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Touch as an Interpersonal Emotion Regulation Process in Couples' Daily Lives: The Mediating Role of Psychological Intimacy

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Abstract

Interpersonal touch seems to promote physical health through its effects on stress-sensitive parameters. However, less is known about the psychological effects of touch. The present study investigates associations between touch and romantic partners' affective state in daily life. We hypothesized that this association is established by promoting the recipient's experience of intimacy. Both partners of 102 dating couples completed an electronic diary 4 times a day during 1 week. Multilevel analyses revealed that touch was associated with enhanced affect in the partner. This association was mediated by the partner's psychological intimacy. Touch was also associated with intimacy and positive affect in the actor. Finally, participants who were touched more often during the diary study week reported better psychological well-being 6 months later. This study provides evidence that intimate partners benefit from touch on a psychological level, conveying a sense of strengthened bonds between them that enhances affect and well-being.

Keywords

emotion regulation, touch, intimacy, e-diary, couples

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Nonverbal interaction plays an important role in human relationships, especially with respect to the communication of emotional content (Schachner, Shaver, & Mikulincer, 2005). Touching an interaction partner is an important way of communicating affection throughout the life-span (Gallace & Spence, 2010; Hertenstein, Verkamp, Kerestes, & Holmes, 2006), especially in romantic relationships (Hanzal, Segrin, & Dorros, 2008). Recent research suggests that touch is positively related to the health of the touch receiver, a linkage that could be established via moderating physiological stress response. For example, in premenopausal women, the reported frequency of received hugs by the husband was found to be linked to lower blood pressure and higher oxytocin levels (Light, Grewen, & Amico, 2005). Moreover, Holt-Lunstad, Birmingham, and Light (2008) have shown that a relatively simple and brief 4-week "warm-touch" intervention that involved the partners learning to display agreeable and responsive touch to each other had a beneficial effect on several stress-sensitive parameters (blood pressure, alpha-amylase, and salivary oxytocin). Finally, simply holding the hand of the romantic partner seems sufficient to attenuate the neural stress response, reflecting stress-buffering effects of touch (Coan, Schaefer, & Davidson, 2006).

Apart from physiological mechanisms, little is known about how interpersonal touch might lead to positive outcomes, particularly via socio-affective *psychological* processes. The main goal of this study is to investigate the emotion regulatory function of touch, adopting a dyadic perspective and using an electronic diary approach. We test the hypothesis that the association between touch and mood, as reported in the couple's daily life, is mediated by increased experience of psychological intimacy.

Partner Touch as an Interpersonal Emotion Regulation Process

Social baseline theory (Coan, 2008, 2010) maintains that social proximity serves the function of regulating affect. Social proximity signals security, which, if present, reduces

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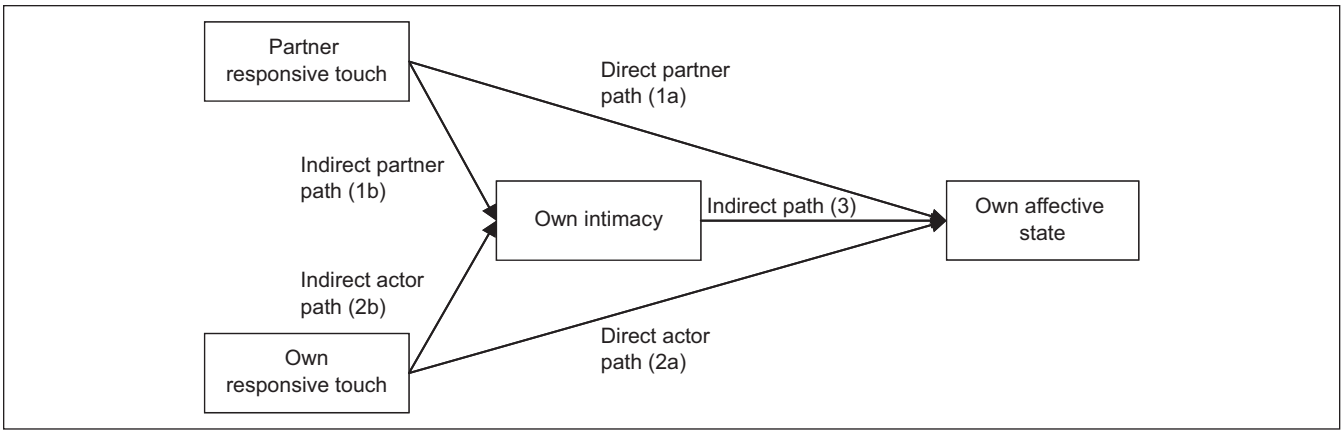

Figure 1. Daily mediation model.

the need to invest one's own regulatory resources to ward off threat. A similar position is adopted by Sbarra and Hazan (2008), who proposed that in romantic relationships, positive rewards and felt security contribute to coregulation that involves psychological and physiological components.

In both models, romantic relationships operate as regulatory systems that contribute to the maintenance of positive affect and to the down-regulation of negative affect. As a signal of proximity and connection, being touched in a responsive way should go along with improved mood, and some evidence supports this view. Burleson, Trevathan, and Todd (2007) reported that women who received nonsexual physical signs of affection from their romantic partner experienced reduced negative affect and more positive affect on the same day. Touching one's partner in a positive, caring manner can thus be considered a way to improve the partner's affect (Hertenstein & Campos, 2001; Niven, Totterdell, & Holman, 2009) and thus an emotion regulation strategy[1].

Adopting this viewpoint, the current study seeks to extend prior research by examining momentary associations between touch in romantic couples' daily lives and concurrent or subsequent affective states. The momentary affective state (Gross & Thompson, 2007; Larsen & Prizmic, 2004), reflects a broad aspect of the emotional experience including the valence of mood and/or discrete emotions (i.e., Frijda & Scherer, 2009). In this study, we refer to it as the momentary valence of peoples' emotional tone. This can be assessed continuously and is readily changed by social, psychological, and environmental contexts (Cranford et al., 2006). In this capacity, reports of affective states are particularly well-suited for assessing fluctuations and, thus, regulation of the affective experience in daily life. Hence, we predict that participants' affective state improves as a function of being touched by the partner, (Figure 1: Path 1a).

Intimacy as a Mediating Variable

In addition, we investigated the experience of intimate feelings toward the partner as a putative mediator of the emotion regulation effects of touch displayed in couples' everyday interactions. Touching the partner is a behavior that signals affection, care, and concern through physical contact (i.e., Dainton, Stafford, & Canary, 1994). When displayed in a benevolent way and in a meaningful situation, touch can be considered a nonverbal form of responsiveness. Being responsive is a critical factor in building and maintaining trust and intimacy in romantic relationships (Lemay & Clark, 2008; Reis & Patrick, 1996). It communicates that the welfare of the partner is important to oneself and conveys empathy, respect, and appreciation as a response to one's partner's action or disclosure (Reis, 1998). Responsiveness fosters the experience of intimacy, that is, the extent to which one feels understood, validated, and cared for (Debrot, Cook, Perrez, & Horn, 2012; Reis & Patrick, 1996)[2]. Accordingly, we propose that touch, as a benevolent gesture in response to the partner's affective state, will foster feelings of intimacy.

The experience of intimate feelings toward the partner involves a sense of the quality and strength of one's bonds with the partner, thereby strengthening mental health and enhancing positive affect (Prager & Roberts, 2004; Reis & Franks, 1994). Intimacy experiences conveyed by the partner's touch should therefore be a key mediator of the effects of touch on the partner's affective states (Figure 1: Path 1b followed by Path 3).

