

DO YOU HAVE TO SAY IT? REFLECTION VERSUS EXPRESSION
IN COMMITTED RELATIONSHIPS

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Do You Have to Say It? Reflection versus Expression in Committed Relationships

In religious and spiritual texts, the positive impact of gratitude on well-being has been widely accepted for centuries (Emmons & McCullough, 2003). Psychological researchers, however, only recently started to examine this neglected and under explored construct (Watkins, Woodward, Stone, & Kolts, 2003). Outcome studies on gratitude interventions in relationships have demonstrated a positive association between gratitude and various relational variables (Algoe, 2012; Algoe, Haidt, & Gable, 2008; Algoe & Wade, 2014; Kubacka, Finkenauer, Rusbult, & Keijsers, 2011; Lambert & Fincham, 2011). However, few have explicitly examined how the method of gratitude expression could differentially influence the outcome (Lambert, Clark, Durtschi, Fincham, & Graham, 2010; Algoe & Wade, 2014) despite ample literature highlighting the benefits of emotional expression in relationships (e.g. Cohen, 1988; Graham, Huan, & Helgeson, 2008; Johnson, 2012; Kennedy-Moore & Watson, 2011; Kalokerinos, Greenaway, & Casey, 2017). The current study compared the outcomes of couples in three experimental conditions: an internal reflection gratitude condition, an interpersonal expression gratitude condition, and a no-treatment control condition. Overall, this study aims to add clarification to current conclusions about internal versus expressed gratitude in relationships and how the experience of gratitude influences relationship satisfaction and pro-relationship behaviors. For an extended review of the following research, see Appendix A.

Theoretical Framework

Gratitude. Defining gratitude has proven a unique challenge for researchers (Emmons & McCullough, 2003). Emmons and Mishra (2012) identified gratitude as an affective trait, mood, and emotion within the framework of Rosenberg's (1998) hierarchical levels of affective experience. In Rosenberg's proposed organization, there are broad categories of affective

experiencing, “traits” and “states”, wherein states are further broken down into “moods” and “emotions”. The organization can be conceptualized as nested, wherein traits are the broadest level, followed by moods, then emotions. The nesting is organized by temporal duration, pervasiveness in consciousness, and distributive breadth. Traits are experienced more consistently across time, are pervasive in one’s consciousness, and are applied broadly to the individual’s experience. Moods may be experienced for days or hours, influence cognitions while the mood is occurring, and apply to a more limited range of experiences (i.e., only while the mood is occurring). Emotions may be experienced for seconds to hours and are acute in their pervasiveness and application. The precise duration of moods and emotions is debated (Ekman, 1994; Frijda, 1994), though Rosenberg (1998) described a visual representation of moods and emotions as wavelengths to clarify their theoretical differences: moods were shorter, smoother waves whereas emotions were tall, narrow spikes.

The *affective trait* is defined by Rosenberg (1998) as a “stable predisposition toward a certain type of emotional responding” (p. 249), thus the trait of gratitude is described as an enduring personal characteristic that increases the individual’s likelihood of experiencing gratitude. Researchers who align with this view also posit trait gratitude predisposes some individuals to be more inclined to respond to their world with positive emotions (Graham & Barker, 1990; Wood, Froh, & Geraghty, 2010), and increases their likelihood of experiencing an *affective state* of gratitude, which can be a mood and/or an emotion. When gratitude is conceptualized as a mood, it is considered a more stable state of mind, perhaps a mental lens through which the world is viewed, that may influence an individual’s cognition (Emmons & Mishra, 2012). For instance, an individual experiencing a grateful mood may cognitively recognize that they have experienced something to be thankful for, such as a loving partner or a

sunset. Experiencing a grateful mood may trigger a variety of positive emotions including joy, happiness, or love. The emotion of gratitude refers to an acute and temporary reaction to receiving a benefit from another (Emmons & Mishra, 2012). In research, gratitude is most commonly categorized as an emotion (Algoe, 2012; Algoe, Haidt, & Gable, 2008; Emmons & McCullough, 2003), which implies gratitude occurs as a time-limited internal response and feeling. Some researchers postulate that gratitude, as an emotional response, occurs primarily in relationships and has unique social benefits (Algoe, 2012; Algoe et al., 2008; McCullough, Kimeldorf, & Cohen, 2008). Conceptualizing gratitude solely as an emotion, however, fails to fully capture the experiences of gratitude reported by participants in some research studies (e.g., Emmons & McCullough, 2003; Wood et al., 2010). In sum, perhaps it is most accurate to think of gratitude as a multifaceted construct that involves both cognition and emotion and can occur as a trait, emotion, and mood (Emmons & Mishra, 2012). Gratitude, then, is not limited to particular circumstances: it may arise in romantic relationships, during a spiritual encounter, while recalling a memory, or while taking a peaceful, solitary walk.

Researchers have operationalized gratitude in many different ways (Lomas, Froh, Emmons, Mishra, & Bono, 2014). The two most commonly used and researched gratitude measures are the Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002) and the Gratitude, Resentment, and Appreciation Test (GRAT; Watkins et al., 2003). The GQ-6 is a brief, six item self-report survey designed to measure one's perception of his/her trait gratitude on six dimensions. The GRAT is a 44-item instrument designed to measure one's trait gratitude in response to others (Wood et al., 2010) on three dimensions: resentment, simple appreciation, and social appreciation (Lomas et al., 2014). Both the GQ-6 and the GRAT have the limitation of only measuring dispositional gratitude. Therefore, when quantifying state gratitude, many

researchers adapt previously used instruments or questions (e.g., Gordon et al., 2011; Kubacka et al., 2011; Leong, 2009; McCullough et al., 2004). For example, both McCullough, Kimeldorf, and Cohen (2008) and Leong (2009) adapted a set of three questions from McCullough, Emmons, & Tsang's (2004) study to measure participant's grateful mood. Researchers may also ask participants to respond to open-ended questions, called "free-response" (Lomas et al., 2014), or respond to scenarios, called "attributional response", which allows the researcher to collect more detailed responses regarding the participant's experience of gratitude.

Although more varieties may be used in actual clinical practice, gratitude interventions explored in research fall into three categories: written, expressed, or contemplative (Davis et al., 2016; Rash et al., 2011; Wood et al., 2010). Written gratitude interventions, the most frequently researched intervention type, typically require the participant to keep a written record of gratitude at a specified interval for a specified duration (e.g., Emmons & McCullough, 2003; Froh, Sefick, & Emmons, 2008; Seligman et al., 2005). Expressed gratitude interventions commonly require participants to verbally disclose gratitude to another individual for a specified amount of time at a specified interval for a specified duration (e.g., Algoe et al., 2013; Gordon et al., 2012; Lambert & Fincham, 2011; Wood et al., 2010). Contemplative gratitude interventions, in the few studies they have been examined, typically involve participants spending a period of time mentally contemplating gratitude before engaging in another activity or behavior, such as writing or telling someone about what they appreciate (Rash, Matsuba, & Prkachin, 2011).

Researchers who explored gratitude interventions have primarily focused on populations of individuals (e.g., Boehm, Lyubomirsky, & Sheldon, 2011; Emmons & McCullough, 2003; Froh et al., 2008; Seligman et al., 2005), or casual or acquaintance relationships (e.g., McCullough et al., 2008). However, the benefits of gratitude have powerful implications for

more intimate relationships like friends and romantic partners (Algoe et al., 2008; Gordon et al., 2011; Joel et al., 2013; Lambert & Fincham, 2011). Gratitude expression is viewed as uniquely potent in the *find-remind-and-bind* theory of gratitude (Algoe, 2012), which is conceptualized in the overarching theory of communal relationships (Clark & Mills, 1979; 2011), as described in the upcoming sections. Specifically, Algoe (2012) argues the act of directly expressing gratitude (a) leaves less room for ambiguity (Algoe & Stanton, 2012), (b) triggers responsiveness from the recipient (Algoe, Fredrickson, & Gable, 2013), and (c) encourages partners to see their relationship as more “communal” (Lambert, Clark, Durtschi, Fincham, & Graham, 2010). In the following sections, the theory of communal relationships (Clark & Mills, 1979; 2011) and the *find-remind-and-bind* theory of gratitude (Algoe, 2012) are described, with relevant research presented throughout. Then, studies that directly compared relational gratitude interventions are reviewed and discussed, leading to the research questions and hypotheses of the current study.

Theory of Communal Relationships. Clark and Mills (1979; 2011) proposed the theory of communal relationships as a framework for researchers to use when studying social bonds. In their theory, the authors challenge the idea that one set of social rules governs all social relationships (see for example, equity theory, Adams, 1965) and instead suggest relational rules and norms change depending on the nature of the relationship. This distinction of relationship categories allows researchers to have a more complete understanding of why certain behaviors, like gratitude expression, may benefit certain relationships but not others. The two categories of relationships described by Clark and Mills (1979; 2011) were exchange relationships and communal relationships.

Exchange relationships are dependent on the giving and receiving of benefits, where benefits are anything that positively impacts the wellbeing of the recipient (Clark & Mills, 1979;

2011). A hallmark characteristic of exchange relationships is the “record keeping” of given and received benefits; that is, when an individual feels they have given more than they have received, they are less motivated to continue the relationship (Clark, 1984; Clark et al., 1986). A feeling of indebtedness, or obligation to repay a benefit, often motivates recipients to repay the benefit and drives exchange relationships to be mutually beneficial.

Unlike exchange relationships, communal relationships are not based on equal benefit exchange (Clark & Mills, 1979; 2011). Rather, benefits given in communal relationships are not expected to be repaid. Though it is possible the giver of the benefit may hope the recipient responds by repaying the benefit at some point, the continuation and quality of the relationship is not contingent upon equal or immediate benefit repayment. Researchers found individuals who expected a communal relationship liked a confederate *less* when the confederate exhibited exchange norms like immediate benefit repayment (Clark, 1984; Clark & Mills, 1979; Clark, Mills, & Powell, 1986; Clark, Mills, & Corcoran, 1989) and were not bothered when a benefit was not repaid (Clark & Waddell, 1985). Communal relationships may be asymmetrical, such as the relationship between most parents and children, or symmetrical, such as many romantic relationships.

Romantic relationships are not inherently communal, and should not be assumed to be communal. However, it can be argued that the thoughts and behaviors of partners in healthy, non-distressed marriages align with communal norms (Clark & Mills, 2011), as the practice of keeping track of costs and benefits in long term intimate relationships is both taxing and unhelpful. Married participants in two separate studies rated communal norms as ideal for their marriage, and rated exchange norms as less desirable (Clark, Lemay, Graham, Pataki, & Finkel, 2010; Grote & Clark, 1998). Though spouses may waiver from their communal ideals when

distressed (Grote & Clark, 2001) or insecure (Clark et al., 2010), participants overwhelmingly identified themselves as working to adhere to communal norms in healthy romantic relationships. Further, perceiving a relationship as communal may also influence how partners perceive one another, serving as a buffer against expressions of anger (Yoo, Clark, Lemay, Salovey, & Monin, 2011).

Gratitude in relationships can be considered a benefit offered in communal relationships as it does not rely on being “repaid” to be positively experienced. Hypothetically, gratitude may promote continued communal relationship norms because grateful recipients, despite feeling no obligation, may return the benefit through increased responsiveness to the needs of the giver (Algoe, 2012). Lambert and colleagues (2010) found, in a series of three studies, that gratitude expression was positively associated with the expressers rating of communal strength for that relationship. Gratitude is also distinct from indebtedness (Tsang, 2006a; 2007). This distinction may demonstrate that gratitude does not primarily operate through obligation to reciprocate, which would likely negate any benefit of gratitude. Thus, gratitude may contribute to the communal strength of romantic relationships, which could improve couples experience and perception of their relationship. The unique importance of gratitude expression between partners and the resulting relational benefits are detailed further below within the *find-remind-and-bind* theory of gratitude (Algoe, 2012).

Find-Remind-and-Bind Theory of Gratitude. Algoe (2012) developed the *find-remind-and-bind* theory of gratitude under the umbrella of the theory of communal relationships (Clark & Mills, 1979; 2011). The author focuses on gratitude as a positive emotion and posits that positive emotions, from an evolutionary perspective, serve to strengthen our relationships with responsive partners. In line with this theory, partners who are responsive to the needs of others

are valuable because human beings are interdependent. When one perceives a partner as caring, understanding, and responsive, he/she is more likely to experience gratitude, and may then respond to the partner in a positive and relationally beneficial way (Algoe 2012; Fredrickson, 2001). Thus, Algoe (2012) proposed gratitude helps people *find* previously unnoticed relationship partners, *remind* them of positive partners already in their life, and *bind*, or bond, with those to whom they are grateful. This theory is used to guide the research questions and exploration of gratitude throughout the current study.

Gratitude expression. The expression of deeply felt emotions to a receptive partner has been found to be healing for couples who are clinically distressed for several reasons (Makinen & Johnson, 2006; Soltani, Shairi, Roshan, & Rahimi, 2014). Outside of dyads, emotion expression has generally demonstrated a multitude of social benefits, including greater social desirability and acceptance, improved health, and better emotional adjustment (Argyle & Martin, 1991; Cohen, 1988; House, Landis, & Umberson, 1988; Myers, 1992; Kalokerinos, Greenaway, & Casey, 2017). Relationships with a lack of emotional expression and understanding, such as the case in which one partner has alexithymia, are associated with lower relational satisfaction, sexual satisfaction, marital adjustment, and marital satisfaction (Cordova, Gee, & Warren, 2005; Epozdemir, 2012; Humphreys, Wood, & Parker, 2009; Kim, Lee, & Park, 2011; Yelsma & Marrow, 2003). Expression of emotions in romantic relationships opens the door for compassion, responsiveness, acceptance, and connection (Cordova, Gee, & Warren, 2005; Makinen & Johnson, 2006; Johnson, 2012).

In the *find-remind-and-bind* theory (Algoe, 2012) and theory of communal relationships (Clark & Mills, 1979; 2011), the interpersonal expression of gratitude is proposed to have benefits beyond simply experiencing gratitude for three reasons (Algoe, 2012). First, the direct

expression of gratitude leaves less room for ambiguity between partners. That is, when partners express their gratitude openly to one another, the significant other can be certain their partner appreciates them or feels positively about them. Algoe and Stanton (2012) studied women with breast cancer and found gratitude expression was associated with increased perception of social support. Second, gratitude expression is proposed to trigger the recipient to be more responsive to the needs of the expresser (Algoe, 2012). In previous literature, emotion expression has been found to “soften” the receiving partner, which is observed through increased responsiveness and caring toward the expresser (Donnelly & Murray, 1991; Makinen & Johnson, 2006). Algoe, Fredrickson, & Gable (2013) asked couples to express gratitude, as well as good and bad events, within a laboratory setting. The authors found the expresser’s rating of perceived partner responsiveness following a gratitude expression to a romantic partner in a laboratory setting predicted improvements in the expresser’s rating of relationship quality over six months ($d=.52$ to $d=.47$ at six months). Relationship quality was not associated with partner responsiveness following disclosure of positive and negative events, supporting that gratitude may uniquely trigger partners to respond to one another. The association between gratitude and relationship maintenance behaviors also demonstrates the connection between gratitude expression and responsiveness in relationships, as explored further below. Finally, gratitude expression may contribute to the communal strength of a relationship (Algoe, 2012), as previously discussed.

Clearly, a body of evidence supporting the benefit of expressing gratitude in relationships is accumulating. Expressed gratitude has been associated with positive relationship outcomes including increased relationship satisfaction, commitment, and stability (Algoe et al., 2010; Barton, Futris, & Nielsen, 2015; Gordon, Impett, Kogan, Oevis, & Keltner, 2012; Joel, Gordon, Impett, Macdonald, & Keltner, 2013). More recently, gratitude expression was found to promote

and protect marital quality in the midst of relationship duress triggered by financial distress (Barton et al., 2015). Taken together, these findings demonstrate the benefits of gratitude in close relationships and provide support for the proposition that it assists in *finding* partners, *reminding* of positive qualities in existing partners, and *binding* partners closer.

Gratitude and relationship maintenance behaviors. Gratitude has also been linked to an increase in pro-relationship behaviors which sustain positive relationships (Dainton & Stafford, 1993; Kubacka et al., 2011), also referred to as relationship maintenance behaviors. Relationship maintenance behaviors vary from simple tasks, such as habitually taking out the trash every Tuesday, to strategic, situation-specific approaches like taking extra time to talk to a partner after a hard day. These pro-relationship behaviors are often the foundation of positive, lifelong bonds (Adams & Baptist, 2012; Dainton & Stafford, 1993). Relationship maintenance behaviors are predictive of liking one's partner, relationship satisfaction, and commitment (Adams & Baptist, 2012; Canary & Stafford, 1992; Ramirez, 2008; Stafford, 2003; Weigel & Ballard-Reisch, 2008), while an absence of these behaviors could predict relationship termination (Guerrero, Eloy, & Wabnik, 1993). In the *find-remind-and-bind* theory (Algoe, 2012), relationship maintenance behaviors are hypothesized to result after gratitude expression because the expression may trigger, or *remind*, the recipient to be responsive (thus *binding*) to their partner's needs in the future.

Kubacka et al. (2011) found evidence for this reciprocal relationship between gratitude and relationship maintenance behaviors (RMBs). In their study, gratitude was experienced as a response to RMBs, and experiencing gratitude then motivated the partner to respond with more RMBs, which then continued as a reciprocal cycle. This proposed relationship aligns well with the *remind* and *bind* components of Algoe's (2012) find-remind-and-bind theory of gratitude, as

the positive response to relationship behaviors *reminds* individuals of their partner, and then serves to further *bond* the partners by promoting additional RMBs. However, gratitude expression was not explicitly examined by Kubacka and colleagues. Relatedly, Joel, Gordon, Impett, MacDonald, and Keltner (2013) examined the relationship between relationship investment, gratitude, and commitment. The authors found gratitude actually mediates the relationship between perceived partner investment and commitment. Specifically, those who were grateful toward their partners and perceived them as strongly invested in the relationship had higher levels of commitment at a nine-month follow-up period than those who did not report experiencing gratitude for their partners, even after controlling for the baseline measures of commitment. Again, gratitude expression was not explicitly examined in this study. Studying the relationship between expressed gratitude and relationship maintenance behaviors would add clarity to the propositions of the find-remind-and-bind theory that expressing gratitude is more beneficial than simply experiencing gratitude in relationships.

Overall, there is evidence gratitude may benefit relationships through secondary effects of reminding partners to engage in more positive behaviors toward their partners, which then may lead to other bonding, pro-relationship responses (Algoe et al., 2008; Joel et al., 2013; Kubacka et al., 2011), as proposed in the find-remind-and-bind theory (Algoe, 2012). More evidence examining the connection between pro-relationship behaviors and gratitude expression is needed to clarify the current conclusions.

Comparing Relational Gratitude Interventions. Both the find-remind-and-bind theory of gratitude (Algoe, 2012) and the theory of communal relationships (Clark & Mills, 1979; 2011) postulate gratitude expression is uniquely beneficial in close relationships, yet direct, experimental comparisons of expressed and reflected gratitude interventions are limited. Direct

comparisons between the intervention types are valuable, as they may confirm or challenge the hypotheses of the find-remind-and-bind theory of gratitude (Algoe, 2012), which could ultimately lead to new understanding of how gratitude functions in communal romantic relationships. To-date, three studies have directly compared expressed and reflective gratitude interventions in romantic relationships. The first, a dissertation by Leong (2009), heavily influenced the methodology and design of the current study though it is not a replication. The second study is yet another dissertation based on DeMoss's (2004) work (Roland, 2009), and the third compared gratitude experiences in long-term relationships (Gordon, Arnette, & Smith, 2011).

Leong (2009) conducted a longitudinal comparison of internally reflected versus externally expressed gratitude interventions using 100 couples in Hong Kong. The study was done in three parts. The first two parts were designed to collect baseline information about gratitude in marriages. In the third part of the study, couples were assigned to either an internal gratitude reflection group or an expression group. Both members of the couples were instructed to complete all the measures in the study, but only one member of the couple was the "actor." The "actor" was designated to directly participate in the intervention and was given explicit instructions. Leong chose to have participants fill out the Gratitude Questionnaire, a measure of trait gratitude (McCullough et al., 2002), as well as answer questions about state gratitude (or grateful mood). Leong hoped to determine if grateful disposition was a covariate of the gratitude intervention (Leong, 2009), as McCullough, Tsang, and Emmons (2004) proposed. The participants in Leong's (2009) gratitude reflection group were given a journal and instructed to write one thing about their partner they were grateful for each day for two weeks. The participants in the reflection condition were also asked not to share their journals or the

information with the other partner. Participants in the expression group were asked to think about something specific about their partner they were grateful for and then verbally express it at least four times or more over the course of two weeks, recording each expression in a journal to provide a log of participation.

