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Enhancing relationship skills and couple functioning with mobile technology: An evaluation of the Love Every Day mobile intervention

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ABSTRACT

A research-informed mobile application (app) was created to encourage and activate couples to demonstrate healthy relationship behaviors in an effort to promote relationship quality, stability, and resilience. The app, Love Every Day, is grounded in the literature on couple quality, habit formation, and family resilience, and it uses tenets of effective behavioral intervention technologies. Forty-three couples ($N = 86$ participants) engaged with the app across a 21-day period and completed online evaluations, which consisted of a pretest, posttest, and three weekly questionnaires. Findings suggest that the couples' app promoted high levels of engagement, such that most participants viewed the app multiple times a day and also submitted answers to daily prompts 19.8 of the 21 days (94% of the intervention). Pretest and posttest assessments suggest that participants enhanced their relationship skills and behaviors, including knowledge of their partner's general well-being, care for one's partner, partner communication, and self-efficacy to manage conflict. Participants also reported higher levels of relationship quality after engaging with the app for 21 days, including less relationship distress, greater partner cohesion, better relationship satisfaction, and more relationship confidence. Implications for self-directed modes of relationship education and promoting family resilience are discussed.

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The couple romantic relationship is a highly salient domain within the family system; the quality and stability of that relationship has implications for individual health and well-being (e.g., Miller, Hollist, Olsen, & Law, 2013) as well as parenting and child outcomes (e.g., McCoy, George, Cummings, & Davies, 2013). Efforts to enhance couple resilience through education and skills training have documented success particularly in

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promoting relationship quality and communication skills (Hawkins, Blanchard, Baldwin, & Fawcett, 2008; Hawkins & Ooms, 2012).

Research suggests that couple and relationship education (CRE) influences the couple subsystem by encouraging behavioral changes that reflect positive, affectionate interactions within the couple dyad, which, in turn, promotes enhanced relationship quality and commitment (Rauer, Adler-Baeder, Lucier-Greer, Skuban, Ketring, & Smith, 2014). The vast majority of evaluated CRE programs have been delivered through in-person classes (Markman & Rhoades, 2012); only a handful of online CRE programs have been assessed (e.g., Duncan, Steed, & Needham, 2009; Gelatt, Adler-Baeder, & Seeley, 2010); and no published studies of CRE programs delivered by mobile application (app) exist.

Efforts to apply these principles to self-directed modes of relationship education stimulated the development of Love Every Day, a research-informed mobile app grounded in the couple quality and resilience literature, habit formation literature, and tenets of effective behavioral intervention technologies. This study provides an initial evaluation of the Love Every Day app as a means to promote couple resilience as assessed by changes in self-reported relationship skills and behaviors (dimensions of know, care, share, and manage) and couple quality (relationship distress, cohesion, satisfaction, and confidence).

Implications of unhealthy romantic relationships

Marital discord is a significant risk factor for negative mental and physical health outcomes (Fincham & Beach, 2010), including substance abuse disorders (e.g., Homish & Leonard, 2007; La Flair et al., 2012) and increases in stress, anxiety, functional impairment, and depression (e.g., McShall & Johnson, 2015). Even moderate levels of ongoing stressors, like relationship conflict (Thoits, 2010), can negatively affect physical health, including high blood pressure, high cholesterol, immune deficiency disorders, ulcers, chronic skin conditions, obesity, cancer, and respiratory and cardiovascular disease (Proulx, Helms, & Buehler, 2007; Sapolsky, 2003). Correlated mental health outcomes include lower levels of self-esteem, increased symptoms of depression, poor motivation, and emotional exhaustion (see review in Whisman & Baucom, 2012).

It has been regularly demonstrated that relationship stress and conflict also spill over into the parenting subsystem and are related to negative child outcomes, including adolescent substance use, more aggressive behaviors, lower academic achievement, and higher rates of depression (e.g., Krishnakumar & Buehler, 2000; Schiff et al., 2014). The strong relationship between couple conflict and parenting is consistent across a broad range of

couples, regardless of marital status, socioeconomic status, ethnicity, or race (Carlson & McLanahan, 2006; Doherty & Beaton, 2004; Gonzales, Pitts, Hill, & Roosa, 2000), and it is also seen in parents of both genders (Carlson, Pilkauskas, McLanahan, & Brooks-Gunn, 2011; Waller, 2012) and across all child age groups (Buehler & Gerard, 2002).

