Emotion

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Behavioral Variability in Physiological Synchrony During Future-Based Conversations Between Romantic Partners

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Physiological synchrony—or similarity between two people's physiological responses—is thought to have important consequences for health and well-being and has been observed in social relationship contexts. The present study investigated variability in dyads' physiological synchrony as a function of both partners' behaviors during an emotionally salient discussion. We examined concurrent covariation in cardiac interbeat intervals in a sample of young adult romantic couples (N = 79 dyads) who discussed the coordination of a personal goal with the future of their relationship (data collected from 2013 to 2015). Partners assigned to be *disclosers* revealed hypothetical good news (e.g., a dream job offer) with their partner, the *responder*, who reacted to this disclosure. To understand covariation–behavior associations, we examined three motivationally relevant behaviors that may underlie synchrony based on people's role in the discussion. We found significant variability in how much couples experienced covariation, and covariation depended, at least in part, on people's behaviors during the discussions. When disclosers spoke more (a behavior associated with less satisfying relationships and less positive partner perceptions), dyads experienced less physiological covariation. Furthermore, when responders showed more neglect and withdrawal, and when both partners displayed less positive emotion, dyads experienced less physiological covariation. These findings underscore couples' physiological synchrony as a heterogeneous process that can emerge with the presence of greater behavioral and emotional positivity.

Keywords: physiological synchrony, close relationships, future discussions, social interaction

Supplemental materials: https://doi.org/10.1037/emo0001437.supp

Physiological synchrony, broadly conceptualized as similarity between people's physiological responses, can occur across a variety of relationship types and in a variety of situations—for example, during interactions involving conflict, empathy, and cooperation (Bell, 2020; Marci & Orr, 2006; Palumbo et al., 2017; Timmons et al., 2015; West & Mendes, 2023). For decades, research on physiological synchrony has documented its presence specifically within romantic relationships, linking it to key outcomes, such as relationship quality and individual health outcomes (Chen et al., 2021; Pietromonaco & Collins, 2017). Throughout this work, a key finding that has emerged is that physiological synchrony is a variable phenomenon: It does not necessarily emerge for a couple across time, nor does it always emerge in the same contexts (Thorson et al., 2018; Timmons et al., 2015). Thus, an ongoing question in this literature regards the factors associated with synchrony: What features of social interactions are associated with physiological synchrony?

The physiological synchrony literature indicates that synchrony is more likely to emerge during conversations that are emotionally charged or require a high degree of involvement from both partners (West & Mendes, 2023). This is true for both negatively valenced (e.g., conflict; Levenson & Gottman, 1983) and positively valenced interactions (e.g., sharing positive events; Shrout et al., 2023). In the current work, we examine an emotionally salient interaction by investigating conversations between romantic partners who are discussing the future of their relationship in the face of uncertainty.

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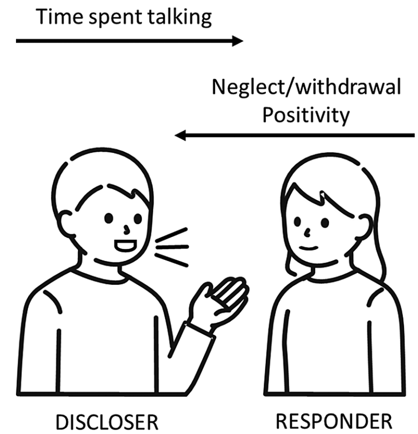
Such situations require partners to navigate the pursuit of personal goals while balancing the needs of their partner and plans for the relationship (Rusbult & Van Lange, 2008). Specifically, we created a conversation context in which one partner discloses positive news about a personal opportunity (e.g., receiving a job offer either in the current city or in a different location) and the couple must then discuss how this will affect the future of their relationship (we refer to these as "future-based conversations"; Peters et al., 2018b). Such conversations can be high stakes given that both partners may be highly attentive to each other's responses and, thus, represent discussions in which physiological synchrony may be likely to occur (Fitzsimons et al., 2015; Gere et al., 2011; Marshall & Gere, 2023). Moreover, these situations are highly relevant and particularly stressful for populations facing life transitions, such as young people starting careers who are often trying to balance personal and relational concerns simultaneously (Domene et al., 2012; Kumashiro et al., 2008).

Even within meaningful conversations, however, it is less clear *how* or *when* synchrony emerges between partners—in other words, what are the behavioral processes that facilitate or co-occur with synchrony (Goldstein et al., 2017)? Past work across a range of social interactions and relationship types has identified a variety of behaviors linked with physiological synchrony. One key idea researchers have focused on is the notion that motivationally tuned behaviors—in other words, those that have motivational relevance (approach/avoidance, especially; Gable, 2006; Gable & Impett, 2012) for one's partner or for the dyad—are the kinds of behaviors tied to synchrony. For example, in a study of students working together to solve math problems, researchers found that physiological synchrony was associated with the amount of time people's partners spent talking about the problems (Thorson et al., 2019). In a study of conversations between White and Black strangers, behavioral tension from White partners was associated with physiological synchrony between dyad members, presumably because Black participants were more vigilant to White partners' behavioral cues of discomfort (West et al., 2017).