The results of Leong's (2009) study indicated a partner's participation in gratitude journaling or expression had comparable, positive outcomes on a spouse's grateful mood. This finding contrasts the find-remind-and-bind theory hypothesis that expression is a more positive means of experiencing relational gratitude (Algoe, 2012). Self-reported grateful mood was also significantly predictive of relationship satisfaction, though the author pointed out the effect was "weak" ($d = .14$). Perceiving one's partner as high in grateful mood was most significantly predictive of relationship satisfaction. Interestingly, the author also found perceiving a partner's expression as insincere was associated with a decrease in satisfaction. The consequence of perceiving a partner as insincere may be a fault of expression that journaling or reflection does not have. When studying emotion expression, others found expression was most beneficial if both partners were engaged; that is, if the expresser is sincere and vulnerable and the receiver demonstrates genuine care (Makinen & Johnson, 2006). Altogether, the results of Leong's (2009) study challenge the *find-remind-and-bind* theory's postulation that gratitude expression benefits relationships more than reflection, but the results are not enough to conclude that Algoe's (2012) theory is moot. Leong applied a Western construct to an Eastern population and did not describe any steps taken to assess the cultural applicability of the construct or measures (e.g. Gerstein & Aegisdottir, 2007). Similarly, the results obtained in an Eastern sample may be very different than those from a Western sample, so further study is merited simply based on the population. The author also only instructed one partner of each dyad to directly participate in the

intervention, so it is possible that having both members of the couple participate could impact the results.

In a slightly different study, Roland (2009) had 12 couples either participate in a gratitude expression or a reflection condition. In the expression condition, participants were asked to give their partner five daily praises and limit daily criticisms to just one, which the partners logged independently and were not to show one another. Couples in the reflection condition simply kept a log of all praise and criticism statements. In the end, couples experienced increased gratitude ($d=.11$) but not relationship satisfaction, affective communication, global distress, or problem-solving which challenges the *find-remind-and-bind* theory (Algoe, 2012) as well as DeMoss's (2004) original research. The results were questionable, though, as it is possible that gratitude was not always the emotion occurring because the authors' instructions to discuss "statements of praise" may not have resulted in gratitude. Therefore, the current study improves upon this study by having a more intentional focus on cultivating and measuring gratitude. More importantly, tracking and monitoring statements of criticism also may have significantly influenced the results, as instructing participants to focus on criticism in any way could interfere with the hypothesized benefit of gratitude. Finally, the author did study the dyad, but did not mention any of the interdependence issues that may occur when analyzing dyadic data and did not control for interdependence in their analysis.

In the most recent study that directly compared expressed and reflected gratitude, Gordon, Arnette, and Smith (2011) recruited couples in "long-term marriages" (mean 20.7 years) and instructed participants to engage in a daily journaling task where they were assigned questions about internal and expressed gratitude in their relationship. In contrast to their hypotheses, the authors found the inward experience of gratitude was more strongly related to

marital happiness (gratitude $d = .52$, relationship satisfaction $d = .25$). This finding is not aligned with the *find-remind-and-bind theory* of gratitude (Algoe, 2012), which posited the expression of gratitude in relationships is powerful because it is less ambivalent and thus may trigger more positive responses (Algoe & Haidt, 2009; Lambert, Clark, Durtschi, Fincham, & Graham, 2010; Lambert & Fincham, 2011). Gordon et al. (2011) speculate the effect could have been the result of grateful disposition, rather than the emotion of gratitude, and encouraged future researchers to continue comparing the two types of interventions (Gordon et al., 2011).

Conclusion. In sum, more research is needed to compare intervention types and determine how gratitude functions in romantic relationships. There is evidence that gratitude expression may benefit close relationships (Algoe, 2012; Algoe & Stanton, 2012; Algoe et al., 2010; Algoe et al., 2008; Kubacka et al., 2011), particularly when compared to couples who are not participating in a gratitude intervention (DeMoss, 2004). Relational gratitude has been associated with pro-relationship behaviors (Joel et al., 2013; Kubacka et al., 2011) and relationship satisfaction (Algoe et al., 2008; Gordon et al., 2011; Leong, 2009). More evidence is needed to clarify how these associations relate to the find-remind-and-bind theory's proposition that gratitude expression is beneficial because it is unambiguous, triggers benefit recipients to be more responsive (such as though relationship maintenance behaviors) and promotes communal relationships (which then lead to greater relationship satisfaction). Direct comparisons of gratitude expression and gratitude reflection (Gordon et al., 2011; Leong, 2009; Roland, 2009) have challenged the find-remind-and-bind theory propositions that gratitude expression is uniquely beneficial in romantic relationships, but further examination of these studies reveals possible limitations that could have significantly influenced the results or generalizability. Additionally, many of the studies examining the impact of gratitude expression only implement

the intervention on one member of the couple (Leong, 2009; Lambert & Fincham, 2011), or do not account for the interdependence of analyzing dyadic data (Roland, 2009). Thus, the find-remind-and-bind theory's position on gratitude expression should not be deemed disproven until further evidence has been gathered.

The current study sought to clarify claims of the *find-bind-and-remind* theory of gratitude (Algoe, 2012) and improved upon methodology from previous relational gratitude intervention studies. In this study an experimental design procedure was implemented with nonclinical, committed couples to compare two gratitude interventions and a no-treatment control condition. Couples who had been either cohabitating or married for more than two years were specifically selected, as Kammrath et al. (2015) found that couples who have been in a relationship for 1.5 to 2.5 years and beyond more easily and automatically engage in communal relationship behaviors. Thus, couples in the current sample were assumed to be engaging in more communal norms than those in newer relationships, which provided a more complete exploration of how gratitude may impact communal relationships as posited in the *find-remind-and-bind* theory (Algoe, 2012). Both members of the couple were given the intervention so the researcher could examine how couples influence one another, as suggested by Lambert and Fincham (2011). Based on previous suggestions, an expression condition that mimicked naturally occurring gratitude expression was implemented (Algoe et al., 2013) to test Algoe's (2012) proposition that gratitude expression is more beneficial for relationships than internally experienced gratitude.

Study Hypotheses

In the present study, three couples intervention groups (interpersonal gratitude expression, intrapersonal gratitude reflection, and a no-treatment control group) were directly compared. Data were analyzed using multilevel modeling, which effectively handles the

interdependence and nested structure of dyadic data (Kenny et al., 2006). Pre-post questionnaires were used to assess impact of the 14 day, daily gratitude interventions on state gratitude, relationship maintenance behaviors, and relationship satisfaction, as aligned with the find-remind-and-bind theory of gratitude (Algoe, 2012). Grateful disposition was examined as a covariate, as high levels of grateful disposition have been associated with higher state gratitude (Gordon et al., 2011). The researcher hypothesized both gratitude intervention groups would have significantly higher state gratitude, relationship maintenance behaviors, and relationship satisfaction compared with a no-treatment control group, even after controlling for grateful disposition as a covariate of grateful mood (HYP1). Second, it was hypothesized that gratitude expression would lead to significantly higher outcomes than gratitude reflection on all three variables, with grateful disposition as a covariate of grateful mood (HYP2).

METHOD

Pilot Studies

Two pilot studies were conducted to assess the accessibility, usability, and confidentiality of the technology in the current study. A convenience sample of graduate students were sent daily survey links via automated emails for one week to test the survey platform and email reliability. The participants provided positive feedback about the convenience and usability of the emails and the electronic survey platform. The pilot studies helped the researcher confirm that Qualtrics, (Version 2017 – 2018, Provo, UT) combined with automated emailing were effective in disseminating the study information to participants. Tracking participation via Qualtrics had many advantages. First, Qualtrics provided timestamps for participation, so the researcher was able to track when the couple participated. Second, Qualtrics is a user- and researcher-friendly online survey company that the IRB is familiar with. Third, using randomly-

assigned identification names for each couple allowed for confidentiality and easy tracking of both members' data. Finally, the answers to the daily questions provided qualitative data that could be available for transcription and analysis in a future study. See Appendix B for more detailed information on the pilot studies and procedures.

Main Study

Participants. Requirements for couples to participate in the study were: (a) over 18 years of age, (b) either married or cohabitating in a monogamous, heterosexual relationship for more than 2 years, (c) willing to engage in the assigned task daily for two weeks, (d) daily access to an individual smartphone or computer for the two-week duration of the study, (e) daily access to an individual email account to receive the links to the electronic study questionnaires, and (f) general comfort using technology as part of the intervention. Couples were asked to not participate if both members were not equally willing or if they could not commit to the required two weeks. The study protocol, including all revisions, were approved through the social and behavioral science IRB at the affiliate university of the researcher (see Appendix C for all IRB documents).

The final sample included $N = 37$ couples, with $n = 14$ expression couples, $n = 12$ reflection couples, and $n = 11$ control couples. Couples were all married or cohabitating for at least 2 years with length of partnership ranging from 2 to 45 years ($M = 12.11$; $SD = 10.424$). On average, participants were aged 34.5 years ($SD = 10.8$, range = 23 to 73 years) and half of the couples had children. Couples mean distress score, as reported on a one-item, face valid question about relationship distress they are currently experiencing, was 2.73 on a scale of 1 to 5 ($SD = .804$). The average pre-test score on the Revised Dyadic Adjustment Scale (RDAS; Busby et al., 1995) was 51.20 ($SD = 6.17$), which is above the nonclinical cutoff of 47.31 (Anderson et al.,

2014). Twenty-seven individuals (23%) reported relationship distress levels at or below (meaning more distress) the clinical cutoff of 47.31 ($M = 42.59$, range = 32 to 47), and the rest of the participants reported scores at or above 47. Ten of the 27 individuals who reported clinical distress did not complete the study. Out of 14 possible intervention days, expression couples participated an average of 10.5 days (females=11 days, males=10 days) and reflection couples participated an average of 12 days (females=13 days, males=11 days). The couples who did not complete the study were, on average, 5 years younger than study completers ($F=5.839$, $t=-2.591$, $p=.011$; mean difference=-4.924) and had been in their relationships for about 5 years less ($F=8.414$, $t=-2.658$, $p=.009$; mean difference = -4.825) but had similar levels of reported distress ($F=1.458$, $t=1.853$, $p=.066$).

Sample size and power. Estimating sample size in multilevel modeling (MLM), also known as hierarchical linear modeling (HLM), is uniquely challenging. To determine the appropriate sample size for the current study, Maas and Hox's (2005) simulation study for multilevel modeling was referenced. In estimating the anticipated effect size for the primary analyses—the impact of gratitude expression on relationship satisfaction—a small effect size of $d = .28$ (Cohen, 1988) was calculated by averaging weighted effect sizes from other similar studies (Algoe et al., 2013; Gordon et al., 2011; Lambert & Fincham, 2011; Leong, 2009; Roland, 2009). The estimated effect size for the impact of gratitude expression on relationship maintenance was $d = .53$. Maas and Hox (2005) determined a sample of 30 units of analysis at the second level of MLM, be they groups or couples or individuals, is adequate to establish power of .80, and 50 units is ideal. Therefore, a goal sample size of approximately 51 couples, 17 couples per group, was estimated to be ideal to establish power.

Currently, a sample size of 51 dyads unachievable, though the total sample ($N=37$ dyads) was above Maas and Hox's (2005) recommended minimum of 30 Level 2 units of analysis. Scholars have recognized the difficult task of dyadic recruitment and retention, especially in experimental research (Kenny et al., 2006; Witternborn et al., 2014). Some have also questioned if standard power estimation techniques are effective in multilevel modeling (Bartle-Haring, Shannon, Bowers & Holowacz, 2016; Fields, 2010; Heck, Thomas, & Tabata, 2014; Kenny et al., 2006). Because of these challenges, other methods of increasing power have been suggested including implementing appropriate research design, applying theoretically sound analytic strategies, and properly using fixed or random effects within the model itself (Kenny et al., 2006; McClelland, 2000; Bartle-Haring, 2016). Due to the smaller sample size of the current study, traditional power analyses were very likely to be insufficient. The current study focused on increasing power through applying theoretically sound analytic strategies and research design as recommended by other dyadic researchers (Bartle-Haring et al., 2016; Kenny et al., 2006).

Procedure

The steps of the procedure, including intervention implementation, sample size and power estimates, recruitment, instruments, and data analysis, are reviewed in this section. Complications in recruitment necessitated revisions to the procedure which are clarified throughout this section. All interventions and questionnaires in the current study, as indicated by the pilot study, were completed via the survey platform Qualtrics (Provo, UT, 2017-2018).

Intervention. The purpose of the study was to compare two versions of a gratitude intervention, external discussion and internal reflection, with a no-treatment control group. The intervention was designed to mimic naturally occurring gratitude, thus participants completed all parts of the study and the intervention in their home or other chosen setting. Participants were

randomly assigned to their intervention group via random group assignment sequence created by the researcher. Both intervention groups were instructed to answer four questions, which were modeled after gratitude questionnaires from previous studies (Emmons & McCullough, 2003; Leong, 2009; see Appendix J), daily for 14 days. Examples of the question prompts, modified from Emmons and McCullough's (2003) gratitude study, include, "Think of a way your partner made you happy today. What did they do? Why did this make you happy?", "Take a few moments to come up with three things you are grateful for about your partner. Why are you grateful for these things?", and "Take a few moments to think about something you could do that you know your partner would appreciate. How could you do this in your relationship right now?". The two-week intervention time frame was implemented based on previous relational studies of gratitude interventions (Gordon et al., 2011; Leong, 2009; Roland, 2009). Gratitude interventions are often very brief, lasting only minutes to hours (e.g., a gratitude letter (Davis et al., 2016; Seligman, 1995), thus a two-week gratitude intervention was intended to be a more longitudinal experience with an intentional and repetitive focus on expressing or reflecting upon relational gratitude.

Participants in the expression group were sent an email, with both partners attached, which asked them to discuss the questions together for 5 to 10 minutes each day. After discussing the questions participants completed the questionnaire via Qualtrics (Provo, UT, 2017–2018), filling in their individual answers they had discussed. Participants in the reflection group were sent individual emails and instructed to answer the daily questions in Qualtrics independently for 14 days. Reflection couples were asked to refrain from discussing the questions with one another. The primary difference between the discussion and reflection groups was (a) whether or not they discussed the questions and (b) whether emails were sent together or

separate. There was also a no-treatment control group whose data were the baseline for statistical comparison.

Once eligible couples contacted the researcher, they received an initial email containing (a) their group assignment, (b) the informed consent, (c) their study identification numbers, and (d) a link to the initial questionnaires measuring state gratitude, grateful mood, relationship satisfaction, and relationship maintenance behaviors. In an effort to increase participation and decrease attrition, participants in the expression and reflection intervention groups were sent daily reminder emails containing (a) their study identification number and (b) a link to the daily questionnaire. The researcher used automated, pre-scheduled emails which were delivered at the participants preferred time of day. After fourteen days, all participants received a final email for the study which contained (a) their study ID's and (b) a link to the final questionnaires measuring relationship satisfaction, grateful mood, and relationship maintenance behaviors. The final questionnaire also had a question inquiring where couples would like to allocate their \$10 donation incentive. The intervention did not change throughout the entire study, though other changes to the procedure occurred.

Recruitment and data collection. One of the primary procedural changes was recruitment. In the first version of the procedure, recruitment was primarily through chain-referral sampling emails (Heckathorn, 2011). The researcher also attempted to get permission from local churches to recruit through verbal or written announcements but was denied access/not responded to by 5 of 7 churches contacted, thus did not utilize this sample. Interested couples were asked to email the researcher to schedule a video meeting. During the meeting, couples completed the initial assessments and were informed of their intervention tasks for the study. For many couples, the amalgamation of (a) scheduling via email and (b) a 40 minute

Skype meeting was onerous and inhibited participation. Sixteen couples were recruited over a period of eight months utilizing this procedure.

A slow pace of recruitment and high cost of time for both the researcher and interested participants compelled procedural modifications. After obtaining IRB approval, the researcher modified the procedure to include (a) expanded recruitment and (b) dissemination of study information through three instructional videos, one for each intervention group (expression, reflection, and control). The researcher recruited through Facebook posts on both her personal page and public pages geared toward relationships. The personal page post was shared over 40 times to obtain a convenience sample. Interested couples were instructed to email the researcher directly. The researcher responded to interested couples with (a) a link to the instructional video, (b) group assignment, (c) randomly generated identification numbers, (d) a link to the initial questionnaires, and (e) a copy of the informed consent (see Appendix G). Couples were asked to notify the researcher after they had completed the initial questionnaires to (a) confirm their completion and (b) provide a time of day they would like their follow-up emails sent. Couples were then emailed the appropriate intervention links for their assigned group. A majority of participants were recruited within a 4-month time period, from January to April 2018. Overall, zero couples were recruited from churches, 16 couples were recruited from chain referral sampling, and 95 couples were recruited from social media.

Participant flow. One-hundred eleven couples contacted the researcher with interest in the study. Sixteen couples were recruited via chain-referral email sampling from April 2017 to November 2017, while the remaining 95 were recruited from January to April 2018 via social media posts. Participants were randomly assigned to each of the three intervention groups, totaling 37 couples per group. Fifty-six couples and eight individuals completed the initial

questionnaire, reduced to 39 couples and one individual who completed the final questionnaire after the two week intervention period. Fourteen completer couples were recruited from chain-referral emails, and the remaining 25 were recruited via social media. One couple who completed the final questionnaire did not have any data from the initial questionnaire, and another couple who completed the final questionnaire had only one partner's data from the initial questionnaire, thus their data were removed from the final analysis.

The incentive offered for participation was a \$10 donation to a charity of the couple's choosing. Though researchers have not specifically explored incentives for dyadic research, current survey recruitment literature proposes small rewards, altruistic appeal, an enjoyable task, and feeling "needed" may serve to increase participant recruitment under Influence Theory (Dillman & Smyth, 2014). Thus, the donation served as an incentive and token of gratitude for participating in the study, ultimately contributing to over \$300 donated to various charities and organizations.

Instruments

A number of assessments were completed by participants throughout the study. All participants completed the informed consent, initial demographics questionnaire (see Appendix E), the Revised Dyadic Adjustment Scale (Busby et al., 1995; see Appendix F), the Gratitude Questionnaire (GQ-6; Emmons et al., 2002; see Appendix G), the measure of grateful mood for self and spouse (Leong, 2009; McCullough et al., 2004; see Appendix H), and the Relational Maintenance Behavior Measure (Stafford, 2010; see Appendix I), which are described below. The measures were randomly ordered in Qualtrics. The no-task control group completed only the pre- and post-assessments, while both intervention groups completed the pre- and post-assessments as well as daily questionnaires (see Appendix J).

Dispositional gratitude. The GQ-6 is a brief, 6-item self-report questionnaire that uses Likert-type scaling from 1 (strongly disagree) to 7 (strongly agree) designed to measure individual differences in dispositional gratitude. The scale is made of statements for the participant to respond to, such as “I am grateful for a wide variety of people.” Higher scores indicate greater gratitude experienced. All the items on the GQ-6 loaded onto one factor, and the items demonstrated high internal consistency ($\alpha = .82$). Responses to the GQ-6 had a strong correlation with a list of positive emotion words ($r = .75$) and other theoretically related constructs such as positive affect ($r = .53$), life satisfaction ($r = .53$), and spiritual transcendence ($r = .53$) (McCullough et al., 2002).

Grateful mood of self and partner. This measure was used to assess pre- and post-intervention grateful mood. State gratitude, or grateful mood, is most frequently assessed by examining the influence of grateful mood on varying outcome measures (Lomas et al., 2014), such as relationship maintenance behaviors and relationship satisfaction in this study, and thus does not have a psychometrically validated instrument. However, directly assessing grateful mood could help determine if one or both interventions were correlated with an increase in the participants state gratitude. Therefore, in the absence of a psychometrically valid measure of state gratitude, grateful mood of self and partner was measured in the same way Leong (2009) used in their experimental design (based on McCullough et al., 2004).

During the two assessment points, participants were given a retrospective measure that assessed grateful mood through three face-valid items: “grateful,” “thankful,” and “appreciative.” Participants were instructed to “indicate to what extent you felt this way during the past two weeks” and “indicate to what extent you believe your partner felt this way during the past two weeks” using a 5-point Likert-type scale (1 = very slightly or not at all; 5 =

extremely) (Leong, 2009; McCullough et al., 2004). In the current study, only the participants' grateful moods were examined as outcome variables, though the gratitude of the spouse may be examined further in other studies. Leong (2009) reported high internal consistency of the scales across three time points ($\alpha = .92-.96$), as did McCullough and colleagues (2004) over a 21-day time period ($\alpha = .92$).

Relationship satisfaction. The Revised Dyadic Adjustment Scale (RDAS; Busby et al., 1995) is a multidimensional self-report instrument created to improve upon the widely-used Dyadic Adjustment Scale (Spainer, 1976) as a measure of marital adjustment and distress. Higher scores on the RDAS indicate better adjustment and the clinical cutoff score is 47.31 with a reliable change index of 11.58 (Anderson et al., 2014). Busby et al. (1995) describe the RDAS is an improvement upon the DAS due to its brevity (14 items versus 32 items), multidimensionality (contains three subscales [Consensus, Satisfaction, and Cohesion]), construct validity ($r = .68$ with the Locke-Wallace Marital Adjustment Test (Locke & Wallace, 1959), $r = .97$ with the DAS), and criterion validity, as the RDAS correctly classified nondistressed and distressed couples as well as the DAS, and a discriminant analysis of the three subscales demonstrated they were valuable. The cohesion subscale measures the degree to which the partner and respondent participate together, the satisfaction subscales measures the degree to which the respondent feels satisfied with the partner, and the consensus subscale measures the degree to which the respondent agrees with their partner. The satisfaction subscale had the strongest influence on the discriminant ability of the measure (.55), while cohesion (.32) and consensus (.34) influenced discriminant ability similarly. The internal consistency of the RDAS was $\alpha = .90$, and the Spearman-Brown split-half reliability coefficient was .95 (Busby et al., 1995). Crouse et al. (2000) established criterion scores for the RDAS, so the results of the study

can easily be compared with other studies that have used other popular measures of marital adjustment.

