


Putting Yourself on the Line: Self-Esteem and Expressing Affection in Romantic Relationships

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Abstract

Although expressing affection is an important way to connect to a romantic partner, it also involves putting yourself on the line—revealing dependence on your partner. Extending the risk-regulation model, we hypothesized that individuals with lower self-esteem (SE), who are concerned about vulnerability in relationships, experience less rewarding reactions to *expressing* affection, and believe that their partners respond less positively to *receiving* affection. We assessed these predictions across two studies that measured retrospective reports, reactions to an in vivo exchange and responses in daily life. We found that participants with lower SE expressed less affection and experienced less positive emotional, cognitive, and physiological reactions when doing so. Participants with lower SE believed that their partners derived fewer benefits from their affection despite that their partners experienced normative boosts in positive emotion and relationship satisfaction during these exchanges. The consequences of these findings for relationship functioning and SE are discussed.

Keywords

self-esteem, risk-regulation model, affection, compliments, romantic relationships

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Relationships involve both challenges and opportunities. For example, articulating needs, responding to conflict, and navigating shared responsibilities require effort and sensitivity and often involve snags along the way. By contrast, expressing affection and love for romantic partners is typically thought of as a straightforward opportunity to feel close and build intimacy. Research supports this intuition (Algoe, Gable, & Maisel, 2010; Gonzaga, Keltner, Londahl, & Smith, 2001; Gordon, Impett, Kogan, Oveis, & Keltner, 2012; Lambert & Fincham, 2011). For example, the tendency to convey gratitude to a partner is associated with relationship satisfaction and feelings of connection (Algoe et al., 2010). Relatedly, expressing appreciation tends to increase partners' feelings of appreciation in return, and this appreciation predicts relationship longevity and commitment (Gordon et al., 2012).

Although expressing affection is a great way to strengthen a relationship, in this article we argue that people differ in how they perceive and respond to this opportunity. Extending the risk-regulation model (Murray, Holmes, & Collins, 2006), we posit that expressing affection for a partner may signal dependence and vulnerability, states less comfortable for people who experience self-doubt and difficulty in romantic relationships, such as those with lower self-esteem (SE). More specifically, we predicted that individuals with

lower SE are less likely to choose dependence by expressing affection and, moreover, that these individuals experience less rewarding cognitive, emotional, and physiological reactions when they indeed do so.

The Risk-Regulation Model and Partner-Initiated Dependence

The risk-regulation model outlines how people navigate the complex struggle between two opposing goals in romantic relationships (Murray et al., 2006). The first is a relationship-promotion goal, fostering a satisfying connection with a partner and preserving stable dependence on them. The second is a self-protection goal, minimizing the risk of rejection from the partner and limiting the emotional vulnerability that would come along with it. To balance these divergent goals, people develop a risk-regulation system that monitors for

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signs of a partner's positive regard, and if found, prioritizes relationship-promotion goals over self-protection. A variety of sources are utilized to determine whether a partner has this regard, including an individual's own self-views. Because people with higher SE see themselves in positive ways, they have fewer doubts about their partners' feelings and more readily prioritize relationship-promotion. In contrast, as people with lower SE doubt their self-worth, it makes it difficult for them to feel confident in their partners' positive regard. Thus, they end up prioritizing self-protection.

In support of this conceptualization, extant research has demonstrated that *actions on the part of the partner* may heighten feelings of dependence and trigger people with lower SE to respond in self-protective ways. Surprisingly, even partners' positive actions, including their expressions of affection, have the potential to catalyze these reactions (e.g., Cameron, Stinson, Gaetz, & Balchen, 2010; Collins & Feeney, 2004; Collins, Ford, Guichard, & Allard, 2006; Murray, Holmes, Griffin, Bellavia, & Rose, 2001). This is because people with lower SE seem to worry that they might feel embarrassed if they are wrong about the meaning or significance of their partners' affection or that allowing themselves to enjoy their partners' affection too much might make a future breakup even more hurtful.

To mitigate feelings of dependence on their partner and maintain self-protection during these circumstances, people with lower SE have been shown to downplay their partners' affection. For example, they perceive less acceptance from potential dating partners (Cameron et al., 2010) and even underestimate how much their actual romantic partners love them (Murray et al., 2001). Relatedly, people with insecure attachment (a similar relationship vulnerability) see their partners as less supportive (Collins & Feeney, 2004) and are less likely to endorse relationship-enhancing attributions for their partners' positive behaviors (Collins et al., 2006). These studies further suggest that in dismissing their partners' affectionate actions, people with lower SE are missing out on a critical opportunity to build closeness and intimacy in their relationships (e.g., Algoe et al., 2010; Gonzaga et al., 2001; Gordon et al., 2012; Lambert & Fincham, 2011).

The Risk-Regulation and Self-Initiated Dependence

Although this research reveals that affectionate actions on the part of the partner can heighten dependence and produce self-protective responses, less is known about how risk-regulation dynamics unfold when *actions on the part of the individual* create the dependence concerns. It may seem that expressing affection for a romantic partner allows the person with lower SE to "take the lead" and be in a high power position as this is a proactive way to strengthen a relationship. However, extending what is known about the risk-regulation system suggests that saying "I love you," giving a compliment, or doing something nice may also amplify feelings of

dependence on one's partner. As further described below, we sought to expand our understanding of the risk-regulation model by evaluating whether the self-protection goals of people with lower SE negatively affect the degree to which they choose to express affection, how rewarding these experiences are when they do take the leap, as well as their perceptions of how rewarding these experiences are for their partners.

Reactions to Expressing Affection

First, and primarily, expressing affection may be viewed as a risky situation for people with lower SE. By communicating affection, one may make clear that he or she needs and depends on the partner. Again, given their doubts about their partners' positive regard, this self-initiated vulnerability is likely to threaten the self-protection goals of people with lower SE. If they express affection and their partner does not reciprocate or does not feel the same, they may embarrass themselves, alienate their partner, or set themselves up for pain should future rejection occur. Therefore, people with lower SE may avoid these opportunities by choosing to express affection for their partners less frequently (Hypothesis 1a). Moreover, even when people with lower SE take on such opportunities, they may express affection half-heartedly as overly enthusiastic expressions could create greater conflict with their self-protection goals (Hypothesis 1b).

Second, because expressing affection involves revealing their dependence, the experience may be less cognitively, emotionally, and physiologically rewarding for people with lower SE. For example, if expressing affection requires a person with lower SE to overcome, or be at odds with their self-protection goals, at a cognitive level they may register the task of expressing affection as more difficult or arduous (Hypothesis 2a). At the emotional level, affiliative exchanges such as expressing affection normatively engender intimacy and closeness with partners (e.g., Algoe et al., 2010; Gonzaga et al., 2001; Gordon et al., 2012; Lambert & Fincham, 2011), states associated with positive emotion (e.g., Ramsey & Gentzler, 2015). However, given that people with lower SE tend to focus on self-protection, when expressing affection for their partner they may experience positive emotion to a lesser degree than people with higher SE (Hypothesis 2b). By contrast, negative emotion seems less relevant or common during these exchanges (i.e., there is no reason to expect people to feel angry).

At the physiological level, people with lower SE may also show a less adaptive profile of hormonal changes associated with pair-bonding and affiliation. Progesterone (PROG) is one such hormone. For example, tonic PROG levels vary with motivation for affiliation (Schultheiss, Dargel, & Rohde, 2003). Moreover, PROG has been shown to increase in response to laboratory-based affiliation manipulations (i.e., affiliation vs. control images; Schultheiss, Wirth, & Stanton, 2004) and interventions (i.e., closeness inductions; Brown et al., 2009). Given that expressing affection for a

romantic partner is an opportunity to build affiliation and closeness, people are likely to experience a boost in PROG when doing so. However, given their focus on self-protection rather than building connection, this change in PROG may be dampened for individuals with lower SE (Hypothesis 2c).

Partner Reactions to Receiving Affection

Prior research shows that people with lower SE are cautious in their interpretation of their partners' affection and, in fact, do not feel comfortable receiving affection from them (Swann, 1997). Therefore, it also seems possible that people with lower SE project these feelings onto their partners. That is, they may believe that their partners do not feel good receiving affection and thus "spare" their partners by preemptively avoiding these types of interactions. Correspondingly, people with lower SE may be more reluctant to believe that expressing affection positively benefits the relationship (e.g., their partners' relationship satisfaction). Overall then, compared with people with higher SE, those with lower SE may perceive that their partners are less receptive (i.e., perceived positive emotion and relationship satisfaction) to their affection (Hypothesis 3a).

Might these perceptions be accurate? On one hand, it is possible that the partners of people with lower SE are indeed less comfortable during these exchanges because the lower SE individuals feel reticent and uncomfortable themselves. On the other hand, it may be that people with lower SE are miscalibrated and that they underperceive the benefits their partners actually accrue from such exchanges. Although both possibilities are reasonable, the latter prediction seems more likely (Hypothesis 3b) given that affection is normatively associated with such positive outcomes (e.g., Algoe et al., 2010; Gonzaga et al., 2001; Gordon et al., 2012; Lambert & Fincham, 2011).