In other studies (i.e., Stadler, Snyder, Horn, Shrout, & Bolger, 2012), physical proximity between romantic partners has been labeled "physical intimacy." In this study, we differentiate touch as a responsive *behavior* toward the partner, from intimacy as a *feeling* toward the partner that is characterized by a subjective experience. To ensure empirically that these are two different aspects of the participant's

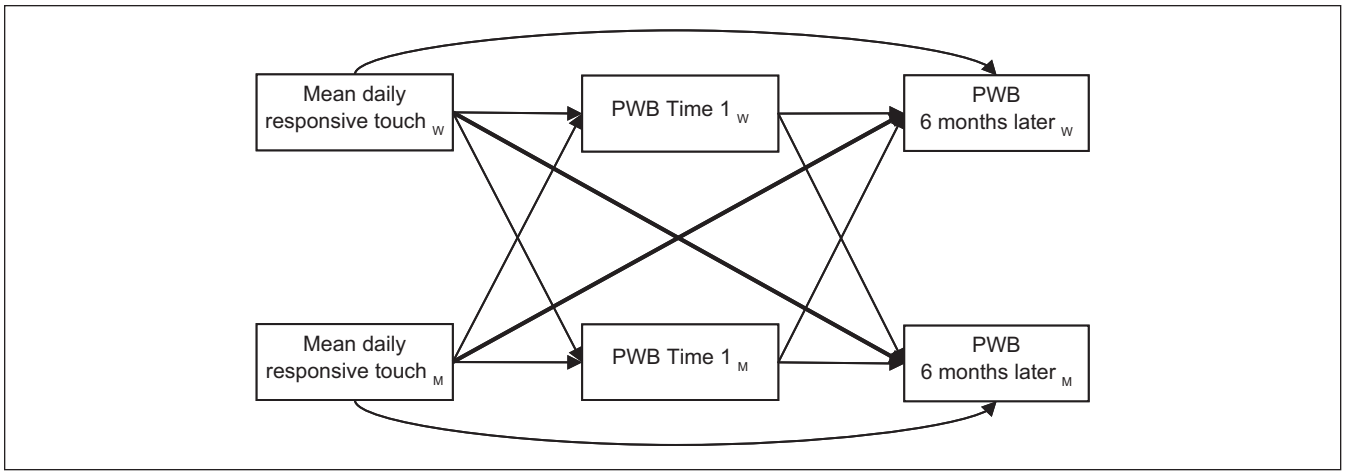

Figure 2. Responsive touch as a predictor of PWB over 6 months.
PWB = psychological well-being; W = woman; M = man.

experience, we test whether (a) touch at the previous report predicts intimacy at the consecutive report and (b) whether intimacy at the previous report predicts consecutive touch.

Benefits of Touching the Partner

Prosocial behaviors can also be beneficial to the health and well-being of the person performing them (i.e., the actor; Kogan et al., 2010; Lemay & Clark, 2008; Post, 2005). Some evidence suggests that these benefits extend to behaviors involving touch. Field, Hernandez-Reif, Quintino, Schanberg, and Kuhn (1998) found that elderly individuals benefit from giving a massage to children; their anxiety, depression, and stress hormone levels were reduced, even more so in the condition where they received a massage. Although based on a small sample ($N = 10$), these results are consistent with attachment-related models of interpersonal coregulation (e.g., Coan, 2010; Sbarra & Hazan, 2008), which suggest benefits for both partners to the extent that the responsive behavior leads to a shared perception of security.

Accordingly, touching one's partner should also foster one's own experience of intimacy (Figure 1: Path 2b followed by Path 3), and thereby improve the affective state in the actor (Figure 1: path 2a). Moreover, we expect this association to be mediated by one's own experience of intimacy (Figure 1: Path 2b followed by Path 3).

Long-Term Consequences of Responsive Touch

Being able to effectively regulate one's affect has important implications for mental and physical health (e.g., Cohen, Alper, Doyle, Treanor, & Turner, 2006; John & Gross, 2004; Kring & Werner, 2004), and to the extent that they contribute to emotion regulation, interpersonal processes, such as touch in the relationship, should be associated with better psychological functioning longitudinally (Ryff, 1989; see Figure 2). We therefore predicted that responsive touch, as reported during daily life, was associated with better psychological well-being (PWB) over the course of 6 months.

In sum, the present study investigated whether a simple touch gesture can have an emotion regulation function in romantic couples' daily lives and whether this association occurs by increasing the intimacy feelings of the partners. We examined the self-reported touch, assessed 4 times per day over a period of 7 consecutive days using an electronic diary procedure. A set of hypotheses is tested: We predicted that the experience of being touched by the partner would be associated with more positive affect states, and that this association would be accounted for by feelings of psychological intimacy toward the partner. Similarly, we hypothesized that the act of touching one's partner would foster one's own experiences of intimacy, which in turn would improve one's affective state. Finally, we examined the longitudinal effects of touch, testing the hypothesis that the frequency of reports of touch during the diary week would predict the PWB of the partners 6 months later.

Method

Participants and Procedure

Participants were recruited by means of e-mails, posters, and flyers distributed in colleges and universities in Switzerland. One hundred and two couples agreed to participate in the study and met the inclusion criteria (being between 18 and 40 years of age, dating for at least 3 months, and being unmarried). The average participant was in his or her mid-twenties ($M = 25.40$, $SD = 5.08$). Couples had been dating between 4 months and 15 years ($M = 35.48$ months, $SD = 32.31$), and less than half of them were cohabitating (43.3%). Most participants had finished high school (89.8%) and 27%

had a master's degree from a university. More than half of the participants (54.4%) were students, while the remaining participants were employed. Participants reported high satisfaction with their relationships (relationship satisfaction, as measured with a German version of the Relationship Assessment Scale [Hendrick, Dicke, & Hendrick, 1998; Sander & Böcker, 1993] was 23.99; *SD* = 1.87, minimum = 17, maximum = 29).

Both partners entered the laboratory, where they completed a computerized questionnaire package (Time 1 assessment). Each couple then participated in a standardized training for completing the electronic diary (e-diary), implemented on handheld computers, and received a manual. Participants were asked to fill in the e-diary during a week they identified as being representative of their everyday lives (i.e., no extraordinary events were reported). Participants were invited to record their entries 4 times a day by means of an acoustic signal. Reports were prompted randomly, but simultaneously for both partners, within 30-min time windows around 9:00 a.m., 1:00 p.m., 5:00 p.m., and 9:00 p.m., within a 2-hr time interval after the signal. Participants were instructed to complete their diaries in private, and not to discuss their answers with their partner. Participants responded at 91.4% of the scheduled reports. The mean response time after the signal was 9:03 min. Because we focused on responsive touch, we only utilized the reports where a direct contact with the partner was reported (62.0% of the reports). At a follow-up assessment 6 months after the e-diary assessment week (Time 2), participants were e-mailed questionnaire packages. A total of 182 questionnaires were completed and returned at this time (89.22%).

Measures

Affective state. At each report, participants rated the valence of their present affective state by responding to the question "How do you feel at this moment?" Answers were given by means of two bipolar 9-point scales, ranging from 1 = *unwell* to 9 = *well*, and from 1 = *discontent* to 9 = *content*. The two reports were averaged to obtain a variable reflecting one's general affective state in the particular situation. Participants' average affective states over the e-diary week ranged from 3.74 to 8.61 (*M* = 6.55, *SD* = .87; after centering the data at the individual mean: *M* = .16, *SD* = 1.52, minimum = −6.61, maximum = 4.26) and did not differ significantly between men and women, paired $t(101) = 1.08$, $p = .28$.

