Falling in Love: Prospective Studies of Self-Concept Change

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Two prospective, longitudinal studies examined the consequences of falling in love, focusing on predictions developed in the context of A. Aron and E. N. Aron's (1986, in press) self-expansion model of motivation and cognition in close relationships. In each study a sample with a high expected incidence of falling in love (first- and second-year undergraduates in the fall term) was tested 5 times over 10 weeks. At each testing participants indicated whether they had fallen in love and either made open-ended lists of self-descriptive terms (Study 1; N = 329) or completed standard self-efficacy and self-esteem measures (Study 2; N = 529). As predicted, after falling in love there was greater change and increased diversity of self-concept domains (Study 1) and increased self-efficacy and self-esteem (Study 2). Partial correlation analyses suggested that results in both studies were not due to mood change.

We define falling in love as the onset of a strong desire for a close, romantic relationship with a particular person; it is the transition from not being in love to being in love (Aron, Aron, Paris, Tucker, & Rodriguez, 1989). Falling in love has long been described as a transforming experience by poets and troubadours, philosophers and psychologists (James, 1906/1961; Jung, 1925/1959), and it seems to happen at least once to most North Americans at some point in their lives (Aron, Dutton, Aron, & Iverson, 1989; Dion & Dion, 1973; Hendrick & Hendrick, 1986). This study addressed the consequences of falling in love, focusing specifically on changes in self-concept.

Among personality and clinical theorists, there seem to be two schools of thought about the impact of falling in love. One, represented by Erikson (1963, 1964, 1968), Kernberg (1977), and Jung (e.g., 1925/1959), holds that falling in love is a valuable experience, contributing to identity development and personality integration. The other school, represented by Casler (1973), De Rougemont (1956), Fromm (1956), Peele (1982, 1988), Peele and Brodsky (1976), Schaeffer (1987), Tennov (1979), and Yalom (1989), has focused on the undesirable aspects of falling in love, judging at least its extreme forms to be atavistic, irrational, and addictive—a sign of neurosis. However, the conclusions of all of these thinkers are based almost exclusively on clinical experience and anecdotal and literary accounts. One reason this study was undertaken was to provide systematic data on falling in love relevant to some of these issues.

Recently, social psychologists have also begun to show interest in the topic of romantic love (for reviews, see Aron & Aron, 1986, 1994; Hatfield & Rapson, 1993; Hendrick & Hendrick, 1992; Shaver & Hazan, 1988; Sternberg, 1986; Sternberg & Barnes, 1988). There has been a smaller body of research specifically on falling in love, including data on individual differences in incidence (e.g., Dion & Dion, 1975; Hatfield, Schmitt, Cornelius, & Rapson, 1988; Hazan & Shaver, 1987; Hendrick & Hendrick, 1986) and of the circumstances and characteristics that appear to promote it (Aron, Dutton, et al., 1989; Averill & Boothroyd, 1977; Dion & Dion, 1973, 1975; Hazan & Shaver, 1987; Hong, 1986; Lester, 1987; Mathes, 1982; Mathes & Moore, 1985; Shea & Adams, 1984). However, none of this research addressed the question of the consequences of falling in love—how people are different, if at all, after the experience. Indeed, we could find only one relevant study. Hendrick and Hendrick (1988) conducted a cross-sectional comparison of those in love versus those not in love. Their main findings, in addition to differences in love style and other relationship-focused variables, were that those in love had lower levels of sensation seeking and self-monitoring and, in one of two samples, higher self-esteem. Overall, however, social science generally, and even close-relationship researchers, have given little attention to this seemingly dramatic transition, perhaps in part be-
cause of the difficulty of learning about it through other than retrospective accounts. That is, what may be lacking is a practical methodology to study falling in love prospectively. (Aron & Aron [1989] and Aron, Dutton, et al. [1989] also suggested that the culture of the scientific community may generate an apprehension about studying intense, irrational experiences, except as pathology.)

What consequences might one expect for falling in love? Given that it is often described as a dramatic, transformative experience, it seems likely that it would affect the self-concept (Markus & Wurf, 1987). With this focus in mind, and following the general line of thinking about love developed by Aron and Aron (1986, in press), we reasoned that there may be at least two ways in which falling in love would impact self-concept, expansion of the content of the self and increased perceived self-efficacy and self-esteem.

Falling in Love and Expansion of the Contents of the Self

The first way is that the perceived contents of the self may change, and this change will specifically be in the direction of what Aron and Aron call "expansion." Any interaction with another person would seem to change the self-concept to some extent, since much of what we consider our self to be probably arises from how others see us (e.g., Cooley, 1902; Mead, 1934). However, this general effect may well be accentuated in a close relationship (e.g., Baldwin, 1992; Swann & Prudmore, 1985). The situation with falling in love might be particularly impactful because it would be likely to involve the three conditions that Tice (1992) found to create greatest self-concept change under these circumstances—high choice, self-reference, and expectation of future interaction with the observer. Furthermore, a new love relationship may provide a supportive environment in which to try out new or suppressed aspects of the self. Indeed, particular partners are likely to admire or clarify specific aspects of the self. That is, falling in love may involve a period of self-discovery, especially for young dating individuals, in which attributes associated with relating to a particular other may take on an added salience. Similarly, a new relationship provides the opportunity to try out ideal aspects of self and to try to claim them in a new social context. Thus, although identity researchers (e.g., Baumeister, 1986) usually focus on change (or stability), rather than expansion, of the perceived content of the self, the idea that falling in love might have an effect of this kind seems consistent with much of the thinking in this area.

In addition to these more general processes, Aron and Aron (1986, in press) argued that in a close relationship, one important way in which the self may be expanded is through a process of "including other in the self." This means that a close relationship involves integrating, to some extent, other's resources, perspectives, and characteristics into the self. Having included these elements of the other in the self, the self is thereby expanded.