What behaviors might be motivationally relevant in the context of future-oriented romantic relationship conversations? According to interdependence theory (Kelley & Thibaut, 1978), situations in which partners must contend with competing interests and desires are diagnostic, meaning that they afford opportunities for both partners to reveal their intentions or priorities toward the self or the relationship (Rusbult & Van Lange, 2003). For example, if discussing whether to accept a job offer and move with or without one's partner, several motivational processes are at play, such as: "Do I want my partner to join me?" "Do I want to continue the relationship?" or "Is this job offer more important to me than my relationship?" to name a few. People must also attend to their partner's intentions for the relationship and their willingness to compromise or make a sacrifice (Van Lange et al., 1997). During stressful life transitions, these situationally specific, motivationally tuned processes have the potential to impact how people orient to one another and exhibit (or not) more (or less) synchrony in biological channels.

Importantly, we predict that the behavioral processes which are motivationally relevant in this context, and thus potentially associated with synchrony, will vary by the partners' roles in these conversations (see Figure 1; Kraus & Mendes, 2014; Vigier et al., 2021). In the present study, by role, we mean whether a relationship partner *discloses* information about a future personal goal to their partner or *responds* to information about their partner's goal. Because the primary role of the discloser is to share positive news about their future personal goals (e.g., getting a job offer or being accepted into a graduate program) with their partner, we anticipate that a motivationally relevant behavior from the discloser is the extent to which they talk—how much they communicate to their partners about the event. Some work suggests talk time might be associated with increased synchrony because more "signaling" from the discloser can lead to better insight into the discloser's experiences (Thorson et al., 2018, 2021; West & Mendes, 2023). Alternatively, disclosers might talk more if they feel apprehensive or negatively about the topic or their partner and "overexplain" or "hedge" the presumably good news in the case of personal goals that may conflict with relationship goals (Peters et al., 2018a). Such negative affective experiences can sometimes be tied to less physiological synchrony (Coutinho et al., 2021; Hale et al., 2023) potentially because partners are disengaging from one another. If this is the case, talk time might be associated with *less*, not more, synchrony. Thus, although we anticipated that the amount of time disclosers spent speaking would be a motivationally relevant behavior, and therefore, would be associated with synchrony, we were agnostic about the direction of the hypothesized association.

Figure 1
Motivationally Relevant Behaviors for Synchrony by Role



Note. Based on the literature, (a) discloser time spent talking may be positively or negatively associated with synchrony, (b) responder neglect/withdrawal is expected to be negatively associated with synchrony, and (c) responder positivity is expected to be positively associated with synchrony.

For the other partner—the responder—their primary role in future-based conversations is to signal interest and attentiveness to the discloser (Gable et al., 2006; Reis et al., 2010). Therefore, motivationally relevant behaviors for the responder may include their level of engagement in the discussion and how much positive emotion they display. Responders who fail to appropriately engage with their partners by, for example, avoiding eye contact or displaying body language that is closed off, or responders who withdraw from the discussion and avoid the topic may be linked to negative outcomes for couples (Gottman & Driver, 2005). Such indicators of withdrawal may inhibit synchronization given that the opposite—overt signals of attentiveness (e.g., shared eye gaze)—have been linked to physiological synchrony (Helm et al., 2012; McAssey et al., 2013). Thus, we predicted that when responders neglected and/or withdrew from conversing with the discloser, dyads would be less likely to be physiologically synchronized with one another.

On the other hand, when responders show general positivity and interest toward their partner (e.g., happiness, enthusiasm, and smiling), dyads are expected to be more physiologically synchronized with each other. When responding to the good news of others with displays of enthusiasm and excitement, responders' behavior is linked to positive outcomes for the couple (Gable & Reis, 2010; Gable et al., 2006). Positive emotion and, in particular, shared positive emotion within a dyad have been linked to physiological synchrony (Chen et al., 2021). For example, positivity resonance theory (Fredrickson, 2016) proposes that high-quality moments of social connection are marked by co-experienced positive affect and physiological synchrony (Brown & Fredrickson, 2021), highlighting their important interrelation. Given that the success of an attempt to share good news largely depends on the responder's positive reaction (Peters et al., 2018a), we predicted that positive emotion particularly on behalf of the responder would be positively linked to physiological synchrony.

The Present Study

In the present study, we explored the variability underlying dyads' physiological synchrony in terms of the behaviors exhibited by partners in particular conversational roles—that is, the roles of discloser versus responder. We tested hypotheses in a study of romantic couples engaging in emotionally salient, relationship-relevant discussions about the coordination of personal goals with the future of the relationship. We assessed autonomic nervous system (ANS) activity of couples throughout their conversations by measuring cardiac interbeat intervals (IBI), the amount of time (in ms) between successive heartbeats. Cardiac IBIs provide a general measure of ANS activity as they are influenced by both the sympathetic and parasympathetic branches of the ANS (Berntson et al., 1993; Mendes, 2016). This is in contrast to metrics of heart rate variability, such as high-frequency heart rate variability, respiratory sinus arrhythmia, and root-mean-square of successive differences between heartbeats, which capture *variability* in the timing between heartbeats as opposed to the *average* timing between heartbeats and are far more heavily influenced by the parasympathetic nervous system (PNS; Thayer et al., 2008; Zygmunt & Stanczyk, 2010). Because IBI represents a measure of general autonomic arousal, we interpret synchrony on IBI responses as indicating the extent to which couples experience similar changes in arousal during their conversations.