Responsive touch. If participants reported that the partner was present, the device presented a list of 16 statements reflecting different ways to deal with the partner's affective state. Sample items included: "*Since the last report, I have hugged, caressed, or physically approached my partner as a response to his or her affective state.*"[3] The item was rated on a 5-point scale (0 = *does not apply* to 4 = *applies very strongly*). Participants' average ratings over the week ranged from .29 to 4.00 (*M* = 2.55, *SD* = .88), reflecting a frequent use of responsive touch toward the partner. Women scored significantly higher than men on this item, paired $t(101) = 2.81$, $p < .01$.

Psychological intimacy. At all reports, participants answered questions concerning how they felt toward their partner since the last report. Intimacy was assessed by four items: *[I felt] close to, secure with, cared for, and understood*. Items were rated on 5-point scales (0 = *does not apply* to 4 = *applies very strongly*). A confirmatory factor analysis indicated that these items reliably assess the same construct for men and women (Debrot et al., 2012). The four items were averaged to provide an intimacy score for each report. Mean scores over the assessment period ranged from .80 to 4.00 (*M* = 3.05, *SD* = .60). They did not differ significantly between men and women, paired $t(101) = .072$, $p = .94$.

PWB. We used the average of six subscales from the PWB Scale by Ryff (1989; see also Springer & Hauser, 2006) to measure PWB. Each subscale was measured with 9 items. The six scales included Self-Acceptance, Environmental Mastery, Positive Relations with Others, Personal Growth, Purpose in Life, and Autonomy. The measure was administered immediately prior to the diary week (Time 1) and 6 months later (Time 2). It was reported to have high degrees of validity and reliability (Risch, Taeger, Morina, & Stangier, 2011). Participants indicated their thoughts and feelings on scales ranging from 1= *disagree strongly* to 6 = *agree strongly*. The mean score overall scales was moderately high (Time 1: *M* = 4.91. *SD* = .47; Time 2: *M* = 4.76. *SD* = .54). In the current sample, the Cronbach's alpha suggested high consistency ($\alpha_{\text{Time 1}} = .90$; $\alpha_{\text{Time 2}} = .88$). We found no gender differences at Time 1, paired $t(100) = 1.025$, $p = .31$, but higher scores for men than for women at Time 2, paired $t(85) = 2.706$, $p < .01$.

Data Analytic Strategy

The current data feature dependencies due to repeated measurements within each participant. Due to the fact that participants were nested within couples, this clustering led to similarity of data stemming from the same person and from the same couple (Laurenceau & Bolger, 2012). To adjust for these dependencies, we used a multilevel modeling approach for dyads. We computed a two-level adaptation of the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann & Bodenmann, 2006, an extension of the Actor-Partner Interdependence Model, APIM; Cook & Kenny, 2005) with two sets of parameters per couple (one for the female and one for the male partner; Kenny, Kashy, & Cook, 2006). Participants' multiple daily reports (Level 1) were considered as nested within couples (Level 2; see also Laurenceau & Bolger, 2005). Intercepts were allowed to vary randomly across persons and reports, and residual terms were allowed to be correlated between partners.

The present hypotheses concern associations at the within-subject level (Level 1). Thus, to remove the effects of individual differences at Level 2 (i.e., mean over the assessment period), all predictors were centered at the person's mean on that variable. Moreover, we adjusted for the score of the dependent variable from the prior report, so that the outcome represented residualized change that occurred since the preceding report. We estimated random variation of parameter estimates at Level 2 (variation across husbands and wives), except for the autoregressive parameter (b_1).

Equation 1 shows the Level 1 model for the effects of responsive touch and intimacy on changes in affective state.

$$\begin{aligned} \textit{Affective state}_{ij} = b_{0j} + b_1\,(\text{previous affective state}) \\ + b_{2j}(\text{partner responsive touch}) + b_{3j}(\text{own} \\ \text{responsive touch}) + b_{4j}(\text{own intimacy}) + e_{ij} \end{aligned} \quad (1)$$

$\textit{Affective state}_{ij}$ is the current self-reported valence of the affective state of a partner from couple j at time i. The estimate for b_{0j} is the average of the participant's affective state, adjusted for all predictors in the model. The estimate for b_1 reflects the effect of the actor's affective state at the previous report (i.e., the autocorrelation of the affective state variable). The estimate for b_{2j} captures the unique effect of partner responsive touch on the affective state change since the previous report (Figure 1, path 1a). The estimate for b_{3j} represents the unique effect of the own responsive touch on one's change in affective state (Figure 1, path 2a). The estimate for b_{4j} captures the effect of the own intimacy on one's changes in affective state (Figure 1, path 3). The parameter for e_{ij} is the Level 1 error term.

Equation 2 represents a model for the prediction of the partner's intimacy changes by both partners' responsive touch:

$$\begin{aligned} \textit{Intimacy}_{ij} = b_{0j} + b_1\,(\text{previous intimacy}) + b_{2j}(\text{partner} \\ \text{responsive touch}) + b_{3j}(\text{own responsive touch}) + e_{ij} \end{aligned} \quad (2)$$

$\textit{Intimacy}_{ij}$ represents the intimacy toward one's partner felt by the male or female partner of couple j at time i. The estimate for b_{0j} is the average of the participant's intimacy, adjusted for all predictors in the model. The estimate for b_1 reflects the effect for the actor's intimacy at the previous report (i.e., the autocorrelation of intimacy reports). The estimate for b_{2j} captures the effect of the partner's responsive touch on the own intimacy change since the prior report (Figure 1, path 1b). The estimate for b_{3j} represents the effect of own responsive touch on one's intimacy changes (Figure 1, path 2b).[4]

To test the indirect effects of a touch experience on one's affective state via intimacy (mediation at Level 1), we used a procedure recommended by Bauer, Preacher, and Gil (2006) for assessing lower-level mediation. This approach tests the two equations of the indirect path simultaneously. The procedure allows obtaining estimates of a possible correlation between the individual's parameters (touch predicting intimacy, and intimacy predicting affective state), and to adjust for this correlation in the tests of the mediational paths. We implemented the proposed model using the multivariate extension of the MLwiN software (Rabash, Charlton, Brown, Healy, & Cameron, 2009). The equation for the independent variable (Equation 1) and the equation for the mediator variable as the outcome (Equation 2) were computed simultaneously. For the formal estimation of the indirect paths, we utilized the Monte Carlo Method for Assessing Multilevel Mediation (MCMAM; Selig & Preacher, 2009).

Commonly, heterosexual couples are seen as distinguishable dyads as women and men belong to clearly distinguishable populations (Olsen & Kenny, 2006). Moreover, means are not equal between women and men, so that the first condition of indistinguishability is not met (Kenny et al., 2006). Therefore, an APIM framework for distinguishable dyads was applied. However, it is commonly recommended to use the most parsimonious model, particularly in complex models as the present one. As research in supportive communication did not yield particular overall gender differences (e.g., Burleson & Kunkel, 2006), we tested whether assuming equality in the actor and partner effects and the size of their variance terms lead to models that performed equally well. A model comparison between the original model and a model with gender constrained suggested no significant difference, $\chi^2_{\text{diff}}(11) = 13.52$, $p = .26$. This provided the empirical grounds to retain a more parsimonious model with equal parameters and variances for husbands and wives, whereas men and women can still be considered to be distinguishable members of the dyad on the gender variable (Olsen & Kenny, 2006).

We ran additional analyses to explore the temporal unfolding of the effects of responsive touch and psychological intimacy. To this end, we ran two slightly modified models, testing prospective change rather than concurrent change. In the first model, responsive touch at the prior report was tested as a predictor of intimacy. In the second model, intimacy at the prior report was tested as the predictor of responsive touch. In both models, we adjusted for the dependent variable at the prior report and for the predictor at the concurrent report.