Family resilience

An unhealthy romantic relationship and persistent relational discord put the family system at risk for elevated family stress and poorer functioning (McCubbin & Patterson, 1983). The family resilience perspective suggests that couples and families have the potential to not only manage or survive chronic stress, but also to transform and grow together from these difficult experiences (Walsh, 2003b). It is also expected that all couples face some degree of challenge and stress and can benefit from primary prevention efforts that promote protective factors that support healthy couple relationship functioning (Coie et al., 1993; Starfield, 1996). Through a synthesis of the empirical literature Walsh (2003b) identifies salient family processes that promote family resilience, including communication and problem solving. More specifically, the family resilience perspective suggests that to foster resilience it is integral that communication (1) be clear and consistent across words and behaviors, (2) support open emotional expression, and (3) embrace collaborative problem solving. These elements can translate into points of focus when providing services to couples as a means to address potential marital discord and family stress (Walsh, 2003a).

Couple relationship education

Couple relationship education (CRE) is an opportunity to provide proactive education and skills training (e.g., positive communication, supportive interactions, collaborative decision making) as an early intervention approach to improving relationship quality, stability, and resilience. Empirical evidence suggests that CRE is an effective approach for preventing and reducing relational discord and its associated problems (Hawkins et al., 2008; Markman & Rhoades, 2012). Recent research studies and meta-analyses have validated that this type of skills-based relationship education program effectively helps couples create and sustain healthy, stable relationships, including among higher-risk and relationally unstable couples (e.g., Hawkins & Erickson, 2015; Lucier-Greer & Adler-Baeder, 2012).

Empirical evidence from the past two decades of research on predictors of marital quality is captured in the national extension relationship and marriage education model (National Extension Relationship and Marriage Education Model [NERMEM]; Futris & Adler-Baeder, 2013). The NERMEM offers a best-

practices intervention model that identifies the key relationship skills and behaviors associated with healthy couple functioning. These skills include choose (making ongoing conscious decisions to be relationally committed, intentional, and proactive), know (maintaining intimate knowledge of each other's personal and relational needs, interests, and feelings), care (engaging in physical and verbal expressions of intimacy, affection, and respect), share (making the effort to spend meaningful time together, find common interests and activities, and nurture positive interactions), manage (learning and using positive anger and conflict management skills and collaborative problem-solving), connect (developing connections as a couple with family, peers, and community), and care for self (attending to one's own physical, mental, and emotional health). These NERMEM domains represent core patterns of cognition and behavior that are regularly associated with relationship quality, stability, and resilience.

Optimizing CRE for mobile delivery: The Love Every Day intervention

Mobile delivery of behavioral intervention technologies capitalizes on increasingly ubiquitous smartphone and text-message technology and has been shown to assist users in successfully implementing health behavior changes (Cugelman, Thelwall, & Dawes, 2011), psychological interventions (Richards & Richardson, 2012), and prevention strategies (Webb, Joseph, Yardley, & Michie, 2010). Additionally, this method of intervention is emerging as a highly effective method for reaching users in the context of their daily lives, as a function of its portability, convenience, just-in-time content delivery, tailoring, increased sense of privacy, and reduced stigma (Ehrenreich, Righter, Rocke, Dixon, & Himelhoch, 2011; Heron & Smyth, 2010). Self-directed mobile approaches permit participants to experience concepts directly and actively engage in the change process, while developing healthy habits, a form of automated behavior prompted by contextual cues and reinforced with powerful feedback loops.

Furthermore, mobile approaches provide an alternative intervention for those who are resistant to traditional programs (Barber, 1990). For some, technology-based, self-directed programs provide a safer environment to disclose personal information more reliably than in traditional, face-to-face assessments (Halford et al., 2010). For example, men are traditionally less likely than women to seek out and participate in counseling and community family life education and may prefer the partners-only privacy of a mobile intervention (Addis & Mahalik, 2003).

Accordingly, the Love Every Day app was created based on tenets of effective behavioral intervention technologies coupled with knowledge of the habit formation literature and CRE literature rooted in the NERMEM. Love Every Day capitalizes on pervasive and habitual use of smartphones and text messaging—and uses a dyadic, direct behavior-activation approach to trigger positive verbal and nonverbal interactions and increase healthy

patterns of thought and behavior within the couple relationship. The intervention uses daily text messages to engage each member of the couple in responding and sharing answers to a brief daily question for 21 days. The Love Every Day intervention emphasizes the key relational skills, know, care, share, and manage, of the NERMEM, with the daily questions carefully designed to foster positive emotions and a sense of unfolding appreciation and cohesion. All components of the NERMEM model serve to promote healthy relationship functioning, but we prioritized these four components in the development of the app because they focus on dyadic interactional skills and processes. The other components of the NERMEM promote personal and community aspects of healthy relationship functioning. If the app is expanded in the future, these elements may be incorporated.