Cardiac IBI is ideal for this investigation because (a) it is sensitive to quick changes in affect, motivation, and emotion (Manfredi et al., 2022; Zygmunt & Stanczyk, 2010), which we were interested in tracking within couples in vivo over time; (b) it can be reliably measured in short intervals (here, 20-s long), allowing us to track psychological changes as they occurred; and (c) measuring it does not require couples to be inhibited in their speech or movement (as might be the case with other noninvasive, continuous measures of ANS, like blood pressure, or with measures of neural responses), allowing for more natural social behaviors to be expressed. In addition, although measures of PNS are sometimes used to examine physiological synchrony (perhaps most frequently in parent–child dyads; e.g., Creavy et al., 2020; Lunkenheimer et al., 2018; Miller et al., 2023), we expected that physiological synchrony between adults during stressful, motivationally relevant conversations like the one we examined here would be more likely to emerge with measures capturing some sympathetic nervous system activity, rather than those focused exclusively on PNS activity (Mayo et al., 2021; Palumbo et al., 2017; Thorson et al., 2018). Thus, we anticipated that we would be more likely to find evidence of physiological synchrony using IBI as opposed to measures more exclusively influenced by PNS activity—please refer to the Supplemental Material for results examining covariation of the root-mean-square of successive differences between heartbeats.

Physiological synchrony in each couple was modeled such that it represents the extent to which two partners experience similar physiological reactivity on average throughout the conversation. Other quantifications of physiological correspondence have been used by researchers (see overviews by Marzoratti & Evans, 2022; Palumbo et al., 2017; Thorson et al., 2018); however, the present operationalization was favored for multiple reasons. First, we wanted to understand the extent to which people *concurrently* share psychological experiences, rather than, for example, the extent to which one partner's response at one time point predicts another's response at a future time point. Thus, we chose a quantification that allowed us to examine simultaneous similarity between partners' physiological responses. Second, given our interest in synchrony as a concurrent, shared dyadic process, we chose a model that could assess synchrony at the level of the dyad and not at the level of the individual. Others have referred to this as "nondirectional" synchrony, in that the estimates of synchrony for both dyad members are the same regardless of which partner serves as the predictor and which partner serves as the outcome (DiGiovanni et al., 2024; Helm et al., 2018; Qaiser et al., 2023); this is necessary for fundamentally dyadic conceptualizations of synchrony. Third, the approach allows for the examination of associations between physiological synchrony and behavioral processes, which not all models can accommodate. Because we are examining distinguishable dyads (dyads in which members differ on a particular variable; here, the variable is role: discloser vs. responder), these behaviors can be at the level of the individual. Thus, we are able to examine whether behaviors exhibited by the partner in a particular role affect synchrony at the level of the dyad.

Method

Participants

Though a total of 112 dyads initially completed the study, 79 couples were analyzed to test hypotheses[1] due to (a) excessive artifacts or insufficient physiological signals in 24 couples during baseline or discussion; (b) six couples not actually being in a romantic relationship; (c) two couples being inattentive to study procedures; and (d) one partner demonstrating evidence of a heart arrhythmia. All exclusions were made prior to analyzing any data. The mean age of participants was 20.1 years old (SD = 1.27, Min = 18, Max = 25). Participants identified as female (51.9%) or

[1] Data from this study are also published in several previous papers, all of which address questions unrelated to physiological covariation (Girme et al., 2021; Joel et al., 2020; Peters et al., 2018b; Tudder et al., 2020).

male (48.1%). There were 76 mixed-sex couples and three same-sex couples. Approximately half of the sample identified as White or Caucasian (53.2%), followed by Asian or Asian American (27.2%); Black, African American, or African (9.5%); Hispanic or Latino (6.9%); and Mixed or Other (3.2%). Couples were together for 13.3 months on average ($SD = 10.9$, Min = 3, Max = 48). Participants were recruited through the university's research subject pool and received either $10 or 2 hr of course extra credit for participation.

The sample size for this study was initially determined for hypotheses addressed elsewhere (Peters et al., 2018b). After data were collected, we did not conduct power analyses prior to conducting the analyses for this study due to a lack of sufficient information needed to estimate the number of parameters in a power analysis with a model of this nature (Helm et al., 2018; Lane & Hennes, 2018; Pek et al., 2024). However, because our sample size of 79 dyads, assessed across 15 time points, is similar to or exceeds most published research on dyadic physiological covariation (see Zee & Bolger, 2023, for an overview), we pursued our research questions with the sample size available. Approval for this study was obtained by the University of Rochester ethics board.