To investigate the long-term effect of responsive touch on PWB, we regressed partner's PWB at Time 2 (6 months follow-up) on the mean scores of responsive touch over the e-diary period, adjusting for PWB at Time 1 (Ledermann & Bodenmann, 2006; see Figure 2). We estimated all actor and partner associations within a Structural Equation Modeling approach (using AMOS, Arbuckle, 2009).

Results

Preliminary Analyses

Table 1 presents the means, standard deviations, and Pearson product moment correlations[5] between variables aggregated across all reports for each person.

Table 1. Mean and Standard Deviation of and Intercorrelations (Pearson's *r*) between Men and Women's Average Scores Over the Assessment Period.

	M	*SD*	1	2	3	4	5
1. Valence of mood W	6.67	0.86					
2. Valence of mood M	6.56	0.91	**0.22***				
3. Responsive touch W	2.7	0.79	0.13	**0.30****			
4. Responsive touch M	2.48	0.94	**0.17**†**	0.47***	**0.61*****		
5. Intimacy W	3.05	0.60	0.49***	**0.37*****	0.37***	**0.31****	
6. Intimacy M	3.05	0.61	**0.26****	0.48***	**0.30****	0.41***	**0.63*****

Note. *N* = 102 men and 102 women. The correlations between the dyad members are in bold. M = men; W = women.
†*p* < .1. **p* < .05. ***p* < .01. ***p < .001 (two tailed).

Table 2. Betas, Standard Errors, and Variances of the Multivariate Multilevel Model.

	Predicting mood		Predicting intimacy	
Predictor	β	Variance of the effect at Level 1	β	Variance of the effect at Level 1
Intercept	5.697 (.141)***	0.510 (.071)***	2.38 (.060)***	.170 (.020)***
Previous outcome	0.124 (.018)***	—	0.209 (.015)***	—
Actor responsive touch	0.156 (.024)***	0.001 (.011) *n.s.*	0.163 (.012)***	.015 (.003)***
Partner responsive touch	0.070 (.023)**	0.001 (.001) *n.s.*	0.067 (.008)***	.003 (.008) *n.s.*
Actor intimacy	0.662 (.076)***	0.295 (.076)***	—	—

Note. Effects were set equal between genders. *N* = 102 men and 102 women. Standard errors are shown in brackets. *n.s.* = nonsignificant.
***p* < .01. ****p* < .001.

To obtain estimates of the intercorrelations of variables at within and between subjects, we examined the variance–covariance matrices of a multivariate analysis with empty models (including random intercepts and no further predictors) for all investigated variables. The results suggested that all variables covaried significantly between partners at both levels. For affective state, the correlation at Level 2 was $r = .27$, $p < .05$ and at Level 1 $r = .32$, $p < .001$; for responsive touch, correlation at Level 2 was $r = .67$, $p < .001$ and at Level 1 $r = .24$, $p < .001$; for intimacy, correlation at Level 2 was $r = .67$, $p < .001$ and at Level 1 $r = .41$, $p < .001$.

Daily Associations Between Touch, Intimacy, and Affective State

Unstandardized parameters estimates, standard errors, and variances of the investigated associations are displayed in Table 2. The average affective state over the assessment period of both partners, controlled for all other parameters in the multivariate model, was $b = 5.697$, $SE = .141$, $p < .001$; the corresponding average intimacy level was $b = 2.38$, $SE = .060$, $p < .001$. The affective state at the previous report predicted the concurrent affective state significantly, $b = .124$, $SE = .018$, $p < .001$. Intimacy at the previous report also predicted concurrent intimacy, $b = .209$, $SE = .015$, $p < .001$.

Turning to our main hypotheses, we first tested our prediction that partner responsive touch was positively associated with own affective state (Figure 1: path 1a). The results showed that daily responsive touch was associated with a concurrent increase in the partner's affective state, thus confirming our first hypothesis ($b = .070$, $SE = .023$, $p < .01$). Computing the effect size[6] (ES) *r* yielded a medium estimate of ES $r = .29$. Moreover, we expected that responsive touch would be positively associated with the touch provider's own affective state (Figure 1: path 2a). We found a significant and large actor effect ($b = .156$, $SE = .024$, $p < .001$; ES $r = .55$), lending support to our hypothesis. Gauging the size of this effect in terms of overall affect variability, this means that compared with situations where the partner is not touched (a score of 0), the partner's affective state is improved by .89 *SD*[7] when he or she is touched very much (a score of 4).

Next, we turned to examine the mediational paths via psychological intimacy. We expected that responsive touch should be positively associated with increases in the partner's intimacy (Figure 1: path 1b), and also with increases in the provider's own intimacy (Figure 1: path 2b). The results confirmed this expectation for the partner's intimacy ($b = .067$, $SE = .008$, $p < .001$; ES $r = .65$), and also for the actor's own intimacy ($b = .163$, $SE = .012$, $p < .001$; ES $r = .81$). This means that compared with situations where the partner is not touched (a score of 0), the partner's intimacy is improved by .45 *SD*, and the own intimacy is improved by .1.09 *SD* as a consequence of high reported touch (a score of 4). Finally, we assumed that experienced intimacy is positively

associated with increases in the own affective state (Figure 1: path 3). The results confirmed our prediction, showing a significant positive association between intimacy and affective state in participants' daily lives ($b = .662$, $SE = .076$, $p < .001$; ES $r = .67$). Thus, compared with reports where one feels little intimacy (a score of 1), one's affective state is improved by 2.28 *SD*s when one feels very strong intimacy (a score of 4).

Prospective Associations Between Touch, Intimacy, and Affect

To obtain estimates that allow for more valid interpretations of the direction of pathways, we also examined moment-to-moment lagged effects of touch on intimacy, and vice-versa in Level 1 analyses that did not apply the APIM framework but instead examined within-person associations.

Controlling for intimacy at the previous report ($b = .562$, $SE = .021$, $p < .001$) and for concurrent responsive touch ($b = .148$, $SE = .011$, $p < .001$), responsive touch at the previous report did not significantly predict intimacy (a marginally significant effect was negative, $b = -.017$, $SE = .009$, $p = .06$). Hence, adjusting for previous intimacy and concurrent touch, prior responsive touch is not related to changes in intimacy.

We also examined the prediction of touch by intimacy at the previous report. Controlling for responsive touch at the prior report ($b = .442$, $SE = .02$, $p < .001$) and for concurrent intimacy ($b = .565$, $SE = .046$, $p < .001$), prior intimacy did not predict prospective change in responsive touch ($b = .038$, $SE = .041$, $p = .35$). Thus, when controlling for previous touch and concurrent intimacy feelings, previous intimate feelings were not associated with changes in responsive touch.

Furthermore, to explore possible effect of mood on touch, a cross-lagged analysis of earlier mood predicting touch controlling for concurrent associations was conducted. It revealed that the prior affective state did not predict touch significantly ($b = .023$, $SE = .019$, $p = .11$), when adjusting for the concurrent affective state ($b = .179$, $SE = .019$, $p < .001$) and previous touch ($b = .419$, $SE = .022$, $p < .001$).

Finally, the cross-lagged association between intimacy and mood was investigated. Results showed that earlier intimacy predicts affect significantly ($b = .115$, $SE = .038$, $p < .01$), while controlling for concurrent intimacy ($b = .638$, $SE = .055$, $p < .001$) and previous affective state ($b = .299$, $SE = .021$, $p < .001$). This effect corresponds to an increase of .26 *SD*s in affect, if one's intimacy increases from moderate (a score of 2) to very strong (a score of 4). The reversed association was not significant (previous mood predicting consecutive intimacy, $b = .007$, $SE = .007$, $p = .16$), while controlling for concurrent affective state ($b = .114$, $SE = .009$, $p < .001$) and previous intimacy ($b = .517$, $SE = .017$, $p < .001$).

