*** (.07)
OQ Time Since Intake	.02 (.01)	.01 (.01)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 1 and the lagged variable of OQ interpersonal relations in model 2. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Table 2. Concurrent Change: Negative Emotion

	Model 3: OQ Symptom Distress	Model 4: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	1.66 (3.42)	1.08 (1.62)
Negative Emotion	9.30*** (1.35)	3.38*** (.70)
NE One Lag	-4.30** (1.51)	-1.95** (.73)
OQ One Lag	.73*** (.08)	.77*** (.08)
OQ Time Since Intake	.01 (.02)	.00 (.01)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 3 and the lagged variable of OQ interpersonal relations in model 4. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Table 3. Concurrent Change: Positive and Negative Emotion

	Model 5: OQ Symptom Distress	Model 6: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	8.21 (4.86)	3.55 (2.44)
Positive Emotion	-8.63*** (1.44)	-3.70*** (.82)
PE One Lag	6.28*** (1.53)	2.86** (.85)
Negative Emotion	6.40*** (1.20)	2.17** (.68)
NE One Lag	-3.11* (1.26)	-1.39* (.66)
OQ One Lag	.74*** (.08)	.79*** (.08)
OQ Time Since Intake	.02 (.01)	.01*** (.01)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 5 and the lagged variable of OQ interpersonal relations in model 6. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Table 4. Prospective Change: Positive Emotion

	Model 7: OQ Symptom Distress	Model 8: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	15.78 (11.89)	8.30 (4.78)
PE One Lag	-10.22*** (2.48)	-2.99** (1.10)
PE Two Lags	6.22* (2.96)	2.18 (1.30)
OQ Two Lags	.73*** (.13)	.66*** (.12)
OQ Time Since Intake	.00 (.03)	-.01 (.01)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 7 and the lagged variable of OQ interpersonal relations in model 8. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Table 5. Prospective Change: Negative Emotion

	Model 9: OQ Symptom Distress	Model 10: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	5.46 (7.80)	6.87* (3.21)
NE One Lag	7.60** (2.20)	1.59 (.97)
NE Two Lags	-6.53* (2.69)	-1.49 (1.09)
OQ Two Lags	.82 * (.15)	.72*** (.14)
OQ Time Since Intake	-.02 (.03)	-.02 (.02)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 9 and the lagged variable of OQ interpersonal relations in model 10. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Table 6. Prospective Change: Positive and Negative Emotion

	Model 11: OQ Symptom Distress	Model 12: OQ Interpersonal Relations
	Estimate (SE)	Estimate (SE)
Fixed Effects		
Intercept	10.22 (11.27)	8.00 (5.01)
PE One Lag	-8.09** (2.70)	-2.73* (1.25)
PE Two Lags	5.30 (2.90)	2.06 (1.33)
NE One Lag	4.58 (2.30)	.58 (1.05)
NE Two Lags	-5.49* (2.55)	-1.03 (1.08)
OQ Two Lags	.85*** (.16)	.73*** (.14)
OQ Time Since Intake	.00 (.03)	-.01 (.02)

Note. OQ denotes Outcomes Questionnaire. PE denotes positive emotion. NE denotes negative emotion. OQ One Lag corresponds to the lagged variable of OQ symptom distress in model 11 and the lagged variable of OQ interpersonal relations in model 12. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$

Measures

Scale 1. The modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh, & Larkin, 2003)

How often have you felt each of these 20 different emotions in the past week?
Ratings were made on a 5-point Likert scale (0 = *never*, 4 = *most of the time*).

Negative Emotions

1. Angry/irritated/annoyed
2. Sad/downhearted/unhappy
3. Scared/fearful/afraid
4. Disgust/distaste/revulsion
5. Contemptuous/scornful/disdainful
6. Embarrassed/self-conscious/blushing
7. Repentant/guilty/blameworthy
8. Ashamed/humiliated/disgraced

Positive Emotions

9. Grateful/appreciative/thankful
10. Interested/alert/curious
11. Love/closeness/trust
12. Amused/fun-loving/silly
13. Glad/happy/joyful
14. Hopeful/optimistic/encouraged
15. Sexual/desiring/flirtatious
16. Proud/confident/self-assured
17. Content/serene/peaceful
18. Awe/wonder/amazement

Other Emotions

19. Sympathy/concern/compassion
20. Surprised/amazed/astonished

Scale 2. The Outcome Questionnaire (OQ- 45.2; Lambert et al., 1996)

Looking back over the last week, including today, help us understand how you have been feeling. Read each item carefully and mark the box under the category which best describes your current situation. For this questionnaire, work is defined as employment, school, housework, volunteer work, and so forth.
Ratings were made on a 5-point Likert scale (0 = *never*, 4 = *always*).

Subscale: Interpersonal Relationships
1. I get along well with others.
7. I feel unhappy in my marriage/significant relationship.
16. I am concerned about family troubles.
17. I have an unfulfilling sex life.
18. I feel lonely.
19. I have frequent arguments.
20. I feel loved and wanted.
26. I feel annoyed by people who criticize my drinking (or drug use). (If not applicable, mark "never")
30. I have trouble getting along with friends and close acquaintances.
37. I feel my love relationships are full and complete.
43. I am satisfied with my relationships with others.

Subscale: Symptom Distress
2. I tire quickly.
3. I feel no interest in things.
5. I blame myself for things.
6. I feel irritated.
8. I have thoughts of ending my life.
9. I feel weak.
10. I feel fearful.
11. After heavy drinking, I need a drink the next morning to get going. (If you do not drink, mark "never")
13. I am a happy person.
15. I feel worthless.
22. I have difficulty concentrating.
23. I feel hopeless about the future.
24. I like myself.
25. Disturbing thoughts come into my mind that I cannot get rid of.
27. I have an upset stomach.
29. My heart pounds too much.
31. I am satisfied with my life.
33. I feel that something bad is going to happen.
34. I have sore muscles.
35. I feel afraid of open spaces, of driving, or being on buses, subways, and so forth.
36. I feel nervous.
40. I feel something is wrong with my mind.

41. I have trouble falling asleep or staying asleep.
42. I feel blue.
45. I have headaches.

Subscale: Social Roles
4. I feel stressed at work/school.
12. I find my work/school satisfying.
14. I work/study too much.
21. I enjoy my spare time.
28. I am not working/studying as well as I used to.
32. I have trouble at work/school because of drinking or drug use. (If not applicable, mark "never")
38. I feel that I am not doing well at work/school.
39. I have too many disagreements at work/school.
44. I feel angry enough at work/school to do something I might regret.

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