Procedure

Data were collected from 2013 to 2015 in which couples arrived at the lab and had an interaction with their romantic partner. The procedure is outlined in Figure 2; partners began the study in separate, private rooms by providing consent and completing questionnaires, which included the question, "Hypothetically, what is your dream job? Or, if you are planning to continue going to school after your undergraduate career, what would be your dream school to get into?" After the questionnaires, experimenters applied physiological sensors to participants, who then rested for a 5-min autonomic baseline period.

Next, participants individually received information about their role and condition assignments for the upcoming discussions. Participants were randomly assigned to one of two roles. The *discloser* was told to imagine they had received an offer from their dream job or school and had to share this good news with their partner. The *responder* listened and reacted to their partner's disclosure of good news. Couples were also randomly assigned to two conditions; although condition is not the focus of the current article, we adjust for its influence in all analyses (see Analytic Strategy section below). In the *noncorrespondent* condition, couples had to imagine that they could not live together and had to date long distance for one partner to attend their new job or school. In the *correspondent* condition, couples imagined that they could live with each other and move together for one partner's new job or school. For these discussions, participants were told to discuss their feelings about the news and how it would impact their relationship in the short and long term.

After receiving role and condition instructions, participants had 3 min to prepare for the discussion alone in separate, private rooms. Then, the door separating participants was opened for the couple to begin the 5-min discussion. After, there was a 3-min recovery period, and participants completed postinteraction questionnaires. Finally, participants swapped roles (e.g., the participant initially in the discloser role became the responder) and completed another discussion sequence. In the current article, we analyzed couples' data from their first discussion.

Transparency and Openness

We report how our sample size was chosen, all measures used in our analyses, and all data exclusions or manipulations. This study was not preregistered. The anonymized data set (available upon request) and code for all analyses can be found in the Open Science Framework at https://osf.io/wj7u6/?view_only=0b8448619027490e8d60c2089871a7d9. Analyses were conducted in SAS 9.4, and results figures were created using R V. 4.1.2 (R Core Team, 2021) in the ggplot2 package (Wickham, 2016).

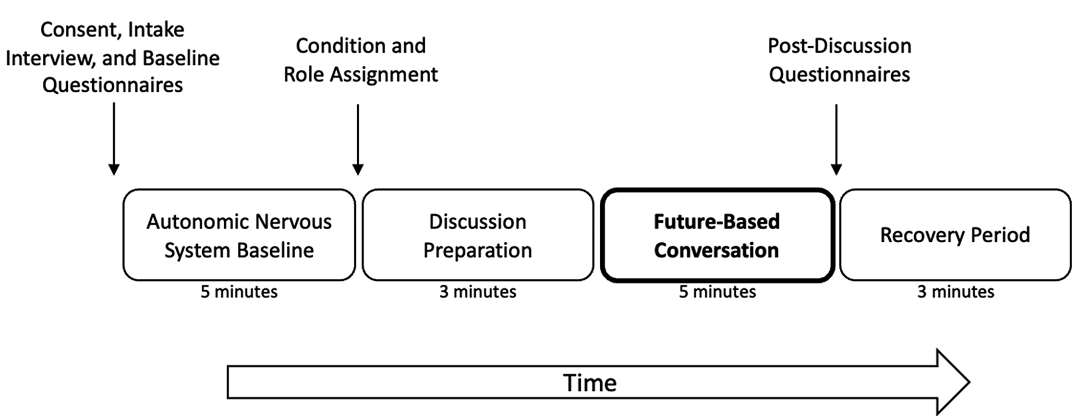
Measures

IBI

We measured ANS activity via mean cardiac IBI. We collected IBI signals using electrocardiography via Biopac's electrocardiography module and the MP150 integrated system (Biopac Systems,

Figure 2

Study Procedure



Note. The bold box indicates when partners were together for the study task. For all other tasks, partners were in separate rooms.

Inc., Goleta, California). Electrodes were applied in a modified Lead II configuration, and signals were collected at 1,000 Hz. Signals were then processed offline in 20-s intervals by trained personnel using Mindware's Heart Rate Variability software (v3.0.21; Mindware Technologies, Gahanna, Ohio). Mindware automatically detected R points in each electrocardiography wave, and trained personnel visually examined and manually corrected incorrect placements when necessary. Mindware then calculated average IBIs per person per 20-s interval, resulting in a maximum of 15 IBI observations per participant.

Time intervals vary widely in work on physiological synchrony, and, at present, there is no clear standard (Marzoratti & Evans, 2022). In general, shorter intervals are preferred because they are more likely to capture rapid changes in psychological experiences that can occur during conversations. However, this concern must be balanced against the reliable estimation of signals (Thorson et al., 2018). Here, we chose 20-s intervals so that we could capture relatively quick changes in experiences during conversations while also obtaining reliable estimates of IBI, even when several seconds of the interval are affected by movement artifacts (which often occur during naturalistic conversations). After focal analyses with the 20-s interval, we also conducted sensitivity analyses with IBI responses averaged over 10-s intervals (30 measurements per person) and 30-s intervals (10 measurements per person). In brief, all fixed effects in the models with 20-s intervals and 30-s intervals were consistent in terms of level of significance and direction. We found two differences in the models with 10-s intervals; the direction of the effects was the same, but the effects were weaker. These analyses and effects are listed in the Supplemental Material.