Taken together, the association between touch and intimacy may be bidirectional and rather immediate. It appeared to emerge within a relatively narrow time window and dissipated over the span of 4 hr. Furthermore, touch was not predicted by an earlier positive affective state. The concurrent association, however, may well be bidirectional. Finally, the association between intimacy and affective state seems to support our assumption, as previous intimacy predicts later mood, but not the reverse.

Testing Mediational Paths

The results of our main model (Figure 1) showed that all hypothesized paths were significant. As mentioned, we estimated the significance of the full mediational paths in a multivariate framework, following the procedure proposed by Bauer and colleagues (2006).

Before beginning with the actual test of the mediational path, to test the value of adding the mediator to the model, we compared a fixed model without the mediator (direct partner path 1a, $b = .112$, $SE = .023$, $p < .001$; direct actor path 2a, $b = .253$, $SE = .023$, $p < .001$) to a fixed model with the mediator (direct partner path 1a, $b = .069$, $SE = .023$, $p < .01$; direct actor path 2a, $b = .154$, $SE = .024$, $p < .001$). The models differed significantly, $\chi^2_{diff}(10) = 1080.3$, $p < .001$, showing the relevant contribution of the mediator.

We first tested an indirect path between partner responsive touch and own affective state via own intimacy. Because we only constrained the variances but not the covariances to be equal across gender, we conducted one MCMAM-analysis (Selig & Preacher, 2008) with 20,000 repetitions for the effect on men's affective state and one for the effect on women's affective state. Results revealed that the hypothesized indirect effect (path 1b × path 3) differed significantly from zero in both partners (men: 95% confidence interval [CI] = [.027, .076]; women: 95% CI = [.005, .055]). This confirms our second hypothesis, whereby the effect of partner responsive touch on own affective state is mediated by own increased intimacy feelings toward the touch-displaying partner. Second, we tested whether intimacy mediated the association between own responsive touch and own affective state (path 2b × path 3). This indirect path was significant for both partners (men: 95% CI = [.070, 1.431]; women: 95% CI = [.074, 1.459]). Note that actor and partner direct effects remained significant when controlling for the indirect effects, indicating partial rather than full mediation.

Long-Term Effects of Responsive Touch

To examine whether the mean amount of responsive touch displayed in couple's daily lives had a long-term association with a trait-oriented well-being measure, we conducted an APIM structural equation model controlling for concurrent well-being. Again, all effects were set equal across genders. As the constrained model did not perform worse than the unconstrained model, $\chi^2_{diff}(6) = 8.21$, and simultaneously the means were not equal for all variables of the model (Kenny et al., 2006), we used a model for distinguishable dyads with effects set equal on gender to improve parsimony. The

Table 3. Responsive Touch as a Predictor of PWB Over 6 Months.

	Actor's PWB at Time 1		Partner's PWB at Time 1		Actor's PWB at Time 2		Partner's PWB at Time 2	
Predictor	β	Stand. β	β	Stand. β	β	Stand. β	β	Stand. β
Mean daily responsive touch	.075 (043)†	W: .133/M: .160	.022 (.043) *n.s.*	W: .040/M: .047	−.053 (.034) *n.s.*	W: −.094/M: −.071	**.094 (.035)****	W: **.140**/M: **.150**
PWB at Time 1	—		—		.999 (.055)***	W: .758/M: .828	.000 (.055) *n.s.*	W: .000/M: .000

Note. Effects were set equal between genders. *N* = 102 men and 102 women. In brackets is the standard error. PWB = psychological well-being; *Stand.* = standardized; M = men; W = women; *n.s.* = nonsignificant.
†$p < .1$. **$p < .01$. ***$p < .001$.

resulting model fit the data well, $\chi^2(6) = 8.21$, $p = .22$, *pclose* = .37, comparative fit index (CFI) = .99. The results of the full model are displayed in Table 3 and illustrated in Figure 2. They revealed a significant partner effect of mean responsive touch at Time 1 on Time 2 PWB ($b = .094$, $SE = .035$, $p < .01$; standardized estimates: effect of women's touch = .14, effect of men's touch = .15), while adjusting for correlation in the two partners' predictors and outcomes and for PWB at Time 1. This suggests that experiencing a relatively high degree of touch from one's romantic partner (e.g., an average score of 3), compared with low-frequency touch (a score of 1), is associated with increases of .40 *SD*s (women) or .35 *SD*s (men) in long-term well-being. The corresponding actor effect, that is, the effect of the mean responsive touch at Time 1 on own PWB 6 months later, was not significant ($b = -.053$, $SE = .034$, $p = .12$), indicating that actors did not benefit from touching their partner.

Discussion

The main aim of the study was to investigate the effects of responsive touch on the romantic partner's affective state as it occurs in daily life. We used electronic diary reports of both partners of dating couples to test the assumption that touching one's partner represents an interpersonal way to improve their emotional experience, and that this regulatory effect is established by conveying a feeling of intimacy. The results confirmed that displaying responsive touch toward one's partner was positively associated with changes in momentary affect, in the touched as well as in the touching individual. This association was partially mediated by fluctuations of intimacy felt toward the partner. Moreover, exploring the possible long-term implications of touch in close relationships, interindividual differences in the overall amount of daily responsive touch were found to be predictive of the partner's PWB 6 months later.

Responsive Touch as Interpersonal Emotion Regulation

The display of responsive touch toward a partner in response to their affective state was associated with a more positive affective valence in the touched partner. This supports the view that responsive touch may be used as a nonverbal interpersonal emotion regulation strategy, not only in mother–child relationships (Hertenstein & Campos, 2001) but also in adult romantic relationships. Few studies have investigated genuine interpersonal emotion regulation (Butler & Gross, 2009), and particularly few in a naturalistic setting. Touch, as a response to the partner's affective state, is obviously displayed and easy to perceive (Debrot et al., 2012). It might be an efficient way to transmit responsiveness toward the partner, which is a key feature of interpersonal transactions that renders social support most beneficial (Maisel & Gable, 2009). Moreover, touch has been shown to have specific stress-reducing (Holt-Lunstad et al., 2008) or stress-preemptive properties (Ditzen et al., 2007), on a physiological and on a subjective level (Coan et al., 2006). These findings are in line with the assumed positive effects of touch on the partner's affective state as observed in this study.

The size of the effect was moderate. However, several aspects indicate that touch may have a substantial practical significance for the partners' daily affective state. First, considering that affect has the function of responding to changing demands of the environment (Robinson & Clore, 2002), there are a multitude of influences on its daily fluctuations. Thus, the fact that partner's reports of responsive touch explain positive changes in affect above and beyond the previous affective state—allowing to exclude that the effect of touch is a mere correlate of better affective atmosphere in the couple—self-reports of touch, the averaged couple level of touch, and actor and partner intimacy is eloquent. Besides, the difference in mood between situations where the individual reports not having been touched and having been touched a lot by the partner corresponds to about a *SD* difference in affect; this supports the notion that touch has a practical emotional-regulation function. Furthermore, as additional analyses revealed that affect at the previous session was not associated with later touch, nothing indicates that partners touch each other because they were previously in a good mood. Moreover, following the APIM framework, the partner effect of touch reflects an added effect above the "touching culture" of a couple (i.e., the covariation of actor and partner touch). That means that the partner effect of touch is additionally predictive even in couples with high rates of mutual touch. In sum, as actor and partner effects

are significant, one might conclude that responsive touch shows a substantial association with fluctuations of daily momentary affect. Via touch, we regulate our own and our partner's emotions, and we thereby contribute to emotional synchrony and connection between spouses (e.g., Schoebi, 2008, Schoebi & Perrez, 2012).