Figure 1 provides a visual demonstration of the app; each morning the partners are sent the same brief prompt and asked to respond (e.g., "One of

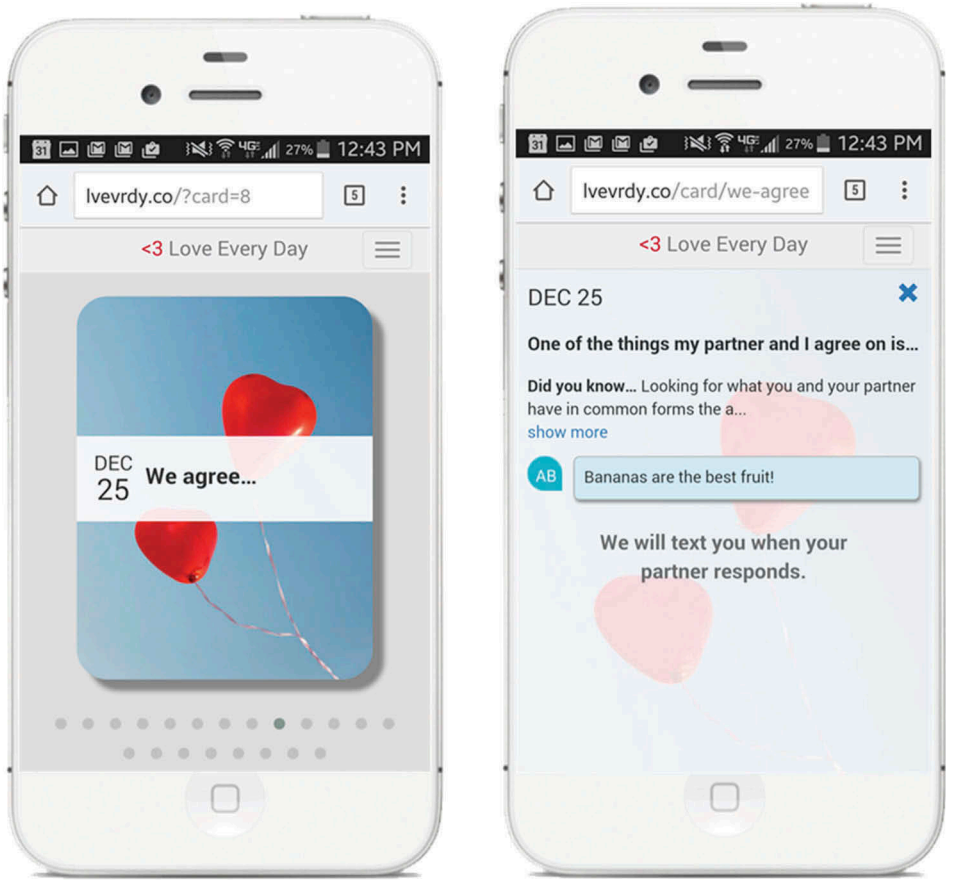

Figure 1. A visual demonstration of the Love Every Day app. Each morning members of the couple dyad are sent the same brief prompt and asked to respond. Questions are supported by a daily relationship fact, based on the related NERMEM key relationship skill.

the things my partner and I agree on is…"). Questions are supported by a daily relationship fact, based on the related NERMEM key relationship skill (e.g., "Looking for what you and your partner have in common forms the attachment necessary to maintain a satisfying long-term couple relationship").

