Journal of Personality and Social Psychology
2001, Vol. 81, No. 2, 247-262

0022-3514/01/$5.00 DOI: 10.1037//0022-3514.81.2.247

Love and the Commitment Problem in Romantic Relations and Friendship

Gian C. Gonzaga, Dacher Keltner, Esme A. Londahl, and Michael D. Smith
University of California, Berkeley

On the basis of the proposition that love promotes commitment, the authors predicted that love would motivate approach, have a distinct signal, and correlate with commitment-enhancing processes when relationships are threatened. The authors studied romantic partners and adolescent opposite-sex friends during interactions that elicited love and threatened the bond. As expected, the experience of love correlated with approach-related states (desire, sympathy). Providing evidence for a nonverbal display of love, four affiliation cues (head nods, Duchenne smiles, gesticulation, forward leans) correlated with self-reports and partner estimates of love. Finally, the experience and display of love correlated with commitment-enhancing processes (e.g., constructive conflict resolution, perceived trust) when the relationship was threatened. Discussion focused on love, positive emotion, and relationships.

> Things base and vile, holding no quantity,
> Love can transform to form and dignity,
> Love looks not with the eyes, but with the mind,
> And therefore is winged Cupid painted blind.
>
> —William Shakespeare, *A Midsummer Night's Dream*

In Shakespeare's reflection on love, one finds a poignant truth that resonates with experience: In transforming the mundane into the sublime, love can seem blind, irrational, and disconnected from what seems to be true and real. This observation dovetails with our ensuing theoretical analysis of the momentary experience of love. Yet we also take exception with what the great bard has to say about this emotion. Unlike Shakespeare, we contend that people also see love with their eyes; that love has a physical side that is evident in movements of the face and the body that prompt the mind's more sublime operations.

More specifically, we propose that the momentary experience of love helps intimate partners remain committed to one another (e.g., Frank, 1988; Sternberg, 1986). This treatment of love as a commitment device leads to the following hypotheses. In terms of the experience of love, we posited that love would correlate with approach-related states. In terms of the display of love, we expected that the experience of love would be encoded in a distinct nonverbal display that is readily interpreted by observers. In terms of the outcomes of love, we predicted that the experience and display of love would correlate with commitment-related perceptions and behaviors evoked by threats to the bond. We tested these hypotheses in studies of the interactions of romantic partners and opposite-sex friends.

Love as a Commitment Device

Recent studies have focused on how emotions regulate interpersonal relationships (e.g., Baumeister, Stillwell, & Heatherton, 1995; Frijda & Mesquita, 1994; Keltner & Haidt, 1999). According to this approach, human survival depends on the formation of cooperative alliances, long-term mating relationships, successful reproduction, and the raising of vulnerable offspring until their age of reproduction (e.g., Buss, 1994; Shaver, Hazan, & Bradshaw, 1988; Trivers, 1972). Emotion-related experiences, expressive behaviors, cognitive processes, and physiology help individuals meet the demands of these relationships in spontaneous interactions (Barrett & Campos, 1987; Keltner & Haidt, 1999; Keltner & Kring, 1998; Nesse, 1990). Emotions are short-term, in-the-moment responses to the problems and opportunities of social relationships.

Scholars working in the traditions of attachment theory (e.g., Bowlby, 1982; Hatfield & Rapson, 1993; Shaver et al., 1988), game theory (e.g., Frank, 1988; Trivers, 1972), and evolutionary theory (Buss & Schmitt, 1993; Nesse, 1990) have argued that emotions help individuals form and maintain reproductive relations. Jealousy, for example, motivates individuals to protect monogamous relationships (Buss, Larsen, Westen, & Semmelroth, 1992; Daly, Wilson, & Weghorst, 1982). Desire motivates sexual behavior in response to physical markers of attributes in potential mates, such as health or status, that might confer evolutionary advantage to offspring (A. Aron & Aron, 1991; Buss, 1994; Metts, Sprecher, & Regan, 1998; Shaver et al., 1988). Love serves as a commitment device.

More specifically, humans enter into long-term intimate relations for numerous reasons (e.g., to raise offspring to the age of viability). In the course of maintaining these long-term bonds,

Gian C. Gonzaga, Dacher Keltner, Esme A. Londahl, and Michael D. Smith, Department of Psychology, University of California, Berkeley.

The current research was supported by a National Science Foundation Minority Predissertation grant. We thank Gene Chang, Tuoc Dao, Marie Kim, Reka Morvay, and Steven Salter for their efforts in coding videotaped interactions for Study 1, and Joseph Walling, Ruben Valencia, Tiffany Fong, Courtney Childress, Valerie Castelo, and Thomas Herber for their efforts in coding videotaped interactions for Study 3. We also thank Belinda Campos, Paige Daniel, and Krysten Morganti for their editorial comments on drafts of this article.

Correspondence concerning this article should be addressed to Gian C. Gonzaga, Department of Psychology, 3210 Tolman Hall, University of California, Berkeley, California 94720-3210. Electronic mail may be sent to zaga@uclink4.berkeley.edu.

romantic partners face the commitment problem: Partners must remain committed to one another in the face of alternatives that might appeal to momentary self-interests but pose obvious threats to the relationship (Frank, 1988). The evidence on extramarital affairs, divorce, and the sources of jealousy (Buss, 1988b; Buss & Shackelford, 1997; Daly & Wilson, 1988; Daly et al., 1982) attests to the frequency and significance of the commitment problem, as does the prevalence of cultural practices that promote commitment between intimates (e.g., wedding vows, anniversary celebrations, couples workshops, intrusive in-laws).

Love promotes commitment in two ways. First, the experience of love motivates approach toward an intimate partner (which of course reduces approach toward competing alternatives), and, in the absence of the partner, is likely to countervail feelings of desire for others. Second, the outward expression of love in word, deed, and gesture communicates commitment to intimate partners, thereby enhancing processes that protect and strengthen the bond (e.g., trust, mutual dependence, affection, kindness). As interdependence, commitment, and trust grow between partners, they become more likely to ignore romantic alternatives, sacrifice for the relationship, and display increasing amounts of prorelationship behavior (i.e., accommodating when the partner acts poorly; Rusbult, Drigotas, & Verette, 1994; Wieselquist, Rusbult, Foster, & Agnew, 1999). For example, descriptive analyses of flirtation and courtship have illuminated how nonverbal displays of romantic interest are part of the exhilarating progression toward intimate relations (e.g., Eibl-Eibesfeldt, 1989; Fisher, 1992).

This analysis of the momentary experience of love is anticipated by theorists who have characterized the role of love in the development of romantic relationships. These theorists treat love more as an enduring attitude toward the partner, or sentiment, but reach the same conclusion. Sternberg (1986) proposed that commitment is one of three components of love. Hatfield and colleagues have described a kind of love called *companionate love* that refers to "the affection we feel for those with whom our lives are deeply intertwined" (Hatfield & Rapson, 1993, p. 596; see also Hatfield & Walster, 1978). In a similar vein, A. Aron and Aron (1991) proposed that love is "associated with a desire to enter or maintain a close relationship with a specific other person" (p. 26). Our commitment-based analysis and these theoretical observations point to the three hypotheses that we tested in this investigation.

Love as an Internal Signal to Approach

It is widely assumed that the feeling component of an emotion signals important states of affairs to the individual, thereby motivating appropriate behavior (Buck, 1999; Frijda, 1988; Schwarz & Clore, 1996). For example, anger informs the individual of events that are unjust, thereby motivating behaviors that reduce this injustice (Lerner & Keltner, 2000).

Our commitment-based analysis suggests that the momentary experience of love should be associated with approach-related tendencies. Various observations lend credence to this contention. Theorists have posited that love involves feelings of connectedness and closeness (Sternberg, 1986), affection (Hatfield, 1988; Hatfield & Rapson, 1993; Hatfield & Walster, 1978), commitment (Hendrick & Hendrick, 1992; Lee, 1977), and a desire to be near an intimate (A. Aron & Aron, 1991; Hatfield, 1988; Hatfield & Walster, 1978).

Somewhat surprisingly, we could find no study that examined the correlates of the momentary experience of love. Three lines of evidence, however, do indirectly suggest that the experience of love will relate to approach. First, people in love (i.e., romantic partners) strongly desire to be with each other, sometimes at the expense of friendships, work, and school (E. N. Aron & Aron, 1997; Buss, 1988c). Second, behavior that may relate to the experience of love, including certain kinds of smiles, enhances approach-related interactions between children and their caregivers (Fogel et al., 1997; Messinger & Fogel, 1998). Third, love appears to correlate with oxytocin (Carter, 1998; Gonzaga, Turner, Keltner, & Altemus, 2001), a neuropeptide that has been linked to bonding behavior in some mammalian species, including humans (Carter, 1998; Insel, 1993; Turner, Altemus, Enos, Cooper, & McGuinness, 1999).

These studies suggest that potential correlates of love (i.e., relationship intimacy, smiling, and oxytocin) relate to approach-related behavior. The current study is the first to document correlates of the spontaneous experience of love, which avoids problems (e.g., memory biases) associated with retrospective studies of emotion (e.g., Parkinson & Manstead, 1993). We hypothesize that the experience of love will positively correlate with approach-related states (e.g., desire and sympathy).

The Nonverbal Display of Love

A commitment-based analysis posits that the assessment of a partner's love is essential to maintaining the relationship (Frank, 1988). In early stages of relationships, knowing another's experience of love contributes to the willingness to entertain and pursue intimate relations (Buss, 1988a, 1988c). As relationships progress, perceiving a partner's love is likely to promote commitment in a variety of ways, from reassuring the partner in times of uncertainty to prompting intimate interactions. These claims presuppose that intimates communicate love to each other, both in words and in nonverbal display.

Although the assertion that the experience of love possesses a nonverbal signal has precedent in the field (Hatfield & Rapson, 1993), there has been no empirical attempt to establish such an expression. Studies have documented behavioral correlates of psychological closeness, interpersonal warmth, openness, and approach (J. F. Andersen, Andersen, & Jensen, 1979; P. A. Andersen, 1985; Beier & Sternberg, 1977; Mehrabian, 1971), as well as affiliative behaviors (on the part of confederates) that influence participants' ratings of liking and approach (e.g., McGinley, McGinley, & Nicholas, 1978). Ethological studies have documented courtship- and flirtation-related behaviors that are likely to engender love (e.g., Eibl-Eibesfeldt, 1974, 1989; Moore, 1985). No study, however, has linked the momentary experience of love to spontaneous behavior (in fact, this sort of evidence is rare in the field of emotion). Furthermore, many studies have examined posed rather than spontaneous behaviors, a method that suffers from numerous problems (Russell, 1994).