Relationship maintenance behaviors. The Relational Maintenance Behavior Measure (RMBM; Stafford, 2011) is a 28-item self-report assessment designed to measure the perception of a partner's relationship maintenance behaviors, defined as strategic and routine relationship behaviors aimed at sustaining or repairing a close relationship (Stafford, 2011). Participants responded to items about their relationship maintenance behaviors using 7-point Likert-type scales (Stafford, 2011). In the current study, the total RMBM scores were examined, as the goal was to determine if experiencing gratitude has an overall effect on relationship maintenance behaviors.

The RMBM was designed to assess relational maintenance behaviors within seven factors: positivity, understanding, assurances, self-disclosure, relationship talk, tasks, and social networks. Each of these factors were theorized to positively influence the maintenance, or healing, of a relationship (Canary & Stafford, 1993). Positivity is defined as interacting with the partner in a cheerful, optimistic, and uncritical manner (e.g., "My partner acts positively with me"; $\alpha = .95$ for husbands, $.94$ for wives [Stafford, 2011]). Understanding is described as demonstrating understanding, cooperation, and patience that are useful in both conflict and non-conflict situations (e.g., "My partner is forgiving of me"; $\alpha = .90$ husbands, $.93$ wives). Assurances include messages that stress one's continuation in the relationship (e.g., "My partner tells me how much I mean to him/her"; $\alpha = .88$ husbands, $.91$ wives). Relationship talk is directly discussing the nature of the relationship and disclosing one's desires for the relationship (e.g., "My partner tells me how he/she feels about the relationship"; $\alpha = .89$ husbands, $.92$ wives), while Self-disclosure encompasses a global sharing of thoughts and feelings not just focused on the

relationship (e.g., “My partner talks about his/her fears”; $\alpha = .89$ husbands, $.92$ wives). Sharing tasks is focused on relationship responsibilities (e.g., “My partner shares in the joint responsibilities that face us”; $\alpha = .92$ husbands, $.94$ wives). Finally, social networks include interacting with or relying on common affiliations and relatives (e.g., “My partner does things with our friends”; $\alpha = .82$ husbands, $.83$ wives). Predictive validity was demonstrated by comparing the RMBM to other measures designed to measure relational characteristics, including satisfaction (Quality Marital Index, Norton, 1983) (wife $r = .79$, husband $r = .71$), liking (Rubin, 1973) (wife $r = .65$, husband $r = .75$), commitment (Rusbult, 1983) (wife $r = .70$, husband $r = .73$) and love (Rusbult, 1983) (wife $r = .73$, husband $r = .43$). When compared with the previously established Relational Maintenance Strategy Measure (RMSM), the RMBM accounted for more variance in predicting relational characteristics and demonstrated improved factor networks (For husbands: TLI = $.92$, CFI = $.94$, RMSEA = $.04$, and $w^2/df = 3.0$; For wives: TLI = $.96$, CFI = $.95$, RMSEA = $.05$, and $w^2/df = 2.97$) and content validity (Stafford, 2011).

Research Design

In this study a repeated measures experimental design was used with two measurement time points and three intervention groups. Data were analyzed within dyads, examining the within-dyad and between-dyad effects while also controlling for how one’s partner may influence outcome variance (Kenny et al., 2006). The independent variable of the current study was the intervention task which had three levels including (a) no-task control group, (b) gratitude expression group, and (c) gratitude reflection group. The dependent variables were state gratitude, relationship satisfaction, and relationship maintenance behaviors. Dispositional gratitude was examined as a covariate.

Dyadic data analysis. Dyadic data are complex and the best way to handle analyses are not always agreed upon between researchers and statisticians. Theoretically, dyadic data are *interdependent*, or “non-independent”, and thus fail the assumption of independence (Fields, 2013; Kenny et al., 2006; Witternborn, Dolbin-MacNab, & Keiley, 2013). Some of the challenges include inaccurate power and sample size estimation, increased risk of Type I and Type II errors, research design, recruitment, retention, and measurement (Fields, 2006; Maas & Hox, 2003; Kenny et al., 2006; Witternborn et al., 2013). Kenny et al. (2006) and Witternborn et al. (2013) provide recommendations for social systems researchers including suggestions on research design, obtaining a representative sample, minimizing sampling bias, and increasing enrollment and retention rates. Relatedly, the authors provide recommendations on what *not* to do with dyadic data, such as ignoring interdependence, analyzing dyadic data on the individual level, only collecting data from one member of the dyad when both are available, unnecessarily separating data based on gender, or discarding data of one dyad member (Kenny et al., 2006).

Multilevel modeling. Kenny et al. (2006) primarily recommend nested, dyadic data be analyzed using structural equation modeling (SEM) or multilevel modeling (MLM). In the current study, MLM was chosen because it effectively handles regression analyses on nested data (Heck et al., 2014; Maas & Hox, 2005). An advantage of using MLM is that several models can be run, and the researcher can choose the model with the best fit without concern of increasing Type 1 or Type 2 error (Heck et al., 2014). However, proposed models should be theoretically based and researchers should move through a MLM analysis systematically, starting with the least complex model and progressing to the most complex model (Fields, 2010; Heck et al., 2014).

Most MLM analyses are two-level models. Models with as many as four levels can be calculated, however, each level added to the model makes the analysis more complex to build and interpret and likely increases the amount of data points needed. For the dyadic data in the current study, the repeated measurements of the relationship variables for each member of the couple (Level 1), are nested within the dyad (Level 2). The intervention group assignment (expression, reflection, or no-treatment control) was a characteristic of the dyad at Level 2. The dyads in the current study are “distinguishable”—meaning there are characteristics of each partner that distinguish them in an analysis—as each pair has one male and one female (Kenny et al., 2006). The outcomes analyzed are the means of the relationship variables and the rates of change on each over the intervention period (Bartle-Haring et al., 2016). As participants are nested within dyads, some of the variation might be due to their partners and thus needs to be taken into account (Bartle-Haring et al., 2016; Kenny et al., 2006).

Data analysis plan. Hypotheses 1 (gratitude intervention leads to an increase in state gratitude, relationship satisfaction, and relationship maintenance behaviors) and 2 (gratitude expression will lead to higher outcomes than both reflection and control groups) were analyzed using two-level conditional linear models. A separate model was created for each dependent variable (grateful mood, relationship satisfaction, and relationship maintenance behaviors), as there are currently no known methods to create a statistically sound multivariate multilevel model with dyadic data. Specifically, though there are multivariate multilevel models (Baldwin, Imel, Braithwaite, & Atkins, 2015; Heck et al., 2014), the primary reason for using multilevel modeling in the current study was to properly address the dyadic, interdependent nature of the data structure. Literature describing multivariate multilevel modeling described the basic framework of the APIM as an example of multivariate multilevel modeling due to accounting for

the dyadic structure and multiple intervention groups within each model (Baldwin et al., 2015), but they did not describe how to extend the APIM to also include multiple outcome variables within one model. The current author followed the available guidelines on conducting a sound statistical analysis of the data by statistically comparing all of the intervention groups within each model using estimated marginal means (Baldwin et al., 2015), building models theoretically (Heck et al., 2014), and accounting for the nested structure of the dyadic data (Kenny et al., 2006). Undoubtedly, as statisticians and researchers continue to explore the flexibility of multilevel modeling, statistical methodology to analyze multivariate multilevel dyadic models will be available in the future. Dyadic researchers should continue to stay up-to-date with the recommended statistical procedures for analyzing multivariate dyadic data using multilevel modeling.

Experimental group (two intervention groups and one control group) was a predictor variable in the models, coded as a fixed effect. Dispositional gratitude was a covariate in the models, coded as a fixed effect (Heck et al., 2014; Snijders, 2005). The experimental group was coded as a condition of the dyad (Kenny et al., 2006). Both the intervention group and gender were fixed effects of the model, as well as the interactions between gender and pre-scores of both members of the couple. Finally, p values in the MIXED SPSS procedures were divided in half per the suggestion of Kenny et al., (2006), as the t-tests are two-tailed when they should be one-tailed.

The main analysis procedure was a mixed linear model. Models were built theoretically, beginning with an intercepts only model, also known as a null model, and adding predictor variables as theoretically and statistically warranted. As variables and predictors were added, the fit of the additive models were compared to the null model to determine if adding the predictors

improved the model fit (Fields, 2010; Heck et al., 2014). For the model comparisons, Maximum Likelihood (ML) estimation was chosen because restricted maximum likelihood (REML) cannot be used to compare models unless only random effects are compared (Heck et al., 2014; Kenny et al., 2006) and the current models contain no random effects. The differences between -2 Restricted Log Likelihood (-2LL) statistics were calculated in chi-square log likelihood ratio tests. The chi-square statistic cannot be used to prove a hypothesis is correct but it can determine if it is incorrect (Fields, 2010; Heck et al., 2014). Beyond model comparisons, the AICC and AIC statistics were examined to determine model fitness, as AICC and AIC are more accurate with a smaller sample size (Fields, 2010). Variances were examined for significance, with the *p* values being divided in half due to the SPSS tests being two-tailed when they should be one-tailed (Heck et al., 2014; Kenny et al., 2006). If the variances of the null models were not significant, other multilevel models were not built (Heck et al., 2014; Kenny et al., 2006). Finally, to examine the second hypothesis, estimated marginal means comparing all of the intervention conditions were calculated with each model to see if the outcomes in the expression, reflection, and control groups were statistically different from one another. Effect sizes were calculated manually.

RESULTS

The statistical program SPSS was used to run the analyses. (Fields, 2010; Heck et al., 2014; Kenny et al., 2006). In the results, preliminary analyses including basic descriptive and group comparisons regarding recruitment differences are reported, followed by data cleaning and the main analyses.

Preliminary Analyses

Participants' responses were digitally collected and timestamped via Qualtrics, ensuring participants did actually participate in the gratitude intervention. To determine if recruitment via email ($n = 28$) or social media ($n = 46$) impacted the study results, an independent samples t-test was run on all variables measured (pre- and post-measures of relationship satisfaction, relationship maintenance behaviors, grateful disposition, and grateful mood). None of the t-test statistics were significant thus there were no meaningful differences between recruitment groups on any of the measures. Overall, the timing and method of recruitment did not meaningfully impact the variables in the current study.

Data Cleaning

The data were imported to SPSS from Qualtrics. Pre- and post-assessments were combined into one dataset and scores from couples who did not complete the study were eliminated. The data were visually inspected for any other missing information or variables. Couples were paired by assigning each couple a case number and manually entering the group assignment. In dyadic analyses, varying organizations of data are required to run the analyses (Kenny et al., 2006; Wittenborn et al., 2013). Thus, data were organized in the "dyad" format, where information for each dyad case was contained within one row allowing the researcher to examine how the variables of the dyad compare to one another over time. Data were also organized in the "pairwise" format, where one partner's information is contained within one row, and their partner's information is also entered into the same row (also referred to as "double entry" format). Pairwise data structure is most often utilized for multilevel modeling, dyad structure is most often used for regression equations or t-tests, and individual structure (typical structure) should generally not be utilized in dyadic analyses (Kenny et al., 2006).

Using the data set up in the dyad format, distributions, descriptive information about the variables of interest, and means were computed to visually examine the data. Per the recommendation of Kenny et al. (2006), nonindependence was tested through a partial Pearson correlation, controlling for the intervention effects, on the variables of interest. In the current study, the correlation between partners on the variables ranged from $\rho = .196$ to $.525$, indicating data were interdependent and should be analyzed as dyads.

Due to the presence of multiple variables in the current study, a correlation matrix was run to examine the level of correlation between the variables. The correlation matrix was run (See Appendix K, Table 3 for the full correlation matrix) with only one partner's data due to the noted correlations between partner's scores, mentioned above. As expected, there were correlations between grateful disposition and pre-post scores within the same variable, both of which were accounted for by including pre-scores and GQ as a covariate in the multilevel model. The only significant correlation between variables was between relationship satisfaction and relationship maintenance behaviors ($p = .012$, $r = .408$). As there is not yet a method to handle a multivariate analysis within one model using the APIM, results were interpreted with consideration of this correlation and it is described as a limitation of the current study.

Main Analysis

For the main analysis, a mixed linear model procedure was analyzed using IBM SPSS. Models were built theoretically, beginning with a null model containing only the dependent variable and adding predictor variables as warranted until the final theoretical model was achieved (Heck et al., 2014). To simplify the explanation, the multilevel model building process can be compared to arranging flowers in a bouquet which similarly requires (a) an understanding of the context within which the bouquet will be placed (theoretical foundation), (b) a suitable

vase (preliminary analyses and null models), and (c) a process of carefully selecting, adding, and removing flowers and greenery (variables) until the desired and appropriate result is achieved.

Step 1: The first step of multilevel modeling was building and testing the null models, which serve as the vase and water of the bouquet. Null models do not contain predictor variables and are essentially one-way ANOVAs. The models serve as the comparison base and foundation for other models, just as the appropriate vase is the foundation for the rest of the bouquet. From examining the null model statistics, we can also determine how much couples' scores were related to one another and where change occurred (whether on the couple level or the individual level). Null models can also provide the values for the intercept in order to compare whether it is statistically significantly different from zero, but that is not particularly useful in the current study.

To examine the overall picture of how much variance existed between- and within-experimental groups, intraclass correlations and covariances were calculated. Intraclass correlation (ICC) values above .05 may indicate substantial clustering, with larger values indicating larger variance between dyads (Heck et al., 2014). In the current study, variance between dyads could indicate that the experimental groups produced meaningfully different outcomes, though follow-up analyses would be needed to confirm. The ICC values (DAS = .3627, RMB = .2997, GMS = .3054) indicated 36% of the variance in DAS scores was *between* couples, as was 30% of RMB scores and 31% of the variance in GMS, overall confirming that some factor is causing grouping between dyads. Heterogeneous compound symmetry (CSH) was chosen as the type of covariance because it can help determine to what degree partners' scores influence each other or overlap (Kenny, 2006; 2018). The variance was significant for DAS ($\rho=.372, p=.006$) indicating a small to moderate, positive relationship (Heck et al., 2014)

between the partner's scores. The variance for RMB was not significant ($\rho=.195, p=.062$) and GMS was not significant ($\rho=.251, p=.142$), indicating partner's RMB and GMS scores did not significantly vary with one another. These results demonstrate couples' relationship satisfaction scores had a moderate amount of overlap, but their relationship maintenance behaviors and grateful mood scores did not have overlap.

Step 2: Relationship Satisfaction. The random intercepts only model for DAS indicated clustering of DAS scores at Level 2, indicating there was variance to be accounted for within both the individual levels and the group levels. Though it is not an expectation that all of the variance would be accounted for with the random intercept, it would clearly indicate that the theoretical predictors are incorrect if there was no further variance to account for in Level 1 or Level 2 of the model. Gender was added as a repeated factor in the null model, which allows for the interaction between partners to be accounted for in dyadic data (Kenny et al., 2006). The first predictor model examined relationship satisfaction (Dyadic Adjustment Scale; DAS) as the outcome with dyads as the subject (Level 2), gender as a repeated factor (Level 1) and interactions between gender and pre-scores as fixed effects (covariates). Both members of the couple were included because the dyads are theoretically assumed to be interdependent and it has been determined that partners scores are reciprocal. Heterogeneous compound symmetry (CSH) of the factors was set as the covariance structure because the data are interdependent. The model fit improved significantly compared to the null model ($\chi^2 = 36.665, df = 5, p = .001$). Goodness of fit statistics were 432.362 (-2LL), 450.362 (AIC) and 453.174 (AICC), with 9 *df*. In the final model, condition was added as a fixed predictor and was found to have an improved fit (-2LL = 420.709, AIC = 442.709; AICC = 446.967; *df* = 11). The chi-square log likelihood test was significant ($\chi^2 = 11.653, df = 2, p = .001$) indicating this model is a significantly better fit than

the model without the intervention group. Intervention group was significant ($p = .003$; $F = 6.893$, $df = 37$) as was the individual's pre-test measure ($F = 48.471$, $df = 72$; $p = .000$;) indicating the intervention group differences should be explored and interpreted further below. The pre-test of the partner ($p = .163$), gender ($p = .441$), and the interaction between gender and pre-tests (female $p = .526$; male $p = .129$) were not significant. Finally, grateful disposition was added to the model as a covariate but was not significant ($p = .966$) thus was not further examined.

In multilevel models with more than one grouping of a variable (gratitude intervention groups in the current study), one of the groups becomes the reference group which other groups are compared to (Heck et al., 2014), which was the no-treatment control group in the current study. Both the expression condition and reflection condition were significant ($p < .000$ & $p = .004$ respectively) after controlling for the partner's influence and the individual's own pre-test scores. Couples in the expression group had higher DAS scores than those in the control group and membership in the expression group accounted for approximately 4.37% of the variance in DAS post-scores ($b = 4.370$, $p < .000$, $SE = 1.239$, $d = .579$), which is a moderate effect (Cohen, 1965). Couples in the reflection group also had higher scores than those in the control group, accounting for approximately 3.67% of the variance in DAS post-scores ($b = 3.672$, $p = .004$, $SE = 1.3$, $d = .464$), which is a moderate effect. For a direct statistical comparison of the group outcomes, estimated marginal means were calculated to compare each condition with the others. A Bonferroni correction was implemented to correct for the multiple comparisons. In these comparisons, the expression group accounted for slightly more variance than the reflection group ($b = .697$), but this difference was not statistically significant ($p = .500$).

Relationship Maintenance Behaviors. The same model building process was carried out for the other dependent variables by exchanging DAS for other outcome variables. When examining relationship maintenance behaviors (RMB), the goodness of fit statistics for the null model were $-2LL = 658.565$, $AIC = 664.565$, and $AICC = 664.908$ ($df = 3$). The estimates of covariance parameters were significant at Level 1 ($p = .000$) and at Level 2 ($p = .041$), and the intraclass correlation statistic was above .05 (RMB ICC = .2997), together indicating there is variance between groups and there may be clustering of groups at Level 2. Adding gender as a repeated factor in the model did not change the statistics significantly. The next model included gender and the interactions between gender and both partner's pre-scores. Goodness of fit statistics were 574.252 ($-2LL$), 592.252 (AIC), and 595.065 (AICC) with $df = 9$. The model fit improved significantly ($\chi^2 = 84.313$, $df = 6$, $p < .001$). Intervention group was added as a predictor and fixed effect of the final model. The final model did not result in a significantly improved fit ($-2LL = 571.693$, $AIC = 597.693$, $AICC = 603.759$, $df = 11$) and the intervention group was not significant ($p = .378$) indicating the gratitude condition did not explain variance in couples' scores and there were no statistically significant differences between the groups' relationship maintenance outcomes (Expression versus Reflection $b = 3.986$, $p = .741$; Expression versus Control $b = 4.405$, $p = .659$; Reflection versus Control $b = .419$, $p = 1.00$). Finally, grateful disposition was added as a covariate but did not significantly improve model fit ($-2LL = 571.562$).

Grateful Mood. The final variable explored was grateful mood. Goodness of fit statistics for the null model were $-2LL = 457.530$, $AIC = 463.530$, and $AICC = 463.873$ ($df = 3$). The estimates of covariance parameters were significant at Level 1 ($p = .000$) and Level 2 ($p = .038$) and the ICC was over .05 (.3054), indicating there is variance and possible clustering that could

be accounted for. The goodness of fit statistics for the second model examining pre-scores and gender were $-2LL = 273.224$, $AIC = 291.244$, and $AICC = 294.057$ ($df = 10$), which made the chi-square test statistic significant ($\chi^2 = 184.306$, $df = 6$, $p < .001$). Adding intervention group as a fixed predictor did not improve the model fit ($-2LL = 267.323$, $AIC = 293.323$, and $AICC = 299.390$, $df = 12$) ($\chi^2 = 3.693$, $df = 6$, $p > .05$). Including grateful disposition weakened the model fit ($-2LL = 285.755$) and was not significant ($p = .788$). Finally, adding the intervention group was not significant ($p = .258$), indicating participation in the intervention did not significantly improve grateful mood of self and there were not statistically significant differences between groups (Expression versus Reflection $b = .053$, $p = 1.00$; Expression versus Control $b = .726$, $p = .417$; Reflection versus Control $b = .673$, $p = .529$).

DISCUSSION

The aim of the current study was to add clarification to the *find-remind-and-bind* theory of gratitude (Algoe, 2012). This study extended previous research by directly comparing couples outcomes from an expressed gratitude intervention, a reflection gratitude intervention, and a control condition in a naturalistic setting. The results indicated reflecting upon and expressing gratitude increased relationship satisfaction beyond what was experienced by couples not participating in the interventions. This effect held after controlling for the pre-test scores, partner effects, and grateful disposition. Contrary to the hypotheses, however, expression group couples did not report significantly higher increases in satisfaction than reflection couples. Also contrary to the hypotheses, participation in an intervention group did not increase grateful mood or relationship maintenance behaviors. These findings are discussed below. Previous research demonstrated that gratitude expressed in a laboratory setting increased relationship satisfaction immediately and after six-months, even when controlling for other pro-relationship behaviors

(Algoe et al., 2013). The current study extends the generalizability of Algoe and colleague's findings and provides an effective and efficient gratitude intervention couples may realistically incorporate into their daily lives.