Behaviors

Discussions were video-recorded, and behaviors were scored by two trained coders. Each coder viewed and coded one member of the couple at a time. Researchers were trained by first watching example interactions that were representative of the scale endpoints and then coding a subset of videos individually that were then discussed together. Coders then independently coded the videos, periodically examining ratings together and discussing discrepancies with the goal of reducing those in future coding. One coder coded all participants, and a second coder coded 75%–80% of those participants. Because neglect/withdrawal and positive emotion were considered to be more subjective codes (relative to talk time), after independently coding, coders then met to agree on a final rating. Descriptive statistics and correlations for behaviors analyzed here are presented in Table 1.

Talk Time. Coders documented the amount of time each participant spent talking in seconds. We used a manual approach where coders watched video recordings independently from each other and recorded talk time for disclosers and responders in separate coding passes. They judged start and stop times for each participant's speech and then added up all the instances of speech (for similar approaches, see Hagiwara et al., 2013; Thorson et al., 2019). We computed intraclass correlation coefficients (ICCs) to assess interrater agreement with a two-way random effects, average-measures, absolute agreement model; both were in the excellent range (ICC for disclosers = .87; ICC for responders = .88). We averaged coders' ratings when possible.

Neglect/Withdrawal. Neglect/withdrawal behavior (Overall et al., 2009; Overall & McNulty, 2017) was coded on a scale of 1 (*low*) to 5 (*high*). High neglect/withdrawal is characterized by passive and dismissing behavior, including avoiding the topic, disengaging from one's partner, and withdrawing from the discussion. We computed an ICC to assess interrater agreement of their independent ratings with a two-way random effects, single-measures, absolute agreement model; the ICC was in the excellent range (ICC = .83).

Behavioral Positivity. A composite of behavioral positivity was created from three behavioral codes of happiness, enthusiasm, and smiling ($\alpha = .83$), each of which was coded on a scale of 1 (*low*) to 5 (*high*; coding scheme adapted from Beltzer et al., 2014). During the coding process, a subset of videos ($n = 20$ participants) was used to assess interrater agreement of coders' independent ratings on these items with two-way random effects, single-measures, absolute agreement models; the ICCs were in the excellent range (happiness ICC = .79, enthusiasm ICC = .73, smiling ICC = .80).

Self-Reports

Postdiscussion Partner Appraisals. After the discussion, participants rated their perception of their partner and their behavior

Table 1

Correlations and Descriptive Statistics for Behavioral Codes and Self-Report Variables by Role

Variable	1	2	3	4	5	6	7	8	9	10
Discloser variable										
1. Discloser time talking	—									
2. Discloser neglect/withdrawal	−.55***	—								
3. Discloser behavioral positivity	−.18	−.02	—							
4. Discloser relationship satisfaction	−.31**	.03	.24†	—						
5. Discloser positive partner perceptions	−.20†	.08	.24†	.58***	—					
Responder variable										
6. Responder time talking	.29**	−.18	−.49***	−.17	−.22†	—				
7. Responder neglect/withdrawal	.08	.32**	.17	−.26*	−.17	−.24*	—			
8. Responder behavioral positivity	−.26*	−.02	.07	.18	.32**	−.26*	−.39***	—		
9. Responder relationship satisfaction	−.39***	.25*	.15	.53***	.35**	−.13	−.28*	.19	—	
10. Responder positive partner perceptions	−.15	.08	.21	.20†	.39***	−.37***	−.28*	.40***	.49***	—
M	74.83	1.74	3.32	130.67	6.05	77.85	1.60	3.25	133.24	6.07
SD	40.16	1.05	0.89	23.70	0.94	38.16	0.93	1.02	20.24	0.79

† $p < .10$ * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

in the previous discussion. Seven items (e.g., "My partner was fair," "My partner's contributions to the discussion were constructive") were rated on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were averaged into a composite ($M = 6.06$, $SD = 0.86$, $\alpha = .85$).

Relationship Satisfaction. As part of the baseline questionnaires, participants reported their relationship satisfaction with the 32-item Couples Satisfaction Index (Funk & Rogge, 2007). Items assessed many different components of relationship satisfaction, including happiness (e.g., "Please indicate the degree of happiness, all things considered, of your relationship"), disagreement (e.g., over making major decisions together), and overall evaluations of the relationship (e.g., from "discouraging" to "hopeful"). Items were summed into a total score ($M = 127.79$, $SD = 31.62$, $\alpha = .96$).