Notwithstanding these limitations, the aforementioned studies converge on four possible behavioral markers of love: head nods,

Duchenne smiles,[1] gesticulation,[2] and leaning toward the partner (see Table 1). We refer to these four behaviors as *affiliation cues*, and in this investigation we used encoding and decoding studies (Ekman, Friesen, & Ellsworth, 1972) to determine whether these cues amount to a reliable display of love. *Encoding studies* ask whether the spontaneous experience of an emotion is associated with a distinct nonverbal display. The study of spontaneous behavior avoids the pitfalls of studying posed behavior or verbal descriptions of emotional behavior (Fridlund, 1992; Russell, 1994). *Decoding studies* ask whether observers readily identify the nonverbal display as a sign of a particular emotion.

We hypothesize that love has a nonverbal signal that includes the four affiliation cues. On the basis of this proposition, we expect these four cues to correlate with the experience of love and to be interpreted as love by intimate partners and naive observers.

Love and Commitment-Related Behaviors and Perceptions

Recently, researchers have begun to document the striking ways in which brief interactions (e.g., the reciprocation of negative affect) predict long-term relationship outcomes (e.g., Gottman, Coan, Carrere, & Swanson, 1998; Gottman & Levenson, 1992). In light of these findings, it is surprising that no study has addressed whether momentary love predicts important relationship outcomes, and few studies have looked more generally at the effects of positive emotion (although see Gottman et al., 1998). The study that comes closest is one that found that couples who participate in novel and arousing activities (which might elicit love) report higher relationship quality (A. Aron, Norman, Aron, McKenna, & Heyman, 2000). Studies of the behavior of satisfied romantic partners, who are likely to experience more love, are also informative. Satisfied romantic partners are more likely to support each other's relationship goals (Burnstein, Dangelmayer, & Schultheiss, 1996), tease in playful rather than hostile ways (Keltner, Young, Heerey, Oemig, & Monarch, 1998), and idealize each other (Murray, Holmes, & Griffin, 1996a, 1996b). These studies establish relations between relationship satisfaction, a more stable and global property of relationships, and commitment-related behaviors and perceptions.

Our approach posits that the momentary experience and display of love promote and preserve enduring commitment both in good times and when relationships are tested—for example, by rivals, opportunities for infidelity, conflict, or the day-to-day tensions of intimate bonds (Frank, 1988). In the current investigation, we therefore asked whether love assessed in one context relates to commitment enhancing behaviors in other contexts in which the relationship is threatened. We predicted that the experience and display of love would relate to solving conflicts in constructive rather than contentious ways, to playful rather than hostile teasing, and to global self-report measures of commitment (e.g., trust, shared activities, support).

The Present Investigation

We present three studies that test our hypotheses concerning the experience, display, and correlates of momentary love. In our first study, we examined romantic partners as they engaged in interactions that generated love and tested their bond. From these interactions, we gathered measures of emotional experience and behavior and asked whether the experience of love is correlated with approach-related states, is marked by a distinct nonverbal display, and, along with the nonverbal display of love, predicts commitment-enhancing behavior when the bond is tested. In our second study, we presented video clips of affiliation cues and sexual cues to naive observers to address whether the nonverbal displays of love and desire are distinct. In our third study, we observed opposite-sex best friends as they interacted with one another and again addressed whether love correlates with approach, has a distinct display, and correlates with commitment-related outcomes.

Study 1: Love and Commitment in Romantic Relationships

In Study 1 romantic partners participated in interactions that generated love (positive self-disclosure) and that tested their commitment (engaging in conflict, teasing). Our commitment-based analysis of love led to the following predictions. First, as an internal signal of approach, we predicted that the experience of love during the positive disclosure would correlate with approach-related states, including desire and sympathy. Second, we expected four affiliation cues to correlate significantly with the individual's reports of love and the partner's attribution of love. Finally, we expected the experience and display of love during the positive disclosure to correlate with the following: (a) global self-reports of mutual influence, shared activities, and satisfaction; (b) constructive conflict resolution, gently delivered criticism, and trust during the conflict; and (c) more intimate, playful teasing.

Method

Participants

Students at a large midwestern university were recruited by advertisements placed in college newspapers and fliers posted in dormitories soliciting participants for a study of the social interactions of romantic partners. Sixty heterosexual, college-aged couples involved in a romantic relationship for at least 6 months participated in the study. At two different times (October and the following April), participants filled out measures of relationship satisfaction, romantic conflict, and personality, and then, 2 weeks later, visited the laboratory to engage in a series of interactions. For their participation, couples received $20. Ten of the 60 couples (16.67%) had broken up by the April follow-up session. All participants provided informed consent and all procedures were approved by the Institutional Review Board at the University of Wisconsin, Madison.

---

[1] The Duchenne smile recruits both the zygomatic major muscle, which pulls the lips up into a smile, and the orbicularis oculi, which, when contracted, creates crows feet at the corners of the eyes. These types of smiles have been linked to positive emotional states, unlike smiles that do not include the orbicularis oculi (Ekman, Davidson, & Friesen, 1990).

[2] *Gesticulation* was defined as "any noticeable movement of arm, hand, or finger, not in moving contact with another part of the body" (Rosenfeld, 1966a, 1966b, p. 67). We expected that gesticulations would indicate a positive form of attention and involvement although it is obvious that they can also indicate hostility. Review of these cues revealed very few of hostile connotation.

Table 1
Studies of Affiliation Cues in Humans by Method

Affiliation cue	Encoding	Decoding	Naturalistic/questionnaire
Affiliative hand gestures	Andersen, Andersen, & Jensen (1979)		Mehrabian (1971)
Nonhostile hand movements in reference to partner	Mehrabian & Williams (1969) Rosenfeld (1966a) Rosenfeld (1966b)		
Duchenne smile	Rosenfeld (1966a)	Burgoon (1991)	Mehrabian (1971)
Smiles involving the zygomatus major and orbiculari occuli	Rosenfeld (1966b)	Burgoon, Buller, Hale, & de Turck (1984) McGinley, McGinley, & Nicholas (1978) Burgoon et al. (1984)	
Leaning toward partner		Mehrabian (1968)	
Torso moved beyond vertical (upright) sitting position toward partner		Trout & Rosenfeld (1980)	
Head nods	Dittmann (1972)	Matarazzo, Saslow, Wiens, Weitman, & Allen (1964)	Mehrabian (1971)
Head movement up and down from horizontal resting position	Mehrabian & Williams (1969) Rosenfeld (1966b)		

Self-Report Measures of Relational Commitment and Personality

Two weeks before the first laboratory visit, partners independently reported on how much their partner influenced their long-term goals on a scale of 1 (*not at all*) to 7 (*a great extent*) in the following domains: marriage plans, plans to have children, plans to make major investments (financial), plans to join organizations, school-related plans, plans for achieving a particular financial standard of living, and vacation plans (α = .89). Our measure of *mutual influence* was equal to the average of the ratings on these items. Participants next reported how many of 37 common activities they had done alone with their partner in the previous week (e.g., prepared a meal, went to a movie, went dancing). Our measure of *shared activity* was equal to the sum of the activities both partners reported sharing divided by two. Participants completed a measure of relationship satisfaction (Locke & Wallace, 1959) tailored to dating relationships (α = .80). Participants also completed the Big Five Inventory (John, Donahue, & Kentle, 1991), a 44-item self-report measure of the Five Factor model of personality.

Procedure

The experimental sessions were conducted by one of three female experimenters, each unaware of the investigation's hypotheses. On arrival, couples were escorted to a room containing two chairs on opposite sides of a small table and two concealed cameras that were installed in two bookshelves 3 feet behind the participants at a height of 6 feet. After the couples were seated, the experimenter described the study and videotaping procedure and engaged the couple in a brief discussion about their majors. The experimenter then left the participant room and conducted the experimental sessions through intercom from a room where she could view and hear the participants through the video cameras. Participants then engaged in six semistructured interactions that involved discussions of different topics that were prompted by the experimenter over intercom. These interactions involved discussions of (a) the couple's first date, (b) each of their plans for the following day, (c) an area of conflict, (d) each of their concerns for the future, and (e) something good that had happened to each of them recently (positive disclosure). In the final interaction, the partners teased each other. After each interaction, participants filled out emotion report inventories, which were followed by 1-min rest periods during which they were asked to relax and not speak. Each laboratory session lasted approximately 1 hr (for additional details, see Keltner et al., 1998).

Positive disclosure. The positive disclosure was chosen for analysis because, as expected, it elicited high amounts of love (the overall sample mean was 5.07 on a scale of 0 to 8). During this interaction, each participant described a good event or good events that had occurred recently and that he or she had not told to his or her partner. Each partner spoke for up to 2 min. In half of the couples, the woman was the first to describe her good event; in the other half the man went first.

Conflict discussion. The conflict discussion was based on a task used by Levenson and Gottman (1983). Two weeks prior to the laboratory visit, partners privately rated the severity of a number of common problems in their relationship (e.g., problems sharing work, spending quality time together, maintaining a satisfying sex life, openness of communication). On the basis of these responses, the experimenter selected one problem that both participants had indicated as being significant, and then guided the participants in a discussion of that issue for 10 min. Partners' discussions centered on the following issues: jealousy (15.5% of couples), time spent together (12.1%), alcohol abuse (12.1%), communication (6.9%), and fidelity, sex, and money (5.2% each). Issues such as religion, friends, commitment, gender roles, housework, and disorganization were the topics for 2 couples or fewer. The remaining couples (25.9%) talked about general problems in their relationship.

Teasing interaction. In the teasing interaction, participants were assigned one of the following pairs of initials, either A. D. and L. I. or H. F. and T. J, and asked to create nicknames from each of the pairs of initials for their partners and a story to justify the nickname (which could be real or imagined). Participants were given 10 min to independently generate their nicknames and stories, and they then teased their partners. In half the couples the woman was first to tease and in the other half the man was first to tease (for additional details and analysis of these interactions see Keltner et al., 1998).

Emotion report. Following each interaction, participants reported on a scale of 0 (*no emotion*) to 8 (*extreme emotion*) the emotions they felt during the interaction and estimated the emotions their partners felt. The emotions included amusement, anger, anxiety, arousal, concern, contempt, desire, discomfort, disgust, embarrassment, fear, guilt, happiness, love, pride, sadness, shame, shyness, sympathy, and tension.

Perceptions of trust during conflict. After the conflict discussion, participants rated themselves and their partners on several items related to the trust and hostility that they experienced during the conflict on a scale of 0 (*not at all*) to 8 (*extremely*). We averaged ratings of fair, open-minded, trustworthy, trusting, forgiving, cooperative, conciliatory, and honest for both self- and partner reports to create measures of perceived trust (α = .80 for self, α = .88 for partner). We averaged ratings of dominant and competitive for both self and partner reports to create a hostility index (α = .46 for self, α = .67 for partner).