The impact of the current intervention on relationship satisfaction is likely quite robust as it was implemented with a convenience sample of nonclinical couples who did not report high distress in their relationships *and* had been in committed relationships for minimum two years, increasing the likelihood they were already engaging in communal norms (Algoe et al., 2013; Clark & Mills, 1979; 2011). Further, altruism was hypothesized to be one of the primary motivators for couples to participate, thus it is reasonable to speculate that many of the participants willing to engage in the study were already cultivating positive emotions in their life and relationships. Ultimately, the opportunity to detect growth in the current sample was limited, which strengthens the reliability of the growth achieved. The findings indicate implementing a relational gratitude intervention, whether expressed or reflective, is a useful tool to increase relationship satisfaction.

The lack of significant variation between the outcomes of expression couples versus reflection couples was contrary to the hypotheses of the current study and the theory of communal relationships, particularly as discussed within the *find-remind-and-bind* theory of gratitude. It is possible this result could be from the small sample size and issues of statistical power of the current study, a limitation present within many of these findings. However, this finding could have occurred because the way in which gratitude was expressed or received was somehow insufficient. It is reasonable to speculate that a lack of felt connection or genuine expression could hinder or even negate the benefits of expressing gratitude, as has been discussed in previous studies comparing reflected versus expressed gratitude in relationships

(Leong, 2009; Gordon et al., 2011). Examining the degree of felt connection and emotional expression of couples in therapy sessions, Makinen and Johnson (2006) found that relationship healing was more strongly associated with intense emotional connection and expression. Kalokerinos, Greenaway, and Casey (2017) also examined how the context of emotional expression impacts social perception, and determined that expression and suppression of emotions can both be beneficial or harmful if the context is not deemed appropriate. As the current study did utilize random assignment to an intervention condition, it is possible that the poor timing of an intervention or a felt obligation to participate could have overshadowed the expresser's or recipient's ability to genuinely express, believe, and receive the positive feedback (Kalokerinos et al., 2017). This lack of flexibility could have resulted in couples feeling pressured to complete their daily study requirements rather than focusing on connecting with one another in the moment, which may not be the ideal context for expressing gratitude and emotionally connecting.

If expression and reflection continue to produce similar results in future studies, the overall implications for implementing intrapersonal, reflective relational interventions could be positive when considering the need for convenient, efficient relational interventions. Though asking couples to independently reflect upon question prompts is certainly never going to replace the healing which occurs through vulnerable emotional expression (e.g., Jacobson, Christensen, Prince, Cordova, & Eldridge, 2000; Johnson, 2012; Kalokerinos et al., 2017; Kennedy-Moore & Watson, 2001; Makinen & Johnson, 2006), it is possible the benefits similar to those found with individually-focused, brief, written gratitude interventions (Emmons & Mishara, 2012; Emmons & McCullough, 2003; Seligman et al., 2005) may extend to relationships. Thus, continued

comparisons of reflected versus expressed interventions and the nuances of time, level of relationship distress, etc., should be carefully considered by future researchers.

Contrary to the *find-remind-and-bind* theory (Algoe, 2012) and the current study's hypotheses, engaging in the gratitude intervention did not increase gratitude or relationship maintenance behaviors. The lack of increase in grateful mood was surprising, as the primary purpose of this intervention was to increase gratitude. One possibility for this finding could be the analysis was unable to detect changes in grateful mood of self, as the scale for the measure had a limited range and a ceiling effect could have occurred within the current sample. Relatedly, the current instrument measured gratitude more globally, which may not have accurately captured the specifically relational gratitude that the intervention was designed to increase. Relational gratitude researchers may benefit from choosing a measure with a specific focus on *relational* gratitude and appreciation. Many previous studies of relational gratitude have measured the construct in different ways (e.g., Algoe & Haidt, 2009; Gordon et al., 2011; Lambert & Fincham, 2011; Leong, 2009), and to our knowledge none of the measures have been psychometrically validated, which makes it difficult to directly compare results across studies. As a whole, researchers may benefit from creating a unified, psychometrically validated relational gratitude assessment, perhaps by combining the measures used in previous studies (e.g., Gordon et al., 2011; Lambert et al., 2011). The current instruments measured gratitude more globally, which is not specifically what the intervention of the present study was designed to achieve. Thus, relationship researchers may benefit from utilizing the Gratitude Expression in Relationships measure by Lambert et al. (2010), or another gratitude measure that is specifically focused on relational gratitude, to explore Algoe's (2012) claims and to determine how and where relational gratitude interventions belong.

Regarding the lack of change in maintenance behaviors, it is possible gratitude does not actually increase relationship maintenance behaviors. However, other explanations are worth exploring as the connection between gratitude and relationship maintenance behaviors has been documented by researchers beyond the *find-remind-and-bind* theory (Joel et al., 2013; Kubacka et al., 2011). First, as previously noted, the sample was largely non-distressed, long-term couples who are likely altruistic. To have achieved such a positive balance in their relationship, couples may already be experienced in pro-relationship behaviors, limiting the growth possible. Second, the Relationship Maintenance Behavior Scale (RMBS; Stafford, 1990) is worded so participants rate their *partner's* relationship behaviors and not their own. Previous gratitude researchers have yet to determine specifically how the individual experiences and expression of gratitude influence the dyad (Algoe et al., 2013; Lambert et al., 2010; Kubacka et al., 2011), or if rating a partner's behaviors would be different than rating one's own. It is plausible that detecting a meaningful, observable shift in a partner's general pro-relationship behaviors is challenging. Instead, focusing on one's own relationship maintenance behaviors or focusing on a specific desirable relationship behavior may be more accurate. For instance, in testing their proposed model of gratitude as a motivator and detector of relationship maintenance behaviors, Kubacka and colleagues (2011) changed (a) the wording of the RMBS to be self-reflective and first-person, (b) the scoring of the instrument (from a seven-point scale to "yes/no" responses) and (c) selected 15 specific items they felt captured more intentional and observable behaviors. Finally, if the relationships studied here truly were communal (Clark & Mills, 2011), partners may theoretically be less likely to notice which maintenance behaviors their significant other exhibited because keeping track of such "benefits" in the relationship is unproductive (Clark, 1984; Clark & Mills, 1979; Clark, Mills, & Powell, 1986; Clark, Mills, & Corcoran, 1989).

Additional findings were also worth noting. First, couples who did not complete the study were approximately five years younger, and had been in a relationship five years less, than couples who did complete the study. These group differences were unanticipated and are difficult to explain. One possible explanation could be that younger couples have additional barriers to participation, such as young children or inflexible job schedules. Yet another possible explanation is that engaging in a relational intervention without a specific exchange of benefits was less attractive to younger, newer couples because they may be more likely to exhibit exchange-based norms than seasoned couples (Clark & Mills, 1979; 2011; Kubacka et al., 2011). Previous research has demonstrated that gratitude can be triggered by exchanging specific benefits (Algoe et al., 2008; McCullough et al., 2008), making it reasonable to speculate that some couples may not be motivated by a more general, cognitive gratitude intervention as was in the current study. Kubacka and colleagues further speculated the function of gratitude in relationships may shift from benefit-triggered to more general as relationships move beyond exchange and into communal (Kubacka et al., 2011). Altogether, continued exploration of how gratitude may function differentially in exchange and communal relationships is warranted.

Finally, completer couples participated in the intervention almost every day they were asked, averaging 11 or 12 of 14 days. Participation could have been increased by the daily reminder emails, having partners present to serve as reminders, enjoyment of the intervention, or a combination of these factors. Previous researchers have highlighted participants enjoyment of gratitude interventions (Davis et al., 2016) and found similarly high participation rates with gratitude interventions (McCullough et al., 2004). Our findings add confidence to previous conclusions that gratitude interventions are accessible and enjoyable.

Considering the current results and previous research, we conclude that couples, both distressed and non-distressed, are likely feel more bonded after participating in a gratitude intervention, particularly if gratitude is verbally expressed. Romantic bonds are powerfully healing and may decrease our physical pain (Davies, Macfarlane, McBeth, Morriss, & Dickens, 2009; Goldstein, Weissman-Fogel, Dumas, & Shamay-Tsoory, 2018), soothe us when we feel threatened (Johnson et al., 2013), and improve our physical health throughout our life (Gottman, 2011; Greenman, Tassé, & Tulloch, 2014). However, it is unreasonable to expect a gratitude intervention could autonomously reduce relationship distress and increase relationship satisfaction with a clinically distressed couple. Only two forms of couple therapy have been empirically validated (*Emotion Focused Couples Therapy*, Johnson, 2012; *Integrated Behavioral Couples Therapy*, Jacobson, Christensen, Prince, Cordova, & Eldridge, 2000), both of which are founded in couples identifying and interrupting negative patterns and sharing vulnerable, attachment-based emotions with one another to create meaningful change. Thus, clinicians should not expect the current gratitude intervention could be sufficient to create profound, sustained change as it does not contain all of the elements required to deepen attachment. Ultimately, a gratitude intervention may be a practical, easy to implement, and enjoyable intervention that could provide at least a brief, small increase in a couple's romantic bond by *reminding* them what they love about their partner and thus *binding* them closer together.

Limitations

Despite the present study attending to gaps in previous research, this study had several limitations that could have affected the results.

First, participants in social sciences research may respond in ways that make them appear socially desirable to others (Johnson & Fendrich, 2005). In the current study, recruiting on social

media and chain-referral emailing could have increased participants desire to please their friend or the researcher (Johnson & Fendrich, 2005) by appearing improved when they did not actually experience change. However, significant improvement on one outcome variable, but not another, may be evidence that social desirability was not problematic.

Second, there was not a fidelity measure in the current study to ensure that expression couples *did* discuss the intervention and reflection couples *did not* discuss the intervention. This is a significant limitation in this study, as the second hypothesis is based explicitly on comparing reflection and expression. Though the “gold standard” of fidelity measures, per recommendations by the National Institute of Health Behavior Change Consortium (Bellg et al., 2004) (i.e. including asking couples to record audio or videotape their discussions and then coding the discussions) were considered, ultimately there were no fidelity measures the current researcher was aware of that would not create significant burdens for the current naturalistic sample. The study did implement other fidelity checks up to date with current standards, such as monitoring participation electronically, delivering the intervention electronically which standardized intervention delivery, and creating equal and consistent dosage for all participants across the interventions (Bellg et al., 2004). As technology will continue changing and developing, future researchers should continue considering how to utilize technology to implement effective and accessible audio or video fidelity measures to ensure couples in a naturalistic setting participate in the intervention as intended.

Third, generalizability of the results may be limited. Only heterosexual couples were included in the sample due to the statistical analyses. Inclusion criteria also required couples to be in a more committed relationship in an effort to capture couples with established communal norms. It is possible that couples who engaged in the study are more altruistic than the general

population, may already engage in healthy communication, or may be interpersonally mindful, which may further limit the generalizability of the sample to largely nondistressed heterosexual couples. Same-sex couples and distressed couples should be explored further in future studies.

Fourth, the complex nature of the procedure may be a limitation. Insufficient recruitment led to the procedure being adjusted in the midst of data collection, and there could be differences between the recruitment groups that were not detected in our analyses.

Fifth, uneven partner motivation to complete the intervention within the dyad could also have existed, as it is possible that one partner could have been encouraging or reminding the other partner to participate. Attempting to quantify motivation would have added additional burdens to the participants and statistical analysis, but could be beneficial in future studies as motivation has been tied to outcomes in a variety of presenting concerns and treatments (e.g. Medalia & Saperstein, 2011; McKee et al., 2005).

Sixth, the sample size of the current study was smaller than desired, which could have resulted in insufficient power to detect smaller effects that could be present but statistically undetectable. Though the sample was above Maas and Hox's (2005) minimum recommendations of 30 Level 2 units of analysis, 50 units were deemed more reliable to increase power. The statistical power of multilevel modeling, and adequate sample size, is debated. McNeish and Stapleton (2014) reviewed a number of studies analyzing sample sizes for MLM and reported all of the studies found 30 Level 2 units of analysis should be sufficient to run the model with adequate power. However, it remains true that the larger the sample in a multilevel regression analysis, the better the model will be at producing accurate results. Therefore, for full confidence in the power of the model to detect any existing effects, future researchers would benefit from a sample of at least 50 couples to increase power and decrease the likelihood of error (Maas &

Hox, 2005). Researchers may also continue to expand the use of multilevel modeling with dyadic data to determine how best to address multiple variables and smaller sample sizes of couples, as the challenges of recruiting couples and families are evident (Witternborn et al., 2014).

Seventh, limited demographic information about the participants was collected as the inclusion of several demographic variables in the analysis would have burdened the models and required a larger sample. Thus, little is known about the ethnicity, education, income, treatment history, and relationship history of the current sample. With an increased sample size, researchers may be able to tease out these demographic variables even further to improve the generalizability of the intervention.

Eighth, the participants in the pilot studies, which were designed to test the technology of the main study, were demographically different than the participants in the main study. Specifically, the pilot study participants were heterosexual and same-sex graduate students and their romantic partners, which included both married and dating partners. Participants in the main study were exclusively heterosexual and in committed cohabitating or marriage relationships of at least two years. The education level of main study participants was unknown. Additionally, participants in the main study had an age range of 23 to 73 years with an average age of approximately 34 years. The exact age of the pilot study participants is unknown, but they were generally younger than the average participants in the main study and the age range was smaller. Thus, it is possible participants in the pilot studies may have responded differently to the technology than participants in the main study due to more familiarity with research, with technology, or both.

Ninth, though couples in the current study were assumed to be engaging in communal norms due to their longer relationship length and commitment to cohabitating or marriage

(Kammrath et al., 2015), it is possible they were not. It is also possible the intervention could have an impact on communal norms that was not detected within the current study. Future researchers should assess the specific impact of the intervention, and the comparison of reflection and expression, on communal norms as measured by a quantitative assessment (Clark & Mills, 2011).

Tenth, though the data were multivariate in nature and dyadic satisfaction was correlated with relationship maintenance behaviors, to our knowledge there is no known procedure to properly conduct a multivariate multilevel analysis with dyadic data. The analyses used in the current study did align with the recommended statistical practices available for multiple outcomes in dyadic data (Baldwin et al., 2014; Kenny et al., 2006), but it is possible that correlations between variables could have impacted the current results. The power and flexibility of multilevel modeling is consistently being demonstrated and improved (Baldwin et al., 2014), thus undoubtedly a framework for multivariate dyadic data will soon be available. Relationship researchers should continue to expand their statistical knowledge to properly analyze the theoretical questions posed in their studies, with their specific populations.

Finally, assessments utilized in the current study may not have been adequate to capture change in the desired variables. The grateful mood of self and partner questionnaire did not have established reliability and validity, and was not specifically designed to measure relational gratitude but a more global grateful mood. Further, the total range of scores on the grateful mood of self and partner questionnaire was limited. Because of this, it is possible that further changes occurred but were undetectable. Similarly, the relationship maintenance behavior measure was worded so participants rated their partner's behaviors instead of their own. Further, the variety of

behaviors was quite broad. Both of these aspects of the RMBM may have limited the effectiveness of the measure.

Recommendations

The findings of the current study present many opportunities for continued exploration of a relational gratitude intervention. As discussed in the current section, future researchers should continue clarifying the *find-remind-and-bind* theory of gratitude (Algoe, 2012) by examining how gratitude impacts romantic relationships in a clinical setting, with different age participants and relationship norms (communal and exchange), examining how implementation impacts the outcomes, and with potential harm of the intervention considered.

In preparing to conduct dyadic research, Wittenborn et al. (2013) discussed important recruitment and procedural considerations for dyadic researchers including (a) considering how couples will be recruited, (b) strategically choosing a time of year to recruit couples, (d) decreasing barriers to participation, (e) measuring the motivation of each partner to participate, and (f) carefully planning the statistical analyses prior to collecting the sample. In this study, recruitment via social media posts was efficient, as was disseminating the instructions via electronic video links. Dyadic researchers should continue to explore how technology and social media can be used to (a) access populations which are otherwise difficult to access and (b) reduce barriers to couples participating in research. Further, a majority of couples were recruited between the months of January and April. Though it is possible that couples were more accessible because of the social media posting, anecdotally fewer couples reported scheduling challenges from the months of January to April than were reported from April to November.

Though the robustness of the intervention leads us to believe the current results could generalize to a distressed population, this speculation should be specifically examined with

clinically distressed couples to determine (a) if the intervention is effective and (b) where in treatment it could be most beneficial. For instance, in emotionally focused couples therapy (Johnson, 2012), a gratitude intervention may be recommended at the end of treatment to serve as a practical, accessible activity to maintain progress, while a therapist practicing integrated behavioral couples therapy (Jacobson et al., 2000) may use the intervention during the “active treatment” phase, in conjunction with other interventions. Other clinicians could also utilize the intervention at the beginning of treatment to instill hope (Hof & Miller, 1981; Weeks, Hof, & Howard, 2013), as could Marriage and Relationship Education programs (MREs) (Hawkins et al., 2012).

An additional extension of the current study may be to implement the gratitude intervention for a longer duration, or in a higher “dosage.” In marriage and relationship enrichment programs, Hawkins et al. (2012) categorized interventions with 1 to 8 contact hours as “low-dose” and 9 to 20 hours as “moderate-dose,” and found that moderate-dose programs improved outcomes for both distressed and non-distressed couples. The current study involved approximately two total hours of time spent engaging in gratitude over 14 days, making it reasonable to quantify this as a “low-dose” intervention (despite it being intended as a more sustained intervention compared to other minutes- or hours-long gratitude interventions). Future researchers should investigate extending the dosage of gratitude both within each experience (e.g., 30 minutes each day instead of 10) and across time (e.g., 3 months instead of 2 weeks).

It is also important to continue exploring the impact of gratitude on relationship maintenance behaviors. One suggestion is for researchers to measure relationship maintenance behaviors differently than the current study. Authors could attempt to track a few specific maintenance behaviors that are desirable and easily quantified, such as chores or financial management, and

ask partners to rate their own and their partner's engagement in the pro-relationship behavior. Further, future researchers may benefit from considering how relationship maintenance behaviors may differ in different samples or populations of couples. It is possible relationship maintenance behaviors may be perceived differently for long-term, committed couples than for newer relationships, as long-term couples may be more communal and newer couples may be more exchange-based (Algoe et al., 2008; Kubacka et al., 2011). Newer couples may be more likely to experience gratitude after receiving a benefit from their partner (such as a relationship maintenance behavior) while more committed couples could experience gratitude more generally (Kubacka et al., 2011). Therefore, it is also recommended that the degree of communality be intentionally measured in future studies (Clark & Mills, 2011), as communal norms are a key focus of the *find-remind-and-bind* theory (Algoe, 2012).

Leong (2009) and Kubacka et al. (2011) discussed the potentially aversive effects of gratitude, including ingenuine expression leading to distrust or an "uneven" expression of gratitude leading to increased dissatisfaction. Such results were not specifically found in the current study, but it is possible the lack of variation between expression and reflection couples were reflective of the downfalls of expression. It is also plausible distressed couples may be more likely to reject, or be critical of, their partner's expression of gratitude, which could negate the positive effects. Relatedly, gratitude could be overextended in situations wherein it is undeserved, resulting in harm to the self or relationship, as Luchies, Finkel, McNulty, and Kumashiro (2010) found with forgiveness. Despite being generally beneficial for relationships, forgiveness was sometimes overextended to partners who were disrespectful or neglectful, resulting in harm to the self and participation in unhealthy relationship patterns. Davis et al. (2016) also posited gratitude could produce aversive affects in individuals who struggle with

perfectionism, guilt, or a fear of being inadequate in relationships, as it may highlight these fears. Overall, situations wherein gratitude may be harmful to the self or relationship should be considered in future research.

Conclusion

The purpose of this study was to examine the *find-remind-and-bind* theory of gratitude (Algoe, 2012), which posits gratitude is beneficial for relationships because it helps individuals *find* previously unnoticed relationship partners, *remind* them of positive partners already in their life, and *bind*, or bond, with those to whom they are grateful. Both relationship satisfaction and relationship maintenance behaviors are theoretically connected to gratitude expression within the *find-remind-and-bind* theory, such that the unambiguous expression of gratitude triggers recipients to be more responsive (through relationship maintenance behaviors) and promotes communal relationships (which then leads to greater relationship satisfaction) (Algoe, 2012). The limited experimental studies that explored couples gratitude interventions did not clearly confirm or negate the claims of the *find-remind-and-bind* theory, and typically only included data from one partner (Leong, 2009) or ignored the interdependence of the data (Roland, 2009). Thus, it was important to clarify (a) if gratitude is beneficial in relationships and (b) if expressing gratitude to a partner is more beneficial than thinking about it, as this will help researchers and clinicians hone efficient and effective interventions to improve romantic bonds. We hypothesized a verbally expressed or internally reflected-upon gratitude intervention would yield higher relationship satisfaction, positive relationship behaviors, and gratitude than couples who did not participate in the intervention. The current study improved upon previous research by directly comparing outcomes from an expressed gratitude intervention, a reflection gratitude intervention, and a control condition in a naturalistic setting with both partners. Further, data from both

members of the couple were collected and included in the analyses. Daily interventions were implemented and tracked electronically, which confirmed participation more reliably than a journal or verbal confirmation. Nonclinical couples were randomly assigned to an expressed gratitude intervention, reflection gratitude intervention, or no-treatment control group, and their relationship satisfaction, gratitude, and relationship maintenance behaviors were measured pre-post. Couples in the intervention groups had higher outcomes on relationship satisfaction than couples in the control group, but did not report significantly higher relationship maintenance behaviors or grateful mood after the intervention. Further, it appears couples did *not* have to “say it,” as expression and reflection couples did not significantly differ on their outcomes for any of the variables. Limitations of power, procedure, and sample size may have impacted the findings, however, the effects that were significant in the current findings are likely to be robust as the population was nonclinical and nondistressed. Ultimately, further study of expressed and reflection gratitude interventions in relationships is warranted and suggestions for future researchers were provided.