Analytic Strategy

Concurrent, nondirectional physiological covariation in participants' IBI responses was estimated in a four-step process (Helm et al., 2018; Qaiser et al., 2023). First, we created IBI reactivity scores by subtracting each person's baseline IBI response (their IBI response during the last 60 s of baseline) from each of their conversation IBI responses (one response per person per 20-s interval; Thorson et al., 2018). Second, we removed linear temporal trends from each participant's IBI responses over time (i.e., we "detrended" responses) so that covariation estimates would not be affected by the typical decline in IBI responses across the conversations (Helm et al., 2018; Wang & Maxwell, 2015; we then conducted sensitivity analyses without detrending, and results were consistent [see the Supplemental Material]). Third, we standardized the detrended IBI responses within person so that covariation estimates would be the same regardless of which partner's response was the predictor and which partner's response was the outcome. This approach allows for one dyad-level estimate of the extent to which partners' physiological responses are concurrently changing in a similar fashion (Helm et al., 2018). By standardizing responses, this means that the dyad-level estimates of covariation are correlation coefficients and, thus, can be used as effect sizes, just as standard Pearson's r correlation coefficients are used. Lastly, we predicted the discloser's detrended standardized IBI response from the responder's detrended standardized IBI response in a no-intercept mixed model using SAS PROC MIXED. We refer to this effect of the responder's response on the discloser's response as covariation; because we used within-person-standardized responses, this covariation estimate was the same regardless of which partner was the predictor and which was the outcome. We used multilevel modeling and allowed covariation estimates to vary from dyad to dyad by adding a random slope. This serves as our first model, addressing whether covariation is significant, on average, and whether dyads significantly vary around this average (Bolger et al., 2019; DiGiovanni et al., 2024).

Additional models tested whether dyadic covariation differed as a function of discloser and responder behaviors by including interaction terms between relevant behaviors and responder's IBI response. These models included discloser *and* responder behaviors to isolate the effects of each partner's behavior on covariation while adjusting for any empirical overlap between them (Ledermann et al., 2011). Results were also consistent when examining only one partner's behavior at a time. All models adjusted for the effect of the experimental condition (correspondent vs. noncorrespondent) on covariation. Sensitivity analyses (Thabane et al., 2013) included interactions between behaviors and condition on covariation. We found no evidence that the behavior–covariation associations presented below were moderated by condition, so we trimmed these interaction terms from the primary models reported here. Behavior–covariation associations were consistent when these interactions were included (see the Supplemental Material).

Results

Table 1 displays descriptive statistics and correlations for key self-report measures and behaviors.

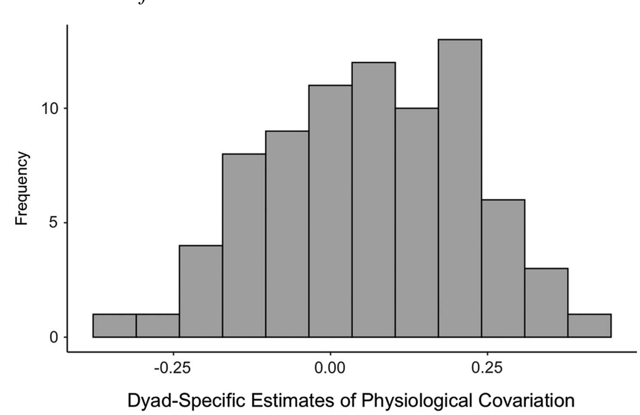
Physiological Covariation

On average, physiological covariation was not significant across couples, $b = 0.06$, $SE = 0.04$, $t(75.9) = 1.48$, $p = .14$, 95% CI [−0.02, 0.14]. However, we observed significant *variability* in covariation from dyad to dyad, $\tau = .06$, $SE = 0.02$, $Z = 2.88$, $p = .002$, 95% CI [0.03, 0.13]. In standard deviation units, the estimate of the random slope was 0.24 units, or about 3 times the size of the fixed effect for covariation. Figure 3 shows the distribution of predicted dyadic covariation estimates, which ranged from −0.32 to 0.43. Additionally, Figure 4 shows the IBI responses of both partners throughout the conversation in select dyads with low, average, and high levels of covariation. Thus, although covariation was not significant on average, given the substantial variability in dyadic covariation estimates, we investigated potential sources of this variability. Specifically, we examined whether covariation was associated with discloser or responder behaviors.

Physiological Covariation and Talk Time

We examined the associations between discloser and responder speaking time with physiological covariation (see the Supplemental Material for the full table). Discloser speaking time was negatively associated with covariation, $b = -0.003$, $SE = 0.001$, $t(69.5) = -2.93$, $p = .005$, 95% CI [−0.005, −0.001]. Dyads with disclosers

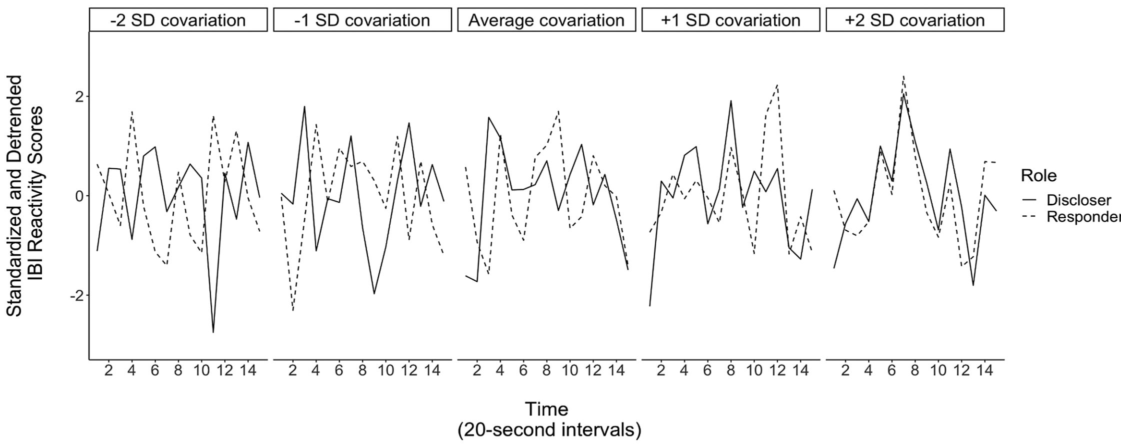
Figure 3
Distribution of Model-Predicted Covariation Estimates