Coding of affiliation cues. For the positive disclosure, we coded the 1st min of each partner's disclosure, beginning at the end of the experimenter's instructions for this task. A set of seven judges coded the occurrence and duration of the four affiliation cues. Coding for the Duchenne smile was based on the criteria established by Ekman and Friesen's Facial Action Coding System, with judges trained to recognize the co-occurrence of the actions of the orbicularis oculi (AU6) and the zygomatic major (AU12) muscles (Ekman & Friesen, 1978). The criteria for coding the remaining behaviors was based on the studies of affiliation cues outlined in Table 1. Behaviors were coded, in seconds, from their onset time (the first visible evidence of the behavior) to their offset time (when the behavior was no longer visible). Behaviors that lasted less than a second were recorded as lasting one half of a second. The behavior of 15 couples was used to establish reliability. To do this, each judge had 3 to 5 of their cases coded by one of the remaining judges, with all judges contributing to the reliability estimate. If the two judges agreed that the same type of affiliation cue occurred at overlapping time points, or if neither judge coded an affiliation cue during the entire interaction, the rating was coded as an agreement. Otherwise it was coded as a disagreement. Overall, judges agreed on 78.3% of the four affiliation cues.

Coding of commitment-related behavior during conflict. To address whether love relates to commitment-related behaviors in other contexts, three judges coded the conflict discussion using the guidelines of the Marital Interaction Coding System (Heyman, Weiss, & Eddy, 1995), which focuses on constructive and destructive processes in intimate relations. Coders noted the occurrence of each instance of two categories of behavior. Commitment-related behaviors include soothing physical contact, joking or humor, friendly laughter, affirmations, appeasement, positive problem descriptions, expressions of concern, and apologies (α = .78). Destructive processes included negative emotion, direct criticism, defensiveness, stubbornness, withdrawal, and dominance (α = .80). For these two categories of behaviors, we summed the occurrences of relevant behaviors to yield two composite measures: one of commitment-related behavior and the other of destructive behavior. Finally, three judges coded each critical utterance during the conflict for verbal (e.g., humiliation, aggression, and denigration) and nonverbal (e.g., displays of contempt or dominance) hostility and verbal and nonverbal signs of play (e.g., saying "I'm only kidding," exaggerated facial expressions). Verbal codes were all on a scale of 1 (*not at all*) to 7 (*very much*). Nonverbal codes were made on a yes-or-no basis (κ = .48).

Coding of teasing interaction. Two different judges coded each tease for three commitment-related themes. First, judges made a yes-or-no judgment if each nickname contained a metaphor of love (e.g., referring to the partner as sweet, divine, a treasure, an object of food, or an animal). Second, judges coded whether the tease conveyed background or intimate knowledge (e.g., distant past knowledge of partner, familial background of partner, private knowledge of partner). Judges agreed on 86% of these judgments. These judgments were combined to create an intimacy index for the tease, which was the percentage of teases that contained intimate knowledge of the partner. Finally, judges coded the amount of aggression, sarcasm, and nastiness in each tease on a scale of 1 (*not at all*) to 7 (*extremely*), which was combined into an aggression index for the tease (α = .74).

Results

Overview of Analyses

Table 2 presents the mean levels and standard deviations of self-reports and partner estimates of love as well as the display times for each affiliation cue. In the ensuing analyses (and in Study 3 as well), we treated the couple as the unit of analysis by averaging couples' responses on each of the dependent measures. To control for the variation in the time partners took for each task, we first summed the duration of partners' affiliation cues, divided this score by the total number of seconds each couple took to complete the discussion, and then standardized these scores.[3] For each result that was significant to the $p < .05$ level, we present how large the effect sizes were according to the standards of Cohen (Cohen, 1988, 1992).

Table 2
Mean Levels of Emotions and Cue Display in Study 1

Indicator	Women (n = 60)		Men (n = 60)	
	M	*SD*	*M*	*SD*
Emotion reports				
Self-reported love	5.02	2.16	5.11	2.08
Partner-estimated love	4.85	2.13	4.58	2.20
Affiliation-cue display				
Affirmative head nods	1.28	2.89	1.21	1.91
Duchenne smiles	4.45	5.24	5.78	5.59
Leaning toward partner	32.27	20.36	31.36	21.08
Gesticulation	0.13	0.40	0.25	0.77

Note. Emotions are rated on a scale of 0 (*none*) to 8 (*extreme*). Cue displays are shown as mean seconds displayed per 60 s.

Did the Positive Disclosure Task Generate Love?

To ascertain whether love was a salient emotion during the positive disclosure, we created an index of positive emotions (the mean of self-reports of amusement, desire, happiness, and sympathy) and an index of negative emotions (the mean of self-reports of anxiety, contempt, discomfort, disgust, fear, and tension). A repeated measures analysis of variance (ANOVA) with emotion type (love, positive, or negative) as the within-subjects factor yielded a significant effect, $F(2, 118) = 222.86$, $p < .001$. Paired t tests found that couples reported significantly higher levels of love ($M = 5.06$) than positive emotion ($M = 3.09$), $t(59) = 10.04$, $p < .001$, Cohen's $d = 1.30$ (a very large effect size), suggesting that the positive disclosure produced elevated love. Couples also reported more love than negative emotion ($M = 0.59$), $t(59) = 16.48$, $p < .001$, Cohen's $d = 2.13$ (a very large effect size), and more positive than negative emotion, $t(59) = 16.48$, $p < .001$, Cohen's $d = 2.12$, (a very large effect size).

Is Love an Internal Signal to Approach?

Our first hypothesis was that the experience of love would positively correlate with approach-related states (desire, sympathy). Table 3 shows that we found significant and positive correlations between self-reports of love and desire, $r(60) = .54$, $p < .001$, $r^2 = .292$ (a large effect size), and sympathy, $r(60) = .26$, $p < .05$, $r^2 = .068$ (a medium effect size), in line with predictions. We also found that self-reports of love correlated with amusement, $r(60) = .42$, $p < .001$, $r^2 = .176$ (a medium-to-large effect size), and happiness, $r(60) = .70$, $p < .001$, $r^2 = .490$ (a very large effect size). Of the negative emotions, love was only related to reports of

[3] We also analyzed the data using the actual display time for each of the cues, and it did not alter the pattern or significance of the results.

reduced disgust, $r(60) = -.22$, $p < .10$, $r^2 = .048$ (a small-to-medium effect size).

Does Love Have a Distinct Nonverbal Display?

The hypothesis that love possesses a nonverbal display generates two predictions: Partners' own experience of love will correlate with the four affiliation cues (encoding evidence), and the affiliation cues will relate to their partners' estimates of love (decoding evidence). To test these hypotheses, we created a composite measure of affiliation cues (the sum of the z scores of the affiliation cues) and correlated that measure with couple's self-reports and their partner estimates of love. Regression analyses ascertained which affiliation cues significantly predicted reports of love. Finally, to ascertain whether the affiliation cues relate to love in unique fashion, we ran the same analyses linking the affiliation cues to desire and happiness after controlling for love.

Controlling for desire. The claim that love is closely related to desire (Sternberg, 1986) was corroborated by the substantial correlation between self-reports of love and desire. To gain an estimate of love that was statistically free of desire, we first regressed couples' desire reports on their love reports (self-reported and partner estimated, respectively) and used the residual (i.e., the "leftover love") in our behavioral analyses.[4] This provides a strong test of the relationship between love and affiliation cues because the residual love estimates contain less variance, and the statistical tests used one less degree of freedom. Given the strength of the correlations between love and happiness, in our encoding and decoding analyses we also addressed whether the affiliation cues relate to happiness.

Encoding hypothesis. Table 4 presents the relations between couples' total affiliation cues and their reports of love, desire, and happiness. As shown in Table 4, the measure of total affiliation cues correlated with self-reports of love, $r(59) = .29$, $p < .05$, $r^2 = .084$ (a medium effect size), when controlling for self-reports of desire, as expected. Total affiliation cues did not correlate significantly with self-reports of desire, $r(59) = .15$, when controlling for self-reports of love, but did, however, show a marginally significant correlation with self-reports of happiness, $r(59) = .23$, $p < .10$, $r^2 = .053$, when controlling for love.

Table 3
Correlations Between Self-Reports of Love and Other Emotions in Study 1

Emotion	r
Approach	
Desire	.54**
Sympathy	.26*
Other positive	
Amusement	.42**
Happiness	.70**
Avoid	
Contempt	.06
Disgust	−.22†
Fear	.14
Stressful	
Anxiety	.15
Discomfort	.07
Tension	.04

† $p < .10$. * $p < .05$. ** $p < .001$.

Table 4
Relationships Between Affiliation Cues to the Experience of Emotion (Encoding) and the Perception of Partner's Emotion (Decoding) in Study 1

	Love[a]		Desire[b]		Happiness[b]	
Predictor of affiliation cue	R	r	R	r	R	r
Self-reported experience	.58**	.29*	.29	.15	.35	.23†
Partner-attributed experience	.55**	.33*	.29	.10	.33	−.08

Note. $N = 60$ dyads.
[a] Controlling desire. [b] Controlling love.
† $p < .10$. * $p < .05$. ** $p < .001$.

When we ran the regression models we found that individual affiliation cues significantly predicted self-reports of love, $R(55) = .58$, $p < .001$, $r^2 = .336$ (a large effect size), as predicted. In this model, affirmative head nods ($\beta = .45$) and Duchenne smiles ($\beta = .38$) were both significant predictors (both $ps < .05$). We also found that affiliation cues did not predict self-reports of desire, $R(55) = .29$, or happiness, $R(55) = .35$, after controlling for love.

Decoding hypothesis. We next addressed whether partners' estimates of love would correlate with their partners' affiliation cues. As expected, we found a significant and positive correlation between total affiliation cues and partner estimates of love, $r(59) = .33$, $p < .05$, $r^2 = .109$ (a medium effect size), after controlling for desire. Total affiliation cues did not, however, correlate significantly with partner estimates of desire, $r(59) = .10$, or happiness, $r(59) = -.08$, after controlling for partner estimates of love.

In the regression analyses the affiliation cues significantly predicted partner estimates of love, $R(55) = .55$, $p < .001$, $r^2 = .302$ (a large effect size). In this model head nods ($\beta = .43$) and Duchenne smiles ($\beta = .37$) were both significant predictors (both $ps < .05$). We also found that affiliation cues did not predict partner estimates of desire, $R(55) = .29$, or happiness, $R(55) = .33$, after controlling for partner estimates of love.

Does Love Relate to Increased Commitment-Related Behaviors and Perceptions When the Relationship Is Tested?

Our final prediction held that the experience and display of love would correlate positively with measures of commitment gathered in other contexts, including global self-report measures of mutual influence, shared activities, and satisfaction, as well as constructive conflict behaviors and playful, intimate teasing. The correlations relevant to these hypotheses are presented in Table 5.

Self-report measures of commitment. Consistent with expectation, couples who displayed more love during the positive disclosure reported engaging in more shared activities, $r(60) = .31$,

[4] We did not use this method when we tested the phenomenological hypothesis because controlling for desire would have nullified our ability to uncover the relationship between reports of love and desire.