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Appendix A: Extended Literature Review

The literature presented in the current study was gathered through databases such as PsycINFO, PsycARTICLES, ResearchPUB, Google Scholar, and ProQuest. The search terms used to identify relevant studies include: “gratitude,” “romantic relationships,” “couples,” “satisfaction,” “gratitude AND romantic relationships/couples,” “relationships AND satisfaction AND gratitude,” “maintenance behaviors AND relationships AND gratitude.” From the articles yielded from these search results, studies included in this review contained information regarding at least one of the variables being examined in the study and were empirical in nature.

Gratitude has a rich history in philosophical, religious, and spiritual texts (Harpham, 2004; Emmons & Crumpler, 2000). In romantic relationships, gratitude has demonstrated some benefits, though the mechanism through which gratitude is most beneficial in relationships are not known. Thus, the current study will compare expressed and written gratitude interventions for couples. To provide a more comprehensive background, the current literature review will begin with a brief summary of emotion expression studies, followed by a comprehensive review on the current gratitude research that includes a theoretical background of gratitude, current definitions and conceptualizations, gratitude interventions for individuals and couples, and remaining gaps in the literature. The find-remind-and-bind theory of gratitude, posited by Algoe (2012), and the theory of communal relationships (Clark & Mills, 1979; 2011), will also be reviewed in more detail, as they are the driving theories behind the current study. Finally, the Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) will be reviewed, as it provides the framework for the dyadic analysis used in the current study.

Emotion Expression

Emotional expression in humans is uniquely important, particularly for communication in social relationships (Parkinson, 2005). In relationships, researchers have studied the effects of expressing both positive and negative emotions (Graham, Huang, & Helgeson, 2008; Kennedy-Moore & Watson, 2001). Emotion focused therapy (EFT; Greenberg, 2004; Johnson, 2012), an empirically validated couples treatment, is founded upon creating deep, meaningful change through expressing vulnerable and heartfelt emotions to a responsive, supportive partner (Makinen & Johnson, 2006). In relationships, spouse's rating of their own emotional expressiveness and their partner's emotional expressiveness were both correlated with marital satisfaction (King, 1993). Further evidence is also found from relationship studies in which one partner has alexithymia, which is a lack of skill in understanding and communicating emotions. Such relationships often suffer from lower relational satisfaction, sexual satisfaction, marital adjustment, and marital satisfaction (Cordova, Gee, & Warren, 2005; Epözdemir, 2012; Humphreys, Wood, & Parker, 2009; Kim, Lee, & Park, 2011; Yelsma & Marrow, 2003).

In an earlier review, Kennedy-Moore and Watson (2001) detailed the possible benefits of emotional expression, particularly how expression can alleviate distress. The authors proposed expression alleviates distress via three key mechanisms: (a) Expression can reduce distress about distress, (b) expression can facilitate insight, and (c) expression can affect interpersonal relationships in a desired way. In therapy, the first two mechanisms are most evident (Greenberg, 2004; Kennedy-Moore & Watson, 2001). However, the third mechanism primarily occurs socially, and most often is between romantic partners. The authors extend that expressing emotions in relationships not only enhances the first two mechanisms, but also opens the door for significant others to validate, reassure, and support the expresser (Donnelly & Murray, 1991). An

older study compared written versus expressed traumatic feelings with a group of college students (Donnelly & Murray, 1991). Individuals in the expression group talked with graduate student therapists daily for four days, who reflected the emotional content of the trauma descriptions, while participants in the writing group kept a journal during the same time. The authors found that individuals in both groups had higher positive emotion, self-esteem, and cognitive and behavioral change, as well as lower negative emotion. However, the individuals in the expression group rated their negative mood as the same or sometimes decreased following sessions, whereas those in the writing group had increases in negative mood and decreases in positive mood following the daily intervention. The authors propose this difference may indicate that verbalizing even the most difficult content with another supportive, warm individual could buffer against negative consequences. Other studies have emphasized the social rewards of positive emotions, highlighting that positive emotions are associated with greater social acceptance, health, emotional adjustment (Argyle & Martin, 1991; Cohen, 1988; House, Landis, & Umberson, 1988; Myers, 1992), and possibly even survival (Berscheid, 2003; Myers, 1999).

In a recent study, Kalokerinos, Greenaway, and Casey (2017) examined how social context effects the appropriateness of positive emotion expression through six studies. In a meta-analytic analysis of the studies the authors found that positive emotions, when expressed in positive contexts, were strongly associated with positive evaluation from others, perceived as more socially appropriate, and were associated with greater social affiliation, which is a measure wherein subjects rate how desirable or enjoyable an interaction with the target would be. The authors also found that suppressing positive emotions was beneficial in negative contexts, where it was viewed as less appropriate, indicating that there is benefit to suppressing emotions in certain contexts. Extending the results to romantic relationships, positive emotion expression

could possibly be associated with more positive outcomes when the partners are open to hearing the positive expression. Overall, the results from Kalokerinos et al. (2017) align with the conclusions of other researchers, indicating expressing emotions is beneficial in relationships as it may open the door for responsiveness, acceptance, compassion, and connection.

Gratitude

Defining Gratitude

Researchers do not consistently agree on how to define gratitude. Emmons and Mishra (2012) organized many previous research studies which had identified gratitude as a trait, emotion, and mood within the framework of Rosenberg's (1998) hierarchical levels of affective experience (see Table 1). The trait of gratitude is described as an enduring personal characteristic that increases the individual's likelihood of experiencing gratitude (Emmons & Mishra, 2012). In their earlier studies, McCullough and colleagues (2002) also categorized gratitude as an affective trait, which is a "stable predisposition toward certain types of emotional responding that set the threshold for the occurrence of particular emotional states" (Rosenberg, 1998, p. 249).

Researchers who align with this view also posit that trait gratitude predisposes some individuals to be more inclined to respond to their world with positive emotions (Graham & Barker, 1990; Wood, Froh, & Geraghty, 2010). Wood, Froh, & Geraghty (2010) wrestled with defining and categorizing gratitude within their qualitative review of gratitude research. Gratitude was proposed to be a dispositional trait, indicating that some individuals are more oriented "towards noticing and appreciating the positive in the world" (Wood et al., 2010, p. 2). The proposed life-orientation of gratitude includes: (1) individual differences in the experience of the grateful affect, (2) appreciation of other people, (3) a focus on what the person has, (4) feelings of awe when encountering beauty, (5) focusing on the positive in the present moment, (6) appreciation

rising from understanding life is short, (7) a focus on the positive in the present moment, and (8) positive social comparisons.

Table 1¹Temporal Differences Among the Levels of Affect as Criteria for Order in the Affect Hierarchy

Criterion and level of affect	Ordinal status
<u>Simple duration</u>	
Affective traits	Longest
Moods	Intermediate
Emotions	Shortest
<u>Pervasiveness in consciousness</u>	
Affective traits	Most pervasive
Moods	Intermediate
Emotions	Least pervasive
<u>Distributive breadth</u>	
Affective traits	Broadest
Moods	Intermediate
Emotions	Narrowest

Note: ¹Reprinted from "Levels of Analysis and the Organization of Affect," by E. Rosenberg, 1998, *Review of General Psychology*, 2, p. 251. Copyright 1998 by the Educational Publishing Foundation.

In Rosenberg's (1998) hierarchy, emotions are often brief, acute, intense, and possibly automatic responses to stimuli. Emotions occur in the "foreground" of one's experiencing, capturing our attention and guiding our response to different situations, while traits occur in the "background" and are typically unchanging (Rosenberg, 1998). The emotion of gratitude refers to an acute and temporary reaction to receiving a benefit from another (Emmons & Mishra, 2012). In research, gratitude is most commonly categorized as an emotion (Algoe, 2012; Algoe, Haidt, & Gable, 2008; Emmons & McCullough, 2003), which implies the authors believe gratitude occurs as an internal response to stimuli. Some researchers extend that the emotion of gratitude is particularly important in relationships and has unique social benefits (Algoe, 2012; Algoe et al., 2008; McCullough, Kimeldorf, & Cohen, 2008). In a brief review of gratitude, McCullough, Kimeldorf, and Cohen (2008) propose that gratitude is a useful emotion in processing and responding to prosocial behavior because it is (a) a benefit detector, (b) reinforcer of prosocial behavior, and (c) motivator of continuing prosocial behavior. As a benefit detector, McCullough et al. (2008) propose that gratitude may also be influenced by four types of information about the benefit-giving situation: (a) the benefit's costliness to the benefactor, (b) its value to the beneficiary, (c) the intentionality with which it was rendered, and (d) the extent to which it was given without relational obligations to help. As a reinforcer of prosocial behavior, the authors proposed that gratitude could increase the likelihood of someone repeating a prosocial behavior. As a motivator of prosocial behavior, gratitude is hypothesized to motivate the receiver of the prosocial behavior to act prosocially toward someone else. Algoe (2012) agreed that gratitude is primarily a social emotion, but added that McCullough et al. (2008) and other researchers tend to overlook a key component of gratitude: the recipient's perception of the benefactor as responsive to their needs (Algoe, Haidt, & Gable, 2008). Algoe (2012) proposes

that a recipient's appraisal of the benefactor as interpersonally responsive can lead to the recipient perceiving the benefactor as more understanding, approving, and caring (Reis, Clark, & Holmes, 2004), which could have implications for various situational appraisals involving gratitude, expression of gratitude and the consequences, and gratitude in dyadic relationships. Further, this proposal by Algoe (2012) aligns with studies on emotion expression that also indicate partners' responses to one another are hinged upon their belief that the partner is caring and safe (Makinen & Johnson, 2006).

However, conceptualizing gratitude solely as an emotion fails to fully capture the experiences of gratitude reported by participants in Emmons and McCullough's (2003) study, as well as anecdotal descriptions provided by Wood and colleagues (Wood, Froh, & Geraghty, 2010; Hillava Elfers, & Offringa, 2014). Within Rosenberg's (1998) hierarchical levels of affect, moods occupy the space between emotions and traits. Rosenberg details that moods, like emotions, do fluctuate across days, but last longer than emotions. Further, moods are more likely to influence which emotions one experiences, and be experienced unconsciously rather than consciously (though conscious experience can occur). When gratitude is conceptualized as a mood, it is considered a more stable state of mind, perhaps a mental lens through which the world is viewed, that may influence an individual's cognition (Emmons & Mishra, 2012). Thus, a grateful mood may increase the likelihood that positive emotions are experienced, or that positive behaviors are noticed and appreciated.

To summarize, one can conceptualize gratitude, hierarchically, in three ways: as an enduring personality characteristic, as a more stable state of mind that influences thoughts and emotions, and as an acute, likely temporary, and more intense response to specific situations (Emmons & Mishra, 2012; Rosenberg, 1998). Though more information and solidarity on the

definition of gratitude could come out of further research (Wood et al., 2010), the complex and multifaceted nature of gratitude is captured well in a three-level experience.

Measuring Gratitude

To operationalize gratitude, researchers use a wide variety of outcome measures including assessments, attributional response, and free-response (Emmons et al., 2014; Lomas, Froh, Emmons, Mishra, & Bono, 2014). The two most common gratitude assessments are the Gratitude Questionnaire (GQ-6; McCullough et al., 2002) and the Gratitude, Resentment, and Appreciation Test (GRAT; Watkins et al., 2003). The GQ-6 is a brief, six item self-report survey designed to measure one's perception of their trait gratitude on six dimensions. The GRAT is a 44-item instrument designed to measure one's dispositional gratitude response to others (Wood et al., 2010) on three dimensions: resentment, simple appreciation, and social appreciation (Lomas et al., 2014; Emmons et al., 2014). Other outcome measures include attributional and free-response styles. Attributional measures may involve providing the participant with a vignette and instructing them to choose how they would respond to the given situation (Lomas et al., 2014). The participant's response choice would then be categorized. Free-response measures typically involves the participant responding to open-ended questions (Lomas et al., 2014; Emmons et al., 2014).

Gratitude Interventions

Although more varieties may be used in actual clinical practice, gratitude interventions explored in research fall into three categories: written, expression, or contemplative (Davis et al., 2016; Rash et al., 2011; Wood et al., 2010).

Written. Written gratitude interventions are far and above the most popular intervention type in research (Davis et al., 2016), although their use in clinical practice is not formally

established. Written gratitude interventions may be used most often because they are simplistic for both the researcher and the participant. For the researcher, written gratitude interventions are economical as they require little time, skill, or resources to implement, are relatively easy to measure, and can be quantified. Participants seem to enjoy completing gratitude interventions (Davis et al., 2016), thus making it easier to motivate them to complete the intervention task for the required duration.

Although the exact format varies widely, a majority of written gratitude interventions fall into a general format, where the participant is (a) asked to keep a record of gratitude (via listing or journaling) that is (b) a specified length (i.e., five items), (c) at a specified interval (daily, weekly) (d) for a specified duration (one week, one month) (Algoe et al., 2008; Emmons & McCullough, 2003; Froh et al., 2008). Written gratitude interventions also include letter writing, wherein the participant is instructed to write a letter to person/benefactor (Seligman et al., 2005). In all forms of written interventions, participants are also instructed to fill out pre- and post-tests examining varying outcomes, which may include wellbeing, happiness, life satisfaction, physical health, and behaviors.

Two of the most popular gratitude studies to date examined the potential benefits of gratitude using written interventions (Emmons & McCullough, 2003; Seligman et al., 2005). In their landmark study, Emmons and McCullough (2003) wanted to determine if episodic, experimentally evoked gratitude could have positive outcomes. The authors conducted a three-series study using varying populations and procedures to examine their hypothesis. In the first study, participants were placed in one of three groups: counting blessings, listing hassles, or a no-treatment control. The participants, who were university students, were then asked to list five things they were grateful for on a *weekly* basis, and journal about their mood, coping behaviors,

health behaviors, symptoms of physical illness, gratitude, and overall life satisfaction. In the second study, the authors added a fourth group of downward social comparison, and also instructed the participants to keep the gratitude record and fill out the assessments on a *daily* basis. In the third study, the authors used a population of adults with neuromuscular disorders, and asked them to complete the journaling task on a weekly basis.

In all three studies, participants in the “counting blessings” condition reported increased gratitude, more stable moods, better coping and health behaviors, a higher overall life satisfaction, and fewer symptoms of physical illness than those in the other conditions (Emmons & McCullough, 2003). These findings were also replicated on a population of youth and the effects held up over a three-month period (Froh et al., 2008). However, the initial study by Emmons and McCullough (2003) had limitations that should be considered when interpreting the results. The authors used a “hassle list” and “downward social comparison” as control, but it is possible that hassle lists may actually increase stress and therefore could inflate potential gratitude effects (Wood et al., 2010; Davis et al., 2016). Algoe et al. (2008) studied the impact of a written gratitude intervention with a naturally occurring gift-giving activity, and found that the gift-givers who were instructed to keep a record of gratitude perceived their interactions with the gift-receivers more positively, and reported higher gratitude.

Cross-cultural studies examining the impact of written gratitude interventions have also been conducted (Boehm, Lyubomirsky, & Sheldon, 2011; Chan, 2010). In both studies, the authors found that gratitude was positively associated with wellbeing, happiness, and life satisfaction (Boehm et al., 2011; Chan, 2010). However, in their study comparing a gratitude intervention with Anglo-Americans and Asian-Americans, Boehm and colleagues (2011) found no benefits of the intervention with the Asian-Americans studied. The authors suggested this

could be because the intervention was designed for more individualistic cultures, and suggested that future researchers alter the intervention to include more family and community values for populations from collectivistic cultures. Further, neither of these studies employed the cross-cultural research methods suggested by Gerstein and Æegisdottir (2007), so it is possible that the construct is not appropriate for cross-cultural application as it was defined in the studies, and it is also possible that the instruments used in the study were not properly translated.

Written gratitude interventions have not been explored in a clinical population (Wood et al., 2010), though gratitude interventions have been compared to clinically established interventions. Specifically, two studies have compared the effects of gratitude journals to previously established cognitive and behavioral interventions (Geraghty et al., 2010a; 2010b) using individuals recruited from the Internet who volunteered to participate in the study. The authors found that gratitude journaling was as effective at decreasing body dissatisfaction and excess worry as the cognitive intervention. However, the self-directed nature of the interventions and lack of official diagnosis for the participants limits the clinical applicability and generalizability of the results.

Expressed. Expressed gratitude interventions are studied far less often than written gratitude interventions, but researchers do employ expressed gratitude conditions in relationship studies. The general format of expressed gratitude interventions is not as simple as written interventions, but participants are commonly instructed to disclose gratitude to another for a specified amount of time (5 minutes) at a specified interval and for a specified duration (Algoe et al., 2013; Gordon et al., 2012; Lambert & Fincham, 2011; Wood et al., 2010). Within the find-remind-and-bind theory of gratitude (Algoe, 2012) reviewed later, expressed gratitude is proposed to have benefits above and beyond other types of gratitude interventions. However, as

the current review will demonstrate, researchers have not consistently found that expressed gratitude is significantly better than other experiences of gratitude.

Expressed gratitude and relationship maintenance behaviors. Relationship maintenance behaviors are the positive actions individuals engage in to maintain relationships (Canary, Stafford, Hause, & Wallace, 1993). Stafford and Canary (1991) identified five strategies of relationship maintenance behaviors: positivity, openness, assurances, social networks, and sharing tasks. Positivity refers to remaining cheerful and optimistic, and openness involves direct discussions or disclosures to the partner. Assurances are statements or actions that imply the partners see a future in the relationship. Social networks are the social associations of the couple, such as sharing friends and wanting to spend time with the same people. Finally, sharing tasks is fulfilling one's chores and responsibilities. Later, Stafford, Dainton, and Haas (2000) revised the scale and added two more categories: advice, referring to the providing social support in the context of the relationship, and conflict management, or the ability to engage in behaviors that effectively reduce or soften conflict. Thus, relationship maintenance behaviors are best conceptualized as the small but meaningful interactions the couple has in their day-to-day, such as putting their phone down to listen to their partner, apologizing after a fight, making plans with people both partners enjoy, and taking out the garbage without being asked.

Gordon, Impett, Kogan, Oveis, and Keltner (2012) examined the impact of gratitude expression in close relationships. The authors conducted a series of studies that employed longitudinal, cross sectional, and clinical observation methods and procedures. Across all studies, the authors found that gratitude preceded appreciation, which then motivated relationship maintenance behaviors. Other researchers have also discovered that gratitude expression positively impacts relationship maintenance behaviors (Kubacka et al., 2011; Lambert

& Fincham, 2011). Lambert and Fincham (2011) conducted a series of studies to examine how gratitude expression could impact one's willingness to voice relationship concerns, which is a relationship maintenance behavior. In each of the studies, both assigned and naturally occurring gratitude expression was associated with an increased willingness to voice relationship concerns. In long-term relationships, gratitude expression was associated with increased relationship satisfaction and was predictive of the spouse's marital happiness (Gordon, Arnette, & Smith, 2011).

Contemplative. To date, few studies have examined gratitude contemplation interventions. In an effort to fill this gap, Rash, Matsuba, and Prkachin (2011) examined the impact of gratitude contemplation on wellbeing, life satisfaction, and physical regulation via cardiovascular activity. Participants in the gratitude contemplation activity were instructed to spend five minutes, twice a week, reflecting on something they are grateful for and truly trying to focus on feeling thankful. After the five-minute contemplation, participants were instructed to journal about their reflections. The contemplation condition was associated with increased wellbeing, satisfaction, and cardiovascular functioning. However, readers should consider the accuracy of the conclusions, since there was a significant writing portion of the intervention.

Comparison of the Interventions

Three studies have directly compared expressed and reflective gratitude interventions in romantic relationships. The first, a dissertation by Leong (2009), heavily influenced the methodology and design of the current study, though this study is not a replication. The second study is yet another dissertation based on DeMoss's (2004) work (Roland, 2009), and the third compared gratitude experiences in long-term relationships (Gordon, Arnette, & Smith, 2011).

Leong (2009) conducted a longitudinal comparison of internally reflected versus externally expressed gratitude intervention using 100 couples in Hong Kong. The study was done in three parts. The first two parts were designed to collect baseline information about gratitude in marriages. In the third part of the study, couples were assigned to either an internal gratitude reflection group or an expression group. Both members of all couples were instructed to complete all the measures in the study, but only one member of the couple was the “actor.” The “actor” was the member of the couple designated to directly participate in the intervention and was given explicit intervention instructions. The author chose to have participants fill out the Gratitude Questionnaire, a measure of trait gratitude (McCullough et al., 2002), as well as answer questions about state gratitude (or grateful mood), in order to determine if presence of trait gratitude was a covariate of the reported effects of the gratitude intervention (Leong, 2009), as McCullough, Tsang, and Emmons (2004) posited grateful disposition could influence individuals to more easily experience a grateful mood and act more positively toward others. The participants in Leong’s (2009) gratitude reflection group were given a journal and instructed to write one thing about their partner they were grateful for each day for two weeks. The participants in the reflection condition were also asked not to share their journals or the information with the other partner. Participants in the expression group were asked to think about something specific about their partner they were grateful for and then verbally express it at least four times, but as often as they wanted beyond four times, over the course of two weeks. Participants in the expression group were asked to record when the expressions occurred in a journal to provide a log of participation.