When each member of the couple dyad responds to the daily question, both partners' answers are revealed, unlocking "bonus" activities designed to facilitate prosocial behaviors within the couple relationship. For example, in Figure 2 partners were asked to respond to the following prompt, "What is the best relationship advice you have received?" with this evidence-based educational fact, "Daily habits of love and care between partners provide a positive model for others around them." When both partners responded, responses became visible to both members of the dyad and each partner received a unique bonus activity intended to facilitate warm interactions (e.g., hug your partner for 7 seconds, share

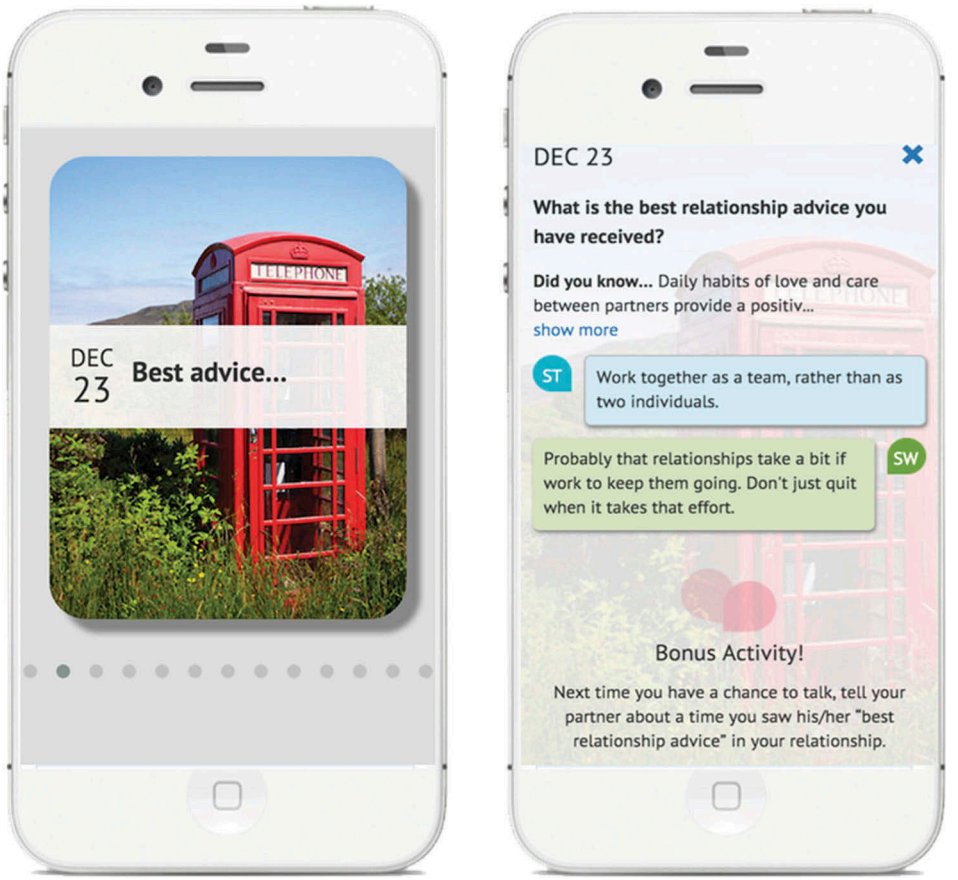

Figure 2. A visual demonstration of the Love Every Day app. When each member of the couple dyad responds to the daily question, both partners' answers are revealed, unlocking a bonus activity designed to facilitate prosocial behaviors within the couple relationship.

a favorite memory with your partner by text, phone or in person later today). Participants have 24 hours to respond to each daily prompt. If no responses or just one response is received, the next prompt is delivered. Participants are able to view past answers, but are not permitted to edit responses.

Current study

The study represents a novel test of CRE delivered through the mobile app Love Every Day intervention offered for 21 days. Through data collected at pretest, posttest, and from three weekly assessments, we examined the ability of the app to promote positive behavioral changes and improve relationship functioning following participation. Specifically, this study examined the following research questions.

Research Question 1: To what degree will participants remain engaged in the Love Every Day intervention for 21 days?

Research Question 2: Does engaging in the Love Every Day intervention result in positive behavioral changes in the couple relationship, specifically in the key relationship skills: know, care, share, and manage of the NERMEM?

Research Question 3: Does engaging in the Love Every Day intervention result in improvements in assessments of couple quality, specifically, relationship distress, cohesion, satisfaction, and confidence?

Research Question 4: Does the Love Every Day intervention result in positive in-person interactions?

Research Question 5: How will participants rate the usability of and their satisfaction with the *Love Every Day* app?

Method

Participants

A total of 43 couples (N = 86 participants) provided consent to participate in the study protocol and online evaluations, which consisted of a pretest, posttest, and three weekly questionnaires. The majority of participants were White (86%), non-Hispanic (96%), and female (56%). Most of the couples (69%) were married, and five couples (13%) were in same-sex partnerships. Average age was 37.3 years (SD = 8.4).