Table 5
Relationships Between Total Affiliation Cue Displays, Self-Reported Love, and Measures of Commitment in Study 1

Indicator	Affiliation cues (r)	Self-reported love (r)	Love and behavior (R)
Self-reported measures of commitment			
Relationship satisfaction	.16	.48**	.48**
Mutual influence on life goals	.32*	.45**	.47**
Amount of shared activities	.31*	.48**	.50**
Constructive conflict reduction			
Behaviors that reduce conflict	.23†	.34**	.36*
Self-perceptions of trust	.28*	.53**	.53**
Partner perceptions of trust	.23†	.53**	.53**
Playful tone of direct criticism			
Verbal	.31*	.18	.31
Nonverbal	.29*	.15	.28
Intimate content of tease	.23†	.39**	.35*

† $p < .10$. * $p < .05$. ** $p < .01$.

$p < .05$, $r^2 = .096$ (a medium effect size), and having more mutual influence on collective life goals, $r(60) = .32$, $p < .05$, $r^2 = .102$ (a medium effect size). Couples who displayed more love also reported more elevated relationship satisfaction, although this correlation was not statistically significant. Couples who reported more love after the positive disclosure reported more shared activities, $r(59) = .45$, $p < .01$, $r^2 = .20$ (a large effect size), mutual influence on life goals, $r(59) = .48$, $p < .01$, $r^2 = .23$ (a large effect size), and relationship satisfaction, $r(59) = .48$, $p < .01$, $r^2 = .23$ (a large effect size). In the third column of Table 5, we report regression analyses that show that the measures of total affiliation cues and self-reports of love together did not predict more variance in the commitment measures than either measure alone.

Measures of conflict and teasing behavior. Consistent with expectation, couples who displayed more love during the positive disclosure task delivered critical utterances with verbal, $r(47) = .31$, $p < .05$, $r^2 = .096$ (a medium effect size), and nonverbal, $r(47) = .29$, $p < .05$, $r^2 = .084$ (a medium effect size), playful markers, and they reported feeling more trust toward their partner, $r(60) = .28$, $p < .05$, $r^2 = .078$ (a medium effect size). We also found marginal correlations between couple's love displays during the positive disclosure and how they engaged in more constructive behaviors while discussing a conflict, $r(60) = .23$, $p < .10$, rating their partners as more trusting, $r(60) = .23$, $p < .10$, and, in another context, teasing each other in more intimate, playful ways, $r(60) = .23$, $p < .10$. The measure of total affiliation cues did not predict the negative behaviors: Total affiliation cues did not correlate significantly with measures of the verbal and nonverbal hostility of the critical utterances, $r(60) = -.08$ and $r(60) = .05$, respectively, or with the measures of destructive behaviors during the conflict, $r(60) = .00$, self-perceived hostility, $r(60) = .04$, or perceived hostility of partner, $r(60) = -.06$.

The experience of love during the positive disclosure related to commitment outcomes in similar ways. Self-reports of love were positively and significantly correlated with constructive, conflict-reducing behaviors, $r(59) = .34$, $p < .01$, $r^2 = .116$ (a medium effect size), less verbal hostility, $r(59) = -.25$, $p < .10$, reports of feeling trust toward the partner, $r(59) = .53$, $p < .01$, $r^2 = .281$ (a large effect size), perceiving the partner to be trusting, $r(59) = .53$, $p < .01$, $r^2 = .281$ (a large effect size), and intimate, playful teasing, $r(59) = .39$, $p < .01$, $r^2 = .152$ (a medium-to-large effect size), that was less hostile, $r(59) = -.35$, $p < .01$, $r^2 = .122$ (a medium effect size). Self-reports of love did not correlate significantly with destructive conflict-related behavior, $r(59) = .14$, self-reports of hostility, $r(59) = .01$, perceptions of the partner's hostility, $r(59) = .00$, playful verbal, $r(46) = .18$, or nonverbal, $r(46) = .15$, delivery of criticisms, or measures of nonverbal hostility, $r(59) = -.08$, or the hostile content of the teasing, $r(60) = -.08$.

Might the relationship between momentary love and commitment be accounted for by personality? Recent studies have documented that (a) personality traits of extraversion and agreeableness predict increased positive emotion (Keltner, 1996; Larsen & Ketelaar, 1991) and (b) certain traits, such as agreeableness, relate to enhanced intimate relations (Graziano & Eisenberg, 1997). These findings raise the following question: Does personality account for the relations between momentary love and relationship outcome? To address this question, we ran a series of stepwise, multiple regression analyses predicting the four outcome measures. In the first step we added a measure of extraversion or agreeableness. In the second step we added either total affiliation cue displays or self-reported love. We expected that the nonverbal and self-report measures of love would significantly increase the amount of variance accounted for in each of the commitment-related measures over and above measures of personality. Thus we predicted that the Δr^2 of the second step would be significant in each regression analysis.

As shown in Table 6, couples' extraversion was related to their self-perceptions of trust and perceptions of partners' trust in the conflict discussion. Couples' agreeableness was related to increased relationship satisfaction and constructive conflict behaviors and perceptions of trust. However, extraversion and agreeableness did not account for the relationship between love and the outcomes of interest. As shown in Table 6, this was true in 19 out of the 36 analyses (53%) when the significance level was less than .05, and 24 out of 36 analyses (67%) when the significance level was less than .10. The average Δr^2 was .093, which would be

Table 6
Amount of Variance in Commitment Measures Accounted for by Affiliation-Cue Displays and Self-Reported Love, After Controlling for Personality in Study 1

Indicator	Extraversion (r)	Agreeableness (r)	Affiliation-cue controls: Extraversion ($\%\Delta r^2$)	Affiliation-cue controls: Agreeableness ($\%\Delta r^2$)	Self-reported love controls: Extraversion ($\%\Delta r^2$)	Self-reported love controls: Agreeableness ($\%\Delta r^2$)
Self-reported measures of commitment						
Relationship satisfaction	.20	.32*	1.2	0.5	19.4**	14.7**
Mutual influence on life goals	.05	−.02	9.9*	10.5*	20.2**	23.6**
Amount of shared activities	.16	.20	8.6*	7.8*	20.6**	19.0**
Conflict discussion measures						
Behaviors that reduce conflict	.21	.38**	4.5†	3.0	8.7*	4.6†
Self-perceptions of trust	.37**	.47**	3.8	2.4	20.4**	14.8**
Partner-perceptions of trust	.36**	.40**	3.4	2.5	20.6**	17.0**
Playful tone of direct criticism						
Verbal	.08	.11	9.0*	8.3†	2.9	2.3
Nonverbal	−.06	.05	8.6*	8.1†	2.6	2.0
Intimate content of teasing	.01	.19	4.9†	3.7	11.8**	8.1*

† $p < .10$. * $p < .05$. ** $p < .01$.

significant in our individual regression models. These results show that personality does not explain the relationship between our measures of love and commitment-related measures.

Discussion

Study 1 provides evidence that is consistent with the proposal that love serves as a commitment device in long-term, intimate relationships. According to this perspective, the momentary experience and display of love play a critical role in motivating approach, signaling commitment, and enhancing commitment-related behaviors and perceptions. Several findings supported these predictions. The experience of love correlated with approach-related states. The four affiliative cues (head nods, Duchenne smiling, gesticulation, and forward leans) correlated with self-reports and partner estimates of love, but not with self-reports of happiness or desire, suggesting that this pattern of behavior may be unique to love. Additionally, both the experience and display of love predicted commitment-related behaviors (e.g., constructive conflict resolution, intimate teasing) and perceptions (self-reported trust, mutual influence) in different contexts, even above and beyond personality traits that relate to increased intimacy. In Study 3 we extended these findings to a different age group and kind of relationship. Prior to discussion of this extension, however, we first present data relevant to the question of whether love and desire are distinct.

Study 2: Naive Observers' Judgments of Affiliation and Sexual Cues

In contrast to most taxonomies of facial expression, our findings suggest that love may indeed have a distinct nonverbal display. In Study 1 the nonverbal display of love was not decoded as desire or happiness. However, we have yet to establish that nonverbal displays of related emotions are not interpreted as love. For this reason, in Study 2 presented observers with behavioral cues associated with love and desire.

Like love, desire has been treated in functional terms (Buss, 1994). Specifically, individuals are alleged to feel sexual attraction to potential mates who display physical attributes that may confer evolutionary advantage to their offspring (Buss, 1994). This analysis suggests that desire will have a display that signals sexual interest, which in turn should be distinct from the nonverbal display of love, which signals long-term commitment.

There is evidence that desire, like love, may be marked by a nonverbal display. Naturalistic observation of humans and nonhuman primates identify four behavioral cues—which have previously been linked to states or interactions related to sexual desire—as prime candidates for study. These cues are lip licks (Chevalier-Skolnikoff, 1971; Epple, 1967; Givens, 1978; McCormick & Jones, 1989; Moore, 1985; Reynolds & Reynolds, 1965), lip puckers (Carpenter, 1934; Kendon, 1975; Tokuda, Simons, & Jensen, 1968), touching the lips with the hands (Eibl-Eibesfeldt, 1989; Givens, 1978; Grammer, 1990; McCormick & Jones, 1989), and tongue protrusions (Carpenter, 1934; Chevalier-Skolnikoff, 1971; Eibl-Eibesfeldt, 1974; Epple, 1967; Givens, 1978; Moore, 1985). We call these *sexual cues*.

In Study 2 we gathered examples of the four affiliation cues and the four sexual cues from the videotapes from Study 1 and presented these to observers. If affiliation cues communicate love and sexual cues communicate desire, then observers should reliably distinguish between the two types of cues.

Method

Participants

Observers were 40 undergraduates (17 men, 23 women) at a large western university. Participants were given research credit for their participation.

Materials

Thirty-two video clips of 2s to 5s in length were drawn from the videotape interactions used in Study 1. Each clip displayed one of the four

affiliation cues or one of the four sexual cues with no accompanying signs of the other affiliation and sexual cues. Four examples of each cue (2 male targets, 2 female targets) were selected. Four different participants were used for each cue displayed.

Procedure

Observers completed the procedure in groups of 3 to 8 participants. After completing demographic questionnaires, observers watched a 15-min videotape containing the 32 video clips in a darkened room. The video clips were soundless. For each cue participants were asked to decide whether the target was feeling love or desire. Each observer was provided response sheets that included numbered pairings of the words *LOVE* and *DESIRE* and was instructed to circle one word that best described the behavior in each clip. After the experimenter was confident that participants understood the task, the videotape was played and participants made their selections.

Results

The mean number of "correct" choices—that is, an observer picking love when shown an affiliation cue and desire when shown a sexual cue—was used as a measure of accuracy. For the subsequent analyses, we used the call rates for love (44.4%) and desire (56.6%) as estimates of chance, except when testing for overall accuracy in judgments of affiliation and sexual cues, in which case we used 50% as the estimate of chance. We predicted that participants would select love at greater than chance rates when judging affiliation cues and select desire at greater than chance rates when judging sexual cues. Observers' overall accuracy rate (61.2%) was significantly above chance level, $t(39) = 6.58$, $p < .001$, Cohen's $d = 1.07$ (a large effect size). This pattern held for both affiliation cues (56.0%), $t(39) = 5.46$, $p < .001$, Cohen's $d = .89$ (a large effect size), and sexual cues (67.2%), $t(39) = 4.45$, $p < .001$, Cohen's $d = .73$ (a large effect size).[5]

Discussion

The results of Study 2 further support our hypothesis that affiliation cues communicate love to observers. Affiliation cues were consistently judged as love and not desire. Love was not consistently attributed to sexual cues. In our final study we returned to our broader set of hypotheses regarding love and commitment in a study of adolescent opposite-sex friendships.