The results of Leong’s (2009) study indicated a partner’s participation in the gratitude journaling and expression conditions had comparable, positive outcomes on the grateful mood of

the spouse, which contrasts with the find-remind-and-bind theory hypothesis that expression will be a more positive means of experiencing gratitude in a relationship (Algoe, 2012). Self-reported grateful mood was also significantly predictive of relationship satisfaction, though the author pointed out the effect was “weak,” which is surprising as many other studies have found gratitude to be connected to relationship satisfaction. Interestingly, the author also found that perceiving a partner’s expression as insincere was associated with a decrease in marital satisfaction, and that perceiving one’s partner as high in grateful mood was most significantly predictive of relationship satisfaction. The consequence of perceiving a partner as insincere may be a component of gratitude expression that gratitude journaling or internal reflection does not have, which is inherent to any expressive communication. Similar patterns are seen in clinical studies of therapies that involve partners expressing vulnerable emotions to one another (Makinen & Johnson, 2006). Specifically, when expressing gratitude, there is both a giver and a receiver, whereas reflection only requires one participant. Altogether, the results of Leong’s (2009) study challenge the find-remind-and-theory’s postulation that gratitude expression benefits relationships more than simply reflecting upon gratitude, but the results are not enough to conclude that Algoe’s (2012) theory is moot. The author applied a Western construct to a non-Western population, and did not describe any steps taken to properly assess the cultural applicability of this construct or measures. Similarly, the results obtained in a non-Western sample may be very different than the results obtained in a Western sample, so further study is merited simply based on the population. Second, the author only instructed one partner of each relationship to directly participate in the interventions, thus the study was not fully capturing a dyadic gratitude expression experience.

In a slightly different study, Roland (2009) had 12 couples either participate in an expression or a reflection condition. In the expression condition, participants were asked to give their partner five daily praises and limit daily criticisms to just one, which the partners logged independently and were not to show one another. Couples in the reflection condition simply kept a log of all praise and criticism statements. In the end, neither intervention group demonstrated significant results on relationship satisfaction, affective communication, global distress, or problem-solving (Roland, 2009), which challenges the find-remind-and-bind theory (Algoe, 2012) as well as DeMoss's (2004) original research. The results of the current study are questionable, though, as it is possible that gratitude was not always the emotion occurring, since the authors' instructions to discuss "statements of praise" may not have necessarily resulted in gratitude. More importantly, tracking and monitoring statements of criticism also may have significantly influenced the results, as instructing participants to focus on criticism in any way could interfere with the hypothesized benefit of gratitude or praise statements. Finally, the author did include both members of the couple, but did not mention any of the interdependence issues that may occur when analyzing dyadic data, and did not control for interdependence in their analysis.

In the most recent study that directly compared expressed to reflected gratitude, Gordon, Arnette, and Smith (2011) recruited couples in "long-term marriages" (mean marriage length of 20.7 years) and instructed participants to engage in a daily journaling task where they assigned to questions about internal and expressed gratitude in their relationship. The authors determined the inward experience of gratitude was more strongly related to marital happiness. This finding contrasts with the find-remind-and-bind theory of gratitude (Algoe, 2012), which posited the expression of gratitude in relationships is powerful because it is less ambivalent and thus may

trigger more positive responses (Algoe & Haidt, 2009; Lambert, Clark, Durtschi, Fincham, & Graham, 2010; Lambert & Fincham, 2011). Gordon et al. (2011) speculate the effect could have been the result of gratitude disposition, rather than the emotion or mood of gratitude, and encouraged future researchers to continue comparing the two types of interventions (Gordon et al., 2011).

Conceptual Theories

In the current study, the theory of communal relationships (Clark & Mills, 1979; 2011) is the foundation upon which the relational benefits of gratitude are built. Prior to exploring the conceptual theories of gratitude, the more general theory of communal relationships will be described to provide a framework for understanding the norms and expectations of healthy romantic relationships.

Theory of Communal Relationships. Clark and Mills (1979; 2011) proposed the theory of communal and exchange-based relationships as a framework researchers could use to explore close relationships. Though equity theory (Adams, 1965; Messick & Cook, 1983) was the prominent theoretical framework for social relationships, Clark and Mills (1979) did not feel it addressed the possibility that different types of relationships have different sets of rules. Equity theory (Adams, 1965; Messick & Cook, 1983) is based on the idea that all human relationships are built upon a set of rules that necessitates the contributions to a relationship are equal to the rewards, punishments, or resources gained. In contrast, Clark and Mills (1979; 2011) outline two categories of relationships with two different sets of rules and expectations in the theory of communal and exchange-based relationships.

Clark and Mills (1979; 2011) agree that some relationships are based upon rules of exchange, where there must be a balance of costs and benefits, but propose other relationships

are communal in nature, where benefits are not expected to be repaid. Exchange relationships are conceptualized as motivated by feelings of indebtedness, in that the individual who received a benefit then feels indebted to repay the other person with an equally valuable benefit. Thus, members of exchange relationships will likely keep track of benefits versus gifts. The motivation to give a benefit in communal relationships, however, is simply a desire to improve the wellbeing of the other person. Though the individual giving the benefit may hope the recipient returns a benefit of some kind, the relationship is not contingent upon it.

This distinction between communal and exchange relationships has been confirmed by a substantial body of literature. In their early studies, Clark and Mills (1979) used confederates and undergraduate students to determine if the social norms changed when the participant was seeking a communal relationship or an exchange relationship. In a series of studies, the authors found separate sets of norms and expectations for individuals who desired communal relationships when compared with those who desired exchange relationships. For example, participants seeking communal relationships reported liking the confederate less when a benefit was repaid immediately, while individuals in the exchange condition reported liking the confederate more in the same condition. The results were opposite when the benefit was not repaid; communal seekers were not affected, while exchange seekers reported a decreased liking of the confederate (Clark & Mills, 1979). Similar results were found in later studies (Clark, 1984; Clark et al., 1986; Clark et al. 1989).

Communal relationships may have an evolutionary basis, as the authors point out that the quintessential communal relationship is between an infant and its caregivers (Clark & Mills, 1979; 2011). Further, experience with communal relationships likely precedes learning to navigate exchange-based relationships. For example, the authors described a young boy at a pool

who asked for potato chips and a drink, and upon receiving the snacks happily turned around and walked away without paying the snack bar attendant. This child demonstrated a strong foundation of communal relationships, where he was given food unconditionally, but perhaps did not fully understand the concept of exchange-based relationships.

Though romantic relationships may be categorized as being communal, it cannot be assumed romantic relationships are inherently communal, just as it cannot be assumed that all parents display equal communal responsibility toward their children. To operationalize the communal nature of a relationship, the authors added a quantitative dimension of communal strength to the theory (Mills & Clark, 1982), which was more sensitive to the varying degrees of communal responsibility present in different relationships. The authors developed a hypothetical hierarchy of communal relationship partners. The model is triangle-shaped, therefore it is wider at the bottom, as many relationships may have a low degree of communal strength, and narrow at the top, as a very limited number of relationships may have a high degree of communal strength. Spouses and children reside at the top of the hierarchy, suggesting the authors believe that people tend to feel the most communal strength in relationships with their spouse and children.

Research has provided support for the hypothesis that healthy romantic relationships are often perceived as being communal much of the time (Clark & Lemay, 2010; Grote & Clark, 1998). Married participants in two separate studies rated communal norms as ideal norms for their marriage, and rated exchange norms as undesirable (Clark et al., 2010; Grote & Clark, 1998). Though spouses may waiver from their communal ideals when distressed (Grote & Clark, 2001) or insecure (Clark et al., 2010), participants overwhelmingly identified themselves as adhering to communal norms in romantic relationships.

The expression of gratitude in relationships can be considered a benefit in the theory of communal relationships (Clark & Mills, 1979; 2011). Ideally, when gratitude is expressed to a partner, it is done without expecting repayment. For example, when one spouse acknowledges and expresses thanks for the hard work the other has put in to the household chores, that spouse likely does not expect that their partner immediately acknowledge their own hard work. Thus, it is possible that gratitude could enhance one's sense of communal strength in their relationship. To fully understand how gratitude functions in relationships, the conceptual theories of gratitude as a construct can be examined.

Conceptual Theories of Gratitude. Researchers are beginning to form theories about gratitude and the mechanisms through which it occurs, which indicates that the research is becoming more advanced (Wood et al., 2010). Currently, theories of what gratitude is (McCullough et al., 2008), how it occurs (Emmons & McCullough, 2003), and how it influences dyadic relationships (Algoe, 2012; Kubacka et al., 2011) have been proposed. In this section, several conceptual theories of gratitude will be presented, as well as the find-remind-and-bind theory (Algoe, 2012), which drives the hypotheses and design of the current study.

Gratitude as a Prosocial Emotion. McCullough et al. (2008) presented a theory of gratitude that proposes it is a prosocial emotion. Specifically, the authors hypothesize that gratitude is (a) a benefit detector, as well as a (b) reinforcer and (c) motivator of prosocial behaviors. As a benefit detector, the authors posit that gratitude allows someone to recognize that they have benefitted from another's prosocial behavior (McCullough et al, 2008). Then, the authors believe that prosocial behaviors encourage prosocial behaviors, which has been supported by other researchers (Dunn & Schweitzer, 2005; Jackson et al., 2001). Finally,

gratitude motivates people to engage in positive behaviors towards others even when the other has done nothing to benefit them (Dunn & Schweitzer, 2005; Tsang, 2006).

Two-Step Cognitive Process of Gratitude. Other researchers have proposed that, cognitively, gratitude occurs as a two-step process (Emmons & McCullough, 2008). First, the individual must recognize that they have received a benefit. Then, the individual must recognize the external source of the benefit. This model lends itself well to research on gratitude interventions, particularly in relationships.

Gratitude in Dyadic Relationships. Kubacka et al., (2011) proposed a reciprocal model of gratitude in dyadic relationships that attempted to describe the relationship between gratitude and relationship maintenance behaviors. In their study, the authors confirmed their hypothesis, and discovered that gratitude precedes relationship maintenance behaviors. The authors also found that, in response to a relationship maintenance behavior, the other partner's gratitude increased, which then motivated further relationship maintenance behaviors, and created a reciprocal cycle of gratitude and relationship maintenance behaviors.

Find-Remind-and-Bind Theory of Gratitude in Relationships. The find-remind-and-bind theory builds upon the previous conceptual theories of gratitude (Emmons & McCullough, 2008; Kubacka et al., 2011; McCullough et al., 2008) by providing a social framework within the theory. Though previous theories propose how gratitude arises when one recognizes a benefit to the self (Emmons & McCullough, 2008; McCullough et al., 2008), Algoe (2012) believes gratitude is better explained in the context of high-quality dyadic relationships. In one study, members of a sorority were given benefits by an anonymous benefactor for a week (Algoe et al., 2008). The degree to which the recipient felt the benefactor was responsive was most strongly

associated with the recipient's feelings of gratitude, indicating that gratitude was associated with the benefit *and* the perception of the relationship with the benefactor.

Thus, within the find-remind-and-bind theory of gratitude, positive emotions strengthen our relationships with responsive partners. This proposition aligns with other emotion literature, which indicates that sharing emotions with responsive and supportive partners is more beneficial than sharing emotions with nonresponsive partners (Berscheid, 2003; Cohen, 1988; Johnson, 2012; King, 1993; Makinen & Johnson, 2006). Partners who are responsive to the needs of others are valuable because humans are interdependent. When one perceives a partner as caring, understanding, and responsive, they are more likely to experience gratitude, and may respond to the partner in a more positive and relationally beneficial way (Algoe 2012; Fredrickson, 2001). Thus, Algoe (2012) proposed gratitude helps people *find* previously unnoticed relationship partners or *remind* them of positive partners already in their life and *bind*, or bond, with those to whom they are grateful.

In the find-remind-and-bind theory, expressed gratitude is proposed to have benefits beyond simply experiencing gratitude because partners may be able to convey more appreciation through behaviors they display when they are expressing thanks. This proposition aligns with emotion expression literature that found expression benefits both the expresser and receiver (Makinen & Johnson, 2006; Myers, 1999). In one study, participants in a gratitude condition who filled out post-intervention free-response questionnaires frequently reported a desire to *express* gratitude to a benefactor (Algoe & Haidt, 2009). Expressed gratitude was also found to convey social support better than internally experiencing gratitude (Algoe, Fredrickson, & Gable, 2013; Algoe & Stanton, 2012) and is associated with increases in relationship satisfaction, commitment, and stability (Algoe et al., 2010; A.M. Gordon et al., 2012; Barton, Futris, &

Nielsen, 2015; Joel, Gordon, Impett, Macdonald, & Keltner, 2013; Kubacka et al., 2011). Algoe, Fredrickson, and Gable (2013) studied 77 nonclinical heterosexual couples in a laboratory gratitude expression intervention. The couples were instructed to think of a positive gesture their partner had done for them recently, and were instructed to thank their partner during a videotaped laboratory visit. Gratitude expression immediately predicted relationship satisfaction, even when controlling for pre-intervention relationship satisfaction, and this effect held up over a 6-month period. Kubacka et al. (2011) discovered that gratitude serves as a predecessor to relationship maintenance behaviors, which are intentional behaviors that may help sustain close relationships (Dainton & Stafford, 1993). Recently, gratitude expression was proposed to mediate pro-relationship behaviors (Joel et al., 2013) and problematic relationship patterns triggered by financial distress (Barton et al., 2015). Gratitude in romantic relationships was also correlated with release of the neurotransmitter oxytocin (Algoe & Way, 2014), indicating that gratitude and oxytocin may influence adult bonding in intimate relationships.

Taken together, most conceptualizations of gratitude need further research. Many of the conceptual theories of gratitude overlap, which may indicate that a more synthesized model is appropriate. Thus far, the find-remind-and-bind theory (Algoe, 2012) is the only theory to propose why and how gratitude may be beneficial for relationships. To advance the study of gratitude, future research could focus on designing and applying gratitude interventions for clinical populations to determine if the proposed benefits have the power to interrupt negative emotions or if they primarily serve to enhance positive emotions (Wood et al., 2010). To test the find-remind-and-bind theory, researchers should conduct studies which examine the proposed mechanisms more explicitly.

Gratitude Conclusions

Overall, there is a general enthusiasm around gratitude research, particularly within positive psychology. However, researchers should heed the warnings of Wood et al. (2010) and Davis et al. (2016) to pay close attention to the modest effect sizes yielded from gratitude interventions and the methodologies used to study them. There is a great need for unifying clarification of the definition of gratitude, conceptualization of gratitude and the mechanisms by which it occurs, and the method of gratitude interventions that may be the most useful in specific settings. Researchers should continue filling the gaps in current research through using more diverse population samples, including clinical populations and dyads, to examine how gratitude occurs in different settings and in relationships. Additionally, more rigorous research methodologies should be employed, and more consistent measures should be used in the studies to see if effects found in earlier research hold up under more rigorous methods. An accumulating body of evidence continues to demonstrate possible benefits of gratitude, but a shift in the research will be necessary to move gratitude beyond our current level of understanding.

The Actor-Partner Interdependence Model: A Strategy of Dyadic Data Analysis

As gratitude was examined in the context of dyads for the present study, a careful examination of research recommendations regarding dyadic research was conducted. Kenny et al. (2006) posit studies analyzing relationship dyads should be thought of as studies of non-independence (Kenny et al., 2006) in which the data were examined specifically to see how both members of an overarching unit, the dyad, may influence one another (Fitzpatrick, Gareau, Lafontaine, & Gaudreau, 2016). There are two identified categories of dyads (Fitzpatrick et al., 2016): indistinguishable, composed of two individuals who are meaningfully related on every variable, and distinguishable, composed of two individuals who differ from one another on some

meaningful variable (e.g. gender) within the dyad. The Actor-Partner Interdependence Model (APIM; Kenny, 2005) was created to provide dyadic researchers with a method of measuring the influence that dyads have on each other.

The APIM (Kenny, 2005) is defined as a “model of dyadic relationships that integrates a conceptual view of interdependence with the appropriate statistical techniques for measuring and testing it (Cook & Kenny, 2005, p. 101). In the visual representation of the model, shown in Figure 1 (Fitzpatrick et al, 2016), X represents each partner, and Y represents the dependent variables. The APIM is designed to examine how each partner’s independent variables influence their own dependent variables, which is known as the *actor effect* (a). There is also a *partner effect* (p) in the APIM, which allows researchers to explore if dependent variables are influenced by the partner. The APIM also examines two correlations. The correlation between partners ($c1$) can help researchers determine if the partners are exhibiting a compositional effect, or if the partners scores are more closely related than they would be between randomly selected individuals in a population. The second correlation ($c2$) can help determine if there is residual non-independence between the dependent variables, which is important for some methods of analyses (e.g., SEM) in order to ensure the endogenous variables do not correlate with one another.

Four patterns are identified within the APIM which can help researchers understand their data and help them create models based on a priori hypotheses (Fredrickson et al., 2016). The first pattern, identified as the couple-oriented pattern (Kenny et al., 2006), is represented by $a = p$, considers that the outcome is equally affected by both partners. The second pattern, known as the social comparisons pattern (Kenny et al., 2006), is represented by $a + p = 0$. The social comparison pattern occurs when the effect a partner has on one outcome has the opposite effect

for the other partner's outcome, such as when a partner's solitary time results in happiness for one partner but sadness for the other partner (Fredrickson et al., 2016). The third pattern is the actor-oriented pattern (Kenny et al., 2006), represented by $a \neq 0, p = 0$, indicating the individual's independent variables significantly effects their own dependent variable, but not their partner's. The fourth pattern, represented by $a = 0, p \neq 0$ is referred to as the partner-oriented pattern (Kenny et al., 2006), and is the most uncommon. In this pattern, a partner's independent variable effects their partner's dependent variable but not their own (Fredrickson et al., 2006). These patterns allow data to be examined in unique ways that cover all of the potential ways that outcomes could be influenced (see Table 2; Fredrickson et al., 2016).

Table 2¹
 4x4 Table Describing All the Possible Combinations of Dyadic Patterns in a Distinguishable Dyad

Male Patterns	Actor-only	Partner-only	Couple-oriented	Contrast
Actor-only	Double actor-only pattern	Male as the sole predictor	No <i>partner effect</i> from male partner	No <i>partner effect</i> from male partner
Partner-only	Female as sole predictor	Double partner-only pattern	No <i>actor effect</i> from male partner	No <i>actor effect</i> from male partner
Couple-oriented	No <i>partner effect</i> from female partner	No <i>actor effect</i> from female partner	Double couple-oriented pattern	Mixed dyadic pattern
Contrast	No <i>partner effect</i> from female partner	No <i>actor effect</i> from female partner	Mixed dyadic pattern	Double contrast pattern

Note: ¹Reprinted from “How to use the Actor-Partner Interdependence Model (APIM) to estimate different dyadic patterns in MPLUS: A step-by-step tutorial” by J. Fitzpatrick, A. Gareau, M. Lafontaine, and P. Gaudreau, 2016, *The Quantitative Methods for Psychology*, 12, p. 78.

The predictive patterns described by Fitzpatrick et al. (2016) were used, as instructed, to inform the models created from the hypotheses. In this particular study, participation in the gratitude intervention is expected to result in an increase in grateful mood and, subsequently, an increase in relationship satisfaction and relationship maintenance behaviors in a couple-oriented pattern (Kenny et al., 2006; Algoe et al., 2008; Algoe et al., 2013; Joel et al., 2013; Kubacka et al., 2011). Part of the analysis sought to determine if the pattern is couple-oriented, actor-only, or partner-only (Gordon et al., 2011), and if the effect changes with different gratitude experiences.

Conclusion

A review of the current gratitude literature demonstrates some of the enthusiasm around the proposed benefits of gratitude, both for individuals and in relationships. Current studies on gratitude in relationships are promising, but causal, dyadic data is very limited. Further, studies have not directly compared the mechanism of the gratitude interventions studied. Thus, more research is needed that examines 1) the mechanism of gratitude, specifically internal, intrapersonal gratitude and external, expressed gratitude, 2) how gratitude occurs between partners within a dyad, and 3) how gratitude interventions may be used as a brief but widely applicable therapeutic intervention.

Appendix B: Pilot Studies

Qumi Pilot Study

Participants. Five couples participated. The couples were 1) over 18 years old, 2) either married, dating, or cohabitating in a monogamous heterosexual or same-sex relationship, 3) willing to engage in the assigned task daily for one week, 4) in possession of an individual smartphone they could access daily for the one-week duration of the study, and 5) generally comfortable using smartphone application technology as part of the intervention. Participants were psychology graduate students or partners of graduate students at a Midwestern university in Muncie, Indiana.

Procedures. Couples were recruited through word of mouth and social media. Interested couples were asked to email, text message, or call the researcher to gain more information about the nature of the study. Couples were asked to test the Qumi (Oppenheim, 2016) smartphone application to assess its 1) participant and researcher usability, 2) accessibility, 3) confidentiality by providing qualitative responses to questions posed by the researcher (see below). Couples were asked to fill out the Qumi survey daily, which took less than one minute, for one week. No incentives were offered for the pilot study intervention.