Procedure

Approximately one half of the couples were recruited through a large national Employee Assistance Program (EAP), with others recruited from a pool of prior study participants. Clients calling into the EAP call center were informed about the study opportunity by an intake counselor, and those individuals expressing interest were emailed a study flyer. Other recruits received Institutional Review Board (IRB)-approved messaging by email or social media or were provided the study flyer in person. Flyers and outreach efforts directed interested couples to the study information website where they completed an online screening and demographic survey.

Both partners were required to complete the screening and meet eligibility requirements for the couple to participate. Eligibility requirements included (1) currently reside with spouse/partner, (2) experiencing up to moderate relationship distress (score >12 on the four-item Dyadic Adjustment Scale [DAS-4; Sabourin, Valois, & Lussier, 2005]), (3) not at high risk for depression (score <10 on the 8-item Patient Health Questionnaire [PHQ-8; Kroenke & Spitzer, 2002; Kroenke et al., 2009), (4) not at risk for intimate partner violence based on two questions adapted from the Computer-Based Intimate Partner Violence Questionnaire (Rhodes, Lauderdale, He, Howes, & Levinson, 2002), (5) one or both partners had EAP benefits (to increase similarity among participants across recruitment populations), (6) have not participated in a CRE program within the past 6 months, (7) use a smartphone with texting capability, and (8) have an email account and access to a high-speed internet connection.

Eligible couples completed an online consent form and pretest assessment. They were enrolled as dyads in the Love Every Day app and asked to use the app for 21 days. Technical support was available via email and a toll-free telephone number during extended weekday working hours. Participants were emailed three weekly surveys to assess completion of the in-person bonus activities by themselves and their partners. Finally, they were asked to complete the online posttest assessment immediately following the completion of the 21-day period. Participants received $50 each for completion of the pretest and posttest assessments and $5 for completion of each weekly survey, for a total of up to $115/participant ($230/couple). All study protocols, the consent process, and subject communications were reviewed and approved by the sponsoring organization's IRB for protection of human subjects. There were no changes to the study design after the trial commenced.

Measures

NERMEM domains

The four key relationship skills from the NERMEM that were targeted within the app were assessed to examine changes in relational knowledge and healthy behavioral interactions.

Know

Knowledge of each partner's overall general well-being was assessed with eight items from the Sound Marital House questionnaire (Gottman & Silver, 1999; e.g., "I can tell you what stresses my partner is facing" and "My partner is familiar with my own hopes and aspirations"). Response options were on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*) and a mean score was computed (α = .92).

Care

Care for one's partner was assessed with five items; four from the Marital Opinion Questionnaire (Huston & Vangelisti, 1991), and one from Interpersonal Competence Disclosure Scale (Buhrmester, Furman, Wittenberg, & Reis, 1988). Items asked on average in the past month how often they engaged in positive interactions with their partner (e.g., "do something nice for your partner"). Response options were on a 7-point scale (1 = *never*, 7 = *more than once a day*) and a mean score was computed (α = .76).

Share

Partner communication was assessed with seven items from the Communication Patterns Questionnaire (Futris, Campbell, Nielsen, & Burwell, 2010; e.g., "you express your feelings to your partner") on a 7-point response scale (1 = *strongly disagree*, 7 = *strongly agree*) and a mean score was computed (α = .66).

Manage

Self-efficacy to manage relational conflict was assessed with seven items from the Attributions and Marital Satisfaction Scale (Fincham, Harold, & Gano-Phillips, 2000; e.g., "When I put my mind to it, I can resolve just about any disagreement that comes up between my partner and me"). Responses were on a 7-point response scale (1 = *strongly disagree*, 7 = *strongly agree*) and a mean score was computed (α = .87).

Relationship quality

Four dimensions of relationship quality were assessed.

Relationship distress

Relationship distress (i.e., absence of adjustment) was measured with the brief Dyadic Adjustment Scale (DAS-4; Sabourin et al., 2005). The abbreviated scale contains four items (e.g., "In general, how often do you think that things between you and your partner are going well?"). Items used a 6-point response option (1 = *never*, 6 = *all the time*). A mean score was computed (α = .73); a higher score indicates higher adjustment (e.g., lower distress).

Partner cohesion

Cohesion with one's partner was assessed with six items adapted from the cohesion subscale of the Dyadic Adjustment Scale (DAS; Spanier, 1976). Items asked how often in the past month a specific event occurred with their partner (e.g., "have a stimulating exchange of ideas"). Response options were on a 7-point scale (1 = *never*, 7 = *more than once a day*) and a mean score was computed (α = .86); higher scores indicate greater partner cohesion.