Note. Values represent couples' covariation estimates across the 5-min conversation.

Figure 4

Covariation in Standardized, Detrended IBI Reactivity Scores Across Dyads Low, Average, and High in Physiological Covariation



Note. The figure illustrates couples' physiological responses across the 5-min conversation for select dyads at low, average, and high levels of covariation. Data are shown from five dyads in our data set based on their covariation estimates. IBI = interbeat interval.

who talked less (−1 *SD*) showed positive covariation, $b = 0.18$, $SE = 0.06$, $t(68.7) = 3.11$, $p = .003$, 95% CI [0.06, 0.29]. In contrast, dyads with disclosers who talked more (+1 *SD*) showed no significant covariation, $b = -0.07$, $SE = 0.06$, $t(70.6) = -1.17$, $p = .25$, 95% CI [−0.18, 0.05]. As predicted, responder talk time was not associated with covariation, $b = -0.001$, $SE = 0.001$, $t(69) = -0.39$, $p = .70$, 95% CI [−0.003, 0.002] (Figure 5).

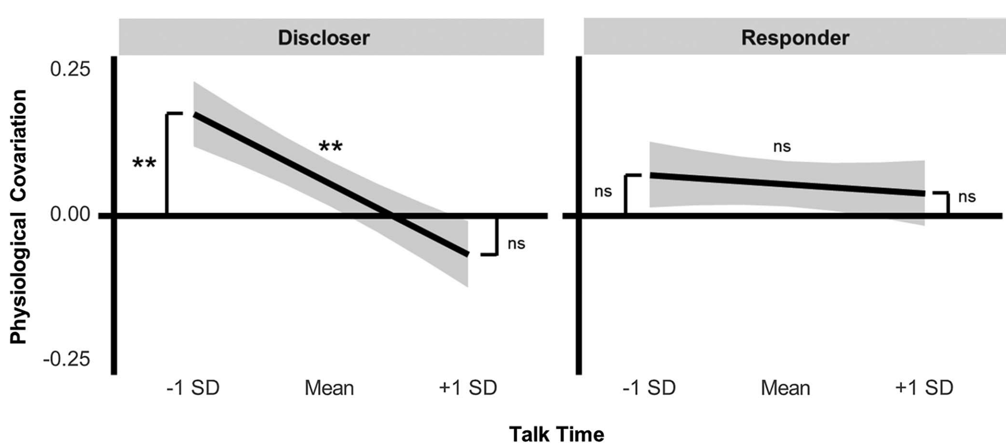
To better understand talk time in these conversations, we examined associations between talk time and subjective reports of relationship and conversation quality. More time spent talking by both disclosers and responders was associated with less positive perceptions of their partner's behavior during the conversation ($-.37 \leq r\text{s} \leq -.15$) and less satisfying relationships ($-.39 \leq r\text{s} \leq -.13$), but was not significantly associated with relationship length, *p*s > .10. Thus, the data indicate that partners spoke more when they were having negative conversations and were in less satisfying relationships.

Physiological Covariation and Neglect/Withdrawal

Next, we examined associations between discloser and responder neglect/withdrawal behavior with physiological covariation (see the Supplemental Material for the full table). As predicted, discloser neglect/withdrawal was not significantly associated with covariation, $b = 0.05$, $SE = 0.05$, $t(60.3) = 1.06$, $p = .29$, 95% CI [−0.04, 0.15]. However, responder neglect/withdrawal was negatively associated with covariation—the less neglect/withdrawal that responders showed during the conversation, the more covariation they exhibited with their partner—though this effect did not meet conventional thresholds for statistical significance, $b = -0.10$, $SE = 0.05$,

Figure 5

Dyadic Physiological Covariation at High and Low Levels of Talk Time



Note. Gray bands indicate standard errors. Brackets indicate whether covariation was significantly different from zero.
** $p < .01$. [ns] $p > .05$. Exact p values are in the text.

$t(59.6) = -1.94$, $p = .057$, 95% CI [−0.20, 0.003]. Dyads with responders low in neglect/withdrawal (−1 *SD*) showed positive covariation, though this effect did not surpass the conventional cutoff for statistical significance, $b = 0.12$, $SE = 0.06$, $t(59) = 1.96$, $p = .054$, 95% CI [−0.002, 0.25]. Dyads with responders high in neglect/withdrawal (+1 *SD*) showed no significant covariation, $b = -0.07$, $SE = 0.07$, $t(60.5) = -0.97$, $p = .34$, 95% CI [−0.21, 0.07] (Figure 6).