The Present Research

The present research therefore sought to extend our understanding of the risk-regulation model by evaluating whether actions on the part of the individual may activate dependence concerns and, correspondingly, a self-protective orientation. More specifically, we examined the connection between SE and the tendency to put oneself on the line—expressing affection for a romantic partner through words and behaviors, and the experienced and perceived reactions to these exchanges when they actually occur.

Although in the current work we focused on SE, there are a number of other constructs, including attachment style and rejection sensitivity, which similarly index relationship vulnerability, and overlap with SE both conceptually and empirically. From our perspective, there is no strong theoretical reason to believe that the predictions we put forth in the current work are necessarily unique to SE. On the contrary, we might expect each of these vulnerability factors to show a

similar pattern of association to the processes we focus on here. However, research within the risk-regulation literature has largely focused on SE, linking it to responses during situations of partner-initiated dependence in romantic relationships (e.g., Murray, Holmes, MacDonald, & Ellsworth, 1998; Murray et al., 2005). Because the current work is situated in this broader literature, it was important to provide continuity with previous findings on risk-regulation processes; thus, we too chose to focus on SE as the key personality variable in the studies we report below. See Online Supplementary Tables 1 to 3 for parallel results with attachment style, rejection sensitivity, and relationship vulnerability—a composite of all of these personality measures.

To review, we hypothesized that people with lower SE express lower levels of affection for their partners, both in terms of frequency (Hypothesis 1a) and magnitude (Hypothesis 1b), experience less rewarding cognitive (Hypothesis 2a), emotional (Hypothesis 2b), and physiological (Hypothesis 2c) reactions to expressing affection, and perceive their partners to be less receptive to their affection (Hypothesis 3a) despite the fact that their partners experience normative benefits from these interactions (Hypothesis 3b). To evaluate these hypotheses, we took a multimethod approach. In Study 1, we measured past reactions to expressing affection as well as reactions to an in vivo conversation in which one partner expressed affection for the other. In Study 2, we measured daily reactions to expressing affection using a diary design.

Study 1

Overview

In Study 1, we operationalized expressing affection as giving a romantic partner a compliment—vocally expressing to the partner what one likes and appreciates about him or her. This allowed us to study these processes in a controlled way during the laboratory interaction. The goals of this study were twofold. First, using a self-report questionnaire administered during the laboratory session, we evaluated participants' past responses to the exchange of compliments in their romantic relationships. Participants reported on the frequency of their past compliment giving, how comfortable they were with these exchanges (both giving and receiving compliments), and how comfortable they perceived their partners to be. Second, we measured reactions to an in vivo compliment interaction that took place in the laboratory. One member of each couple was assigned to generate and provide a compliment to his or her romantic partner and we measured cognitive, emotional, and physiological reactions to this exchange. Participants also reported their perceptions of their partners' reactions to receiving the compliment.

Overall, we evaluated whether reactions to compliment exchanges varied as a function of individual differences in SE. In these analyses, we focused on the SE of the person

putting himself or herself on the line by expressing a compliment. That is, we evaluated whether the compliment givers' SE was associated with their own, as well as their partners', reactions.

Method

Participants. Fifty-nine heterosexual couples involved in nonmarried, monogamous dating relationships were recruited for participation in the study. To be eligible, couples had to be dating for a minimum of 3 months ($M = 22.39$ months, $SD = 18.93$) and each person had to be 18 to 35 years old ($M = 21.92$ years, $SD = 3.63$). Participants were also screened for contraindications to the hormone assessment (e.g., currently pregnant). Ethnic breakdown across both members of the couple was 1.71% American Indian/Alaskan Native, 29.91% Asian, 5.98% Black or African American, 45.30% White, and 17.09% Other, with 15.18% identifying as Hispanic or Latino. Each member of a couple was compensated with US\$10 per hour of participation for a total of approximately US\$20.

Procedure. This assessment was part of a larger project evaluating responses to expressing and receiving affection. Only measures directly relevant to the current hypotheses are described here. See the online supplementary materials for additional measures.

Background survey. Members of each couple completed a series of background surveys online from their home. This included the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1989) as well as a health screening questionnaire relevant for the hormone measure (more information below).

Laboratory session. To minimize diurnal variations in hormone levels, all sessions were scheduled to begin between the hours of 12:00 and 4:00 p.m. (e.g., Brown et al., 2009; Maner, Miller, Schmidt, & Eckel, 2010). Before arriving for his or her laboratory session, each person was asked to refrain from a variety of activities known to affect hormone levels, including eating, smoking, drinking alcohol and caffeine, and exercising.

The members of each couple were separated after informed consent. One member was randomly assigned to give the compliment (referred to as the participant; female: $n = 28$, male: $n = 31$), and the other to receive the compliment (referred to as the partner). Both the participant and the partner completed a survey that assessed their baseline emotion. Next, the experimenters collected the first baseline saliva sample. Each person chewed a piece of sugar-free gum to stimulate salivation and then provided a minimum of 1 mL of saliva by drooling through a straw into a vial. The experimenter recorded the drooling onset time. These same procedures were used for all saliva assessments. After finishing the sample, the participant was given a relatively neutral

magazine to read (*National Geographic*) and left alone. Simultaneously, the experimenters collected psychophysiological measurements (including electrodermal activity and electrocardiogram [EKG]) from the partner. These measures are unrelated to the goals of the current study. Once complete, both members provided the second baseline saliva sample.

At this point, the experimenter explained to the participant that he or she was assigned to lead the interaction and provide a compliment to the partner who would be asked to listen silently during the delivery. Participants were told that during the interaction they would describe three qualities about their partner that they liked and appreciated. These could be qualities that first drew them to their partner or that made their partner stand out in their eyes. The experimenter explained that the interaction would last 5 min in total and the participant should attempt to make use of the entire time. Participants were given 5 min to prepare for the interaction during which they wrote down the qualities they planned to discuss and/or the situations in which their partners displayed these characteristics.

The participant alerted the experimenter once he or she had completed the form. At this time, the partner was told that the participant had been asked to lead the interaction, that he or she had *chosen* from a variety of topics, and had ultimately decided to talk about "qualities about your partner that you really like and appreciate." Partners were told that during the interaction they were to sit quietly and listen without responding verbally.

Both members then completed a preinteraction questionnaire, which assessed, among other things, how difficult it was for the participant to generate the compliment. Once complete, the participant was brought back to the same room as the partner, and was seated across from him or her. The experimenter gave a signal over an intercom for the participant to begin the interaction that lasted 5 min and was video-recorded.

Following the interaction, the couple had a second conversation unrelated to this assessment, in which they talked freely about any topic for 5 min. Subsequently, both members of the couple completed the next saliva sample. The experimenter then escorted the participant back to the other room. Once separated, both members completed a postinteraction questionnaire, which asked about their reactions to both the in vivo interaction as well as past compliment exchanges. Afterward, they were debriefed and compensated for their participation.

Background measures

RSE. The RSE is a standard questionnaire used to measure subjective feelings of SE (Rosenberg, 1989). The measure consists of 10 items that range on a scale from 1 (*does not describe me at all*) to 6 (*describes me very well*). Appropriate items were reverse-scored and responses to the questions were averaged (participant: $M = 4.62$, $SD = 1.00$,

$\alpha = .90$; partner: $M = 4.76$, $SD = 0.93$, $\alpha = .91$). Consistent with many studies using the Rosenberg Scale (e.g., Ayduk, Gyurak, Akinola, & Mendes, 2013; Gyurak et al., 2011), average SE in our sample was above the midpoint of the scale. As such, when we refer to participants with lower SE, we mean participants whose SE is lower than the average in this particular sample. There was a significant correlation between participants' and partners' SE, $r(57) = .29$, $p = .03$, and no difference in SE across members of a couple, $t(58) = .92$, $p = .36$.

Health Questionnaire. Both members reported on their medications and health status. These included anxiety or depression medications or any pill or creams known to affect hormone levels, along with any ovary or hormones problems.

Past reactions to compliment exchanges. Past reactions to giving and receiving compliments were assessed in the postinteraction questionnaire.

Degree of expressed affection. Each member reported how often they give their partners compliments on a scale from 1 (*not very often*) to 7 (*very often*; $M = 4.83$, $SD = 1.72$); correlation between members of a couple: $r(57) = .20$, $p = .13$.

Emotional reactions to expressing affection. Each member reported how comfortable he or she generally feels giving his or her partner compliments on a scale from 1 (*not very comfortable at all*) to 7 (*very comfortable*; $M = 5.66$, $SD = 1.65$); correlation between members of a couple: $r(56) = .24$, $p = .07$.

Emotional reactions to receiving affection. Each member reported how comfortable he or she generally feels receiving compliments from his or her partner on a scale from 1 (*not very comfortable at all*) to 7 (*very comfortable*; $M = 5.49$, $SD = 1.62$); correlation between members of a couple: $r(56) = .22$, $p = .10$.