Relationship satisfaction

Satisfaction with one's relationship was assessed with 10 items adapted from the fourth version of the Family Adaptability and Cohesion Scale (FACES IV), family satisfaction subscale (Olson, 2008). Participants rated their level of satisfaction (e.g., "the degree of closeness between you and your partner") using a 5-point response option (1 = *very dissatisfied*, 5 = *extremely satisfied*). A mean score was computed (α = .91) with a high score indicating greater levels of satisfaction.

Relationship confidence

Confidence in one's relationship was assessed with four items on relationship confidence and dedication (Stanley & Markman, 1992). Items asked participants to rate the confidence (e.g., "I feel very confident when I think about our future together") with a 7-point response option (1 = *strongly disagree*, 7 = *strongly agree*). A mean score was computed (α = .88), with higher scores indicating greater confidence in one's relationship.

In-person partner interactions

Completion of positive in-person "bonus activity" interactions (e.g., "shared a favorite memory about us as a couple," "gave a 7-second hug") were assessed with weekly questionnaires delivered to both partners during the 3-week intervention period. Each week each partner was asked which of their own and which of their partner's seven in-person bonus activities were completed. A sum score for in-person interactions was computed by averaging the partner-report and self-report measures.

App usability

The 10-item System Usability Scale (SUS; Sauro, 2011) was administered at posttest to ascertain participants' attitudes regarding ease of use of the app. Items asked users how much they agreed or disagreed with program usability statements, with response options on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). The scale consisted of five positively worded items (e.g., "I think that I would like to use Love Every Day frequently") and 5 negatively worded items (e.g., "I found Love Every Day unnecessarily complex"). An overall sum composite score was computed with a higher score indicative of more positive attitudes toward the app.

App-specific satisfaction

Thirteen items developed for the study assessed satisfaction at posttest (e.g., "I feel like the Love Every Day app was made for someone like me"). Response options were on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*) and a total mean score computed. Two open-ended questions elicited participants most and least favored aspects of *the Love Every Day* intervention.

Analytic plan

To address RQ1, descriptive statistics were examined to first assess participants' level of engagement in the app. Next, a multi-level random coefficient linear model was conducted to examine change from pretest to posttest assessment in the four relationship skills (RQ2) and the four dimensions of relationship quality (RQ3). Multilevel modeling is the appropriate analytic approach when data are organized at more than one level. In this design, the repeated assessments were nested within individuals, and individuals were nested within couples to account for the longitudinal and dependent nature of the data. Finally, we explored descriptive reports of in-person partner interactions (RQ4), as well as app usability and satisfaction (RQ5).

Results

All 86 participants completed the pretest and posttest assessments. Participation in the weekly surveys was 98% at Week 1, 94% at Week 2, and 98% at Week 3.

App engagement

Findings suggest that the majority of Love Every Day users engaged with the app consistently, most often with multiple daily visits. Across the full 3-week

Table 1. Descriptive statistics and results for pretest to posttest study outcomes.

	Pretest		Posttest		Test Statistics		
	M	*SD*	*M*	*SD*	*t* value	*p* value	*pr*
Relationship skills and behaviors							
NERMEM – Know	5.86	0.79	6.18	0.58	3.87	<.001	.39
NERMEM – Care	5.56	0.91	5.85	0.76	4.49	<.001	.44
NERMEM – Share	5.20	0.83	5.57	0.84	4.50	<.001	.44
NERMEM – Manage	5.22	1.07	5.60	1.04	3.89	<.001	.39
Relational quality							
Relationship distress	4.89	0.74	5.17	0.67	4.67	<.001	.45
Partner cohesion	4.21	0.95	4.66	0.84	5.52	<.001	.52
Relationship satisfaction	3.43	0.68	3.68	0.70	4.67	<.001	.45
Relationship confidence	6.17	0.89	6.40	0.87	3.22	.003	.33

Note. NERMEM = National Extension Relationship and Marriage Education Model.
The point-biserial partial *r* (*pr*) is an estimate of effect size (conventions: .14 small, .36 medium and .51 large).

intervention, participants viewed the question/answer page an average of 73.3 times (*SD* = 17.5, range = 37–127) or 3.5 times per day. Participants submitted answers to questions an average of 19.8 times (*SD* = 2.0, range = 12–21), which is 94% of the 21 intervention days. More than one half of users (58%) answered all 21 questions, and even the least engaged user answered 12 (57%) of the 21 daily relationship questions, despite the 24-hour timeout on each day's question.