Study 3: Love and Commitment in Adolescent Opposite-Sex Friendships

As adolescents learn to cultivate relationships, they often explore feelings of intimacy and commitment in opposite-sex friendships (Furman, 1993; Furman & Shaffer, 1999; Sippola, 1999). Adolescents often date their opposite-sex friends and derive benefits from platonic bonds: Adolescents with many as opposed to few opposite-sex friends are more likely to have romantic partners (Connolly & Johnson, 1996) and to have lasting dating relationships (Fering, 1999). Given the potential for intimacy in opposite-sex friendships, we chose to examine the commitment-related functions of love in adolescent opposite-sex friendships. As in Study 1, we expected (a) the experience of love to relate to approach-related states, (b) affiliation cues to relate to self-reports and partner estimates of love, and (c) the display and experience of love to correlate positively with commitment-related outcomes (perceived support).

Method

Participants

Opposite-sex friends were recruited from a public high school of approximately 2,300 students in a large California city. Friendship-nomination forms were distributed to approximately 1,000 9th- and 12th-grade students. Of these, 236 forms were returned. Sixty-six participants (16 opposite-sex friend 9th-grade pairs and 17 opposite-sex friend 12th-grade pairs) participated in the study. The mean age of the 9th graders was 14.77 years ($SD = 0.55$ years) and the mean age of the 12th graders was 17.92 years ($SD = .44$ years). The sample reflected the diversity of the school (53% Caucasian, 10.6% African American, 13.6% Latino/Chicano, 6.1% Asian, 10.6% mixed race, 6% no reply). Both participants and their legal guardians provided consent forms and the entire procedure was approved by the Committee for the Protection of Human Subjects at the University of California, Berkeley.

On the friendship-nomination form, students were asked to name all of their "close friends" in any order they wished, regardless of sex, not including their boyfriend or girlfriend. Participants were then asked to list their opposite sex friends in order of closeness (from the most close to the least close). From these nominations, reciprocal pairs (participants who listed each other in one of the top three positions of closeness) were asked to be part of the study.

Measures of Friendship

The Assessment of Friendship Features (Berndt, 1995) was used to assess the quality of the friendship. This 26-item measure assesses various aspects of the friendship. Participants responded to items regarding how often certain interactions with their friend took place on a 5-point scale ranging from 1 (*never*) to 5 (*very often*). We used the scales that measured decreased conflict (four items, $\alpha = .72$), increased equality (four items, $\alpha = .63$), instrumental support (four items, $\alpha = .60$), intimate self-disclosure (four items, $\alpha = .82$), and emotional support (four items, $\alpha = .85$). Friends also reported how often, if ever, they had thought about dating their friend on a scale ranging from 1 (*never*) to 7 (*frequently*).

Procedure

Esme A. Londahl and a research assistant conducted the experimental sessions at the high school during free time of the day in an unused school office. Participants were seated in chairs placed at a 45° angle to each other facing a video camera that was on a tripod approximately 3 feet tall. The camera captured images of both participants from their knees to their heads. After being seated, participants were given a brief overview of the experimental session and the videotaping procedure. To encourage spontaneous interaction, the experimenters discussed classes

[5] Because of the averaging method we used to treat the couple as the unit of analysis in Studies 1 and 3, it was impossible to test for sex differences. In Study 2 we found no sex-related differences in the accuracy rates of judging sex of affiliation cues or overall accuracy. We did find that male targets were more accurately judged when they were displaying desire (male targets' $M = 72.6\%$, female targets' $M = 61.7\%$), $t(39) = 2.67$, $p < .05$. This finding is consistent with a previous study that found observers were more accurate in decoding men's sexual attitudes (Gangestad, Simpson, DiGeronimo, & Biek, 1992).

and teachers with the participants for approximately 5 min before the start of the interactions. Participants then engaged in four semistructured interactions: (a) They talked about the beginnings of their friendship, (b) they teased each other, (c) they spoke of the challenges of the friendship, and, finally, (d) they spoke of the benefits of their friendship. After each discussion, participants reported on their own emotions and estimated their partner's emotions. At the end of the videotaping procedure, the friends were taken to separate rooms to fill out questionnaires in which they assessed their friendship quality. We chose to code two of the four interactions, the friendship beginnings discussion and the benefits of the friendship discussion, because these two interactions produced elevated reports of liking (average of both together, $M = 5.19$ on a scale of 0 [*not at all*] to 8 [*extreme*]). The entire procedure lasted approximately 1 hr.

Friendship beginnings. Friends were instructed to think back to the time when they first met each other. Both members of the friendship, in random order, were asked for their first impressions of their friend, and how they became close friends. The experimenters had a standard set of questions to prompt discussion (e.g., "Where did you first meet each other?" and "What do you have in common?"). Participants were given 5 min to complete this discussion.

Friendship benefits. For the friendship-benefits interaction, participants were asked to each discuss "What's your favorite thing about your friend or the friendship in general?" Again, participants were allowed to discuss whatever came to mind, but in the case of reticence the experimenters had a standard set of questions to prompt discussion (e.g., "What makes you happiest about your friendship?" and "Why do you like hanging out with your friend?"). Participants were given 3 min to complete this discussion.

Emotion report. At the start of the experimental session and after each of the four interactions, participants reported on a scale of 0 (*no emotion*) to 8 (*extreme emotion*) the levels of seven emotions that they experienced and the emotions their partner experienced during the interaction. The emotions included anxious/nervous, amused, attracted, embarrassed, frustrated/angry, hurt/sad, and liking. We felt that terms like *love* and *desire* might be inappropriate for use in a high school sample of friends. We therefore piloted a series of terms that would be the equivalent of these terms using a small number of high school students not involved in the current study. The students deemed *liking* to be most similar to *love* and *attraction* most similar to *desire*. We then confirmed this in a sample of 10 psychology graduate students, who were asked to rate how much *love* and *desire* were like both *liking* and *attraction* on a scale of 1 (*not at all alike*) to 7 (*exactly alike*). Participants rated *liking* as more similar to *love* ($M = 4.30$) than to *desire* ($M = 3.20$), $t(9) = 3.97$, $p < .01$, Cohen's $d = 1.26$ (a very large effect size), and *attraction* as more similar to *desire* ($M = 6.20$) than to *love* ($M = 4.90$), $t(9) = 4.62$, $p < .01$, Cohen's $d = 1.58$ (a very large effect size).

Coding of affiliation cues. Coding of the affiliation cues (head nods, Duchenne smiles, gesticulation, and leaning toward the partner) was completed by a set of seven judges (who were different than those judges used for Study 1) using the same procedure outlined in Study 1. To establish reliability, 28 cases (21% of the total number of cases) were randomly selected and coded by a second judge to establish reliability. Judges agreed 70.6% of the time.

Results and Discussion

We ran the same analyses as in Study 1, replacing the term *love* with *liking*, the term *desire* with *attracted*, and the term *happy* with *amused*. We calculated measures of affiliation cue display and self-reported emotion by finding the average of the relevant measures across two interactions: the friendship-beginnings discussion and the friendship-benefits discussions. Table 7 summarizes participants' reports of liking and affiliation-cue display.

Affection Among the Friends

Although the friendship beginning and benefits discussions produced elevated feelings of liking, two additional results suggest that there was some romantic interest between friends. First, 15.2% of the friends had previously dated. Second, for those friends who had not dated, the average response on the question, "Have you ever wished you could date your friend?" was 2.30 on a 1 (*never*) to 7 (*frequently*) scale (the anchor here was between 2 [*once or twice*] and 3 [*rarely*]). This response was significantly different from the lowest response (1 [*never*]), $t(27) = 5.88$, $p < .001$, Cohen's $d = 1.11$ (a very large effect size).

To address whether *liking* (our proxy for love) was a pronounced experience during the friendship-beginning and friendship-benefits discussions, we created an index of positive emotions (e.g., amusement and attraction) and an index of negative emotions (e.g., anxious/nervous and hurt/sad). A repeated measures ANOVA with emotion type (liking, positive, negative) as the within-subjects factor yielded a significant effect, $F(2,60) = 62.96$, $p < .001$. Paired t tests indicated that friends reported significantly more liking ($M = 5.19$) than positive emotion ($M = 3.50$), $t(30) = 5.07$, $p < .001$, Cohen's $d = .91$ (a large effect size). They also reported more liking than negative emotion ($M = 1.68$), $t(31) = 9.76$, $p < .001$, Cohen's $d = 1.73$ (a very large effect size), and more positive than negative emotion, $t(30) = 8.22$, $p < .001$, Cohen's $d = 1.48$ (a very large effect size).

Is Liking an Internal Signal to Approach?

Our first hypothesis was that the experience of liking would positively correlate with approach-related states. Table 8 shows that we found a significant and positive correlation between self-reports of liking and amusement, $r(31) = .45$, $p < .05$, $r^2 = .202$ (a large effect size), in line with predictions. Self-reports of liking did not correlate with self-reports of attracted, $r(31) = .28$, contrary to predictions, or with self-reports of anxious/nervous, $r(31) = .12$, or hurt/sad, $r(31) = .11$.

Does Liking Have a Distinct Nonverbal Display?

We expected the four affiliation cues to significantly correlate with self-reports and partner estimates of liking. As in Study 1, we tested these hypotheses by correlating the friends'

Table 7
Mean Levels of Emotions and Cue Display in Study 3

	Girls ($n = 33$)		Boys ($n = 33$)	
Indicator	*M*	*SD*	*M*	*SD*
Emotion reports				
Self-reported liking	5.06	2.28	5.24	2.08
Partner-estimated liking	4.98	2.25	4.89	2.05
Affiliation-cue display				
Affirmative head nods	1.71	2.14	1.90	2.55
Duchenne smiles	8.84	8.58	6.76	5.67
Leaning toward partner	1.97	10.55	0.48	1.55
Gesticulation	3.34	3.10	4.36	6.20

Note. Emotions are rated on a scale of 0 (*none*) to 8 (*extreme*). Cue displays are shown as mean seconds displayed per 60 s.

Table 8
Correlations Between Self-Reports of Love and Other Emotions in Study 3

Emotion	*r*
Approach	
Attracted	.28
Other positive	
Amusement	.45*
Avoid	
Hurt/sad	.11
Stressful	
Anxious/nervous	.12

* $p < .05$.

total affiliation-cue display scores with self-reports of liking (encoding evidence) and partner estimates of liking (decoding evidence). We also ran a multiple regression model in which we predicted reports of liking with the duration scores of the four affiliation cues.