Leaving aside for the moment the question of whether the self is expanded by including other in the self, one can ask if including other in the self is a useful way to model interpersonal closeness. The idea is consistent with a variety of theoretical approaches, including, for example, work that emphasizes that intimacy involves exchange of self-relevant information (e.g., McAdams, 1988; Reis & Shaver, 1988). In more direct support of this notion of closeness as including other in the self, Aron, Aron, Tudor, and Nelson (1991) demonstrated that allocation of resources between self and other and information processing about other vary as a function of the relationship to the other. Specifically, Aron et al. showed that in a close relationship (e.g., best friend, mother, or spouse), resource allocation to other and processing information about other are similar to these in regard to self. Such data are consistent with other findings that when self is in a close relationship with other, the differences are smaller between self and other in terms of self and other as knowledge structures (e.g., Bower & Gilligan, 1979; Keenan & Baillet, 1980; Prentice, 1990) and in terms of actor-observer discrepancies in attributional processes (Goldberg, 1981; Nisbett, Caputo, Legant, & Merckel, 1973, Study 3; Prentice, 1990). Also relevant, Aron, Aron, and Smollan (1992) found that a particularly salient measure of closeness was allowing participants to represent their relationship to other by choosing among an array of pairs of circles overlapping to varying degrees.

We interpreted these various studies as suggesting that in a close relationship people treat other as if other were part of the self. Further, Sedikides, Olsen, and Reis (1993) found that participants spontaneously encode information about other people in terms of their relationships with each other. This suggests that even cognitive representations about other people are organized in a way that overlaps the selves of those in a close relationship.

If other is included in the self in a relationship, it also would seem to follow that the self is not only changed, but expanded, in the sense that one now has additional aspects included in the self. In support of this line of reasoning, Sedikides (personal communication, October, 1992) found that self-descriptions of participants who were currently in a close relationship, compared to self-descriptions of participants not in a close relationship, included terms representing significantly more domains of the self.

Falling in Love and Increased Perceived Self-Efficacy and Self-Esteem

A second way in which self-concept may be affected by falling in love is an increase in perceived self-efficacy and self-esteem. There are several processes through which this may come about. For example, because falling in love seems to be a desired experience in our culture (e.g., Swidler, 1980), having achieved this experience may enhance perceived self-efficacy and self-esteem. Indeed, the appropriate role enactments themselves may entail a sense of invincibility. Perhaps even more salient, falling in love typically involves discovering that another person likes the self (Aron, Dutton, et al., 1989), or even idealizes the self (Reik, 1944), a discovery that may well be taken as evidence of one's own self-worth (cf. Greenberg, Pyszczynski, & Solomon, 1986). Finally, falling in love may enhance perceived self-efficacy and self-esteem as a result of the expansion described above: To the extent that falling in love expands the self (in terms of resources, perspectives, and characteristics), the individual's awareness of that expanded content should provide
grounds for an increased feeling of self-efficacy, and hence also increased self-esteem.

The general importance of self-efficacy in behavior and experience has been emphasized in a number of data-based theoretical approaches (e.g., Bandura, 1989; Deci, 1975; Gekas, 1989; White, 1959). Its specific role in falling in love has been explored in several studies focusing on attraction processes (Aron & Aron, 1991; Aron, Dutton et al., 1989); other data suggest that associating an ongoing relationship with expansion of self-efficacy leads to increased relationship satisfaction (McKenna, 1989; Reissman, Aron, & Bergen, 1993).

In sum, based on these various lines of reasoning from the self-expansion model, identity perspectives, and related theorizing, we hypothesized that falling in love should lead to (a) change in the perceived content of the self, which might be characterized as an expansion in that perceived content, and (b) an increase in self-efficacy and self-esteem.

To examine these hypotheses, we conducted two prospective studies of falling in love. The first study focused mainly on whether the perceived content of the self changes and expands after falling in love; the second study focused on whether there is an increase in self-efficacy and self-esteem. In each of these two studies we identified a sample in which we expected to find a relatively high incidence of persons falling in love (first- and second-year college students during the fall term), then arranged to measure aspects of self-concept and whether the participant had fallen in love, carrying out measurements about every 2 weeks over a 10-week period. In the first study, at each testing participants completed open-ended listings of terms applying to the self. These listings permitted analyses of whether the perceived content of the self changed in the important sense of there being new or newly recognized elements in the self and other elements dismissed or forgotten— not merely an increase or decrease in the importance of particular traits provided by the researcher. Furthermore, using these listings we were able to explore whether there was an expansion of the perceived contents of the self in the sense suggested by Sedikides (personal communication) of an increase in the diversity of domains represented in the self-concept. Finally, it was possible to use these data to obtain a preliminary measure of self-esteem by analyzing the positivity versus negativity of words listed. The second study focused specifically on whether there were increases in perceived self-efficacy and self-esteem, administering standard measures of these two variables at each testing.

We should emphasize that this research was conducted under real-world conditions and focused on an experience (falling in love) that would be expected to have very diverse meanings and intensities for different individuals and with different partners. In addition, the kinds of effects we expected, relatively rapid changes in self-concept, are probably not well-integrated into the individual’s cognitive structure, making any kind of measurement difficult (e.g., this situation much weakens the sensitivity of standard self-concept measures which generally focus on long-term traits). The result of all this is that in this type of research there is necessarily a large amount of uncontrolled variance masking any underlying effects. For this reason we anticipated that even if the hypothesized impacts of falling in love on the self-concept are substantial, the offsetting noise of the real-world research conditions would result in rather small mean differences (and effect sizes).

At the same time, we should also emphasize that a key potential contribution of the present research is that it developed and illustrated the application of a method of studying real-life falling in love, prospectively, and in a way that can be implemented practically by future researchers.

Study 1

This study examined whether falling in love was associated with changes in the contents of the self-concept, including overall change, diversity of domains, and a preliminary measure of positivity (self-esteem).