Perceptions of partners' emotional reactions to receiving affection. Finally, each member reported how comfortable he or she believed his or her partner generally feels receiving compliments on a scale from 1 (*not very comfortable at all*) to 7 (*very comfortable*; $M = 5.53$, $SD = 1.51$); correlation between members of a couple: $r(55) = .46$, $p < .01$.

Reactions to the in vivo compliment exchange

Degree of expressed affection. Two judges blind to SE viewed the video recordings of the compliment interactions and coded expressed love and affection on a scale from 0 (*not at all*) to 3 (*very much so*). Judges' ratings were averaged to index expressed affection ($M = 1.85$, $SD = 0.74$, $\alpha = .69$).

Cognitive reactions to expressing affection. Using face-valid items, participants reported how difficult it was to come up with the compliment ($M = 2.19$, $SD = 1.03$) and how difficult

it was to actually deliver the compliment ($M = 2.32$, $SD = 1.66$). Responses were made on a scale from 1 (*not difficult at all*) to 7 (*very difficult*). Although these two items were significantly correlated, their alpha reliability suggests that they are not completely redundant, $r(57) = .33$, $p = .01$, $\alpha = .46$. As such, they were analyzed separately.

Emotional reactions to expressing affection. Emotional reactions were assessed in two ways. First, the postinteraction questionnaire included two face-valid items that closely paralleled the measure of past emotional reactions. Participants rated their feelings of comfort and enjoyment during the interaction on 1 (*not all*) to 7 (*very much*) scales. Responses were averaged to create a composite measure of *comfort* ($M = 5.47$, $SD = 1.48$, $\alpha = .88$).

In addition, participants rated their positive emotion more generally on an altered version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Using a scale from 1 (*very slightly or not at all*) to 5 (*extremely*), participants rated their emotions first at baseline and then reported on how they felt during the exchange in the postinteraction questionnaire. Exploratory factor analysis on baseline emotions with varimax rotation revealed a single positive emotion factor. Ratings on the following items were averaged to index PANAS *positive emotion*: "Interested," "Excited," "Enthusiastic," "Proud," "Happy," "Inspired," "Attentive," and "Loved" (baseline: $M = 3.09$, $SD = 0.75$, $\alpha = .85$; postinteraction: $M = 3.42$, $SD = 0.96$, $\alpha = .90$). There was a significant correlation between ratings of comfort and positive emotion during the interaction, $r(57) = .37$, $p < .01$.

Physiological reactions to expressing affection. PROG was measured at three key time points (see online supplementary materials for additional measures unrelated to the current assessment). The first baseline measurement was collected after members reported on their baseline emotion and hormone activities (minutes after the start of the session: $M = 9.03$, $SD = 16.04$). We elected to collect a second baseline measurement to give participants additional time to acclimate to the laboratory environment. This second measure was taken after the researchers completed the partners' baseline physiological measures (minutes after the start of the session: $M = 28.69$, $SD = 16.15$). The third measurement was designed to correspond to PROG levels during the compliment interaction. Given that PROG takes approximately 15 min to peak in saliva following a psychological event (e.g., Maner et al., 2010), this measurement was taken approximately 15 min after the start of the compliment interaction (minutes after the start of the session: $M = 63.64$, $SD = 16.91$; minutes after the start of the compliment interaction: $M = 15.74$, $SD = 1.29$).

Saliva samples were stored in a freezer and, after the completion of the study, were assayed at the Primate Behavior Laboratory at the California National Regional Primate Research Center, University of California, Davis. Prior to

assay, samples were centrifuged at 3,000 rpm for 20 min to separate the aqueous component from mucins and other suspended particles. Salivary concentrations of PROG were estimated in duplicate using commercial radioimmunoassay kits (Siemens Healthcare Diagnostics, Inc., Los Angeles, CA). Assay procedures were modified to accommodate overall lower levels of PROG in human saliva relative to plasma as follows: (a) standards were diluted to concentrations ranging from 0.05 to 4.0 ng/mL and (b) sample volume was increased to 200 μ l. The salivary PROG assay has a least detectable dose of 0.00914 ng/ml. Intra- and interassay coefficients of variation were 4.58% and 6.38%, respectively.

Members of each couple were excluded from the PROG analyses if they were taking anxiety or depression medications ($n = 3$), or using pills or creams that alter hormone levels ($n = 4$). Those reporting problems with ovaries ($n = 2$) or hormones ($n = 2$) were also excluded. Finally, given that PROG levels vary across the menstrual cycle, among females we included only those individuals currently in the follicular phase of the menstrual cycle¹ (0-7 days after the start of menstruation). There was a total of 40 participants (10 women and 30 men) included in the PROG analyses.

In the final sample, participants' PROG levels during Baseline 1 ($M = .078$, $SD = 0.021$) and Baseline 2 ($M = .074$, $SD = 0.025$) were averaged ($M = .076$, $SD = 0.019$, $\alpha = .65$). This average was subtracted from PROG levels during the interaction ($M = .088$, $SD = 0.024$) to index change in PROG ($M = .012$, $SD = 0.020$). For participants, there were no sex differences in PROG levels at baseline, during the compliment interaction, or in PROG change, $F_s < 1.25$, $p_s > .27$. Moreover, variability in PROG change did not differ across men and women, $F(29, 9) = 1.43$, $p = .60$. Note that descriptive statistics for partners' PROG levels are reported separately below.

Partner emotional reactions to receiving affection. Using the same scales and procedures described above, partners' ratings of how comfortable they felt during the interaction and how much they enjoyed the interaction were averaged to create a composite measure of *comfort* ($M = 5.69$, $SD = 1.24$, $\alpha = .56^2$). *Positive emotion* was calculated using the same PANAS items as above (baseline: $M = 3.06$, $SD = 0.64$, $\alpha = .84$; postinteraction: $M = 3.75$, $SD = 0.78$; $\alpha = .86$). There was a significant correlation between partners' ratings of comfort and positive emotion during the interaction, $r(57) = .40$, $p < .01$.

Perceived partner emotional reactions to receiving affection. Participants used the same scales above to report how comfortable they perceived their partner to feel during the compliment interaction and how much they perceived their partner to enjoy the compliment interaction. These ratings were, again, averaged to create an index of perceived *comfort* ($M = 5.57$, $SD = 1.20$, $\alpha = .68$). Participants also reported how they perceived their partner to feel during the compli-

ment interaction on the same general PANAS *positive emotion* items above ($M = 3.58$, $SD = 0.91$, $\alpha = .92$). There was a significant correlation between perceived partner comfort and perceived partner positive emotion, $r(57) = .46$, $p < .01$.

Partner physiological reactions to receiving affection. Given the aforementioned exclusion criteria, 48 partners (22 women and 26 men) were included in the PROG analyses. Partners' PROG levels at Baseline 1 ($M = .088$, $SD = 0.028$) and Baseline 2 ($M = .089$, $SD = 0.026$) were averaged ($M = .088$, $SD = 0.026$; $\alpha = .86$), and this average was subtracted from PROG levels during the compliment interaction ($M = .088$, $SD = 0.03$). This value served as the measure of PROG change ($M = .0003$, $SD = 0.02$). As with participants, there were no PROG differences across male and female partners at any measurement, $F_s < 2.0$, $p_s > .16$, and, again, variability in change scores did not differ by gender, $F(25, 21) = 1.0$, $p = 1.0$.

Results

Analysis overview. We evaluated reactions to past compliment exchanges as well as reactions to the in vivo interaction as a function of participant SE (mean-centered). Following the recommendations of the actor-partner interdependence model (Kashy & Kenny, 2000) all analyses included partner SE as a covariate. In addition, preliminary analyses indicated that there were significant sex differences in some of our dependent variables. Thus, sex was included as a covariate (with additional covariates described as necessary). Although we had no a priori predictions, we did evaluate interactions between participant SE and participant sex and partner SE. Significant interactions were inconsistent across variables and studies and are therefore only outlined with footnotes. Parameter estimates from the regression analyses are presented in Table 1.

Reactions to past compliment exchanges. When evaluating reactions to past compliment exchanges, reports from both members of each couple were included in the analyses, irrespective of role within the laboratory session (compliment giver or compliment receiver). Note that role was unrelated to any of these results and, as such, was not included in the reported analyses. These data were structured in a hierarchical manner with participants nested within couples. Therefore, we used the SAS mixed procedure, which is a hierarchical linear model approach (Kenny, Kashy, & Bolger, 1998). Bivariate correlations are found in Table 2.

Degree of expressed affection (Hypothesis 1a). There was a marginal effect of SE, $F(1, 56) = 3.62$, $p = .06$, $b = .31$, 95% confidence interval (CI) = $[-.02, .64]$, $\beta = .18$, such that participants with lower SE reported giving their partners compliments less frequently.

Table 1. Unstandardized Regression Coefficients Study 1.