Controlling for attraction. To control for attraction in our behavioral analyses, we regressed participants' attraction reports on their liking reports (both self-reported and partner estimated, respectively) and then used the residual. Given the strength of the correlation between liking and amusement, we also addressed whether the affiliation cues related to amusement.

Encoding hypothesis. Table 9 shows the relations between total affiliation cues and liking, attraction, and amusement. As expected, we found a positive and significant correlation between total affiliation-cue displays and self-reports of liking, $r(30) = .40$, $p < .05$, $r^2 = .16$ (a medium-to-large effect size). The measure of the four affiliation cues did not correlate significantly with self-reports of attraction, $r(31) = -.28$, or amusement, $r(31) = -.09$, providing further evidence that the four affiliation cues relate to love or liking but not other positive states.

Regression analyses documented that affiliation cues significantly predicted self-reports of liking, $R(27) = .58$, $p < .05$, $r^2 = .336$ (a large effect size), as expected. In this model gesticulation ($\beta = .49$) and leaning toward the partner ($\beta = .42$) were both significant predictors (both $ps < .05$). Affiliation cues did not predict self-reports of attraction, $R(27) = .43$, but did predict self-reports of amusement, $R(27) = .57$, $p < .05$, $r^2 = .325$ (a large effect size).

Decoding hypothesis. Next we addressed whether friends' estimates of liking would correlate with their partners' affiliation cues. As expected, we found a significant and positive correlation between total affiliation-cue displays and partner estimates of liking, $r(30) = .41$, $p < .05$, $r^2 = .168$ (a medium-to-large effect size). The four affiliation cues did not correlate significantly with partner estimates of attraction, $r(30) = -.25$, or amusement, $r(30) = -.04$.

In the regression models, we found that affiliation cues significantly predicted partner estimates of liking, $R(27) = .57$, $p < .005$, $r^2 = .325$ (a large effect size), as expected. In this model gesticulation ($\beta = .49$) and leaning toward the partner ($\beta = .40$) were both significant predictors (both $ps < .05$). Affiliation-cue displays did not predict partner estimates of attraction, $R(27) = .45$, but did marginally predict estimates of amusement, $R(27) = .54$, $p < .10$, $r^2 = .292$.

Does Liking Relate to Increased Commitment-Related Perceptions?

Our final hypothesis held that displays of affiliation cues and self-reports of liking would correlate positively with the measures of support taken at the end of the experimental session. As shown in Table 10, and in line with predictions, friends who displayed more affiliation cues reported greater emotional support, $r(33) = .35$, $p < .05$, $r^2 = .122$ (a medium effect size). We also found marginal correlations between friends' affiliation-cue displays and higher instrumental support, $r(33) = .32$, $p < .10$, and greater relationship equality, $r(33) = .32$, $p < .10$. The measure of affiliation cues did not correlate significantly with greater intimate self-disclosure, $r(31) = .16$, or decreased conflict, $r(31) = .29$.

Self-reported liking correlated with greater relationship equality, $r(30) = .36$, $p < .05$, $r^2 = .13$ (a medium effect size), but not with informational support, $r(30) = .27$, increased intimate self-disclosure, $r(30) = -.01$, emotional support, $r(30) = .08$, or decreased conflict, $r(30) = .21$. Finally, when we predicted the outcome measures using both the experience of liking and display of affiliation cues in a regression model, the total amount of

Table 9
Relationships Between Affiliation-Cue Display and the Experience of Emotion and the Perception of Partner's Emotion in Study 3

	Liking[a]		Attracted[b]		Amused[b]	
Predictor of affiliation cue	*R*	*r*	*R*	*r*	*R*	*r*
Self-reported experience	.58**	.40*	.43	−.28†	.57*	−.09
Partner-attributed experience	.57**	.41*	.43	−.25	.54†	−.04

Note. $N = 33$ dyads.
[a] Controlling attracted. [b] Controlling liking.
† $p < .10$. * $p < .05$. ** $p < .001$.

Table 10
Relationships Between Total Affiliation-Cue Displays, Self-Reported Love, and Self-Reported Measures of Commitment in Study 3

Measure	Affiliation cues (*r*)	Self-reported love (*r*)	Love and behavior (*R*)
Decreased conflict	.29	.21	.32
Emotional support	.35*	.08	.31
Increased equity	.32†	.36*	.41†
Increased intimate disclosure	.16	.27	.27
Instrumental support	.32†	−.01	.31

† $p < .10$. * $p < .05$.

variance explained was at best only nominally larger than the amount of variance explained by either measure alone.[6]

General Discussion

Long-term, intimate bonds require partners to remain committed in the moment-to-moment interactions that make up their quotidian lives and in response to the tests that can make or break bonds. We have posited that love helps individuals in intimate relations solve the commitment problem. This formulation led us to predict that the momentary experience of love motivates approach and that the outward display of love conveys commitment to the partner. In these ways brief occurrences of love should enhance commitment-related behavior and perceptions, thus contributing to the stability and health of long-term bonds.

This analysis translated to three sets of empirical hypotheses, for which our studies generated support. First, we expected the experience of love to correlate with approach-related states. Indeed, in Study 1 romantic partners' reports of love correlated with increased reports of desire and sympathy; in Study 3 opposite-sex friends' reports of liking correlated with reports of amusement. In both studies there were insignificant correlations between self-reports of love and reports of negative emotion, in contrast to recent evidence showing that other positive states, such as amusement (Fredrickson & Levenson, 1998) and laughter (Keltner & Bonanno, 1997), correlate negatively with negative emotion. We take up the significance of these findings in an ensuing section.

Our second hypothesis held that love would have a nonverbal display. Findings in each of the three studies suggest that the four affiliation cues, head nods, Duchenne smiles, gesticulation, and forward leans, are part of a nonverbal signal of love. These affiliation cues correlated with the individual's own experience of love. Further, there were insignificant relationships between the four affiliation cues and reports of other positive emotions (e.g., desire, amusement), and they did not correlate with the negative emotions. Romantic partners' and opposite-sex friends' attributions of love (or liking) were correlated with the four affiliation cues (and again there were insignificant relationships between their attributions of other positive emotions typically and affiliation cues). Finally, in Study 2, naive observers were more likely to attribute love than desire to the four affiliation cues, and desire rather than love to sexual cues. This pattern of encoding and decoding evidence strongly suggests that love may indeed have a distinct signal—a claim with theoretical implications that we take up toward the end of this article.

Finally, we hypothesized that the momentary experience and display of love, as markers of enduring commitment, would correlate with behaviors and perceptions that enhance commitment in contexts in which relationships are threatened. Here the evidence was perhaps most persuasive. Romantic couples who experienced and displayed more love negotiated a conflict in more constructive, trust-enhancing ways, they teased in more playful, intimate ways, and they reported sharing more activities and considering each other more when defining life goals. In Study 3, opposite-sex friends who displayed more love reported receiving greater emotional and instrumental support from one another as well as disclosing more intimate details to each other. These findings are all the more impressive in light of the fact that we relied on brief assessments of love in one context to predict commitment-related behavior assessed in a different context and global self-report measures of relationship functioning.

Before turning to the implications of these findings, we first note limitations of our investigation. Our experimental tasks, although evocative of affiliative behavior and self-reports of love, were necessarily contrived (in fact, it is hard to imagine a context more antithetical to the expression of love than the well-lit laboratory). The laboratory setting is certain to have constrained participants in ways that prevented them from displaying love with additional behaviors, such as touching.[7] We did not address the extent to which the affiliative cues are unique to the experience of love. Some of these behaviors (e.g., leaning toward the partner, head nods) are certain to occur in contexts unrelated to love. We hasten to add that the behavioral cues of other emotions (e.g., the lip press of anger, the head movements down of embarrassment) are also observed in nonemotional contexts. And clearly, one can imagine more direct tests of the commitment hypothesis than the ones that motivated our experimental design (e.g., one might address whether the momentary experience and display of love predicts infidelity). We think the current findings set the stage for such endeavors.

The Nature of Love

The field of emotion has recently turned its long overdue attention to the positive emotions (e.g., Fredrickson, 1998), which were typically considered under one or two umbrella terms (e.g., *happiness*). The present study's findings make interesting contact with recent work on other positive states, and suggest that the realm of positive emotion is more differentiated than previously thought. Specifically, several studies now indicate that certain positive states, such as amusement (Fredrickson & Levenson, 1998) and laughter (Keltner & Bonanno, 1997), are associated with the reduction of distress. In fact, Tomkins, who shaped much of the contemporary field of emotion research, posited that positive emotions were primarily the consequence of reducing arousal (Tomkins, 1984).

In contrast, our two studies found that the experience and display of love were unrelated to the negative emotions. Love only correlated with more positive states. Consistent with these results, our measures of the display and experience of love only predicted the more positive relationship outcomes, but not the more negative ones. For example, measures of love predicted constructive conflict resolution but not hostile critical statements in Study 1. This body of evidence clearly indicates that love is less about the reduction of distress and more about pleasure and approach.

---

[6] We tested for developmental differences in two groups (9th graders and 12th graders), and found no significant differences between the two groups in any of the analyses, beyond those mentioned in the main body of the article. Considering the small sample size, we consider it a possibility that there were age-related differences that did not reach significance because of power issues. Future work should more systematically investigate this area.

[7] There is a literature that shows a relation between touching and love-like states (e.g., Beier & Sternberg, 1977; Burgoon, 1991; Heslin & Boss, 1980). Unfortunately touching behavior occurred in such low rates during the procedure that we were unable to analyze its relationship to love.

This interpretation of our findings also raises interesting issues about conceptualizations of love in attachment processes. The study of attachment has been guided by the theorizing of John Bowlby (Bowlby, 1982, 1988), who based many of his ideas on observations of children who were separated from their caregivers. Although love has been portrayed as an attachment process (Hazan & Shaver, 1987), empirical research on attachment has most typically focused on negative emotions, most notably emotions that promote anxiety and avoidance (e.g., Collins, 1996; Mikulincer & Orbach, 1995; Shaver & Clark, 1996). Our findings highlight how love promotes attachment. In a similar vein, Hazan and Shaver (1987) showed that individuals with a secure attachment style reported more happiness, friendship, and trust than their insecure counterparts. Clearly, research that examines how emotions promote attachment is an important line of inquiry, and one that will be essential to the understanding of positive emotions, such as love, desire, compassion, and even awe.

Is Love a Basic Emotion?

As the reader may have anticipated, we believe that the findings from the present studies call for some revision of prevailing conceptions of emotion. In most taxonomies of emotion (e.g., for one review, see Keltner & Buswell, 1997), the negative emotions outnumber the positive ones, and love is rarely considered an emotion, even though it is one of the first states that the layperson mentions when asked to generate names of emotions (Fehr & Russell, 1984). Our evidence, in contrast, suggest that love is a "basic" emotion (Shaver, Morgan, & Wu, 1996; Shaver, Schwartz, Krison, & O'Connor, 1987; Shaver, Wu, & Schwartz, 1992).[8] Our findings show that there is a distinct display of love, although it may not be easily posed in photos like facial expressions of other emotions. The recent studies of oxytocin suggest that love may have distinct neural substrates (Gonzaga et al., 2001; Insel, 1993). Finally, our proposal that love serves a commitment function, which may increase the ability of offspring to survive, is in line with theories of the evolutionary value of emotions (Nesse, 1990).