Touch Brings Us Together: The Mediating Role of Intimacy

The second main result of this study is that the positive effect of responsive touch on the partner's affective state was partially but significantly mediated by increased intimacy experienced by the receiving partner. In other words, when we are touched by our partner, we experience being closer and more intimate with him or her; this in turn is associated with a more positive affective state. Thus, a significant part of the emotion regulative function of touch seems to be established via the experience of intimate bonds toward the romantic partner. It is interesting to note that the mediation was only partial—even if the partner does not feel any closer, there remains a significant direct association of touch with the affective state. Possibly, this can be explained by the soothing and calming effect of touch as reported earlier in studies focusing on the physiological effects (i.e., Ditzen et al., 2007).

Additional analyses on the temporal unfolding of the association between touch and intimacy show that only previous intimacy predicted consecutive affect and not the reverse. This finding supports our assumptions about the importance of feeling intimate for well-being (Reis & Franks, 1994), confirming its value in a short time period (about 4 hr).

The results of the mediation analyses reflect the socio-affective pathways that seem to play an important role in terms of health benefits of touch. In this study, responsive touch represents a reaction to the partner's state and is a way to express care and affection that is easily perceived as such by the target (Debrot et al., 2012; Lemay & Clark, 2008). Coan and colleagues (2006) reported that the positive effects of touching a hand while being exposed to a stressor were stronger when it was the spouse's hand, as compared with a strangers' hand. Moreover, this effect was stronger the more satisfied the individuals were in their relationship. This finding underlines the importance of the relationship quality with the touching person beyond the mere physical process. In fact, based on Sbarra and Hazan (2008)'s adult attachment perspective, one could argue that the positive effect of touch on affective state is a conditioned response of reward, related to experiences of a secure attachment situation. This conditioned association may explain the positive impact on a moment-to-moment basis but also in the long term. Physiological and psychological effects are closely interwoven and may reinforce each other. Investigation of interactions between physiological and psychological responses to interpersonal touch will be a promising avenue to increase our understanding of the effects of touch.

Positive Effects on the Touch Displayer

Accumulating evidence supports that doing good to others is also beneficial for the self (Kogan et al., 2010; Lemay & Clark, 2008; Post, 2005). This study showed that the displayer benefits from the responsive touch in romantic relationships, as touch also increases his or her affective state. Moreover, we demonstrated that this effect was partially mediated by an increase in the displayer's intimacy toward the touched partner. Thus, touch seems to be a way to bring both partners together, to increase their mutual feelings of connectedness and, in turn, to positively affect both partners' affective state. In the context of romantic relationships—as opposed for example to a professional setting of massage—it is probably often not clear which partner is the touch displayer and which the receiver. Rather, caring touch appears as a genuine exchange between both partners, as indicated by the high correlation between both partner's responsive touch at the person's level.

Long-Term Effects of Partner Responsive Touch

The aggregated amount of responsive touch displayed in daily life was associated with enhanced partner's PWB in the long term. As the APIM framework provides a control for interdependencies in the couple, this effect goes beyond the mere common level of touch in couples. Individuals with partners who reported touching them more frequently experienced higher levels of well-being 6 months later. As the mean level of PWB was high in our sample and even higher at Time 1 than at Time 2, it may be that partner touch prevents a decrease in PWB rather than promoting increases. A small ES for this finding supports this interpretation. This association indicates a possible mechanism by which positive relationships play a health-enhancing (or rather health-preserving) role (Berkman, Glass, Brissette, & Seeman, 2000; Holt-Lunstad, Smith, Layton, & Brayne, 2010). Interestingly enough, this effect is not observable in concurrent associations between habitual responsive touch and well-being, showing that this association seems to be delayed.

Accumulated measures of momentary affect have been shown to be particularly meaningful for health and well-being (Cohen et al., 2006) and even more predictive than common retrospective measures of affect (Gunthert et al., 2007). Further research is needed to identify mediators of this long-term effect, on a psychological and physiological level. Leaning on Sbarra and Hazan's model (2008), it seems plausible to assume that factors such as relationship quality, perceived proximity of social resources (Coan et al., 2006), or a positive or idealized perception of the partner (Murray, Holmes, & Griffin, 1996) mediate the long-term benefits of touch.

Strengths, Limitations, and Future Directions

The present study relied on an electronic diary method to investigate interpersonal emotion regulation in daily life. We can therefore assume ecological validity for the present results (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007; Reis, 2012). The sample included mostly young, well educated, and relatively satisfied partners. These results may therefore not generalize to the broader population, nor may they characterize distressed or clinical populations well. Moreover, the study was conducted in Switzerland; results may not generalize to other cultural contexts.

In most effects found in this study, significant variability at the person level remained to be explained. In this regard, it would be worth investigating whether the beneficial effects of touch are also found in avoidantly attached individuals who often distrust their relationship partner's goodwill (Schachner et al., 2005). One might expect that their reaction to responsive touch will not be always positive and might even be negative. A similar pattern can be expected in distressed couples, where conflict history might affect the perception of the goodwill of a partner's touching behavior (Gottman, 1993). Relationship length or relational stage (Emmers & Dindia, 1995; Guerrero & Andersen, 1991), socioeconomical level, or cultural background may also moderate the effect of touch. It is important to note that differences in relationship satisfaction did not alter the observed results, albeit in a rather homogeneous sample to this regard. More research is needed to examine possible influences of couple-related variables in this process.

A further possible limitation concerns the fact that the study relies entirely on self-reported data. This raises the possibility of inflated coefficients due to reporting bias regarding the actor effects. However, we have determined that the partner effect of responsive touch is not due to reporting biases, as this measure relies on reports of two different individuals. As mentioned, another limitation is that although responsive touch was reportedly displayed as a reaction to the partner's affective state, we do not know to which discrete emotion (i.e., anger, joy, or sadness) the touch was related. The conferred meaning and therefore the associations might differ according to which emotion or situation the partners are experiencing.

Finally, the current results are correlational and do not allow the identification of causal relationships. Rather, it is possible that the associations found in this study are also likely to be valid in other configurations. For example, being in a good mood could concurrently promote more responsive touch toward the partner, as it could also encourage the partner to approach responsively. However, the cross-lagged analyses show that neither earlier positive affective state nor intimacy predicts responsive touch. Therefore, there is no temporal antecedence in directionality that contradicts our theoretical assumptions. The associations seem to be concurrent (except for intimacy predicting mood), and bidirectional associations may also be likely. The reported results reflect changes in affective state and intimacy as they are controlled for earlier affective states and intimacy.

Conclusion

Our results complement and extend previous research on the health benefits of a positive physical contact to a close partner. Our study shows that in everyday life of couples, the display of responsive touch has direct short-time effects on the affective state not only of the touch target but also for the touching partner. The mediational role of intimacy suggests that the benefits of a positive partner contact are transmitted on the socio-affective level, as mood and relationship quality are highly interwoven and both relevant for health (Ong & Allaire, 2005). Furthermore, the amount of accumulated received responsive touch in everyday life appears to have a long-lasting effect, as reflected by enhanced PWB of the target 6 months later. The route of physical closeness leading to psychological closeness and thereby enhancing positive affect may be an important pathway through which the health-enhancing function of positive relationships can be explained (Berkman et al., 2000).

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Notes

1. Even if we do not assess discrete emotions per se, but rather the valence of the momentary affective experience, as strategies aiming at altering the latency, magnitude, duration, and offset of affective dynamics on the behavioral, experiential, and physiological domain are commonly referred to as emotion regulation strategies (Gross & Thompson, 2007, p. 8), here we use the term "emotion regulation."