	<i>n</i>	SE	PSE	Sex
Reactions to past compliment exchanges				
Participants' frequency giving compliments	118	.31 [†] (.18)	.32 [†] (.18)	-.03 (-.02)
Participants' comfort giving compliments	117	.40* (.23)	.19 (.11)	.08 (.05)
Partners' comfort receiving compliments	117	.22 (.13)	.64** (.38)	.07 (.04)
Participants' perceptions of partners' comfort receiving compliments ^a	115	.32* (.21)	.14 (.09)	-.09 (-.06)
Reactions to an in vivo compliment exchange				
Participants' expressed affection	59	.19 [†] (.06)	.02 (.001)	-.01 (.0001)
Participants' difficulty generating the compliment	59	-.39** (.13)	.12 (.01)	.18 (.04)
Participants' difficulty delivering the compliment	59	-.40 [†] (.06)	.11 (.004)	-.67** (.18)
Participants' comfort	59	.31 (.04)	-.13 (.01)	.45* (.10)
Participants' positive emotion ^b	59	.04 (.002)	-.08 (.008)	.07 (.008)
Participants' PROG change ^c	40	.008* (.12)	-.007 (.07)	-.004 (.03)
Partners' comfort	59	.21 (.03)	.29 (.05)	.21 (.03)
Partners' positive emotion ^d	59	.09 (.02)	-.01 (.0001)	.08 (.01)
Participants' perceptions of partners' comfort ^e	59	.39* (.11)	.22 (.03)	.33* (.09)
Participants' perceptions of partners' positive emotion ^f	59	.05 (.004)	.27* (.09)	.22* (.08)
Partners' PROG change ^c	48	-.006 [†] (.08)	.001 (.0006)	-.005 [†] (.07)

Note. Gender was scored with males = 1, females = -1. SE = participants' SE; PSE = partners' SE; Sex = participants' sex. All analyses included participants' SE as the main predictor and included partners' SE and participants' sex as covariates. Additional covariates are indicated by lettered superscripts. Effect sizes are in parentheses next to the unstandardized regression coefficients. These include β for the nested "Reactions to Past Compliment Exchanges" and η_p^2 for "Reactions to an In Vivo Compliment Exchange."

^aPartners' comfort receiving compliments.

^bParticipants' baseline positive emotion.

^cTime of the session.

^dPartners' baseline positive emotion.

^ePartners' comfort during the interaction.

^fPartners' positive emotion during the interaction.

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

Emotional reactions to expressing affection (Hypothesis 2b). SE significantly predicted feelings of comfort giving compliments, $F(1, 56) = 6.53, p = .01, b = .40, 95\% CI = [.09, .72], \beta = .23$, suggesting that participants with lower SE felt less comfortable.

Emotional reactions to receiving affection (Hypothesis 3b). Participants' SE was unrelated to their partners' self-reported comfort receiving compliments, $F(1, 56) = 2.21, p = .14, b = .22, 95\% CI = [-.08, .51], \beta = .13$. This suggests that the partners of people with lower SE feel as comfortable receiving compliments as the partners of people with higher SE.

Perceptions of partners' emotional reactions to receiving affection (Hypothesis 3a). To isolate participants' perceptions of their partners' comfort receiving compliments, we additionally controlled for partners' own self-reported comfort. There was a significant effect of participant SE, $F(1, 55) = 5.25, p = .03, b = .32, 95\% CI = [.04, .60], \beta = .21$, suggesting that regardless of partners' own feelings, participants with lower SE perceived their partners to feel less comfortable receiving compliments from them.

Reactions to the in vivo compliment exchange. We conducted general linear models (GLM) analysis on reactions to the in

vivo compliment exchange. Here, only one person's ratings were included in each analysis (e.g., when measuring reactions to giving the compliment, only the compliment givers' reports were included, when measuring reactions to receiving the compliment, only the compliment receivers' reports were included). Bivariate correlations are found in Table 3.

Degree of expressed affection (Hypothesis 1b). There was a marginal effect of SE, such that participants with lower SE tended to convey less affection during the in vivo exchange, $F(1, 55) = 3.27, p = .08, b = .19, 95\% CI = [-.02, .39], \eta_p^2 = .06$.

Cognitive reactions to expressing affection (Hypothesis 2a). Participants with lower SE reported greater difficulty generating the compliment, $F(1, 55) = 8.26, p < .01, b = -.39, 95\% CI = [-.67, -.12], \eta_p^2 = .13$, and delivering the compliment (at a nearly significant level), $F(1, 55) = 3.81, p = .056, b = -.40, 95\% CI = [-.81, .01], \eta_p^2 = .06$.

Emotional reactions to expressing affection (Hypothesis 2b). First we evaluated participants' feelings of comfort during the exchange. The effect of SE was not significant, though in the theoretically expected direction, $F(1, 55) = 2.58, p = .11, b = .31, 95\% CI = [-.08, .70], \eta_p^2 = .04$. In addition, we conducted GLM analysis on participants' PANAS positive

Table 2. Bivariate Correlations Study I—Past Reactions to Compliment Giving.

	SE	PSE	Sex	FG	CG	PCR	PPCR
SE	—	.29*	.11	.22 [†]	.27*	.23 [†]	.27*
PSE	—	—	-.11	.23 [†]	.17	.42**	.24 [†]
Sex	—	—	—	-.02	.06	-.08	-.06
FG	—	—	—	—	.72**	.25 [†]	.26*
CG	—	—	—	—	—	.08	.27*
PCR	—	—	—	—	—	—	.36**
PPCR	—	—	—	—	—	—	—

Note. Sex was scored with males = 1, females = -1. SE = participants' SE; PSE = partners' SE; Sex = participants' sex; FG = participants' frequency giving compliments; CG = participants' comfort giving compliments; PCR = partners' comfort receiving compliments; PPCR = participants' perceptions of partners' comfort receiving compliments. To account for dependence within couples, we report significance based on z-statistics calculated by dividing Pearson's r by its standard error ($1/\sqrt{n}$) with n based on the number of dyads rather than the number of participants (Kenny, Kashy, & Cook, 2006). [†] $p < .10$. * $p < .05$. ** $p < .01$.

emotion during the in vivo exchange. Here, we additionally controlled for baseline positive emotion. There was no effect of participant SE, $F < 1$.

Physiological reactions to expressing affection (Hypothesis 2c). We conducted GLM analysis on change in PROG from baseline to the compliment exchange. Given diurnal fluctuations in PROG levels, the time of the session was included as an additional covariate. This analysis revealed a significant effect of SE, $F(1, 35) = 4.95, p = .03, b = .008, 95\% \text{ CI} = [.0007, .02], \eta_p^2 = .12$, suggesting that participants with lower SE experienced a smaller increase in PROG during the in vivo exchange. Although we do not have the power to detect gender differences [there were fewer women ($n = 10$) than men ($n = 30$)], we note that there was neither a main effect of sex in predicting PROG change, $F(1, 35) = 1.05, p = .31, b = -.004, 95\% \text{ CI} = [-.01, .004], \eta_p^2 = .03$, nor an SE \times Sex interaction, $F < 1$.

Partners' emotional reactions to receiving affection (Hypothesis 3b). Partner-reported comfort during the interaction was not predicted by participants' SE, $F(1, 55) = 1.59, p = .21, b = .21, 95\% \text{ CI} = [-.12, .54], \eta_p^2 = .03$. GLM analysis on partner-reported positive emotion, controlling for partner baseline positive emotion, was also nonsignificant, $F < 1$.

Perceived partner emotional reactions to receiving affection (Hypothesis 3a). When controlling for the partners' self-reported comfort,⁴ there was a significant effect of participants' SE in predicting perceptions of their partners' comfort during the interaction, $F(1, 54) = 6.80, p = .01, b = .39, 95\% \text{ CI} = [.09, .69], \eta_p^2 = .11$. This suggests that regardless of the partners' own feelings, participants with lower SE perceived that their partners felt less comfortable receiving the compliment. Parallel analysis on perceived positive emotion was not significant, $F < 1$.

Partners' physiological reactions to receiving affection (Hypothesis 3b). GLM analysis was conducted on partners'

change in PROG from baseline to the compliment interaction as predicted by participants' level of SE. Again, the time of the session was included as an additional covariate. There was a marginal effect of participant SE, $F(1, 43) = 3.56, p = .07, b = -.006, 95\% \text{ CI} = [-.01, .0004], \eta_p^2 = .08$, suggesting that the partners of people with lower SE experienced a larger increase in PROG during the compliment interaction than the partners of people with higher SE. Note that there was also a marginal effect of partner sex, $F(1, 43) = 3.19, p = .08, b = -.005, 95\% \text{ CI} = [-.01, .0007], \eta_p^2 = .07$, such that female partners had larger increases in PROG than male partners. There was no Participant SE \times Partner sex interaction, $F(1, 42) = 1.01, p = .32, b = -.003, 95\% \text{ CI} = [-.009, .003], \eta_p^2 = .02$.