These findings are just a beginning. Little is known about the universality (and cultural variation) in the experience and display of love (for relevant observations, see Eibl-Eibesfeldt, 1974; Fisher, 1992). No study has examined the autonomic correlates of love. Clearly researchers need to further examine the extent to which love relates to outcomes in ways that are consistent with our commitment hypothesis. For example, it would be quite striking to show that displays of love predict the development of intimacy as well as its maintenance. These remain important lines of inquiry that are enabled by our documenting a reliable display of love.

The Value of Positive Emotions

Psychologists have long studied the detrimental effects of negative emotions and interactions on long-term relationship functioning (e.g., Shaver & Clark, 1996). The field has learned that negative emotional expression, negative affect reciprocity, and physiological linkage, to name just a few processes, predict problematic outcomes in intimate relations (Gottman & Levenson, 1992). In a similar spirit, other researchers have proposed that anxiety and avoidance are basic determinants of attachment patterns to romantic partners (Brennan, Clark, & Shaver, 1998). This research was no doubt motivated by the compelling nature of romantic discord, dysfunction, and dissolution, and remains an important area of study.

Yet there is another side to the relationship equation: The processes that make partners and intimate friends close, happy, and likely to persevere in the face of difficulty. The literature is starting to outline some answers. Intimate relations are enhanced by novel and arousing activities (A. Aron et al., 2000), positive expressions between romantic partners (Gottman et al., 1998), positive illusions about partners (Murray et al., 1996a, 1996b), play (Keltner et al., 1998), and positive expressivity (Harker & Keltner, 2001). Our study adds to this growing literature and suggests that love may not be as blind as Shakespeare portrayed, and has effects that are very real.

[8] The term *basic* had been contested in the study of emotion (Ortony & Turner, 1990). Here we use the term to refer to emotional states that have been shown to have distinct phenomenology, expressive behavior, and physiology.

References

Andersen, J. F., Andersen, P. A., & Jensen, A. D. (1979). The measurement of nonverbal immediacy. *Journal of Communication Research, 7*, 153–180.

Andersen, P. A. (1985). Nonverbal immediacy in interpersonal communication. In A. W. Siegman & S. Feldstein (Eds.), *Multichannel integrations of nonverbal behavior* (pp. 1–36). Hillsdale, NJ: Erlbaum.

Aron, A., & Aron, E. N. (1991). Love and sexuality. In K. McKinney & S. Sprecher (Eds.), *Sexuality and close relationships* (pp. 25–48). Hillsdale, NJ: Erlbaum.

Aron, A., Norman, C. C., Aron, E. N., McKenna, C., & Heyman, R. E. (2000). Couples' shared participation in novel and arousing activities and experienced relationship quality. *Journal of Personality and Social Psychology, 78*, 273–284.

Aron, E. N., & Aron, A. (1997). Extremities of love: The sudden sacrifice of career, family, dignity. *Journal of Social and Clinical Psychology, 16*, 200–212.

Barrett, K. C., & Campos, J. J. (1987). Perspectives on emotional development: II. A functionalist approach to emotions. In J. D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 555–578). New York: Wiley-Interscience.

Baumeister, R. F., Stillwell, A. M., & Heatherton, T. F. (1995). Personal narratives about guilt: Role in action control and interpersonal relationships. *Basic and Applied Social Psychology, 17*, 173–198.

Beier, E. G., & Sternberg, D. P. (1977). Marital communication: Subtle cues between newlyweds. *Journal of Human Communication, 27*, 92–97.

Berndt, T. J. (1995). *Assessment of friendship features*. Unpublished manuscript, Purdue University.

Bowlby, J. (1982). *Attachment and loss: Attachment* (2nd ed., Vol. 1). New York: Basic Books.

Bowlby, J. (1988). *A secure base: Parent–child attachment and healthy human development*. New York: Basic Books.

Brennan, K. A., Clark, C. L., & Shaver, P. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford Press.

Buck, R. (1999). The biological affects: A typology. *Psychological Review, 106*, 301–336.

Burgoon, J. K. (1991). Relational message interpretations of touch, conversational distance, and posture. *Journal of Nonverbal Behavior, 15*, 233–259.

Burgoon, J. K., Buller, D. B., Hale, J. L., & de Turck, M. A. (1984). Relational messages associated with nonverbal behaviors. *Human Communication Research, 10*, 351–378.

Burnstein, J. C., Dangelmayer, G., & Schultheiss, O. C. (1996). Personal goals and social support in close relationships: Effects on relationship mood and marital satisfaction. *Journal of Personality and Social Psychology, 71*, 1006–1019.

Buss, D. M. (1988a). The evolution of human intrasexual competition: Tactics of mate attraction. *Journal of Personality and Social Psychology, 54*, 616–628.

Buss, D. M. (1988b). From vigilance to violence: Tactics of mate retention in American undergraduates. *Ethology and Sociobiology, 9*, 291–317.

Buss, D. M. (1988c). Love acts: The evolutionary biology of love. In R. J. B. Sternberg & Michael L. (Eds.), *The psychology of love* (pp. 100–118). New Haven, CT: Yale University Press.

Buss, D. M. (1994). *The evolution of desire: Strategies of human mating.* New York: Basic Books.

Buss, D. M., Larsen, R. J., Westen, D., & Semmelroth, J. (1992). Sex differences in jealousy: Evolution, physiology, and psychology. *Psychological Science, 3*, 251–255.

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review, 100*, 204–232.

Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology, 72*, 346–361.

Carpenter, C. R. (1934). A field study of the behavior and social relations of howling monkeys. *Comparative Psychology Monographs, 10*, 1–168.

Carter, C. S. (1998). Neuroendocrine perspectives on social attachment and love. *Psychoneuroendocrinology, 23*, 779–818.

Chevalier-Skolnikoff, S. (1971). *The female sexual response in stump-tail monkeys and its broad implications for female mammalian sexuality.* Paper presented at the 70th Annual Meeting of the American Anthropological Association, New York.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Erlbaum.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.

Collins, N. L. (1996). Working models of attachment: Implications for explanation, emotion, and behavior. *Journal of Personality and Social Psychology, 71*, 810–832.

Connolly, J. A., & Johnson, A. M. (1996). Adolescents' romantic relationships and the structure and quality of their close interpersonal ties. *Personal Relationships, 3*, 185–195.

Daly, M., & Wilson, M. I. (1988). *Homicide.* Hawthorne, NY: Aldine De Gruyter.

Daly, M., Wilson, M. I., & Weghorst, S. J. (1982). Male sexual jealousy. *Ethology and Sociobiology, 3*, 11–27.

Dittmann, A. T. (1972). Developmental factors in conversational behavior. *Journal of Communication, 22*, 404–423.

Eibl-Eibesfeldt, I. (1974). *Love and hate: The natural history of behavior patterns* (G. Stracham, Trans.). New York: Schocken. (Original work published 1971)

Eibl-Eibesfeldt, I. (1989). *Human ethology.* New York: Aldine de Gruyter.

Ekman, P., Davidson, R. J., & Friesen, W. V. (1990). The Duchenne smile: Emotional expression and brain physiology: II. *Journal of Personality and Social Psychology, 58*, 342–353.

Ekman, P., & Friesen, W. V. (1978). *Facial Action Coding System: A technique for the measurement of facial movement.* Palo Alto, CA: Consulting Psychologists Press.

Ekman, P., Friesen, W. V., & Ellsworth, P. (1972). *Emotion in the human face: Guidelines for research and an integration of findings.* New York: Pergamon Press.

Epple, B. (1967). Maintenance, breeding and development of marmoset monkeys in captivity. *Folia Primatology, 7*, 36–65.

Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Psychology: General, 113*, 464–486.

Fering, C. (1999). Other-sex friendship networks and the development of romantic relationships in adolescence. *Journal of Youth and Adolescence, 28*, 459–512.

Fisher, H. (1992). *Anatomy of love.* New York: Fawcett Columbine.

Fogel, A., Dickson, K. L., Hus, H.-C., Messinger, D., Nelson-Goens, G. C., & Nwokah, E. (1997). Communication of smiling and laughter in mother–infant play: Research on emotion from a dynamic systems perspective. In K. C. Barrett (Ed.), *The communication of emotion: Current research from diverse perspectives* (Vol. 77, pp. 5–24). San Francisco: Jossey-Bass.

Frank, R. H. (1988). *Passions within reason: The strategic role of the emotions.* New York: Norton.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology, 2*, 300–319.

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition & Emotion, 12*, 191–220.

Fridlund, A. J. (1992). Darwin's anti-Darwinism in "The Expression of the Emotions in Man and Animals." In K. T. Strongman (Ed.), *England international review of studies on emotion* (Vol. 2, pp. 117–137). New York: Wiley.

Frijda, N. H. (1988). The laws of emotion. *American Psychologist, 43*, 349–358.

Frijda, N. H., & Mesquita, B. (1994). The social roles and functions of emotions. In S. Kitayama & H. R. Markus (Eds.), *Emotion and culture: Empirical studies of mutual influence* (pp. 51–87). Washington, DC: American Psychological Association.

Furman, W. (1993). Theory is not a four-letter word: Needed directions in the study of adolescent friendships. *New Directions in Child Development, 60*, 89–102.

Furman, W., & Shaffer, L. A. (1999). A story of adolescence: The emergence of other-sex relationships. *Journal of Youth and Adolescence, 28*, 513–522.

Gangestad, S. W., Simpson, J. A., DiGeronimo, K., & Biek, M. (1992). Differential accuracy in person perception across traits: Examination of a functional hypothesis. *Journal of Personality and Social Psychology, 62*, 688–698.

Givens, D. B. (1978). The nonverbal basis of attraction: Flirtation, courtship, and seduction. *Psychiatry, 41*, 346–359.

Gonzaga, G. C., Turner, R. A., Keltner, D., & Altemus, M. (2001). *Oxytocin and affiliation behavior in humans.* Unpublished manuscript, University of California, Berkeley.

Gottman, J. M., Coan, J., Carrere, S., & Swanson, C. (1998). Predicting martial happiness and stability from newlywed interactions. *Journal of Marriage and the Family, 60*, 5–22.

Gottman, J. M., & Levenson, R. W. (1992). Martial processes predictive of later dissolution: Behavior, physiology, and health. *Journal of Personality and Social Psychology, 63*, 221–233.

Grammer, K. (1990). Strangers meet: Laughter and nonverbal signs of interest in opposite-sex encounters. *Journal of Nonverbal Behavior, 14*, 209–236.

Graziano, W. G., & Eisenberg, N. (1997). Agreeableness: A dimension of personality. In R. Hogan & J. A. Johnson (Eds.), *Handbook of personality psychology* (pp. 795–824). San Diego, CA: Academic Press.