Method

Participants were 325 undergraduates, 156 attending an introductory psychology course and 169 attending an introductory psychological statistics course, all during the fall academic quarter of 1989. Students in these courses were invited to participate by filling out the initial questionnaires during class time set aside for this purpose. The students in the introductory course were primarily first-year students, those in the statistics class primarily second-year students. The majority of the participants were White and middle class, and about two-thirds were women. Ages ranged from 17 to 52 years, with 94% 18 through 22. All testings were conducted as part of regular class sessions, usually at the start of class. Five testings were conducted over all, one approximately every 2-1/2 weeks.\(^1\)

\(^1\) Just after the second testing (later the same afternoon for one class, the next day for the other), a major earthquake occurred with an epicenter 10 miles (16 km) from the research site, the University of California at Santa Cruz. We reported elsewhere (Aron, Paris, & Aron, 1995) an analysis of the relation of the quake to our longitudinal data (the five testings) plus data from an additional questionnaire administered 10 days after the quake. In the present article on the consequences of falling in love, all major analyses for Study 1 were conducted both controlling for (by analysis of covariance) and not controlling for whether the falling in love occurred in the interval following the quake (between the second and third testing). These analyses all yielded identical results in terms of reaching or not reaching statistical significance. Thus we report here the simpler (not controlled) analyses. (It should be emphasized that a major limitation of statistical control, that the variable being controlled may not be adequately measured, is not a problem here because the date of occurrence of the quake is clearly reliable and valid.)

Real-world research like this must deal with real-world events. If the occurrence of the quake during this study is a threat at all, it would seem to be a threat only to external validity, because both those who did and did not fall in love were exposed to the same quake. Also, whether thinking in terms of internal or external validity, there is no reason we could come up with for why the quake should affect the pattern of results. The main impact of the quake, it would seem, would be to increase random variance so that any results obtained in spite of this disturbance are more, not less, impressive.

However, we did take advantage of the occurrence of the quake to see if there were any special relationships between this kind of event and falling in love. The most interesting results were as follows: Participants were not more likely to fall in love after the quake than at other periods. However, those who did fall in love in the period following the quake reported themselves to have been substantially more distressed immediately after the quake than did other participants, but by 10 days later they were less distressed. This crossover interaction was significant, \(F(2, 304) = 4.77, p < .05\), and the pattern was consistent with other relevant
At each testing, prior to completing any other materials (except consent forms at the first testing), participants were asked "Who are you today?" and given 3 min to write single-word or single-phrase answers on a blank sheet of paper. This was done as a group-administered, timed procedure. This measure, which was inspired by the work of McGuire and McGuire (1982, 1988), focuses on the content of the self-concept, rather than evaluative valence of that content. Also important for purposes of the present study, this approach permits maximum individual differences in the ways that the self-concept might change. Finally, the emphasis on "today" makes the measure especially sensitive to the kinds of rapid changes in self-concept we were anticipating.

After the listing period was completed, participants were given a questionnaire including two specific questions and a scale, which together were used to identify whether the participants had fallen in love since the preceding testing. The specific questions were, "Are you currently in love?" and "Have you just fallen in love with someone during the time since completing the last questionnaire?" (On the first testing's questionnaire, the last question referred to "the past 2 1/2 weeks").

The scale was the abbreviated version of Mathes' (1982) Romantic Love Symptom Checklist. This scale consists of 35 feelings presumed to be symptomatic of romantic love (e.g., "tingling," or "off in the clouds") that are elicited by thoughts of the respondent's beloved, or if the respondent is not currently in love, thoughts of someone with whom she or he would like to be in love. Mathes (1982) reported that the full scale showed an internal consistency of .95, and suggested that its validity is supported by correlations with Rubin's (1970) Love Scale of .48 for women and .37 for men. A participant was considered to have fallen in love at a given testing if the participant either (a) answered "yes" to the question "have you fallen in love in the past 2 1/2 weeks?"; (b) indicated they were currently in love but had not indicated they were currently in love on the previous testing; or (c) showed a two-standard-deviation increase (13 items checked) in the number of Romantic Love Symptom Checklist items checked.

Results and Discussion

Due to the longitudinal design and the nature of testing students during class sessions, there were many cases of missing values on particular tests. However, we could not identify any association of the pattern of missing values to variables measured in the study. Thus, we adopted the strategy of simply excluding a participant from any analysis that involved data for which the participant had a missing value. (However, when an analysis involved an average over several testings and the participant had data for some of them, the average of completed testings were used.) For this reason, ns vary among analyses.

The main data analyses involved content analyses of the free-response lists of self-descriptive terms. Unfortunately, after the analysis for change in self-concept was completed and we were beginning the analysis for diversity of domains in the self-concept, the self-concept lists of about half the participants were lost. (These were participants whose lists had been randomly selected for coding by a particular judge.) Thus the analyses reported below for the diversity of self-concept domains and for self-esteem were based on only 145 participants. The gender, age, and year-in-school data for this subsample were essentially identical to those from the larger sample. However, the analyses relying on only this subsample necessarily possessed considerably less power so that nonsignificant results using this subsample should be treated with caution. Based on a predicted .30 effect size (δ), the power for the analyses using the full sample was .88 for the within-subject comparisons of the group that fell in love and .73 for the between-subject comparisons of change in the participants who fell in love to change in the participants who did not fall in love; for the comparisons using the reduced sample, the corresponding power figures were .62 and .47, respectively.

Determination of whether a participant had fallen in love. Using the criteria described in the Methods section, 108 participants were classified as having fallen in love. Those who had fallen in love were more likely to be first-year students (58% vs. 33% for those who had not fallen in love; χ²[2] = 17.39, p < .01) and younger (19.0 vs. 19.9, t[295] = 2.10, p < .05). The distribution of gender did not differ over groups. Of those who had fallen in love, the number (and proportions of women and men) who did so at each testing was about equal.