Study 1 Summary

The results from Study 1 generally supported our hypotheses. Consistent with the perspective that expressing affection may activate dependence concerns and challenge the self-protection goals of people with lower SE, these participants reported giving their partners fewer compliments (Hypothesis 1a) and expressed less affectionate compliments during the in vivo interaction (Hypothesis 1b). Moreover, participants with lower SE demonstrated a less positive pattern of reactions to expressing affection when they indeed did (or were asked to) take the leap. As compared with participants with higher SE, they reported greater difficulty (Hypothesis 2a), reported feeling somewhat less comfortable (Hypothesis 2b), and experienced smaller boosts in PROG (Hypothesis 2c) when expressing affection for their partner. Despite these responses, the partners of people with lower SE experienced normative emotional benefits from these exchanges (Hypothesis 3b). In fact, these same partners showed marginally larger increases in PROG (a hormone associated with intimacy and affiliation) when receiving the compliment (as compared with the partners of people with higher SE). Interestingly, however, participants with lower SE were less inclined to believe that their partners experienced emotional

Table 3. Bivariate Correlations Study 1—Reactions to the In Vivo Compliment Exchange.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. SE	—	.29*	.18	.26*	-.32*	-.30*	.24 [†]	.13	.26	.26*	.29*	.44**	.29*	-.22
2. PSE	—	—	-.04	.10	-.01	.01	-.03	.17	-.11	.26*	.09	.26*	.31*	-.02
3. Sex	—	—	—	.03	.11	-.45**	.35**	.13	-.02	.19	.17	.34**	.30*	.20
4. EA	—	—	—	—	-.19	-.14	.21	.52**	.10	.14	.30*	.17	.50**	.04
5. DGC	—	—	—	—	—	.33*	-.22 [†]	-.15	-.23	-.19	-.26*	-.23 [†]	-.17	.12
6. DDC	—	—	—	—	—	—	-.70**	-.14	.03	-.33*	-.23 [†]	-.44**	-.23 [†]	.01
7. COMF	—	—	—	—	—	—	—	.37**	.08	.26*	.16	.50**	.28*	-.05
8. POS	—	—	—	—	—	—	—	—	-.27 [†]	.17	.26 [†]	.23 [†]	.76**	.01
9. PROG	—	—	—	—	—	—	—	—	—	.02	.23	.17	-.21	-.06
10. PCOMF	—	—	—	—	—	—	—	—	—	—	.40**	.23 [†]	.20	-.15
11. PPOS	—	—	—	—	—	—	—	—	—	—	—	.15	.45**	-.09
12. PPCOMF	—	—	—	—	—	—	—	—	—	—	—	—	.46**	-.06
13. PPPOS	—	—	—	—	—	—	—	—	—	—	—	—	—	.09
14. PPROG	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Note. Gender was scored with males = 1, females = -1. SE = participants' SE; PSE = partners' SE; Sex = participants' sex; EA = participants' expressed affection; DGC = participants' difficulty generating the compliment; DDC = participants' difficulty delivering the compliment; COMF = participants' comfort; POS = participants' positive emotion; PROG = participants' progesterone change; PCOMF = partners' comfort; PPOS = partners' positive emotion; PPCOMF = participants' perceptions of partners' comfort; PPPOS = participants' perceptions of partners' positive emotion; PPROG = partners' progesterone change.

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

benefits from their affection, suggesting that their perceptions are inaccurate and biased (Hypothesis 3a).

Study 2

Overview

In Study 1, we narrowed in on giving compliments, one approach to expressing affection for a romantic partner that could be assessed in a controlled way during a laboratory interaction. In Study 2, we assessed behavior outside of the laboratory, in daily life. This allowed us to broaden our scope to a fuller range of behaviors romantic partners engage in to express their affection. Both members of romantic couples completed a daily diary over a 3-week period. Each day, participants reported on the degree to which they said or did things to make their partner feel secure and loved.

First, we evaluated whether participants with lower SE expressed less affection for their partners in daily life than participants with higher SE. We also measured how rewarding participants' reactions are when expressing affection, focusing on the association between the level of affection participants expressed each day and their self-reported positive emotion. Although we did not measure perceptions of partner positive emotion like in Study 1 (items were limited to avoid overtaxing participants given the daily assignment), we did measure participants' perceptions of their partners' relationship satisfaction. Finally, using the latter positive emotion and relationship satisfaction items, we also evaluated whether the partners of people with lower SE experience the same positive benefits from receiving affection in daily life as the partners of people with higher SE.

Method

Participants. Fifty-three heterosexual couples involved in nonmarried, monogamous dating relationships were recruited for participation in the study (age: $M = 20.59$ years, $SD = 2.44$). Study 2 was run 10 years ago, at a time when there were only a few dyadic diary studies published. We used the sample sizes reported in Downey, Freitas, Michaelis, and Khouri (1998) as a benchmark given that they also evaluated the role of personality (rejection sensitivity) in relationship dynamics (also see Shrout, Herman, & Bolger, 2006). This led us to determine that our sample size should be approximately 60 couples—a heuristic we had also used to determine the sample size in Study 1. To be eligible for enrollment, participants had to be dating for a minimum of 3 months ($M = 16.52$ months, $SD = 14.44$). Ethnic breakdown was 46.15% Asian, 35.58% White, 0.96% Pacific Islander, and 17.31% Other, with 9.71% of the sample identifying as Hispanic or Latino.

Procedure. Here, we present previously unpublished data from a larger study on interactions between romantic partners in daily life (Ayduk, Gyurak, & Luerssen, 2009; Ayduk & Kross, 2010; Hooker, Gyurak, Verosky, Miyakawa, & Ayduk, 2010). Participants completed an online questionnaire, a 2-hr laboratory session, and a subsequent 21-day daily diary. As the laboratory session is not relevant for the current analysis, it will not be described further. The online questionnaire included the RSE (Rosenberg, 1989) among other measures. Upon completion of the laboratory session, participants received a link to the daily diary survey that they were instructed to complete at the end of the day for the

21 days of the assessment. Members of each couple were instructed to complete the diaries separately and to refrain from discussing their responses. They were sent daily emails reminding them to complete the diary, and were instructed to complete their responses sometime between 6:00 p.m. and 3:00 a.m. the following morning. Average response rate was 91.70% of diary days, with 0.5% of responses eliminated due to submission outside the time window. Each member of a couple was paid US\$55 for completion of all diaries within the submission window or a prorated amount for fewer submissions.

Background measures

RSE. The RSE scale used in Study 1 was also used in Study 2 ($M = 5.25$, $SD = 0.87$, $\alpha = .89$). There was no correlation between partners' levels of SE, $r(51) = 0$, $p = .99$.

Diary measures. The daily diary assessed the partners' daily interactions including positive events and conflict. Each participant reported on his or her own, and his or her partner's, thoughts, feelings, and behaviors, and also described nonrelationship relevant stressors and successes. See the online supplementary materials for a complete description of all diary measures. The current assessment focused on the following items. Each was reported on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*).

Expressed affection. Each day, participants reported the degree to which they said or did things that made their partner feel secure and loved ($M = 3.38$, $SD = 1.05$).

Positive emotion. Because this study reports secondary analyses on an existing data set, we had to focus on the following positive emotion items that were included in the diary due to their relevance to broader relationship functioning: "Happy," "Satisfied," "Calm," "Confident," "Loved," "Accepted," and "Supported." Exploratory factor analysis with varimax rotation revealed a single positive emotion factor. Ratings on these items were averaged to index daily positive emotion ($M = 3.34$, $SD = 0.75$, $\alpha = .90$).

Relationship satisfaction. Participants indicated the degree to which they were happy/satisfied with the relationship that day ($M = 3.50$, $SD = 1.07$).

Perceived partner affection. Participants also rated the degree to which they perceived their partner doing or saying things to make them feel secure and loved that day ($M = 3.47$, $SD = 1.06$).

Perceived partner relationship satisfaction. Finally, participants reported the degree to which they perceived their partner to feel happy/satisfied with the relationship that day ($M = 3.46$, $SD = 1.01$).

Results

The diary data involved a hierarchical structure. Days of assessment were nested within participants and participants were nested within couples. For each couple, this structure represented a two-level model and required the simultaneous analysis of within-person and between-person levels that are hierarchically organized. These analyses were again conducted using the SAS mixed procedure. For each member of a couple, the lower level *within-person* analysis generated estimates of the relationship among daily measures (e.g., the association between daily expressed affection and daily emotion/relationship satisfaction). The higher level *between-person* analyses then examined whether these within-person processes varied as a function of differences in SE. To be clear, both members of the couple were included in these analyses. Thus, each member of the couple served as the participant (when evaluating the connection between their SE and their expressed affection, and corresponding reactions and perceptions) as well as the partner (when evaluating the connection between their partners' level of SE and their own reactions to receiving affection).

All analyses assumed an error structure allowing for contemporaneous (same-day) dependence between the errors within a couple and a first-order autoregressive structure within a person in a couple. In addition, variances were allowed to differ between males and females. To adopt a conservative approach to significance testing, we used the number of couples to compute degrees of freedom. All continuous predictors were centered on their grand mean (Aiken & West, 1991). As in Study 1, sex and partner SE were included as covariates. Interactions with these variables are footnoted.