2. Some authors have considered these feelings as reflecting "perceived partner responsiveness", that is, an earlier step in the interactive process of intimacy (e.g., Laurenceau, Barrett, and Rovine, 2005). However, in this study, we consider perceived responsiveness and intimacy as distinct constructs, leaning on Reis, Clark, and Holmes' (2004) definition of perceived responsiveness: "[. . .] a process by which individuals come to believe that relationship partners both attend to and react supportively to central, core defining features of the self. [. . .] This definition does not equate perceived partner responsiveness with intimacy or closeness; rather we see this process as one path (albeit a key one) by which people become intimate or close" (p. 203).
3. No explicit distinction was made between sexual and nonsexual touch. However, the example points toward nonsexual aspects of touch.
4. Relationship duration and relationship satisfaction could have an influence on the studied processes. They were therefore included in the model. Relationship duration showed no association with the outcomes. Relationship satisfaction was positively and significantly related to daily affective state and daily intimacy. However, the inclusion of these variables in the model did not affect the hypothesized effects in a significant way, and we therefore excluded them from our models.
5. Prior centering at the person's mean.
6. Determining effect sizes (ESs) in multilevel models is an issue of ongoing debate. We computed ESs *r* (e.g., Rosenthal, Rosnow & Rubin, 2000) based on the Wald test and the degrees of freedom for coefficients with random variation. These ESs should be interpreted with caution, and might overestimate the true size of the effects.
7. To compute such ESs, we calculated the predicted units of change in the outcome variable divided it by its standard deviation.

References

Arbuckle, J. J. (2009). *Amos 18.0 user's guide*. Chicago, IL: Amos Development Corporation.

Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods*, *11*, 142-163. doi:10.1037/1082-989X.11.2.142

Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science & Medicine*, *51*, 843-857. doi:10.1016/S0277-9536(00)00065-4

Burleson, B. R., & Kunkel, A. W. (2006). Revisiting the different cultures thesis: An assessment of sex differences and similarities in supportive communication. In K. Dindia & D. J. Canary (Eds.), *LEA's communication series: Sex differences and similarities in communication* (2nd ed., pp. 137-159). Mahwah, N.J: Lawrence Erlbaum.

Burleson, M. H., Trevathan, W. R., & Todd, M. (2007). In the mood for love or vice versa? Exploring the relations among sexual activity, physical affection, affect, and stress in the daily lives of mid-aged women. *Archives of Sexual Behavior*, *36*, 357-368. doi:10.1007/s10508-006-9071-1

Butler, E. A., & Gross, J. J. (2009). Emotion and emotion regulation: Integrating individual and social levels of analysis. *Emotion Review*, *1*, 86-87. doi:10.1177/1754073908099131

Coan, J. A. (2008). Toward a neuroscience of attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 241-265). New York, NY: Guilford.

Coan, J. A. (2010). Adult attachment and the brain. *Journal of Social and Personal Relationships*, *27*, 210-217. doi:10.1177/0265407509360900

Coan, J. A., Schaefer, H. S., & Davidson, R. J. (2006). Lending a hand: Social regulation of the neural response to threat. *Psychological Science*, *17*, 1032-1039. doi:10.1111/j.1467-9280.2006.01832.x

Cohen, S., Alper, C. M., Doyle, W. J., Treanor, J. J., & Turner, R. B. (2006). Positive emotional style predicts resistance to illness after experimental exposure to rhinovirus or influenza A virus. *Psychosomatic Medicine*, *68*, 809-815. doi:10.1097/01.psy.0000245867.92364.3c

Cook, W. L., & Kenny, D. A. (2005). The Actor-Partner Interdependence Model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*, *29*, 101-109. doi:10.1080/01650250444000405

Cranford, J. A., Shrout, P. E., Iida, M., Rafaeli, E., Yip, T., & Bolger, N. (2006). A procedure for evaluating sensitivity to within-person change: Can mood measures in diary studies detect change reliably? *Personality and Social Psychology Bulletin*, *32*, 917-929. doi:10.1177/0146167206287721

Dainton, M., Stafford, L., & Canary, D. J. (1994). Maintenance strategies and physical affection as predictors of love, liking, and satisfaction in marriage. *Communication Reports*, *7*, 88-98. doi:10.1080/08934219409367591

Debrot, A., Cook, W. L., Perrez, M., & Horn, A. B. (2012). Deeds matter: Daily enacted responsiveness and intimacy in couples' daily lives. *Journal of Family Psychology*, *26*, 617-627. doi:10.1037/a0028666

Ditzen, B., Neumann, I. D., Bodenmann, G., von Dawans, B., Turner, R. A., Ehlert, U., & Heinrichs, M. (2007). Effects of different kinds of couple interaction on cortisol and heart rate responses to stress in women. *Psychoneuroendocrinology*, *32*, 565-574. doi:10.1016/j.psyneuen.2007.03.011

Emmers, T. M., & Dindia, K. (1995). The effect of relational stage and intimacy on touch: An extension of Guerrero and Andersen. *Personal Relationships*, *2*, 225-236. doi:10.1111/j.1475-6811.1995.tb00088.x

Fahrenberg, J., Myrtek, M., Pawlik, K., & Perrez, M. (2007). Ambulatory assessment—Monitoring behavior in daily life settings: A behavioral-scientific challenge for psychology. *European Journal of Psychological Assessment*, *23*, 206-213. doi:10.1027/1015-5759.23.4.206

Field, T. M., Hernandez-Reif, M., Quintino, O., Schanberg, S., & Kuhn, C. (1998). Elder retired volunteers benefit from giving massage therapy to infants. *Journal of Applied Gerontology*, *17*, 229-239. doi:10.1177/073346489801700210

Frijda, N. H., & Scherer, K. R. (2009). Emotion definitions (psychological perspectives). In D. Sander & K. R. Scherer (Eds.), *The Oxford companion to emotion and the affective sciences* (1st ed.). Oxford, UK: Oxford University Press.

Gallace, A., & Spence, C. (2010). The science of interpersonal touch: An overview. *Neuroscience & Biobehavioral Reviews*, *34*, 246-259. doi:10.1016/j.neubiorev.2008.10.004

Gottman, J. M. (1993). The roles of conflict engagement, escalation, and avoidance in marital interaction: A longitudinal view of five types of couples. *Journal of Consulting and Clinical Psychology*, *61*, 6-15. doi:10.1037/0022-006X.61.1.6

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-24). New York, NY: Guilford.

Guerrero, L. K., & Andersen, P. A. (1991). The waxing and waning of relational intimacy: Touch as a function of relational stage, gender and touch avoidance. *Journal of Social and Personal Relationships*, *8*, 147-165. doi:10.1177/0265407591082001

Gunthert, K. C., Conner, T. S., Armeli, S., Tennen, H., Covault, J., & Kranzler, H. R. (2007). Serotonin transporter gene polymorphism (5-HTTLPR) and anxiety reactivity in daily life: A daily process approach to gene-environment interaction. *Psychosomatic Medicine*, *69*, 762-768. doi:10.1097/PSY.0b013e318157ad42

Hanzal, A., Segrin, C., & Dorros, S. M. (2008). The role of marital status and age on men's and women's reactions to touch from a relational partner. *Journal of Nonverbal Behavior*, *32*, 21-35. doi:10.1007/s10919-007-0039-1

Hendrick, S. S., Dicke, A., & Hendrick, C. (1998). The Relationship Assessment Scale. *Journal of Social and Personal Relationships*, *15*, 137-142. doi:10.1177/0265407598151009

Hertenstein, M. J., & Campos, J. J. (2001). Emotion regulation via maternal touch. *Infancy*, *2*, 549-566. doi:10.1207/S15327078IN0204_09

Hertenstein, M., Verkamp, J., Kerestes, A., & Holmes, R. (2006). The communicative functions of touch in humans, nonhuman primates, and rats: A review and synthesis of the empirical research. *Genetic, Social, and General Psychology Monographs*, *132*, 5-94. doi:10.3200/MONO.132.1.5-94

Holt-Lunstad, J., Birmingham, W. A., & Light, K. C. (2008). Influence of a "warm touch" support enhancement intervention among married couples on ambulatory blood pressure, oxytocin, alpha amylase, and cortisol. *Psychosomatic Medicine*, *70*, 976-985. doi:10.1097/PSY.0b013e318187aef7

Holt-Lunstad, J., Smith, T. B., Layton, J. B., & Brayne, C. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, *7*(7), e1000316. doi:10.1371/journal.pmed.1000316

John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality*, *72*, 1301-1334. doi:10.1111/j.1467-6494.2004.00298.x

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis* (Methodology in the social sciences). New York, NY: Guilford.