Harker, L. A., & Keltner, D. (2001). Expressions of positive emotions in women's college yearbook pictures and their relationship to personality

and life outcomes across adulthood. *Journal of Personality and Social Psychology, 80*, 112–124.

Hatfield, E. (1988). Passionate and companionate love. In R. J. Sternberg & M. L. Barnes (Eds.), *The psychology of love* (pp. 191–217). New Haven, CT: Yale University Press.

Hatfield, E., & Rapson, R. (1993). Love and attachment processes. In M. Lewis & J. M. Halaviland (Eds.), *Handbook of emotions* (pp. 595–604). New York: Guilford Press.

Hatfield, E., & Walster, G. W. (1978). *A new look at love*. Lantham, MD: University Press of America.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*, 511–524.

Hendrick, S. S., & Hendrick, C. (1992). *Romantic love*. Newbury Park, CA: Sage.

Heslin, R., & Boss, D. (1980). Nonverbal intimacy in arrival and departure at an airport. *Personality and Social Psychology Bulletin, 6*, 248–252.

Heyman, R. E., Weiss, R. L., & Eddy, J. M. (1995). Martial Interaction Coding System: Revision and empirical evaluation. *Behaviour Research and Therapy, 33*, 737–746.

Insel, T. R. (1993). Oxytocin and the neuroendocrine basis of affiliation. In J. Schulkin (Ed.), *Hormonally induced changes in mind and brain* (pp. 225–251). San Diego, CA: Academic Press.

John, O. P., Donahue, E. M., & Kentle, R. P. (1991). *The "Big Five" Inventory: Versions 4a and 54*. Berkeley: University of California, Institute of Personality and Social Research.

Keltner, D. (1996). Facial expressions of emotion and personality. In C. Magai & S. H. McFadden (Eds.), *Handbook of emotion, adult development, and aging* (pp. 385–401). San Diego, CA: Academic Press.

Keltner, D., & Bonanno, G. A. (1997). A study of laughter and dissociation: Distinct correlates of laughter and smiling during bereavement. *Journal of Personality and Social Psychology, 73*, 687–702.

Keltner, D., & Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement functions. *Psychological Bulletin, 122*, 250–270.

Keltner, D., & Haidt, J. (1999). Social functions of emotions at multiple levels of analysis. *Cognition & Emotion, 13*, 505–521.

Keltner, D., & Kring, A. M. (1998). Emotion, social function, and psychopathology. *Review of General Psychology, 2*, 320–342.

Keltner, D., Young, R. C., Heerey, E. A., Oemig, C., & Monarch, N. D. (1998). Teasing in hierarchical and intimate relations. *Journal of Personality and Social Psychology, 75*, 1231–1247.

Kendon, A. (1975). Some functions of the face in a kissing round. *Semiotica, 15*, 299–334.

Larsen, R. J., & Ketelaar, T. (1991). Personality and susceptibility to positive and negative emotional states. *Journal of Personality and Social Psychology, 61*, 132–140.

Lee, J. A. (1977). A typology of styles of loving. *Personality and Social Psychology Bulletin, 3*, 173–182.

Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgment and choice. *Cognition & Emotion, 14*, 473–493.

Levenson, R. W., & Gottman, J. M. (1983). Marital interaction: Physiological linkage and affective exchange. *Journal of Personality and Social Psychology, 45*, 587–597.

Locke, H. J., & Wallace, K. M. (1959). Short marital-adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living, 21*, 251–255.

Matarazzo, J. D., Saslow, G., Wiens, A. N., Weitman, M., & Allen, B. V. (1964). Interviewer head nodding and interviewee speech durations. *Psychotherapy: Theory, Research, and Practice, 1*, 54–63.

McCormick, N. B., & Jones, A. J. (1989). Gender differences in nonverbal flirtation. *Journal of Sex Education and Therapy, 15*, 271–282.

McGinley, H., McGinley, P., & Nicholas, K. (1978). Smiling, body position, and interpersonal attraction. *Bulletin of the Psychonomic Society, 12*, 21–24.

Mehrabian, A. (1968). Relationship of attitude to seated posture, orientation, and distance. *Journal of Personality and Social Psychology, 10*, 26–30.

Mehrabian, A. (1971). Verbal and nonverbal interactions of strangers in a waiting situation. *Journal of Experimental Research in Personality, 5*, 127–138.

Mehrabian, A., & Williams, M. (1969). Nonverbal concomitants of perceived and intended persuasiveness. *Journal of Personality and Social Psychology, 13*, 37–58.

Messinger, D. S., & Fogel, A. (1998). Give and take: The development of conventional infant gestures. *Merrill-Palmer Quarterly, 44*, 566–590.

Metts, S., Sprecher, S., & Regan, R. C. (1998). Communication and sexual desire. In P. A. Andersen & L. K. Guerrero (Eds.), *Handbook of communication and emotion: Research, theory, applications, and contexts* (pp. 353–377). San Diego, CA: Academic Press.

Mikulincer, M., & Orbach, I. (1995). Attachment styles and repressive defensiveness: The accessibility and architecture of affective memories. *Journal of Personality and Social Psychology, 68*, 917–925.

Moore, M. M. (1985). Nonverbal courtship patterns in women: Context and consequences. *Ethology and Sociobiology, 6*, 237–247.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (1996a). The benefits of positive illusions: Idealization and the construction of satisfaction in close relationships. *Journal of Personality and Social Psychology, 70*, 79–98.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (1996b). The self-fulfilling nature of positive illusions in romantic relationships: Love is not blind, but prescient. *Journal of Personality and Social Psychology, 71*, 1155–1180.

Nesse, R. M. (1990). Evolutionary explanations of emotions. *Human Nature, 3*, 261–289.

Ortony, A., & Turner, T. J. (1990). What's basic about basic emotions? *Psychological Review, 97*, 315–331.

Parkinson, B., & Manstead, A. S. (1993). Making sense of emotion in stories and social life. *Cognition & Emotion, 7*, 295–323.

Reynolds, V., & Reynolds, F. (1965). Chimpanzees in the Budongo forest. In I. DeVore (Ed.), *Primate behavior* (pp. 368–424). New York: Holt, Rinehart & Winston.

Rosenfeld, H. M. (1966a). Approval-seeking and approval-inducing functions of verbal and nonverbal responses in the dyad. *Journal of Personality and Social Psychology, 4*, 597–605.

Rosenfeld, H. M. (1966b). Instrumental affiliative functions of facial and gestural expressions. *Journal of Personality and Social Psychology, 4*, 65–72.

Rusbult, C. E., Drigotas, S. E., & Verette, J. (1994). The investment model: An interdependence analysis of commitment processes and relationship maintenance phenomena. In D. Canary & L. Staffort (Eds.), *Communication and relational maintenance* (pp. 115–139). New York: Academic Press.

Russell, J. A. (1994). Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin, 115*, 102–141.

Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experiences. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 433–465). New York: Guilford Press.

Shaver, P. R., & Clark, C. L. (1996). Forms of adult romantic attachment and their cognitive and emotional underpinnings. In G. G. Noam & K. W. Fischer (Eds.), *Development and vulnerability in close relationships* (pp. 29–58). Mahwah, NJ: Erlbaum.

Shaver, P., Hazan, C., & Bradshaw, D. (1988). Love as attachment: The integration of three behavioral systems. In R. J. Sternberg & M. L. Barnes (Eds.), *The psychology of love* (pp. 68–99). New Haven, CT: Yale University Press.

Shaver, P. R., Morgan, H. J., & Wu, S. (1996). Is love a "basic" emotion? *Personal Relationships, 3*, 81–96.

Shaver, P., Schwartz, J., Krison, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology, 52*, 1061–1086.

Shaver, P. R., Wu, S., & Schwartz, J. C. (1992). Cross-cultural similarities and differences in emotion and its representation. In M. S. Clarke (Ed.), *Emotion* (Vol. 13, pp. 175–212). Newbury Park, CA: Sage.

Sippola, L. K. (1999). Getting to know the "other": The characteristics and developmental significance of other-sex relationships in adolescence. *Journal of Youth and Adolescence, 28*, 407–418.

Sternberg, R. J. (1986). A triangular theory of love. *Psychological Review, 93*, 119–135.

Tokuda, K., Simons, R. C., & Jensen, G. D. (1968). Sexual behavior in a captive group of pigtailed monkeys. *Primates, 9*, 283–294.

Tomkins, S. S. (1984). Affect theory. In P. Ekman & K. Scherer (Eds.), *Approaches to emotion* (pp. 163–195). Hillsdale, NJ: Erlbaum.

Trivers, R. L. (1972). Parental investment and sexual selection. In B. G. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136–179). Chicago: Aldine.

Trout, D. L., & Rosenfeld, H. M. (1980). The effect of postural leans and body congruence on the judgment of psychotherapeutic rapport. *Journal of Nonverbal Behavior, 4*, 176–190.

Turner, R. A., Altemus, M., Enos, T., Cooper, B., & McGuinness, T. (1999). Preliminary research on plasma oxytocin in normal cycling women: Investigating emotion and interpersonal distress. *Psychiatry: Interpersonal and Biological Processes, 62*, 97–113.

Wieselquist, J., Rusbult, C. E., Foster, C. A., & Agnew, C. R. (1999). Commitment, pro-relationship behavior, and trust in close relationships. *Journal of Personality and Social Psychology, 77*, 942–966.

Received November 27, 2000
Revision received December 13, 2000
Accepted December 21, 2000 ■

New Editors Appointed, 2003–2008

The Publications and Communications Board of the American Psychological Association announces the appointment of five new editors for 6-year terms beginning in 2003.

As of January 1, 2002, manuscripts should be directed as follows:

- For the *Journal of Applied Psychology*, submit manuscripts to **Sheldon Zedeck, PhD,** Department of Psychology, University of California, Berkeley, CA 94720-1650.
- For the *Journal of Educational Psychology*, submit manuscripts to **Karen R. Harris, EdD,** Department of Special Education, Benjamin Building, University of Maryland, College Park, MD 20742.
- For the *Journal of Consulting and Clinical Psychology*, submit manuscripts to **Lizette Peterson, PhD,** Department of Psychology, 210 McAlester, University of Missouri—Columbia, Columbia, MO 65211.
- For the *Journal of Personality and Social Psychology: Interpersonal Relations and Group Processes*, submit manuscripts to **John F. Dovidio, PhD,** Department of Psychology, Colgate University, Hamilton, NY 13346.
- For *Psychological Bulletin*, submit manuscripts to **Harris M. Cooper, PhD,** Department of Psychological Sciences, McAlester Hall, University of Missouri—Columbia, Columbia, MO 65211.

Manuscript submission patterns make the precise date of completion of the 2002 volumes uncertain. Current editors, Kevin R. Murphy, PhD, Michael Pressley, PhD, Philip C. Kendall, PhD, Chester A. Insko, PhD, and Nancy Eisenberg, PhD, respectively, will receive and consider manuscripts through December 31, 2001. Should 2002 volumes be completed before that date, manuscripts will be redirected to the new editors for consideration in 2003 volumes.