Across dependent variables, all significant interactions between SE and expressed (or perceived) affection were followed with simple slopes analyses (Aiken & West, 1991). Key to our hypotheses was the relationship between expressed affection and corresponding reactions among participants lower (1 *SD* below the mean) versus higher (1 *SD* above the mean) in SE. Thus, we focused our simple slopes analyses on these comparisons. Bivariate correlations between variables are found in Table 4 and parameter estimates from the regression analyses are presented in Table 5.

Expressed affection (Hypothesis 1b). Participants with lower SE expressed less affection for their partners across the 21 days of the daily diary, $F(1, 50) = 7.26$, $p < .01$, $b = .17$, 95% CI = [.04, .30], $\beta = .14$.

Positive emotion and expressing affection (Hypothesis 2b). Mixed analysis was conducted on positive emotion with participant-expressed affection, participant SE, and the interaction between them as predictors. There were main effects of expressed affection, $F(1, 48) = 295.04$, $p < .01$, $b = .28$, 95% CI = [.25, .31], $\beta = .39$, and participant SE, $F(1, 48) = 47.65$,

Table 4. Bivariate Correlations Study 2.

	SE	PSE	Sex	EA	POS	PPOS	PRS	PPRS
SE	—	-.004	.05	.21	.36**	.05	-.05	.19
PSE	—	—	-.05	-.04	.13	.44**	.20	-.003
Sex	—	—	—	-.20	-.15	.14	.25 [†]	-.28*
EA	—	—	—	—	.34*	.26 [†]	.29*	.82**
POS	—	—	—	—	—	.23 [†]	.10	.33*
PPOS	—	—	—	—	—	—	.72**	.29*
PRS	—	—	—	—	—	—	—	.41**
PPRS	—	—	—	—	—	—	—	—

Note. Sex was scored with males = 1, females = -1. SE = participants' SE; PSE = partners' SE; Sex = participants' sex; EA = participants' expressed affection; POS = participants' positive emotion; PPOS = partners' positive emotion; PRS = partners' relationship satisfaction; PPRS = participants' perceptions of partners' relationship satisfaction. For daily measures, we created a daily composite by averaging each participant's 21 scores on the variable. This daily average was then correlated with the other variables. To account for dependence within couples, we report significance based on z-statistics calculated by dividing Pearson's r by its standard error ($1/\sqrt{n}$) with n based on the number of dyads rather than the number of participants (Kenny, Kashy, & Cook, 2006).

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

$p < .01$, $b = .23$, 95% CI = [.17, .30], $\beta = .27$. These main effects were qualified by a significant interaction between expressed affection and participant SE,⁵ $F(1, 48) = 4.24$, $p < .05$, $b = .03$, 95% CI = [.0008, .07], $\beta = .04$.

Simple slopes analysis indicated that for participants with higher SE, their daily positive emotion was higher the more they expressed affection for their partner, $F(1, 48) = 184.27$, $p < .01$, $b = .31$, 95% CI = [.26, .36], $\beta = .43$. This relationship was also significant for participants with lower SE, $F(1, 48) = 146.20$, $p < .01$, $b = .25$, 95% CI = [.21, .29], $\beta = .35$, but was weaker in strength as indicated by the significant interaction. Illustration of the interaction based on estimates obtained from the mixed analysis is presented in Figure 1.

Partner positive emotion and receiving affection (Hypothesis 3b). Mixed analysis was conducted on partner positive emotion with participant-expressed affection, participant SE, and the interaction between them as predictors. There was no effect of participant SE in predicting his or her partner's positive emotion, $F < 1$. There was a main effect of participant-expressed affection, $F(1, 48) = 53.05$, $p < .01$, $b = .13$, 95% CI = [.10, .17], $\beta = .19$, suggesting that partners experienced more positive emotion on days in which participants reported expressing more affection for them. As predicted, there was no interaction between participant SE and his or her expressed affection in predicting partner positive emotion, $F < 1$.

Partner relationship satisfaction and receiving affection (Hypothesis 3b). Parallel analysis was conducted on partner relationship satisfaction. There was no effect of participant SE in predicting his or her partner's relationship satisfaction, $F(1, 48) = 1.35$, $p = .25$, $b = -.06$, 95% CI = [-.16, .04], $\beta = -.05$. There was a main effect of participant-expressed affection, $F(1, 48) = 25.72$, $p < .01$, $b = .24$, 95% CI = [.14, .33], $\beta = .24$, suggesting that partners experienced higher relationship satisfaction on days in which participants reported expressing

affection to a greater degree. Again, there was no interaction between participant SE and his or her expressed affection in predicting partner daily relationship satisfaction, $F < 1$.

Perceived partner relationship satisfaction and receiving affection (Hypothesis 3a). Next, mixed analysis was conducted on perceived partner relationship satisfaction, with participant-expressed affection, participant SE, and the interaction between them as predictors. To isolate the effect of perceptions, the partners' own report of their relationship satisfaction was included as an additional covariate. There were main effects of Expressed affection, $F(1, 47) = 464.67$, $p < .01$, $b = .50$, 95% CI = [.45, .54], $\beta = .52$, and participant SE, $F(1, 47) = 13.46$, $p < .01$, $b = .11$, 95% CI = [.05, .16], $\beta = .09$. These main effects were qualified by a significant Expressed affection \times SE interaction, $F(1, 47) = 4.16$, $p < .05$, $b = .04$, 95% CI = [.0006, .09], $\beta = .04$.

Participants with higher SE perceived their partner to be more satisfied in the relationship on days in which they reported expressing more affection for their partner, $F(1, 47) = 309.33$, $p < .01$, $b = .53$, 95% CI = [.47, .59], $\beta = .56$. This relationship was also significant for participants with lower SE, $F(1, 47) = 253.03$, $p < .01$, $b = .46$, 95% CI = [.40, .52], $\beta = .48$, but, again, was weaker in strength. Illustration of the interaction is presented in Figure 2.

Study 2 Summary

Consistent with predictions based on the risk-regulation model, as well as the findings of Study 1, participants with lower SE reported doing and saying less to make their partners feel secure and loved across the 21 days of the daily diary (Hypothesis 1b). Although these participants did, in fact, experience higher levels of positive emotion on days in which they expressed more affection, this association was not as strong as the one demonstrated by participants with

Table 5. Unstandardized Regression Coefficients Study 2.

	<i>n</i>	SE	PSE	Sex	Participant expressed affection	SE × Expressed affection
Participants' expressed affection	106	.17** (.14)	-.06 (-.05)	-.14** (-.13)	—	—
Participants' positive emotion	106	.23** (.27)	.04 (.04)	-.05* (-.06)	.28** (.39)	.03* (.04)
Partners' positive emotion	106	.001 (.001)	.28** (.32)	.11** (.14)	.13** (.19)	-.001 (-.001)
Partners' relationship satisfaction	106	-.06 (-.05)	.19** (.15)	.20** (.19)	.24** (.24)	.01 (.01)
Participants' perceptions of partners' relationship satisfaction ^a	106	.11** (.09)	-.02 (-.02)	-.15** (-.15)	.50** (.52)	.04* (.04)

Note. Sex was scored with males = 1, females = -1. SE = participants' SE; PSE = partners' SE; Sex = participants' sex. All analyses controlled for partners' SE and participants' sex. Additional covariates are indicated by lettered superscripts. Effect size, β , is in parentheses next to the unstandardized regression coefficients.

^aPartners' relationship satisfaction.

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

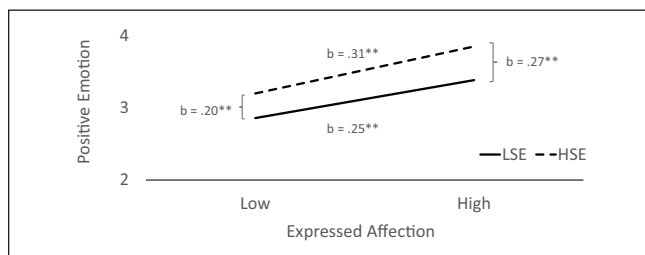


Figure 1. Participants experienced higher levels of positive emotion on days in which they reported higher levels of expressed affection, but this effect was stronger for those with higher SE (HSE) than those with lower SE (LSE).

Note. Predicted values are at one standard deviation above and below the mean of SE and expressed affection.

* $p < .05$. ** $p < .01$.

higher SE (Hypothesis 2b). This suggests that people with lower SE are not fully capitalizing on the emotional benefits these exchanges typically afford. By contrast, partners experienced more positive emotion and relationship satisfaction on days in which participants reported expressing more affection and this effect persisted regardless of whether the person expressing the affection was higher or lower in SE (Hypothesis 3b). While participants accurately believed that their partner experienced higher levels of relationship satisfaction on the days in which they provided more affection, this effect was, again, weaker for participants with lower SE, suggesting that they underperceive the benefits of providing affection (Hypothesis 3a).