Kogan, A., Impett, E. A., Oveis, C., Hui, B., Gordon, A. M., & Keltner, D. (2010). When giving feels good: The intrinsic benefits of sacrifice in romantic relationships for the communally motivated. *Psychological Science*, *21*, 1918-1924. doi:10.1177/0956797610388815

Kring, A. M., & Werner, K. H. (2004). Emotion regulation in psychopathology. In P. Philippot & R. S. Feldman (Eds.), *The regulation of emotions* (pp. 359-385). Mahwah, N.J: Lawrence Erlbaum.

Larsen, R. J., & Prizmic, Z. (2004). Affect regulation. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 40-61). New York, NY: Guilford.

Laurenceau, J.-P., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. *Journal of Family Psychology*, *19*, 314-323. doi:10.1037/0893-3200.19.2.314

Laurenceau, J.-P., & Bolger, N. (2005). Using diary methods to study marital and family processes. *Journal of Family Psychology*, *19*, 86-97. doi:10.1037/0893-3200.19.1.86

Laurenceau, J.-P., & Bolger, N. (2012). Analyzing diary and intensive longitudinal data from dyads. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 407-422). New York, NY: Guilford.

Ledermann, T., & Bodenmann, G. (2006). Moderator and mediator effects in dyadic research: Two extensions of the Actor-Partner Interdependence Model. *Zeitschrift für Sozialpsychologie*, *37*, 27-40. doi:10.1024/0044-3514.37.1.27

Lemay, E. P., & Clark, M. S. (2008). How the head liberates the heart: Projection of communal responsiveness guides relationship promotion. *Journal of Personality and Social Psychology*, *94*, 647-671. doi:10.1037/0022-3514.94.4.647

Light, K. C., Grewen, K. M., & Amico, J. A. (2005). More frequent partner hugs and higher oxytocin levels are linked to lower blood pressure and heart rate in premenopausal women. *Biological Psychology*, *69*, 5-21. doi:10.1016/j.biopsycho.2004.11.002

Maisel, N. C., & Gable, S. L. (2009). The paradox of received social support: The importance of responsiveness. *Psychological Science*, *20*, 928-932. doi:10.1111/j.1467-9280.2009.02388.x

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

Niven, K., Totterdell, P., & Holman, D. (2009). A classification of controlled interpersonal affect regulation strategies. *Emotion*, *9*, 498-509. doi:10.1037/a0015962

Olsen, J. A., & Kenny, D. A. (2006). Structural equation modeling with interchangeable dyads. *Psychological Methods*, *11*, 127-141. doi:10.1037/1082-989X.11.2.127

Ong, A. D., & Allaire, J. C. (2005). Cardiovascular intraindividual variability in later life: The influence of social connectedness and positive emotions. *Psychology and Aging*, *20*, 476-485. doi:10.1037/0882-7974.20.3.476

Post, S. G. (2005). Altruism, happiness, and health: It's good to be good. *International Journal of Behavioral Medicine*, *12*, 66-77. doi:10.1207/s15327558ijbm1202_4

Prager, K. J., & Roberts, L. J. (2004). Deep intimate connection: Self and intimacy in couple relationships. In D. J. Mashek & A. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 43-60). Mahwah, NJ: Lawrence Erlbaum.

Rabash, J., Charlton, C., Brown, W. J., Healy, M., & Cameron, B. (2009). *MLwiN (Version 2.2) [Computer Software]*. Center for Multilevel Modelling, University of Bristol.

Reis, H. T. (1998). Gender differences in intimacy and related behaviors: Context and processes. In D. J. Canary & K. Dindia (Eds.), *Sex differences and similarities in communication: Critical essays and empirical investigations of sex and gender in interaction* (pp. 203-231). Mahwah, NJ: Lawrence Erlbaum.

Reis, H. T. (2012). Why researchers should think "real-world": A conceptual rationale. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3-21). New York, NY: Guilford.

Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In D. J. Mashek & A. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 201-225). Mahwah, NJ: Lawrence Erlbaum.

Reis, H. T., & Franks, P. (1994). The role of intimacy and social support in health outcomes: Two processes or one? *Personal Relationships*, *1*, 185-197. doi:10.1111/j.1475-6811.1994.tb00061.x

Reis, H. T., & Patrick, B. C. (1996). Attachment and intimacy: Component processes. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 523-563). New York, NY: Guilford.

Risch, A. K., Taeger, S., Morina, N., & Stangier, U. (2011). *Die Erfassung von eudämonischem Wohlbefinden mit dem Fragebogen zum Psychologischen Wohlbefinden* [The assessment of eudemonistic well-being with the Scales of Psychological Well-Being]. Manuscript submitted for publication.

Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, *128*, 934-960. doi:10.1037//0033-2909.128.6.934

Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). Contrasts and effect sizes in behavioral research: A correlational approach. Cambridge University Press.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069-1081. doi:10.1037/0022-3514.57.6.1069

Sander, J., & Böcker, S. (1993). Die deutsche Form der Relationship Assessment Scale (RAS): Eine kurze Skala zur Messung der Zufriedenheit in einer Partnerschaft [The German version of the Relationship Assessment Scale (RAS): A short scale for assessing satisfaction in a relationship]. *Diagnostica*, *1*, 55-62.

Sbarra, D. A., & Hazan, C. (2008). Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*, *12*, 141-167. doi:10.1177/1088868308315702

Schachner, D. A., Shaver, P. R., & Mikulincer, M. (2005). Patterns of nonverbal behavior and sensitivity in the context of attachment relations. *Journal of Nonverbal Behavior*, *29*, 141-169. doi:10.1007/s10919-005-4847-x

Schoebi, D. (2008). The coregulation of daily affect in marital relationships. *Journal of Family Psychology*, *22*, 595-604. doi:10.1037/0893-3200.22.3.595

Schoebi, D., & Perrez, M. (2012). Emotional coregulation in marriage: Contingencies between partners' anger and sadness, as associated with symptoms of depression, marital satisfaction and culture. *Studi Interdisciplinari sulla famiglia* [Interdisciplinary family studies], *25*, 243-260.

Selig, J. P., & Preacher, K. J. (2008). *Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects*. Retrieved from http://www.quantpsy.org/medmc/medmc.htm

Springer, K., & Hauser, R. M. (2006). An assessment of the construct validity of Ryff's Scales of Psychological Well-Being: Method, mode, and measurement effects. *Social Science Research*, *35*, 1080-1102.doi:10.1016/j.ssresearch.2005.07.004

Stadler, G., Snyder, K. A., Horn, A. B., Shrout, P. E., & Bolger, N. (2012). Close relationships and health in daily Life: A review and empirical data on intimacy and somatic symptoms. *Psychosomatic Medicine*, *74*, 398-409. doi:10.1097/PSY.0b013e31825473b8