2 We selected these three criteria because we believed they represented different aspects of our definition of falling in love. It turned out that correlations between the first two criteria (a and b) were quite high, ranging from .45 to .75 (all ps < .001) suggesting that they were quite similar indices, as would be expected from their content. The third criterion, a large change on the checklist ratings, was intended to tap experiences that might be missed by the other two; thus it was not surprising that it had little correlation with the other two criteria. (That is, collectively our criteria served to treat falling in love as a composite variable representing these different sources—what are sometimes called “causal indicators”—rather than as an underlying true state for which these different measures were indicators of the usual kind; see Bollen & Lennox, 1991). Nevertheless, as a check on the impact of including this third criterion, we conducted a series of analyses paratalesse those reported below (i.e., for changes in self-concept, diversity of self-concept, and self-esteem), including in the falling-in-love group only those participants who met one of the first two criteria. (This eliminated seven participants for the analyses involving change in self-concept and five in the analyses involving the other two change variables.) Although the loss in power due to reduced sample size affected the significance levels on the diversity and self-esteem analyses (where n's were already quite small), the effect sizes for all three analyses were quite similar when using the reduced sample. This suggests that incorporating the third criteria had little effect on the pattern of results, although it did serve to enhance power by including some additional subjects in the crucial falling-in-love group.

3 In order to examine the relation of falling in love to change on other variables, if a participant fell in love on the first testing (and not also on a later testing), because a comparison is needed to a previous testing, the participant had to be excluded from all analyses reported below (that is, such participants were excluded from all the change analyses and also were excluded from the comparison group that did not fall in love). (The power figures reported above were based on the ns after eliminating those who fell in love only on the first testing.) It was also necessary to determine which testing to use for those who fell in love
sample for which we were able to conduct the content analyses for diversity of domains of the self-concept and self-esteem, there were 49 who had fallen in love. The breakdowns in this subsample for year in school, age, and gender, and the distributions of when participants fell in love, were all highly similar to the overall sample.

**Self-concept change.** The self-description lists were scored independently by three judges (each scoring a third of the lists) who were unaware of whether or when a participant had fallen in love or any other information about the participant. The scoring involved eight steps. First, each judge determined the number of nonredundant words in the participant's list from the first testing. (Words were considered nonredundant if one was not a derivative of the other and they did not both appear in a list of synonyms in Roget's *Thesaurus*, 1962). Second, the judges determined the number of nonredundant words from the participant's list from the second testing. Third, they determined the number of nonredundant words that were different in the two lists. Judges repeated this process for each pair of lists obtained in consecutive testings. For example, the list from the second testing was compared with the list from the third testing, the list from the third testing was compared with the list from the fourth testing, and so forth.

As a check of interjudge reliability, each judge was also asked to score 18 participants' lists randomly selected from the participants scored by the other two judges. That is, a total of 36 additional participants were scored by each judge, making 108 of the participants scored by two judges. Correlations between the ratings of the two judges for these 108 participants ranged over the nine rating tasks from .82 to .98, with a median of .96. In cases where judges gave different ratings, the mean of the two judges was used.

The next step was to use these ratings to construct an index that would operationalize the variable of self-concept change (in the sense of there being new or newly recognized elements in the self and other elements dismissed or forgotten). The index used was based on the number of words differing between two adjacent lists (the total number of words of the two lists, minus the number that overlapped between the two) divided by the total number of words in the two lists. This proportion, which we refer to as the Self-Concept Change Index, ranges from a minimum change of .5 (same words in both lists) to 1.0 (entirely different words in the two lists).  

For those participants who fell in love, the mean Self-Concept Change Index score for before to after falling in love was .89. This Change Index score was significantly greater than the mean Change Index scores (.86) for these participants over other pairs of testings (those testings over which the participant did not fall in love), t(78) = 2.63, p < .01.  

**4** Use of this approach was probably not biased by differences in overall number of words reported since there were no significant mean differences in the number of words between any two testings or significant mean changes in absolute number of words from before to after falling in love. Furthermore, we conducted all of the analyses reported below using the change in nonredundant words but not dividing by the total in the two lists. The results were identical in terms of significance. It should also be noted that distribution of scores on the Self-Concept Change Index were somewhat skewed. Thus we conducted all of the analyses using this Index using square-root transformed scores (which were not skewed). These analyses provided identical results in terms of significance. Thus the simpler, untransformed results are reported here.

**5** We used t tests throughout all analyses of Studies 1 and 2 because more complicated methods could not be appropriately carried out under the circumstances of the present research. (When checking for gender effects and interactions, the t tests were expanded to 2 x 2 analyses of variance, either mixed or all between, depending on the analysis.) For example, repeated-measures analyses with planned contrasts for before-versus-after could not be done given both the many cases with missing values on some testings and the fact that the points at which participants fell in love were distributed across the various testings. Other kinds of time-series analyses were impractical for similar reasons, as well as the limited number of measurement points in the study (e.g., ARIMA modeling is usually considered to require at least 30 measurement points). Also, we could not practically investigate longer-term changes, such as from before falling in love to two or three testings later, because the number of such later testings available for a given participant depended on when the participant fell in love (as well as on whether the later testings were completed), leaving a much smaller sample available for such comparisons.

**6** In most cases in Study 1, as can be seen from the t values, whether a result was significant was not affected by whether one- or two-tailed tests were used. However, we preferred one-tailed tests because the direction of changes was clearly predicted.