Meta-Analysis

Although the pattern of results was largely consistent across these approaches, some of the findings were significant at a marginal or nearly marginal level. As such, we conducted meta-analyses on theoretically overlapping outcome variables where possible, focusing on the results across Studies 1 and 2 that pertained to the main effect of participant SE. Note that we did not include statistical interaction effects (e.g.,

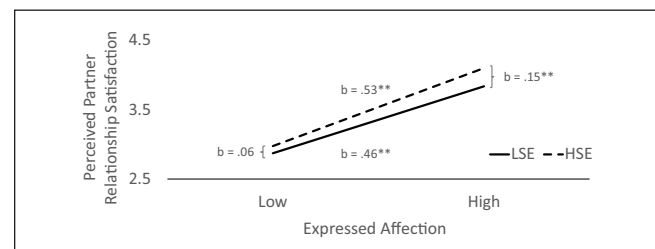


Figure 2. Participants perceived that their partners experienced higher levels of relationship satisfaction on days in which they reported higher levels of expressed affection, but this effect was stronger for those with higher SE (HSE) than those with lower SE (LSE).

Note. Predicted values are at one standard deviation above and below the mean of SE and expressed affection.

* $p < .05$. ** $p < .01$.

Participant SE × Degree of expressed affection predicting positive emotion in Study 2) in the meta-analyses because they are not equivalent, either statistically or conceptually, to findings pertaining to main effects of participant SE.

This allowed us to synthesize the results depicting the relationship between participant SE and four conceptual outcome variables. Magnitude of expressed affection (Hypothesis 1b) was assessed with degree of expressed affection in response to the in vivo exchange in Study 1 and with degree of expressed affection across the 21 days of the daily diary in Study 2. Emotional reactions to expressing affection (Hypothesis 2b) was assessed in Study 1 with both past reports of comfort giving compliments and with participant comfort during the in vivo exchange. Perceived partner emotional reactions to receiving affection (Hypothesis 3a) was assessed in Study 1 with past reports of perceptions of partner comfort receiving compliments and participant perceptions of partner comfort during the in vivo exchange. Finally, partner emotional reactions to receiving affection (Hypothesis 3b) was assessed in Study 1 with past reports of partner comfort receiving affection and partner comfort during the in vivo exchange.

To conduct these meta-analyses, we used a weighted least squares approach for synthesizing regression slopes (see Becker & Wu, 2007). We estimated beta as a weighted average across the two studies, with each study's beta weighted by the reciprocal of its variance. Next, if the two effect size estimates could be assumed to be independent, we calculated a meta-analytic standard error by taking the square root of the inverse of the two summed weights. Finally, we divided the average weighted beta by the meta-analytic standard error to produce a z -statistic and calculated statistical significance using the z -distribution.

We used these same basic procedures for all meta-analyses. However, three of the analyses (Hypotheses 2b, 3a, and 3b above) involved synthesizing results from the same participants (i.e., the same participants provided their past reactions to compliment giving as participated in the *in vivo* exchange) thereby giving rise to possible dependence between effect size estimates from the two studies. In the presence of dependence, the variance of the weighted average $\check{\beta}$, treating the weights as fixed constants, is

$$\text{Var}(\check{\beta}) = \text{Var}\left(\frac{\check{\beta}_1 w_1 + \check{\beta}_2 w_2}{w_1 + w_2}\right) = \frac{1}{(w_1 + w_2)^2} \text{Var}(\check{\beta}_1 w_1 + \check{\beta}_2 w_2),$$

where the first step follows from the definition of a weighted average and the second step follows because the variance of a random variable multiplied by a constant is the square of the constant times the variance of the random variable. Applying this rule once more, along with the fact that the variance of a sum of two random variables is the sum of their variances plus twice their covariance, we have

$$\text{Var}(\check{\beta}) = \frac{1}{(w_1 + w_2)^2} \left[w_1^2 \text{Var}(\check{\beta}_1) + w_2^2 \text{Var}(\check{\beta}_2) + 2w_1 w_2 \text{Cov}(\check{\beta}_1, \check{\beta}_2) \right].$$

Finally, because $w_1 = 1/\text{Var}(\check{\beta}_1)$ and $w_2 = 1/\text{Var}(\check{\beta}_2)$, we have:

$$\text{Var}(\check{\beta}) = \frac{1}{(w_1 + w_2)^2} \left[w_1 + w_2 + 2w_1 w_2 \text{Cov}(\check{\beta}_1, \check{\beta}_2) \right].$$

The standard error of the weighted average $\check{\beta}$ is the square root of this quantity. To estimate it, we need estimates of $\text{Var}(\check{\beta}_1)$ and $\text{Var}(\check{\beta}_2)$, which come from the models we fit in our initial analyses, and of $\text{Cov}(\check{\beta}_1, \check{\beta}_2)$, which we obtained by bootstrapping. In particular, we drew 1,000 bootstrap samples using couple identification (ID) as the sampling unit (so that both members of a couple were always sampled together). Next, we reran the original analyses (described in the Study 1 "Results" section) on each of the 1,000 bootstrap samples, saving the standardized betas for participant SE for

each sample. We then estimated the covariance of the SE betas for each pair of analyses as the sample covariance of the two sets of 1,000 slope estimates computed from the same bootstrap samples.

Results

The meta-analytic effect of participant SE predicting degree of expressed affection (Hypothesis 1a) was significant, $\beta = .15$, $z = 3.12$, $p = .002$, suggesting that individuals with lower SE indeed express less affection for their partners. The meta-analysis also showed that participants with lower SE are less comfortable expressing affection to their partners (Hypothesis 2b), $\beta = .23$, $z = 2.57$, $p = .01$, and perceive that their partners experience less positive emotional reactions to receiving their affection, regardless of how their partners actually feel (Hypothesis 3a), $\beta = .39$, $z = 5.25$, $p < .01$. Contrary to the study-level results, there was a marginal effect of participant SE predicting partners' actual reactions to receiving affection (Hypothesis 3b), $\beta = .14$, $z = 1.75$, $p = .08$. This suggests that when synthesizing the past reactions and the reactions to the *in vivo* exchange, there was evidence to suggest that the partners of people with lower SE experience somewhat less positive reactions to receiving affection than the partners of people with higher SE, a point we will return to in the general discussion below. See Table 6 for the results of the meta-analyses.

General Discussion

The risk-regulation model argues that individuals with lower SE respond self-protectively when feelings of dependence on a romantic partner are heightened. This self-protection is presumed to buffer the individual from pain and humiliation from future rejection. Prior research on risk-regulation dynamics has largely focused on linking SE to responses when actions on the part of the partner heighten dependence, including his or her expressions of affection. We expanded this work by showing that people with lower SE also respond self-protectively when it comes to initiating dependence by choosing to *express* affection for their romantic partners.

Reactions to Expressing Affection

Given that expressing affection involves putting oneself on the line, we hypothesized that people with lower SE are less likely to take this risk (Hypotheses 1a) and are half-hearted when attempting to do so (Hypothesis 1b). Findings generally supported these predictions. In Study 1, participants with lower SE self-reported giving their partners compliments marginally less frequently than participants with higher SE. When asked to give their partner a compliment during the *in vivo* interaction, participants with lower SE expressed marginally less heartfelt compliments than participants with higher SE. This finding was corroborated in Study 2, with participants lower in SE expressing less affection

Table 6. Meta-Analyses.

Conceptual variable	Measurement 1	<i>n</i>	Measurement 2	<i>n</i>	β (SE)	<i>z</i>
Magnitude of expressed affection	Expressed affection during the in vivo exchange (Study 1)	59	Expressed affection across the 21 diary days (Study 2)	106	.15**	3.12
Emotional reactions to expressing affection	Past reports of comfort giving compliments (Study 1)	117	Participants' comfort during the in vivo compliment exchange (Study 1)	59	.23*	2.57
Perceived partner emotional reactions to receiving affection	Past reports of participants' perceptions of partners' comfort receiving compliments (Study 1)	115	Participants' perceptions of partners' comfort during the in vivo compliment exchange (Study 1)	59	.39**	5.25
Partner emotional reactions to receiving affection	Past reports of partners' comfort receiving compliments (Study 1)	117	Partners' comfort during the in vivo compliment exchange (Study 1)	59	.14 [†]	1.75

Note. SE = participants' self-esteem.

[†]*p* < .10. **p* < .05. ***p* < .01.

across the 21 days of the daily diary. The meta-analysis of the latter two findings showed that participants with lower SE expressed less affection overall than participants higher in SE, suggesting that these individuals are missing out on opportunities to build intimacy and strengthen their relationships.

Given that expressing affection may threaten self-protection goals, we also hypothesized that people with lower SE experience less rewarding reactions when engaging in these behaviors. Consistent with Hypothesis 2b, participants with lower SE in Study 1 reported feeling less comfortable expressing affection in the past. While the effect of SE predicting feelings of comfort during the in vivo exchange was (just) nonsignificant, when these two effects were synthesized in the meta-analysis, the results suggested that people who are lower in SE indeed feel less comfortable expressing affection for their partners.