Participants were emailed instructions from the researcher to download and set up the Qumi (Oppenheim, 2016) smartphone application. The researcher was also in personal contact with the couples to ensure they could set up the application, fill out the questions, and receive daily reminder notifications. Couples were informed they could discontinue the study at any time. If couples consented to the study, they selected “Agree” to the informed consent presented immediately upon opening the survey in Qumi. Participants were asked to follow the question prompts and write very brief, nonsense responses each day. After one week, couples were

emailed by the researcher and asked to provide their own responses to the questions listed below, addressing the usability, accessibility, and confidentiality of the Qumi app.

Results. One participant reported during the study that her reminders were not working, and the researcher was unable to determine what the problem was. Generally, participants reported the Qumi smartphone application (a) had pop-up reminders that encouraged them to participate and (b) was largely uncomplicated to access. Unfortunately, it was discovered the smartphone application was not currently available for non-Apple platforms (i.e., Android). Through personal contact, the developer also revealed Qumi would not be available for a non-Apple platform in the near future. Therefore, Qualtrics was piloted as an alternative to the Qumi smartphone application, as Qualtrics has the technology necessary to monitor if participants are completing the required tasks on a daily basis. To provide daily reminders to participants, the Delayd app was piloted in conjunction with Qualtrics to determine if the combination of Delayd and Qualtrics effectively reminded participants to participate, monitored daily participation, and collected data for the measures used in the study.

Participant Questions:

1. Were you able to access the Qumi survey when you were ready to take the survey?
2. Did the Qumi application remind you to participate in the survey each day? _____
 - a. If Yes, how many times a day did you receive a reminder?
3. Did the survey code work?
 - a. If No, did the subsequent survey link work?
4. Did you find it easy to use Qumi?
 - a. Why or Why Not?
5. Would you feel comfortable using this smartphone application daily for two weeks?

6. Do you have any other general comments or feedback regarding the smartphone application?

Qualtrics Pilot Study

In a second pilot study, Qualtrics was proposed as a medium through which both measures for the variables of interest and the daily response surveys were completed. To remind couples to participate in the daily surveys, the Delayd smartphone application was utilized to send automatic reminders each day. A qualitative pilot study was conducted to assess the usability, accessibility, and confidentiality of Qualtrics and the Delayd reminder application.

Participants. Eight couples participated in the pilot study. The inclusion criteria for couples were 1) over 18 years old, 2) either married or in a monogamous relationship, 3) willing to engage in the assigned task daily for two weeks, 4) had an individual smartphone or computer they could access daily for the two-week duration of the study, and 5) generally comfortable using technology as part of the intervention.

Procedure. A convenience sample of couples was recruited via email. Interested couples were asked to respond with the name, phone number, and personal email for both members of the couple. The participants of the study were psychology graduate students and their partners (dating or married, heterosexual and same-sex) from a Midwestern university in Muncie, Indiana. Couples were asked to test the Qualtrics daily survey, as well as the Delayd reminder application, to assess 1) participant and researcher usability, 2) accessibility, 3) confidentiality. Couples were asked to fill out the Qualtrics survey daily for five days, which took an average of 1 minute per day. Specific instructions were given to couples to not participate in the actual intervention, but to simply fill in random letters or words in the response boxes. Further, couples gave permission to use a third-party text message or email reminder service. Incentives were not offered for the pilot study intervention.

Participants received email instructions from the researcher to access the Qualtrics daily survey link. The researcher was in contact with the couples to ensure couples could access the survey, fill out the questions, and receive daily reminder notifications. Participants were asked to read the question prompts and write very brief, nonsense responses each day so the researcher could determine how to track partner responses together. Couples were informed they could discontinue the study at any time. Couples who decided to drop out of the study were asked to inform the researcher they were not interested and their information was deleted, but no couples dropped out of the study.

Results. After one week, couples were emailed a brief set of questions and asked to qualitatively report their own experiences to assess the usability, accessibility, and confidentiality of the Qualtrics survey and Delayd reminders, similar to the previous pilot study. The participants consistently indicated that Qualtrics was easy to use and the email reminders were helpful, especially after the researcher included links to the daily surveys within them. Overall, the results of the pilot study demonstrated Qualtrics was reliably accessible on smartphones and computers, links were easy to access, and information was easily tracked by the researcher for the daily survey responses. The Delayd application also was sufficient to provide daily reminder texts or emails. Ultimately, however, Delayd was replaced with automatic email reminders using Boomerang for Gmail as Delayd unexpectedly went out of business. The researcher attempted to contact the company that ran Delayd to inquire about the termination of the business, but the company simply responded that Delayd had to shut down unexpectedly.

Appendix C: IRB Approval Letter Images



Office of Research Integrity
 Institutional Review Board (IRB)
 2000 University Avenue
 Muncie, IN 47306-0155
 Phone: 765-285-5070

DATE: April 26, 2017

TO: Alyssa Brown, M.A.

FROM: Ball State University IRB

RE: IRB protocol # 1060484-1

TITLE: Do You Have to Say it? Reflection versus Expression in Romantic Relationships

SUBMISSION TYPE: New Project

ACTION: DEFERRED (pended/tabled)

DECISION DATE: April 26, 2017

REVIEW TYPE: Expedited Review

The Institutional Review Board began its review of the New Project for the above protocol on April 26, 2017. We were unable to perform a complete review of your submission and ask for additional information so that it may be reviewed further. We would appreciate your response to the information requested below, submitted electronically to IRBNet (<http://www.irbnet.org>) as a revision for review and approval before beginning the research activities described in the submission. If you have any questions regarding this request, please contact (ORI Staff).

Submit your response to the requested information, with changes/corrections highlighted (if possible), for IRB review. Along with your submission, please attach a separate Word Document with an itemized response to each of the points listed below explaining how and what was corrected in your study's protocol. Both of these things need to be addressed in order for the IRB committee to continue your study's review.

To complete the review of the above submission, the following information must be provided:

1. Unless this is strictly an online survey, you will need to add signature lines (2 needed as this is a couples only type study).
2. Refer to the IRB user manual on how to add the proposed research assistant as soon as they are known.
3. Add risk statement and participant benefit statement in the consent form.
4. Only exclusion you list is participants had to be couples but there is a screening questionnaire to determine eligibility? Please list all exclusions.

5. Application has no deception listed but then in compensation indicates that you will be debriefed about deception at the end of the study. Please explain.
6. What information are you providing at the end of the study? How will you ensure the information only gets to the one person? (Questions about regret and arguments/divorce might be problematic if shared). Please explain.
7. Read all online services terms and agreement, the current ToU and ToS policies concerning changes in laws. Service providers may use the information collected via their sites. Any changes that allow data/responses to be collected and used by the providers need to be added to the informed consent.

If this request affects your project dates, please revise them appropriately. Also, reference the above IRB protocol number (IRBNet #) in any communication to the IRB regarding this project. Please note that approval of this submission is not conferred until all of the above have been submitted and approved by the IRB.

If requested revisions are not submitted to the IRB within 60 calendar days, this package will be withdrawn within IRBNet. If you require more than 60 days to submit this revision, you must contact the Research Integrity Office (irb@bsu.edu or 765-285-5070) to request an extension. In the event that the IRB withdraws this package, and you would like to carry out this study in the future, you will need to recreate the study within IRBNet using the instructions found [here](#).

Bryan Byers, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity



Office of Research Integrity
 Institutional Review Board (IRB)
 2000 University Avenue
 Muncie, IN 47306-0155
 Phone: 765-285-5070

DATE: May 17, 2017

TO: Alyssa Brown, M.A.

FROM: Ball State University IRB

RE: IRB protocol # 1060484-2

TITLE: Do You Have to Say it? Reflection versus Expression in Romantic Relationships

SUBMISSION TYPE: Revision

ACTION: APPROVED

DECISION DATE: May 17, 2017

EXPIRATION DATE: May 16, 2019

REVIEW TYPE: **Expedited:** This protocol had been determined by the board to meet the definition of minimal risk.

The Institutional Review Board has approved your Revision for the above protocol, effective May 17, 2017 through May 16, 2019. All research under this protocol must be conducted in accordance with the approved submission and in accordance with the principles of the Belmont Report.

Review Type:

	Category 1: Clinical studies of drugs and medical devices
	Category 2: Collection of blood samples by Finger stick, Heel stick, Ear stick, or Venipuncture
	Category 3: Prospective collection of biological specimens for research purposes by noninvasive means
	Category 4: Collection of data through Non-Invasive Procedures Routinely Employed in Clinical Practice, excluding procedures involving Material (Data, Documents, Records, or Specimens) that have been collected, or will be collected solely for non-research purposes (such as medical treatment or diagnosis)
	Category 5: Research involving materials that have been collected or will be collected solely for non-research purposes.
	Category 6: Collection of Data from Voice, Video, Digital, or Image Recordings Made for Research Purposes

X	Category 7: Research on Individual or Group Characteristics or Behavior or Research Employing Survey, Interview Oral History, Focus Group, Program Evaluation, Human Factors, Evaluation, or Quality Assurance Methodologies
	Category 8: Continuing review of research previously approved by the convened IRB
	Category 9: Continuing review of research, not conducted under an investigational new drug application or investigational device exemption where categories 2-8 do not apply but the IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and not additional risks have been identified.

Editorial Notes:

Approve

As a reminder, it is the responsibility of the P.I. and/or faculty sponsor to inform the IRB in a timely manner:

- when the project is completed,
- if the project is to be continued beyond the approved end date,
- if the project is to be modified,
- if the project encounters problems, or
- if the project is discontinued.

Any of the above notifications must be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>). Please reference the IRB protocol number given above in any communication to the IRB regarding this project. Be sure to allow sufficient time for review and approval of requests for modification or continuation. If you have questions, please contact Sandra Currie at (785) 285-5052 or scurrie@bsu.edu.

In the case of an adverse event and/or unanticipated problem, you will need to submit written documentation of the event to IRBNet under this protocol number and you will need to directly notify the Office of Research Integrity (<http://www.bsu.edu/irb>) **within 5 business days**. If you have questions, please contact (ORI Staff).

Please note that all research records must be retained for a minimum of three years after the completion of the project or as required under Federal and/or State regulations (ex. HIPAA, FERPA, etc.). Additional requirements may apply.

Bryan Byers, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity



Office of Research Integrity
 Institutional Review Board (IRB)
 2000 University Avenue
 Muncie, IN 47306-0155
 Phone: 765-285-5070

DATE: November 8, 2017

TO: Alyssa Brown, M.A.

FROM: Ball State University IRB

RE: IRB protocol # 1060484-4

TITLE: Do You Have to Say it? Reflection versus Expression in Romantic Relationships

SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVED

DECISION DATE: November 8, 2017

EXPIRATION DATE: May 16, 2019

REVIEW TYPE: **Expedited:** This protocol had been determined by the board to meet the definition of minimal risk.

The Institutional Review Board has approved your Amendment/Modification for the above protocol, effective November 8, 2017 through May 16, 2019. All research under this protocol must be conducted in accordance with the approved submission and in accordance with the principles of the Belmont Report.

Review Type:

	Category 1: Clinical studies of drugs and medical devices
	Category 2: Collection of blood samples by Finger stick, Heel stick, Ear stick, or Venipuncture
	Category 3: Prospective collection of biological specimens for research purposes by noninvasive means
	Category 4: Collection of data through Non-Invasive Procedures Routinely Employed in Clinical Practice, excluding procedures involving Material (Data, Documents, Records, or Specimens) that have been collected, or will be collected solely for non-research purposes (such as medical treatment or diagnosis)
	Category 5: Research involving materials that have been collected or will be collected solely for non-research purposes.
	Category 6: Collection of Data from Voice, Video, Digital, or Image Recordings Made for Research Purposes

	Category 7: Research on Individual or Group Characteristics or Behavior or Research Employing Survey, Interview Oral History, Focus Group, Program Evaluation, Human Factors, Evaluation, or Quality Assurance Methodologies
	Category 8: Continuing review of research previously approved by the convened IRB
	Category 9: Continuing review of research, not conducted under an investigational new drug application or investigational device exemption where categories 2-8 do not apply but the IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and not additional risks have been identified.

Editorial Notes:

1. Read all Terms of Service and Terms of Use on all sites being used for this study.

As a reminder, it is the responsibility of the P.I. and/or faculty sponsor to inform the IRB in a timely manner:

- when the project is completed,
- if the project is to be continued beyond the approved end date,
- if the project is to be modified,
- if the project encounters problems, or
- if the project is discontinued.

Any of the above notifications must be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>). Please reference the IRB protocol number given above in any communication to the IRB regarding this project. Be sure to allow sufficient time for review and approval of requests for modification or continuation. If you have questions, please contact John Mulcahy at (765) 285-5106 or jmulcahy@bsu.edu.

In the case of an adverse event and/or unanticipated problem, you will need to submit written documentation of the event to IRBNet under this protocol number and you will need to directly notify the Office of Research Integrity (<http://www.bsu.edu/irb>) **within 5 business days**. If you have questions, please contact (ORI Staff).

Please note that all research records must be retained for a minimum of three years after the completion of the project or as required under Federal and/or State regulations (ex. HIPAA, FERPA, etc.). Additional requirements may apply.

D. Clark Dickin, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/
Director
Office of Research Integrity

Appendix D: Consent to Act as Human Research Subject

Study Title: Do You Have to Say it? Reflection versus Expression in Romantic Relationships

Dear Potential Participant,

You are being asked to participate in a research study. Your participation in this study is completely voluntary and you are free to withdraw your permission at anytime for any reason without penalty or prejudice from the investigator. Please feel free to ask any questions of the investigator before signing this form and at any time during the study.

Ball State University's Institutional Review Board has approved this study. Please read the information below before deciding if you would like to participate.

PURPOSE OF STUDY

The purpose of this research study is to examine how different forms of communication may impact romantic relationships.

SUBJECTS

Inclusion Requirements

You are eligible to participate in this study if you are:

- over 18 years of age,
- either married or cohabitating in a monogamous heterosexual relationship for more than 2 years,
- willing to engage in the assigned task for two weeks,
- able to use an individual smartphone or computer on a daily basis for the two-week duration of the study,
- able to check an individual email account each of you can access to receive the links to the electronic study questionnaires, and
- generally comfortable using technology as part of the intervention.

Exclusion Requirements

You will not be eligible to participate in this study if:

- You do not meet all of the inclusion criteria
- Both members of the couple are not in agreement to participate in the study
- You and your partner are unable to commit to a two-week intervention period

Time Commitment

One initial meeting that will be no longer than 1 hour is required.

The time commitment of this study will be approximately 5-10 minutes daily for two weeks, as well as approximately 15 minutes on the day after the final intervention period.

PROCEDURE

This study will consist of questionnaires about your demographic information and relationship characteristics.

One internet-based company will be used in the current study:

Qualtrics: Qualtrics is a widely-used, internet-based company designed to collect research. The researcher is using Qualtrics via Ball State University. The data collected on Qualtrics will be coded to maintain participant confidentiality, and will be password protected. The current policies of Qualtrics deem all data collected is owned by the primary investigator of this study. Should any of these policies change, the researcher will notify the participants.

Additionally, you may be sent reminder emails by a researcher during the intervention period. The emails will contain a short greeting, a link to an anonymous survey, and your assigned coded ID.

COMPENSATION, COSTS AND REIMBURSEMENT

Compensation for Participation

Each couple will receive a total of \$10, \$5 after the initial assessments and \$5 after the final assessments. All couples will also be given the option of donating the \$10 to a charity, potentially contributing to a combined \$500+ donated.

Couples will also receive information about the overall study results upon study completion, and a link to a video about general relationship tips made by the primary investigator.

CONFIDENTIALITY

Subject Identifiable Data

All responses will be confidential. Any identifiable participant information will not be stored with the data. Couples will be given a code by the researcher, and will use that code when filling out all questionnaires.

Data Storage

Anonymous data collected will be stored temporarily on Qualtrics, which is a 3rd party website designed to collect research. The Qualtrics account associated with the data will be kept confidential and is password protected.

Identifying information about participants will be stored separately from the data.

The final data will be downloaded and contained on a password protected computer.

Data Access

The researchers named on this form will have access to study records.

Data Retention

The researchers intend to keep the research data for five years, as the researcher may wish to use the data for future studies.

RISKS OR DISCOMFORTS

There are no perceived risks for participating in this study.

BENEFITS

Participating in this study may improve some aspects of your relationship, including communication. However, not all participants may benefit from participating in this study.

If you have any comments, concerns, or questions regarding the conduct of this research please contact the research team listed on the first page of this form. If any emotional discomfort arises in relation to participation in this study, please contact the Ball State University Counseling Center or the Principal Investigator, who will help you find an appropriate referral in your location.

IRB Contact Information

For one's rights as a research subject, you may contact the following: For questions about your rights as a research subject, please contact the Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5070 or at irb@bsu.edu.

Consent

We, _____ and _____, agree to participate in this research project entitled, **Do You Have to Say it? Reflection versus Expression in Romantic Relationships**. I have had the study explained to me and my questions have been answered to my satisfaction. I have read the description of this project and give my consent to participate. I understand that I will receive a copy of this informed consent form to keep for future reference.

To the best of my knowledge, I meet the inclusion/exclusion criteria for participation (described on the first page) in this study.