**7** Throughout Studies 1 and 2, for each analysis in which we compared change among those who fell in love to those who did not, we also conducted two additional sets of analyses to check on the possibility that using the average change of the control group might bias it toward reduced variance. In these additional analyses, for each participant who did not fall in love we randomly selected a testing (2 through 5) as a comparison testing, such that each participant had his or her own randomly selected comparison testing. One set of these additional analyses compared (a) change in the group that fell in love, from before to after falling in love, to (b) change in the group that did not fall in love, from before to after the randomly selected comparison testing. The other set of these additional analyses compared (a) change in the group that fell in love, from before to after falling in love minus the average of change from before to after other testings, to (b) change in the group that did not fall in love, from before to after the randomly selected comparison testing minus the average of change from before to after other testings. For each of the three key measures (Self-Concept Change Index, diversity, self-esteem), these two kinds of analyses were each carried out 11 times, each time using different seeds to produce the random numbers so that the randomly selected comparison testings for those who did not fall in love were different. We then examined the median effect size of each set of 11 such comparisons. In each case, the median effect size was nearly identical to the effect size of the result reported in the main body of the article using the procedure of comparing the pre-post
Diversity of self-concept domains. Based on reviewing the raw lists, we identified 19 categories that seemed to encompass most of the words listed. These categories were anger, anxiety/stress, confusion, fatigue/boredom, freedom, helping/humanitarian, happiness, inquiring, longing, love, negative self-regard, occupations, peace/security, positive self-regard, roles (family and social), sadness, selflessness/personhood ("I," "me," "a person"), sexuality, and wholesomeness/health. Using this set of categories, the self-description lists were scored blind as to whether or when a participant had fallen in love and to any other information about the participant. Raters were instructed to assign each word to one and only one of these categories (or to a 20th category, miscellaneous). A randomly selected quarter of the lists were independently rated by a second judge to assess reliability. The correlations between the two judges for the crucial variable (number of categories for which a participant listed words) ranged over the five testings from .84 to .93, with a median of .89. In cases where judges gave different ratings, the mean of the two judgments was used.

For those who fell in love, there was an increase in diversity of self-concept domains from 5.25 categories listed before to 6.15 after, \( t(38) = 2.09, p < .05 \). This increase was greater than the average change (a decrease of .32) for these participants over testings in which they did not fall in love, \( t(36) = 2.18, p < .05 \). The increase was also greater than the average testing-to-testing change (a decrease of .02) for participants who did not fall in love, \( t(138) = 2.90, p < .01 \). There were no gender interactions or main effects on these analyses for change. However, over the five testings, the average level of diversity was higher for women than men, \( t(142) = 3.43, p < .01 \).

As an exploratory analysis, we had also planned to examine change on individual categories. However, the increase in number of categories rated could not be attributed to a change in any particular categories: The only single category in which there was a significant change associated with falling in love was love itself—participants listed words associated with love more often after falling in love (see footnote 8).

Self-esteem. As a preliminary approach to measuring the level of self-esteem at each testing, we conducted another independent content analysis of the lists, focusing on positivity or negativity of the words listed. The rating scheme we developed was based on Anderson’s (1968) norms for personality-trait words, which we divided into seven groupings corresponding to a 7-point scale, from −3 (very negative) to +3 (very positive). Judges were instructed to code each word in a participants’ list first as to whether it was rateable (that is, whether it was a trait term and also reflected a positive or negative evaluation) and then as to where it fell relative to Anderson’s norms. (Most words that were rateable were included in Anderson’s article. But if a word was not included by Anderson, the norms for similar words were used as a guide to how positively or negatively to rate this word.) Ratings were made independently, and without knowledge of whether or when a participant had fallen in love or any other identifying information about the participant.

We were not entirely optimistic about this procedure, because McGuire and McGuire (1982, 1988) typically found very low percentages of words in spontaneous self-concept lists that are rateable as positively or negatively self-evaluative. However, in our lists approximately half the words were self-evaluative traits. Nevertheless, it should be kept in mind that these ratings are based on only half the words listed—and also that the overall power for this analysis was already small, given the reduced sample size.

Given these limitations, the results, though generally not significant, were nevertheless encouraging as preliminary indications. For those who fell in love there was a nonsignificant increase in mean total positivity of rateable words from .97 before falling in love to 3.18 after, \( t(37) = 1.15, p = .13 \). This increase was nonsignificantly greater than the average increase (−1.01) for these participants over testings in which they did not fall in love, \( t(35) = 1.21, p = .12 \). Finally, the increase was significantly greater than the average testing-to-testing increase (−.43) for participants who did not fall in love, \( t(137) = 1.97, p < .05 \). There were no gender interactions or main effects on these analyses of change, nor were there gender differences in average scores over the five testings.

The basic pattern of increased self-esteem provides some initial support for part of our second hypothesis (which predicted increased self-efficacy and self-esteem) and is consistent with the pattern reported by Hendrick and Hendrick (1988) in their cross-sectional study.

Self-concept, diversity, and self-esteem changes controlling for mood change. A possible explanation for the changes we have so far identified is that they are due to changes in mood. To investigate this possibility we developed indexes of mood using the data from the content analysis conducted for the diversity of domains. First we conducted a series of factor analyses of these self-concept categories (excluding love—see footnote 8), one for each of the five testings. Two clear mood-related factors emerged, a factor consisting of three positive mood categories (happiness, inquiring, peace/security) and a factor consisting of four negative mood categories (anger, anxiety/stress, confusion, sadness). The median interjudge correlation over the five

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8 We were concerned that any change in diversity of domains of the self-concept might be a function simply of an increase in mentions of love and love-related terms. (There was in fact a significant increase for words in the love category after falling in love.) Thus, we conducted a set of analyses for diversity in self-concept which only considered the other 19 categories. These analyses produced identical results in terms of significances. We also realized that an increase in mentions of love might account for the results on the Self-Concept Change Index. Thus, we conducted a series of analyses on the Self-Concept Change Index in which we partialed out change over the same testings on number of words listed in the love category. Again, these results were identical in terms of significance to the original analyses as reported above.
tests for the combined mood categories was .88 for positive mood and .86 for negative mood.