Couple relationship outcomes

Pretest and posttest scores for each area of assessment can be found in Table 1. The results of the multilevel random coefficient linear model suggest that all variables showed statistically significant change across the 3-week period with moderate- to large effect sizes in the expected direction. Specifically, after engaging with the Love Every Day app, participants reported improvements in the four relationship skills and behaviors that were targeted by the app (i.e., know, care, share, and manage from the NERMEM). Participants also reported significantly higher levels of relationship quality after engaging with the app for 21 days, including less relationship distress, greater partner cohesion, better relationship satisfaction, and more relationship confidence.

On average, partners reported experiencing app-prompted positive in-person interactions ("bonus activities") approximately 3 days per week, with highest completion in the first week (3.53 activities, *SD* = 1.46, range = 1–7), a drop in the second week (2.89 activities, *SD* = 1.49, range = 1–7), and a rebound in week 3 (3.12 activities, *SD* = 1.26, range = 1–7).

App usability and satisfaction

Overall, participants indicated a high degree of usability and satisfaction with Love Every Day. The mean SUS score at posttest was 89.5 (*SD* = 10.0), which corresponds to a normative rating of "excellent" and acceptability in the "high acceptable" range (Sauro, 2011). The average rating for Love Every Day satisfaction items was 4.8 of a possible 5 (*SD* = .70), indicating that participants were very satisfied with the app. When asked if they would recommend the app to a friend, 84% of participants responded *yes*.

Qualitative feedback in response to two open-ended questions indicated that the app provided entertaining and efficient means of staying connected that improved or renewed their sense of partnership and commitment. In response to the question, "What did you like best about the Love Every Day app?," 34% referred to anticipating or revealing their partner's responses; 23% said the app prompted communication with their partner; and 10% indicated that the questions prompted valuable thought. In response to the question, "What did you dislike about the app?," 18% of answers indicated that there was nothing they disliked; 11% mentioned the 24-hour timeout for answering questions; 10% expressed issues with specific questions; 7% noted that the text-message notifications were either too numerous or bothersome; and 4% disliked that the app experience had ended.

Discussion

This project successfully developed and evaluated the prototype Love Every Day mobile intervention, designed to promote daily positive interactions between the members of a couple. Consistent with the family resilience perspective (Walsh, 2003b), Love Every Day provided opportunities for couples to enhance their communication and connection to one another by encouraging consistent and nurturing words and actions, a forum to share thoughts and feelings, and suggestions for shared decision making and conflict resolution. The initial evaluation shows pretest to posttest improvements with medium to large effect sizes in all relationship domains: couples' knowledge about each other, expressions of care, communication, self-efficacy for managing conflict, relationship distress, partner cohesion, relationship confidence, and relationship satisfaction. App engagement was extremely high throughout the intervention and partners confirmed that the Love Every Day experience prompted positive interactions outside the app throughout the intervention. Couples also reported high levels of usability and satisfaction with the app experience.

Qualitative feedback received at posttest confirmed that the app activated positive couple behaviors and cognitions, even when couples were busy, and built a habit loop with a powerful social-affective reward and sense of

anticipation. Only a small number (n = 6) of participants reacted negatively to receiving multiple text notifications per day, indicating overall acceptance of that aspect of the intervention.

Although user engagement has been one of the most difficult problems with commercial and research health apps and websites (Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012; Krebs & Duncan, 2015), the Love Every Day app achieved and maintained an extraordinary level of user engagement on par with social media apps like Facebook (Duggan, 2015). Because the participant compensation provided was associated with the completion of the surveys, regardless of participation level with the app, it is reasonable to assume that the participants were not incentivized to use the app every day and the app usage level can be expected outside of evaluation. Qualitative feedback received at posttest confirmed that the app activated positive couple behaviors and cognitions, even when couples were busy. Participants' references to anticipating their partners' answers suggest that within the 21-day intervention, the user experience built a habit loop with a powerful social-affective reward.