Participant's Signature

Date

Participant's Signature

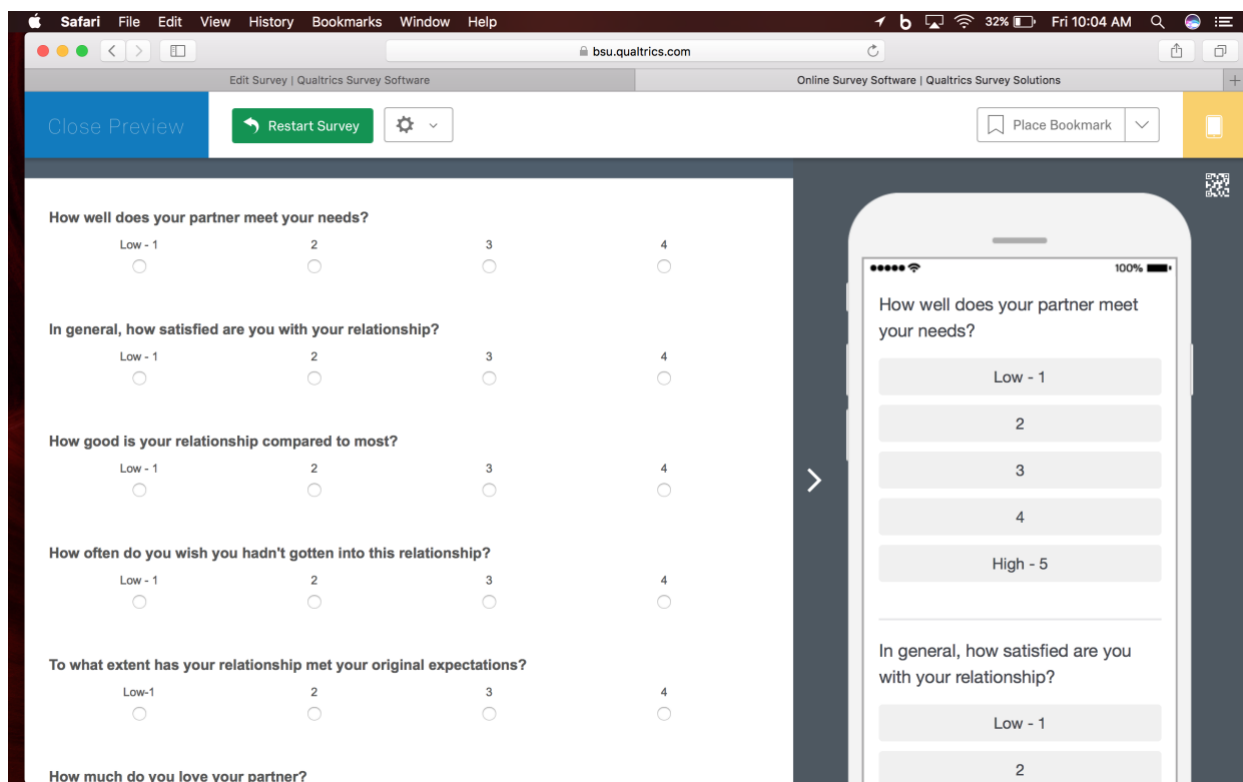
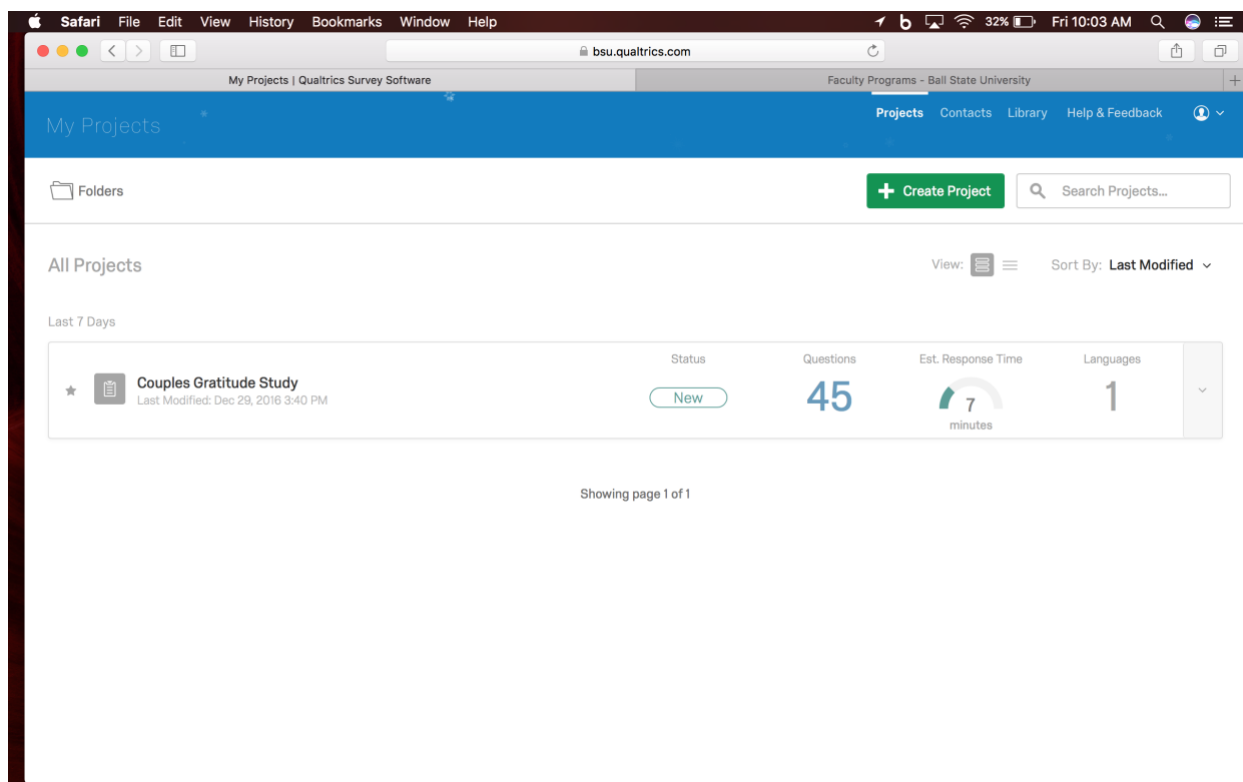
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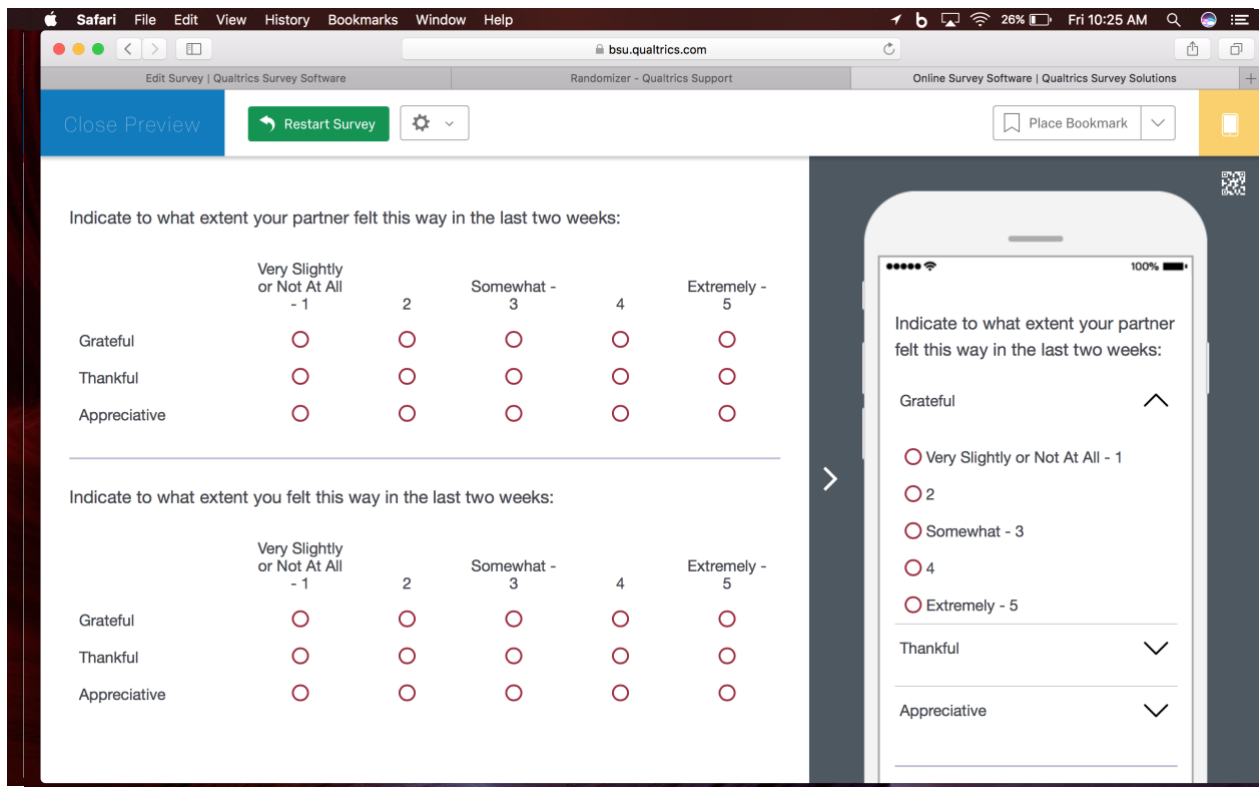
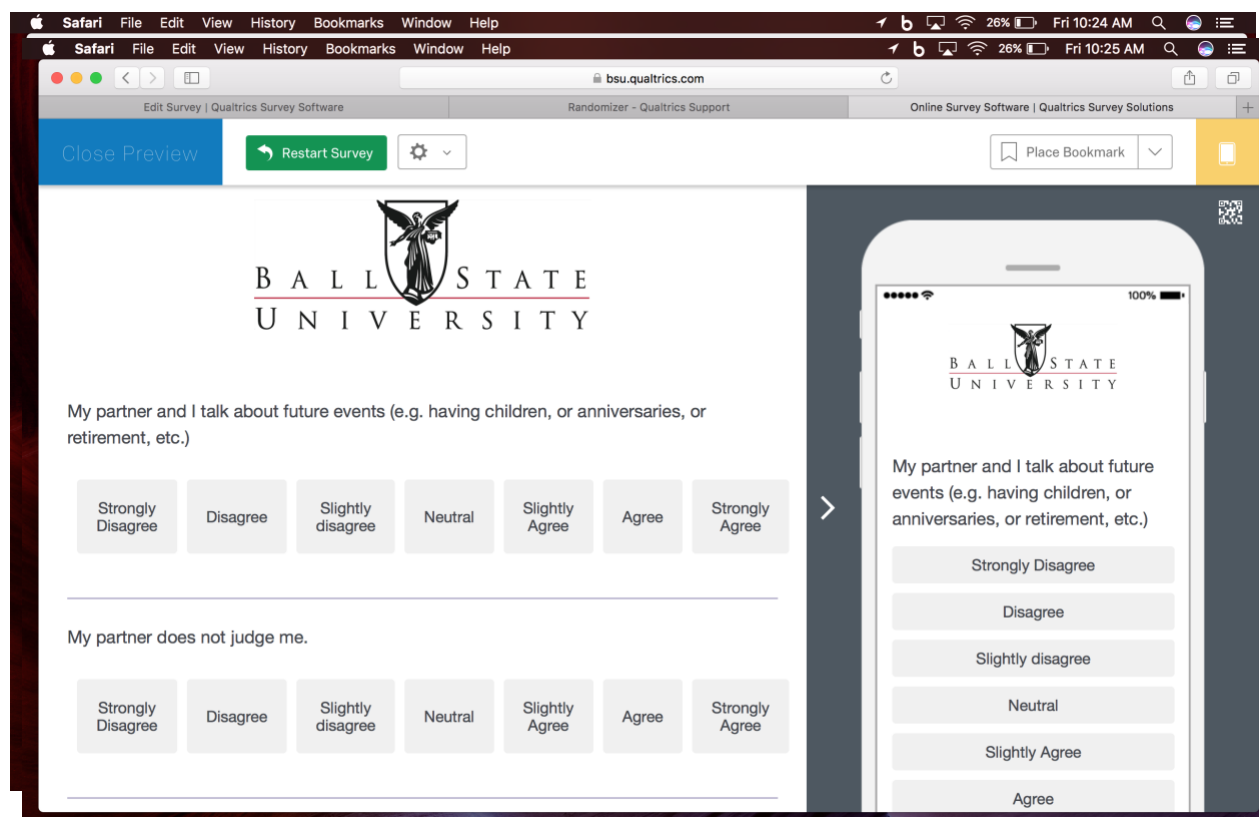
Researcher Contact Information:

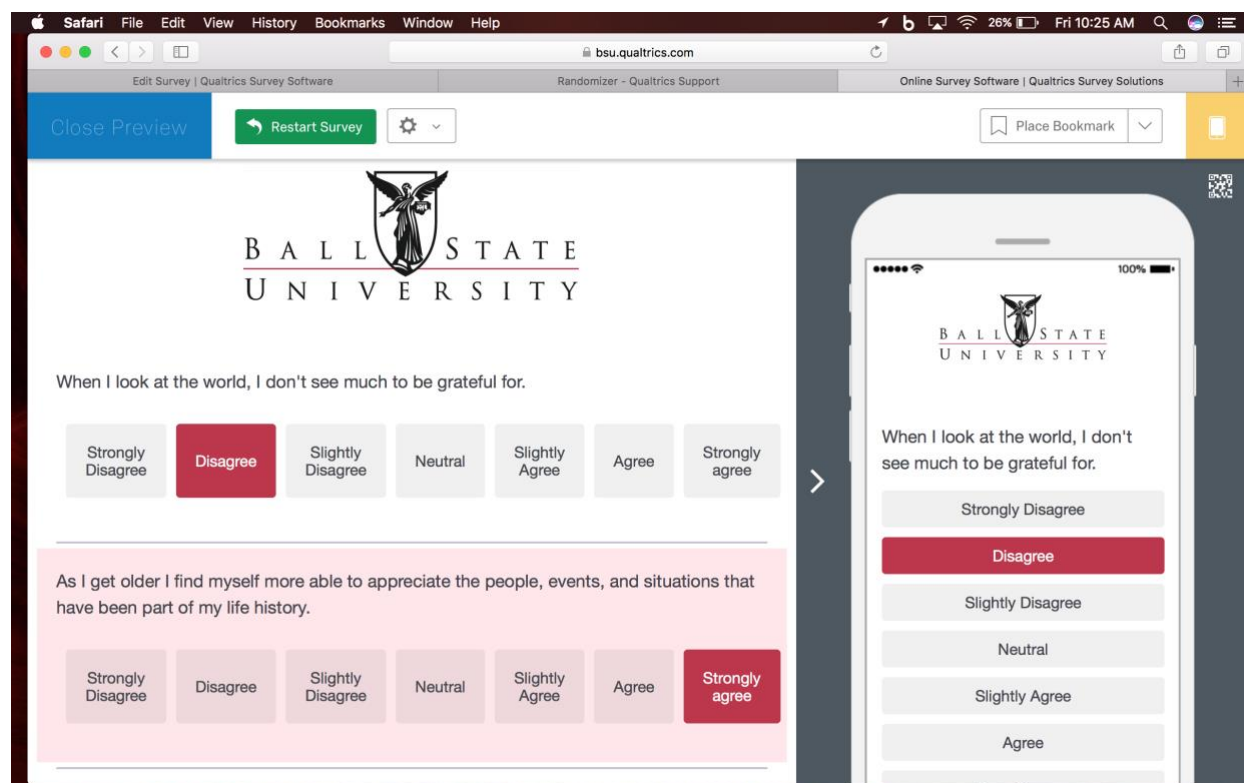
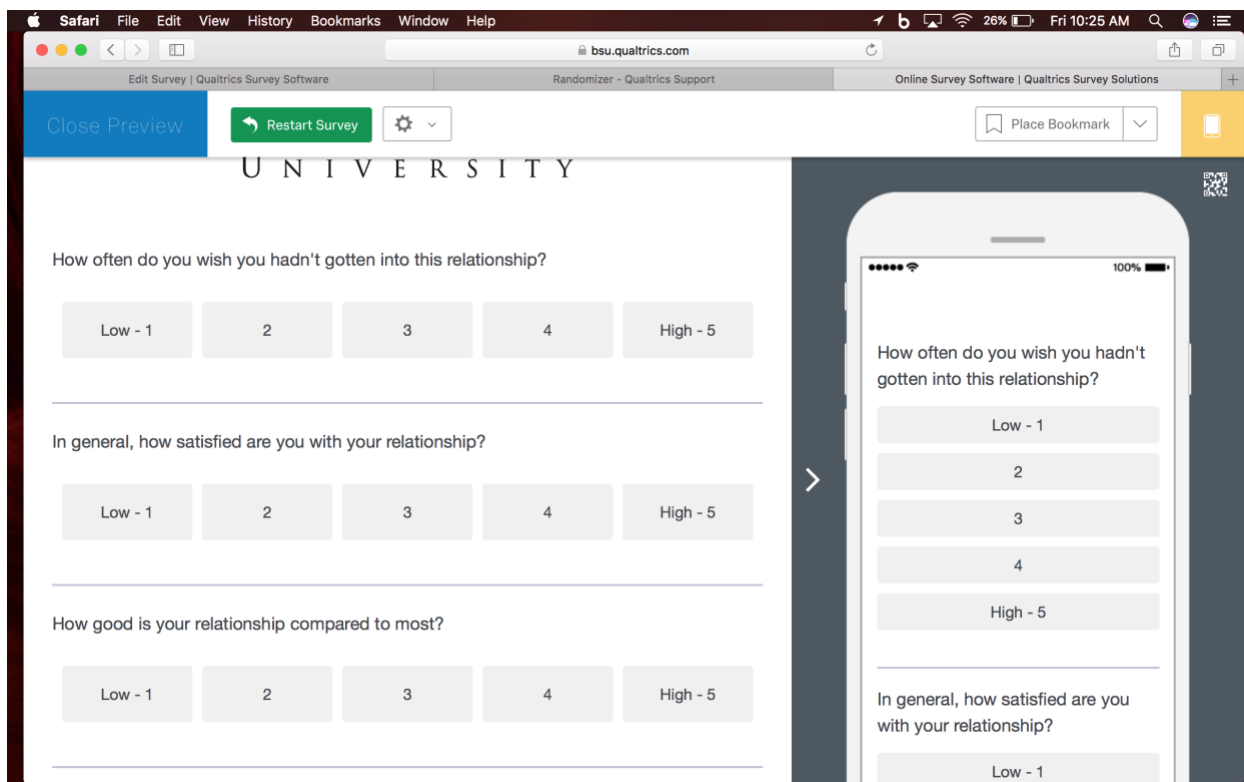
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Appendix E: Qualtrics Survey Images







Appendix F: Demographics

- What is your gender?
 - Male
 - Female
- How did you hear about this study?
 - Friend
 - Church Announcement
 - Church name? _____
- How old are you in years? _____
- Length of marriage
 - _____ Years _____ months
- Do you have children?
 - Yes If yes, how many? _____
 - No
- How much distress are you currently experiencing in your relationship?
 - None at all (1)(2)(3)(4)(5)(6) Very much

Appendix G: Revised Dyadic Adjustment Scale

Most people have disagreements in their relationships. Please indicate below the extent of agreement or disagreement between you and your partner for each item.

	Always Agree (5)	Almost Always Agree (4)	Occasionally Agree (3)	Frequently Disagree (2)	Almost Always Disagree (1)	Always Disagree (0)
1. Religious matters						
2. Demonstrations of affection						
3. Making major decisions						
4. Sex relations						
5. Conventionality (correct or proper behavior)						
6. Career decisions						

	All the Time (0)	Most of the time (1)	More often than not (2)	Occasionally (3)	Rarely (4)	Never (5)
7. How often do you discuss or have you considered divorce, separation, or terminating your relationship?						
8. How often do you and your partner quarrel?						
9. Do you ever regret that you married (or lived together)?						
10. How often do you and your mate "get on each other's nerves"?						

	Every Day	Almost Every Day	Occasionally	Rarely	Never
11. Do you and your mate engage in outside interests together?					

How often would you say the following events occur between you and your mate?

	Never (0)	Less than once a month (1)	Once or twice a month (2)	Once or twice a week (3)	Once a day (4)	More often (5)
12. Have a stimulating exchange of ideas						
13. Work together on a project						
14. Calmly discuss something						

For office use only	CON	SAT	COH	TOT
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Consensus (1-6): 22; Satisfaction (7-10): 14; Cohesion (11-14): 11; Total: 48

Crane, D. R., Bean, R.A., & Middleton, K. C. (2000). Establishing criterion scores for the Kansas Marital Satisfaction Scale (KMSS) and the Revised Dyadic Adjustment Scale (RDAS). *The American Journal of Family Therapy*, 28 (1), 53-60.

Appendix H: Gratitude Questionnaire (GQ-6)

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1 _ strongly disagree

2 _ disagree

3 _ slightly disagree

4 _ neutral

5 _ slightly agree

6 _ agree

7 _ strongly agree

___ 1. I have so much in life to be thankful for.

___ 2. If I had to list everything that I felt grateful for, it would be a very long list.

___ 3. When I look at the world, I don't see much to be grateful for.

___ 4. I am grateful to a wide variety of people.

___ 5. As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.

___ 6. Long amounts of time can go by before I feel grateful to something or someone.

Items 3 and 6 are reverse scored

Appendix H: Grateful Mood of Self and Spouse

Indicate to what extent you felt this way today:

1) Grateful

1	2	3	4	5
very		somewhat		extremely

2) Thankful

1	2	3	4	5
very		somewhat		extremely

3) Appreciative

1	2	3	4	5
very slightly		somewhat		extremely

Indicate to what extent your partner felt this way today:

1) Grateful

1	2	3	4	5
very slightly or not		somewhat		extremely

2) Thankful

1	2	3	4	5
very slightly or		somewhat		extremely

3) Appreciative

1	2	3	4	5
very slightly or		somewhat		extremely

Appendix I: Relational Maintenance Behavior Measure

Using the scale below as a guide, please indicate the extent to which you believe your spouse has performed over the past two weeks in order to maintain the relationship:

1 _ strongly disagree

2 _ disagree

3 _ slightly disagree

4 _ neutral

5 _ slightly agree

6 _ agree

7 _ strongly agree

1. My partner acts positively with me. _____
2. My partner is upbeat when we are together. _____
3. My partner acts cheerfully with me. _____
4. My partner acts optimistically when he/she is with me. _____
5. My partner is understanding. _____
6. My partner is forgiving of me. _____
7. My partner apologizes when he/she is wrong. _____
8. My partner does not judge me. _____
9. My partner talks about his/her fears. _____
10. My partner is open about his/her feelings. _____
11. My partner encourages me to share my thoughts with him/her. _____
12. My partner encourages me to share my feelings with him/her. _____

13. My partner discusses the quality of our relationship. _____
14. My partner tells me how he/she feels about the relationship. _____
15. My partner and I have talks about our relationship. _____
16. My partner and I talk about future events (e.g. having children, or anniversaries, or retirement.,
etc). _____
17. My partner and I talk about our plans for the future. _____
18. My partner tells me how much I mean to him/her _____
19. My partner shows me how much I mean to him/her. _____
20. My partner and I share in the joint responsibilities that face us. _____
21. My partner performs his/her household responsibilities. _____
22. My partner helps with the tasks that need to be done. _____
23. My partner does not shirk his/her duties. _____
24. My partner includes our friends in activities_____
25. My partner does things with our friends_____
26. My partner spends time with our families _____
27. My partner asks a family member for help _____
28. My partner turns to a family member for advice_____

Appendix J: Daily Gratitude Questions

- 1) Think of a way your partner made you happy today. What did they do? Why did this make you happy?
- 2) Take a few moments to come up with three things you are grateful for about your partner. What are the three things that you are grateful for?
- 3) What makes you grateful for these aspects of your partner?
- 4) Take a few moments to think about something you could do that you know your partner would appreciate. How could you do this in your relationship right now?

Appendix K: Correlation Matrix of Variables of Interest

Table 3

Correlation Matrix of Pre- and Post- DAS, GMS, and RMB and GQ of One Partner

		Pre_DAS_A	Pre_GMS_A	Pre_RMB_A	GQ_A	Post_GMS_A	Post_DAS_A	Post_RMB_A
Pre_Das_A	<i>r</i>	1	.217	.408*	.378*	.104	.593**	.231
	Sig.		.198	.012	.021	.539	.000	.169
Pre_GMS_A	<i>r</i>	.217	1	.292	.377*	.417*	.306	.360*
	Sig.	.198		.079	.021	.010	.065	.029
Pre_RMB_A	<i>r</i>	.408*	.292	1	.183	.131	.484**	.731**
	Sig.	.012	.079		.277	.439	.002	.000
Pre_GQ_A	<i>r</i>	.378*	.377*	.183	1	.045	.285	-.103
	Sig.	.021	.021	.277		.790	.087	.543
Post_GMS_A	<i>r</i>	.104	.417*	.131	.045	1	.085	.278
	Sig.	.539	.010	.439	.790		.616	.096
Post_DAS_A	<i>r</i>	.593**	.306	.484**	.285	.085	1	.528**
	Sig.	.000	.065	.002	.087	.616		.001
Post_RMB_A	<i>r</i>	.231	.360*	.731**	-.103	.278	.528**	1
	Sig.	.169	.029	.000	.543	.096	.001	

Note: *r* = Pearson's correlation, Significance = 2-tailed

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).