Treating the combined mood categories for each factor as a scale, we conducted three analyses for each mood-factor scale: change from before to after falling in love, this change compared to average changes over other testings, and this change compared to the average change of those who did not fall in love. We also conducted these same three analyses for a variable consisting of the sum of the two mood-factor scales. This summed measure was intended as an indicator of total mood, testing whether falling in love may have produced a polarization of mood or simply an increase in overall emotionality (Rousar, 1989). In none of these analyses for positive mood, negative mood, or their sum, were there any significant or near significant findings. Also, there were no gender main effects or interactions on any of these change analyses. However taking the average score over the five testings, women had higher scores on the negative-mood factor, \( t(142) = 4.13, p < .01 \), and higher scores on the sum of positive and negative mood factors, \( t(142) = 2.91, p < .01 \).

We should emphasize that this failure to find mood-related changes associated with falling in love is a null-hypothesis finding based on a low power analysis. Indeed, it is quite possible that falling in love produces short-term mood changes, just as mood-related research generally finds that event-driven mood changes rarely last long. Thus such changes might not show up when measurement is only every 2-1/2 weeks. Further, the index of mood we used was ad hoc and probably less sensitive than the kind of more direct questions typically used in mood research.9

On the other hand, the failure to find a link of falling in love with our mood measures suggests that the links obtained of falling in love with the various self-concept effects are not merely a result of mood change. For this purpose, the present measure would seem to be especially apt because it is based on the same data (the self-descriptions) as the self-concept analysis measures.

As a further check on the possible role of mood in the self-concept findings, we conducted a series of analyses in which we partialed out the measures of mood. We conducted a series of such analyses for each of the three mood measures (positive, negative, and summed), for each of the three change analyses, and for all of our three self-concept measures. In all of these analyses, the link of falling in love with the Change Index and with diversity of self-concept domains remained significant. (On the self-esteem measure most of the differences were already not significant. Using adjusted means controlling for the mood measures, results remained in the predicted direction, though effect sizes were smaller still.) These analyses would seem to further undermine a mood-change explanation for the findings regarding the Self-Concept Change Index and diversity of self-content domains.

Summary of Study 1 results. Consistent with the expectations based on our theoretical analysis, we found reliable evidence for increased change in the contents of the self-concept and increased diversity of domains included in the self-concept. Furthermore, these results remained when controlling for various indicators of mood change. We also found preliminary indications consistent with a predicted increase in self-esteem.

Study 2

Study 2 focused directly on our hypothesis that there would be increases in perceived self-efficacy and self-esteem after falling in love. This study was very similar to Study 1, with the major exception of the nature of the questionnaire completed at each testing. In Study 2, at each testing participants now completed standard measures of self-efficacy and self-esteem. Use of these measures was particularly important because the self-concept measures used in Study 1 had no independent evidence of their validity. Study 2 also modified the Study 1 procedure in a number of ways designed to make it unlikely that participants would be aware that the study had any special relation to falling in love. (Although it is not obvious how such awareness might have created the pattern of results observed in Study 1, it seemed wise to attempt to minimize the possibility of any subtle demand-character effect.)

Method

Participants were 529 undergraduates, 246 attending an introductory psychology course at Stanford University and 283 attending an introductory psychology course at the University of California at Santa Cruz, all during the fall academic quarter of 1993. The majority were first-year students, White and middle class, with about three-fifths women. Ages ranged from 16 to 24 years, with 92% 18 through 22.

The research was explained as a study of the relation of life events and personality. No mention was made of any special link to love or falling in love, and care was taken to minimize the chance that students would know of the researchers' general interest in love and relationships. Questionnaires were administered during regular class sessions at the start of the 10-week quarter, and again every 2 weeks for a total of five testings.

The first part of the questionnaire included a “Life Events Check List,” on which participants were instructed to “Check as many of the following as occurred in your life in the past 2 weeks.” There were 16 events listed (e.g., major success at school, unusually bad time with one's family, or started a new job). The key item for our purposes, “Fell in love,” was about midway through the list. The next section was a list of six “Moods and feelings” that the participant was instructed to rate on a 10-point scale from “Not at all” to “All the time” according to how much “it was typically true of you during the past 2 weeks.” The six moods and feelings, in the order presented, were “anxious,” “happy,” “in love” (our target item), “stressed,” “sad,” and “angry.” A participant was considered to have fallen in love if, at any of the five testings, the participant either (a) checked the life event “Fell in love” or (b) showed a two-standard-deviation increase (6 scale points) from the previous testing in the rating for “In Love.”10

9 We used these same mood scales (but including love in the positive mood scale) in the study of the earthquake (Aron, Paris, & Aron, 1995). In that analysis, we found a substantial, significant increase following the earthquake in negative mood and a near-significant decrease in positive mood. This suggests that these mood scales are sufficiently reliable and sensitive to show change due to an event which is highly impactful on mood. (Of course, the power of the quake analyses for mood change were greater than the power of the mood-change analyses in the current study since the quake mood-change analyses were within-subject comparisons using the entire subsample whose lists were content analyzed for self-concept categories.)

10 These two criteria were intended to tap similar, though not perfectly identical, experiences of falling in love. (It was not practical in this study, in which there were severe time constraints on the length of the questionnaire we could administer, to also include Mathes' checklist.) The median correlation, over testings, between change on being in
The remainder of the questionnaire consisted of 20 items rated on a 4-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree). The first 10 items were the widely used Rosenberg (1965) self-esteem scale. The second 10 items were those with the highest loadings (all .347 or above) on the General Self-Efficacy factor on Shera et al.'s (1982) Self-Efficacy Scale. (We used only 10 items to keep the overall questionnaire short.) Example items are "When I make plans I am certain I can make them work" and "I avoid facing difficulties" (reverse scored). Shera et al. reported an alpha of .86 for the entire 17 items in this factor in a sample of undergraduates. As indications of validity of the scale (based on the General Self-Efficacy factor), Shera et al. reported, in a sample of adult alcoholics, positive correlations with employment, educational level, and military rank, and negative correlations with number of jobs quit and number of times fired. Furthermore, in a sample of undergraduates, there were positive correlations with measures of internal locus of control, personal control, ego strength, and interpersonal competency. The scale had a substantial (but far from perfect) correlation of .51 with the Rosenberg scale.