The changes reported following completion of the program in the targeted skills, as well as the indicators of relationship quality, were quite large in comparison to immediate changes reported for the average participant in community-based in-person CRE programs. Several meta-analyses conducted over the past few decades have resulted in a general consensus that participation in CRE classes results in significant but small improvements in communication and indicators of relationship quality based on effect sizes reported (e.g., Hawkins et al., 2008; Hawkins & Erickson, 2015; Hawkins, Stanley, Blanchard, & Albright, 2012). In the current study of a CRE mobile app, the effect sizes ranged from moderate to large, with the most significant shift in the measure of relationship cohesion. These findings have interesting implications, given the time and money spent on the implementation of in-person CRE (Bradford, Hawkins, & Acker, 2015). Although app development can be initially costly, its maintenance and outreach potential likely makes the cost per participant much lower than in-person offerings of CRE.

The typical CRE program is offered through 2-hour classes for 6 to 8 weeks and research finds greatest benefit for participants at 12 hours of participation (Hawkins et al., 2012). Although participants in this study did not log the amount of time spent each day using the app, the activities are designed to be completed within minutes. If a participant spent 15 minutes reading and responding to messages each day, the total time investment would be 5.25 hours over the 21 days. Through the comparison of effect sizes across studies we can suggest that this method of CRE is more time- and cost-efficient and is more effective in enhancing measures of relationship skills and relationship quality than in-person programs. However, more definitive assessments can only be made by directly comparing these

experiences through random assignment to either in-person or mobile app CRE experiences and a control condition. It would also be valuable to assess the effectiveness of combining in-person CRE classes with use of the mobile app. Exploring alternative and combined methods of delivery is suggested for understanding best practice of CRE and its role in promoting couple and family resilience (Cowan & Cowan, 2014; Markman & Rhoades, 2012).

We note that Employee Assistance Program (EAP) staff allowed access to potential study participants, given that the promotion of couple and family resilience has implications for the workplace as well. Family relationship challenges are among the top presenting issues in EAPs (Attridge et al., 2009). Work loss associated with marital problems translates into losses of over $6.8 billion per year for U.S. businesses and industry due to absenteeism, reduced productivity, and increased health care costs (Forthofer, Markman, Cox, Stanley, & Kessler, 1996). An estimated 30% of sick time is taken due to marital distress, rather than physical illness (Gottman, 1998). Perhaps even more damaging to employers is "presenteeism,"—impaired performance at work when one has physical discomfort or emotional distress (Aronsson & Gustafsson, 2005). Adults in healthy relationships have higher rates of attendance, greater work commitment, higher levels of productivity, and lower rates of job turnover (e.g., Bianchi & Milkie, 2010; Sandberg et al., 2013). Results of this study can provide some initial support for promoting access to and use of the app through multiple community-based outlets, including the workplace, in an effort to strengthen couples and families and foster resilience and stability.

We acknowledge several limitations in this initial evaluation study and offer some caution in interpreting the findings. First, this preliminary study was not randomized to assess the results of the treatment (i.e., using the app for 21 days) in comparison to a control group; the study was conducted with a sample of couples that volunteered for the study and reports on their changes from pre- to postprogram. Effect sizes ranged from moderate to large and indicate a practical difference, yet caution should be used when interpreting the findings as program impact and generalizing the potential positive influence of the app on couple functioning. Second, taking a primary prevention approach, we limited the study population to couples experiencing only mild to moderate distress. This may have diluted the results due to a ceiling effect on the improvements that could be achieved. Future research will include a wider range of distress levels, including couples engaged in counseling for relationship issues. This will allow for a test of the program as an intervention tool for promoting resilience. Third, the reliability of a couple of measures is only moderate, which may have attenuated the intervention effect sizes for those measures in this study. Fourth, although attrition in the study was negligible, participants were compensated for completing assessments. Thus, it cannot be concluded that the subject completion rate found here would

occur at the same rate without compensation for participation in the study. Finally, the long-term efficacy of the Love Every Day intervention was not assessed and should be addressed in future research to better understand the maintenance, decline, or further improvements in the outcome measures.

This study provided initial evidence of the usability and effectiveness of Love Every Day, an innovative CRE program offered through a mobile app. The program experience was largely favorably reviewed by participants and resulted in significant improvements in key relationship skills and indicators of relationship quality that are associated with couple and family resilience. The program appears to be highly engaging and shows great promise for increasing the outreach of CRE to broader segments of the population. In-person CRE has significant time and cost limitations, and many involved in the research and implementation of these programs have called for innovations that would promote greater access to helpful information related to couple relational health and family strengthening. These efforts can serve to enhance the well-being of a greater number of individuals in couples, as well as promote the well-being of children, workplace environments, and the broader community

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