In Study 2, participants with lower SE also experienced less PANAS positive emotion in response to expressing affection in daily life. We do note, however, that the pattern of results for the PANAS positive emotion composites in Studies 1 and 2 differed. SE was unrelated to PANAS positive emotion in response to expressing affection during the in vivo exchange in Study 1. It might be that the findings across these two PANAS composites differ because in vivo and daily measures are tapping into unique processes. For example, the act of expressing affection in daily life may change other dynamics in the relationship that accumulate and thus emerge more strongly at the end of the day. Another possibility is that these effects differ because the PANAS composite in Study 1 included quite a few general positive emotion items (e.g., "Interested," "Enthusiastic"), whereas the items used in Study 2 were more dyadic in nature (e.g., "Satisfied," "Supported").

In Study 1, participants also reported greater difficulty coming up with and delivering the compliment (Hypothesis 2a) and experienced smaller changes in PROG during the in

vivo exchange (Hypothesis 2c). Again, prior research finds that PROG levels covary with feelings of affiliation and closeness (e.g., Brown et al., 2009; Schultheiss et al., 2003; Schultheiss et al., 2004), suggesting that participants with lower SE failed to fully foster both psychological and physiological intimacy during this interaction. It is important to remember that our sample size was small when considering these PROG findings. Future research should be conducted to establish their reliability.

Partner Reactions to Receiving Affection

That people with lower SE express less affection for their partners may also have to do with their perceptions of their partners' feelings. Prior research finds that as compared with those with higher SE, people with lower SE tend to feel less comfortable *receiving* affection from their partners (e.g., Swann, 1997). We hypothesized that these individuals may assume that their partners feel similarly uncomfortable (Hypothesis 3a) and results tended to support this prediction. While participants SE was unrelated to their perceptions of their partners' PANAS positive emotion (Study 1), participants with lower SE did believe that their partners felt less comfortable receiving their affection, both retrospectively and in response to the in vivo exchange. This effect was corroborated by the meta-analysis. In Study 2, participants with lower SE also perceived that their partner experienced smaller increases in relationship satisfaction when receiving affection from them. Across studies, these effects persisted even when controlling for the partners' self-reported emotion/relationship satisfaction.

Interestingly, we found that the latter perceptions did not completely line up with the partners' actual experiences. Consistent with Hypothesis 3b, when receiving affection, the partners of people with lower SE experienced the same reported feelings of PANAS positive emotion (Studies 1 and 2) and relationship satisfaction (Study 2) as the partners of

people with higher SE. Even more, these partners showed marginally larger boosts in PROG when receiving a compliment during the in vivo exchange in Study 1. Given that these experiences are relatively uncommon when their lower SE partner is left to his or her own devices, perhaps receiving the compliment registered as even more meaningful, and they felt even closer to their partner, at least at a physiological level.

In Study 1, the effects of participant SE predicting their partners' feelings of comfort receiving compliments during past exchanges and during the in vivo compliment conversation were also nonsignificant. However, the meta-analysis of these two findings did reveal a marginal effect of participant SE. Although this is not a robust finding, it may point to the fact that participants' feelings of discomfort during the exchange of affection has the potential to contaminate partners' experiences as well. Nevertheless, the results indicate that people with lower SE overestimate their partners' discomfort in receiving affection. Unfortunately, such misperceptions likely guide and even strengthen their reluctance in displaying love and affection in their relationships.

Implications

In the current research, we took a multimethod approach, evaluating retrospective reports of expressing affection, reactions to an in vivo interaction, and responses in daily life. Although some of the findings were marginally significant, they were consistent with a priori predictions and largely converged across these approaches when meta-analyzed.

While we focused this research in the context of romantic relationships, it is not unreasonable to expect that SE is associated with less positive responses across a variety of life domains. However, to advance theory, these responses still need to be demonstrated empirically. The current evaluation is a worthy jumping off point for this broader research given that SE has previously been linked to risk-regulation dynamics but extends and advances this theory in new ways.

Moreover, given that people with lower SE tend to struggle in romantic relationships (e.g., Fincham & Bradbury, 1993), studying how they respond to the exchange of positive feedback in this context has the potential to contribute to future intervention and treatment programs designed to improve relationship functioning for these individuals. As described above, expressing affection is a fundamental opportunity to build intimacy and connection in close relationships (Algoe et al., 2010; Gonzaga et al., 2001; Gordon et al., 2012; Lambert & Fincham, 2011). The pattern of self-protective behaviors that people with lower SE demonstrate in response to fostering dependence through expressions of affection likely has consequences for both their partners and themselves. Partners may come to feel unappreciated and unloved. With time, these feelings are likely to erode relationship satisfaction (see Gordon et al., 2012). Furthermore, if people with lower SE provide less affection for their

partners, it may create a cycle in which their partners do not express affection in return. This may catalyze a self-fulfilling prophecy in which people with lower SE feel even less secure in their relationships. In fact, prior research finds that people with lower SE report less satisfying romantic relationships (e.g., Fincham & Bradbury, 1993) and the pattern identified may be an important contributing factor.

Correspondingly, these individuals could benefit from learning the normative outcomes associated with expressing affection (e.g., Algoe et al., 2010; Gonzaga et al., 2001; Gordon et al., 2012; Lambert & Fincham, 2011). Even more, understanding that their partners are likely to feel good and experience enhanced relationship satisfaction when receiving affection may encourage people with lower SE to more readily put themselves on the line. These are important areas of future research.

Conclusion

Collectively, these results provide a holistic understanding of the self-protective behaviors people with lower SE experience when (and when not) choosing to put themselves on the line. Extending our understanding of risk-regulation dynamics, we found that while people with higher SE seemed poised to take advantage of opportunities to express affection for their partners, those with lower SE demonstrated a more strained and distant tone. This reflects a cautious stance, in that being forthcoming with their affection could put people with lower SE at risk for humiliation and hurt should their partners rebuff their love or reject them in the future. These results further suggest that promoting a more open exchange of affection has the potential to help people with lower SE achieve long-lasting and satisfying relationships.

Authors' Note

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Notes

1. We initially attempted to schedule the laboratory session during the follicular window of female participants' menstrual

cycles. We relied on a loose definition of the follicular phase, which ranged from 0 to 10 days after the start of menstruation. Subsequent to data collection, it was recommended that we use a more conservative window (0-7 days). Note that when we run these analyses with the looser window, the participant sample size increases from $n = 40$ to $n = 47$ and the main effect of participant self-esteem (SE) in predicting change in progesterone (PROG) becomes nonsignificant, $F(1, 42) = 1.62$, $\beta = .21$, $b = .004$, 95% confidence interval (CI) = $[-.002, .01]$, $\eta_p^2 = .04$. For partners, the sample size increases from $n = 48$ to $n = 50$ and the effect of participant SE remains marginally significant, $F(1, 45) = 3.50$, $p = .07$, $b = -.006$, 95% CI = $[-.01, .0005]$, $\eta_p^2 = .07$.

2. Although the alpha reliability for partner *comfort*, as measured with partner-reported enjoyment and comfort, was not high ($\alpha = .56$), we nevertheless elected to utilize this composite. With it, we were able to conduct parallel analyses in which we predicted each person's comfort from participant SE. Moreover, the pattern of results was the same when we predicted partner-reported enjoyment, $F(1, 55) = 1.93$, $p = .17$, $b = .24$, 95% CI = $[-.11, .58]$, $\eta_p^2 = .03$, and partner-reported comfort, $F < 1$, separately from participant SE.
3. There was a significant Participant SE \times Partner SE interaction in predicting partners' reported comfort receiving compliments, $F(1, 55) = 5.00$, $p = .03$, $b = -.35$, 95% CI = $[-.67, -.04]$, $\beta = -.20$. Partners lower in SE reported greater comfort receiving compliments from higher (vs. lower) SE participants, $F(1, 55) = 7.01$, $p = .01$, $b = .55$, 95% CI = $[.13, .97]$, $\beta = .33$. This relationship was not significant among higher SE partners, $F < 1$.
4. Participant SE and sex interacted in predicting perceptions of partners' comfort in response to the compliment, $F(1, 53) = 9.10$, $p < .01$, $b = -.40$, 95% CI = $[-.67, -.13]$, $\eta_p^2 = .15$. The effect of SE was significant for female participants, $F(1, 24) = 14.84$, $p < .01$, $b = .73$, 95% CI = $[.34, 1.12]$, $\eta_p^2 = .38$, but not for male participants, $F < 1$.
5. There was a significant three-way interaction between participant SE, expressed affection, and sex in predicting positive emotion, $F(1, 45) = 4.68$, $p = .04$, $b = -.04$, 95% CI = $[-.07, -.003]$, $\beta = -.04$. The main interaction between expressed affection and SE was marginally significant for female participants, $F(1, 49) = 3.70$, $p = .06$, $b = .05$, 95% CI = $[-.002, .10]$, $\beta = .06$, but was not significant for male participants, $F < 1$.

Supplemental Material

The online supplemental material is available with the manuscript on the PSPB website.

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