Results and Discussion

As in Study 1, there were many cases of missing values on particular testings, and we adopted the same strategy for dealing with them.

**Determination of whether a participant had fallen in love.** Based on the criteria described in the Methods section, 138 participants were classified as having fallen in love. There were no significant differences between those who did and did not fall in love in gender, year in school, or age. Of those who had fallen in love, the number and proportions of women and men who did so at each testing was about equal.

**Self-efficacy.** Over the five testings, alphas on the 10-item self-efficacy scale ranged from .79 to .88, with a median of .85. For those who fell in love there was an increase in self-efficacy from 2.90 before to 2.97 after; \( t(81) = 1.79, p < .05 \). This increase was greater than the average increase (-0.03) for these participants over testings in which they did not fall in love, \( t(72) = 1.57, p = .06 \). It was also greater than the average testing-to-testing increase (.00) for participants who did not fall in love, \( t(368) = 2.20, p < .05 \). There were no significant main effects or interactions for gender on any of the change analyses; however, men scored higher on this self-efficacy measure overall (M\( = 2.97 \) and 2.86, respectively), \( t(517) = 2.75, p < .01 \).

**Self-esteem.** Over the five testings, alphas for the Rosenberg scale ranged from .87 to .91, with a median of .90. For those who fell in love there was an increase in self-esteem from 3.36 before to 3.43 after (we scored the scale so that higher scores meant greater self-esteem); \( t(81) = 2.04, p < .05 \). This increase was greater than the average increase (-0.01) for these participants over testings in which they did not fall in love, \( t(72) = 1.67, p < .05 \). It was also greater than the average testing-to-testing increase (.02) for participants who did not fall in love, \( t(368) = 1.54, p = .06 \). On some of these analyses, there was a tendency for these effects to be larger for men than for women. However, the only interaction that was significant was the comparison, for those who had fallen in love, of increase from before to after falling in love versus increases over other pairs of testings. There were no main effects for gender on the change analyses; however men scored higher on this self-esteem measure overall (M\( = 3.34 \) and 3.15, respectively), \( t(517) = 4.25, p < .01 \).

We also considered a possible alternative explanation for these results. This alternative was that the apparent increase in self-esteem from before to after falling in love was actually due to participants being more likely to fall in love who were experiencing an unusually low level of self-esteem just prior to falling in love. (Thus, the apparent increase after falling in love would be due to regression to the mean.) The possibility that participants might be more likely to fall in love during a period of particularly low self-esteem is consistent with a theory of falling in love originally proposed by Reik (1944) and which has received some support in both experimental (Walster, 1965) and correlational (Mathes & Moore, 1985) studies.

To test this alternative, we first examined whether the level of self-esteem at the testing just prior to falling in love was lower than at the testing preceding it. The result was that there was actually a slight (nonsignificant) increase. Also, the level of self-esteem just prior to falling in love seemed to be somewhat higher than the average level of self-esteem for the participants who did not fall in love, \( t(370) = 1.91, p = .06 \) (two-tailed). Thus the Reikan process does not appear to explain our results. It is nevertheless still possible that such a process may operate in some cases of falling in love. Furthermore, some experimental data (Dion & Dion, 1975; Jacobs, Berscheid, & Walster, 1971) suggest that other factors may interact with lowered self-esteem so that in some cases one would expect more and in other cases less likelihood of falling in love. \(^{11}\)

**Combined results.** Taking self-efficacy and self-esteem together (that is, treating them as part of a two-level repeated measures factor), there were overall increases from before to after falling in love, \( F(1, 81) = 5.25, p < .05 \); overall greater increases from before to after versus increases from before to after other testings for the same participants, \( F(1, 72) = 3.52, p = .06 \); and greater increases than the average testing-to-testing increases for those who did not fall in love, \( F(1, 368) = 5.15, p < .05 \). There were no interactions (that is, in no case was the effect of one variable significantly different as a function of the level of the other).

**Self-efficacy and self-esteem changes controlling for mood change.** The five mood items other than love (anxious, happy, stressed, sad, and angry) had a unidimensional factor structure

\(^{11}\) A related possibility is that participants who fell in love showed mean changes on the various self-concept indicators because some of them had fallen out of love just prior to the preceding testing. To check on this possibility, we ran all major analyses for Studies 1 and 2 excluding participants who on any of the testings had fallen out of love. The effect sizes of the results were all virtually identical to those obtained in the full analyses. However, due to the lower power of these analyses arising from the smaller sample size, these same effect sizes did not always quite reach statistical significance.
on all five testings. Taken as a scale (with reverse scoring for happy), these five items had a median alpha of .76. We examined change in mood for each of the three falling-in-love analyses (before to after, before-to-after change vs. change at other testings for those who fell in love, and before-to-after change for those who fell in love vs. average change for those who did not fall in love). None of these three analyses reached or approached significance. Nor were there any gender main effects or interactions on the change analyses; however overall women had more negative moods, \( t(517) = 5.06, p < .01 \). We also repeated the analyses for self-esteem and for self-efficacy, in each case partialing out mood. In all cases, the differences remained in the predicted direction and were significant \( (p < .05) \). (We also conducted analyses for self-efficacy and self-esteem controlling for mood polarization, using the sum of happy plus the average of the negative moods; again all results remained in the predicted direction and significant.) Thus there was no indication that the self-efficacy and self-esteem changes associated with falling in love were due to mood change.

**Summary of Study 2 results.** Consistent with our theoretical analysis (and, specifically, our second hypothesis), we found reliable evidence for increased self-efficacy and increased self-esteem after falling in love and this pattern was not affected by partialling out measures of mood change.

**General Discussion**

This article described two prospective studies of changes in self-concept associated with falling in love. These studies developed a procedure for studying falling in love prospectively, provided the first substantial information on the positive or negative impact of falling in love on the self-concept, and provided support for two hypotheses generated from our theoretical analysis of the possible impacts of falling in love—that falling in love should lead to change in (a) the perceived content of the self, which might be characterized as an expansion in that perceived content, and (b) an increase in self-efficacy and self-esteem.

The methodological contribution of this work is primarily in showing that it is possible to identify a "high-risk" group for falling in love that is readily available to most university-based researchers, making it feasible to conduct prospective research on this seemingly profound but understudied life event. Furthermore, we developed a longitudinal procedure of testing every 2 weeks that is both practical to implement and apparently sufficiently sensitive to yield significant results with sample sizes that are not unreasonably large. In addition, the measures of self-concept change, especially our integration of McGuire's (1982, 1988) spontaneous self-concept approach with Sedikides' method for measuring diversity of self-concept, represent new and potentially fruitful operationalizations of expansion of self and self-concept change more generally.

With regard to the general issue of the impact of falling in love, as raised in the past by clinicians, the results of both studies are clearly consistent with the notion that falling in love is a positive experience, at least in the short term. It appears to change the self-concept in ways which lead to the individual feeling a greater ability to accomplish goals and a greater sense of self-worth.

Most important, our two key hypotheses were supported. In Study 1 participants who fell in love showed significant changes in the contents of the spontaneous self-concept and increased diversity of domains included in the self-concept. These results are consistent with the first hypothesis. Study 1 also yielded a nonsignificant tendency after falling in love to include more positive words in self-descriptions (a preliminary measure of self-esteem), providing tentative support for part of our second hypothesis. In Study 2 participants who fell in love showed significant increases in standard measures of perceived self-efficacy and self-esteem, providing direct support for our second hypothesis. In both studies the various findings remained significant after controlling for mood changes, suggesting that the obtained self-concept changes could not be accounted for as simple reflections of transient mood change.

Furthermore, the pattern of results is entirely consistent with our theoretical perspective of falling in love from which we generated the hypotheses. The self-expansion model of motivation and cognition in close relationships (Aron & Aron, 1986, in press). According to this view, falling in love should result in self-expansion arising from several sources. One important source is including other in the self—that a close relationship involves integrating, to some extent, other’s resources, perspectives, and characteristics into the self. The individual’s sub consequent awareness of these greater resources and so forth, in turn, leads to an increase in perceived self-efficacy (and hence also self-esteem).

In the introduction we also described several other ways in which falling in love may expand the self and create increased perceived self-efficacy and self-esteem. For example, the individual who falls in love in Western culture enact a scripted scenario (Aron, Dutton, et al., 1989; Aron & Rodriguez, 1992; Averill & Boothroyd, 1977; Swidler, 1980) which involves a set of dramatically altered behaviors (Buss, 1988; Swensen, 1961), cognitions (e.g., Aron & Westbay, 1994; Fehr, 1988; Tesser & Paulhus, 1976), and emotions (e.g., Shaver, Schwartz, Kinron, & O’Connor, 1987). As we also noted, falling in love usually includes the discovery that other likes the self (Aron, Dutton, et al., 1989). All such processes would be expected to lead to self-concept changes, at least some of which can be usefully characterized as an expansion of self as well as increased self-efficacy and self-esteem, due both to self-perception and awareness of other’s changed perceptions of self (cf. Baumeister, 1986).

In any case, we think that the self-expansion approach (Aron & Aron, 1986, in press) provides a useful overarching framework for linking the kinds of self-concept changes associated with falling in love with relationship phenomena more generally, in which individuals represent their relationships as overlapping selves (Aron et al., 1992) and confuse self with other (Aron et al., 1991), as though the other has been included in the self, creating a presumably more expanded self.

In interpreting the present findings we are well aware that the complexity of real-life research of this kind inevitably leaves loose ends that open our results to alternative explanations—some of which we may not have even imagined. We could not, for example, control exposure to other variables in the participants’ lives. Furthermore, although these data are prospective, they are nevertheless correlational, so that third factor explanations cannot be ruled out. Thus, in addition to replication through longitudinal studies like ours, laboratory experimental
studies may well be indicated. Nevertheless, the present data are unique just because we were able to impose such a comparatively high degree of control in studying significant, real-life events.

In sum, the present research makes three main contributions. First, this research program demonstrates a feasible means of studying falling in love prospectively as well as the application of original approaches to measuring self-concept change. Second, these data provide the first substantial answers to the question of what are the psychological consequences of falling in love—the immediate impact, on the average, seems to be quite positive. Finally, and most importantly, the results suggest that falling in love is followed by self-concept change that is not merely a result of enhanced mood, but represents a change in the contents of the self-concept that can be appropriately characterized as an expansion of self and a change in the evaluation of the self-concept that includes greater perceived self-efficacy and self-esteem.

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1996 APA Convention Call for Programs

The Call for Programs for the 1996 APA annual convention appears in the September issue of the APA Monitor. The 1996 convention will be held in Toronto, Ontario, Canada, from August 9 through August 13. The deadline for receipt of program and presentation proposals is December 1, 1995. Additional copies of the Call are available from the APA Convention Office, effective in September. As a reminder, agreement to participate in the APA convention is now presumed to convey permission for the presentation to be audiotaped if selected for taping. Any speaker or participant who does not wish his or her presentation to be audiotaped must notify the person submitting the program either at the time the invitation is extended or before the December 1 deadline for proposal receipt.