Physiological Covariation and Behavioral Positivity

Lastly, we examined associations between discloser and responder behavioral positivity with physiological covariation (see the Supplemental Material for the full table). Contrary to our predictions, both discloser and responder behavioral positivity were positively related to covariation. The relationship between discloser behavioral positivity and covariation, while not "significant" per conventional thresholds: $b = 0.10$, $SE = 0.05$, $t(56.7) = 1.93$, $p = .058$, 95% CI [−0.003, 0.21], was similar in magnitude to the relationship between responder behavioral positivity and covariation, which was significant, $b = 0.09$, $SE = 0.04$, $t(56.7) = 2.14$, $p = .037$, 95% CI [0.01, 0.18].

Dyads with disclosers high in positive emotion (+1 *SD*) showed positive covariation (though it was not significantly different from zero), $b = 0.11$, $SE = 0.06$, $t(56.4) = 1.77$, $p = .082$, 95% CI [−0.01, 0.24]. Dyads with disclosers low in positive emotion (−1 *SD*) did not show significant covariation, $b = -0.08$, $SE = 0.07$, $t(57.6) = -1.18$, $p = .24$, 95% CI [−0.22, 0.06]. Dyads with responders high in positive emotion (+1 *SD*) showed positive covariation (though it was not significantly different from zero), $b = 0.10$, $SE = 0.06$, $t(56.3) = 1.71$, $p = .093$, 95% CI [−0.02, 0.22]. Dyads with responders low in positive emotion (−1 *SD*) showed negative covariation (though, again, not significantly different from zero), $b = -0.07$, $SE = 0.06$, $t(58) = -1.21$, $p = .23$, 95% CI [−0.19, 0.05] (Figure 7).

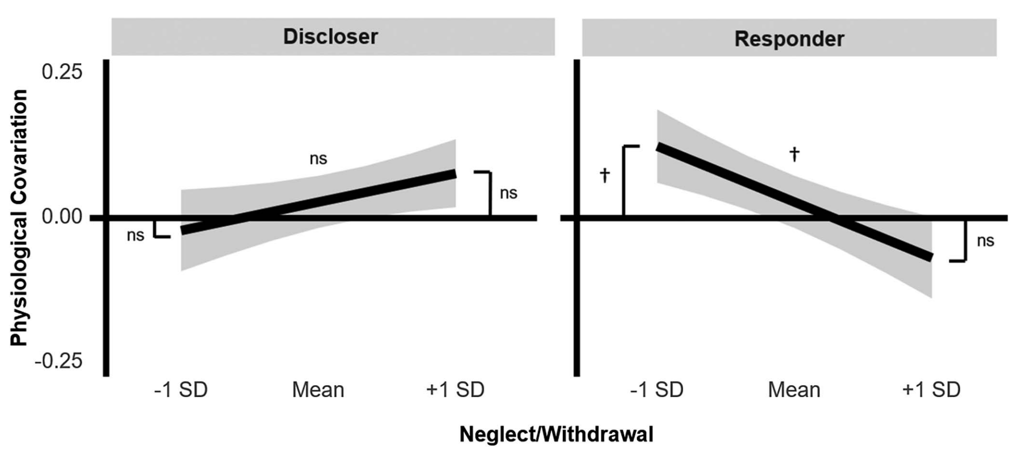
Discussion

We examined couples' physiological synchrony when discussing the future of their relationship. The current findings underscore the nature of dyadic physiological synchrony as a variable process that can emerge as a function of different features of social interactions, including the behaviors that are exhibited by people in particular social roles. Specifically, physiological synchrony emerged for dyads when disclosers spoke less, responders demonstrated less withdrawal, and both partners displayed greater behavioral positivity. Although scholars have been clear that physiological synchrony is variable, much less research has identified behavioral processes that co-occur with synchrony and contribute to its variability. Thus, this work helps identify motivationally relevant behaviors that are related to physiological synchrony within an important and relatively common situation for committed romantic partners.

Although we initially predicted that talk time from disclosers would be associated with physiological synchrony, we were agnostic regarding the direction. For instance, talk time has been associated with more physiological synchrony between partners, possibly because talking can help provide insight into each other's experiences, promoting synchronization (Thorson et al., 2019, 2021). Here, though, we found the opposite: The more that disclosers talked, the *less* physiological synchrony dyads showed. This is potentially due to the unique (and relevant) nature of the conversational context examined: college students discussing their relationship plans after college. Because talk time in this study aligned with partners feeling more negatively about each other and being less satisfied in their relationships, it is possible that disclosers who talked a lot were in less satisfying or committed relationships, and generally struggling to "get on the same page" with each other. It is also possible that, as a discloser, talking more in this context when one has received positive news for oneself—but not necessarily for the relationship—creates psychological distance between partners, hindering their ability to develop physiological synchrony with each other. The current data

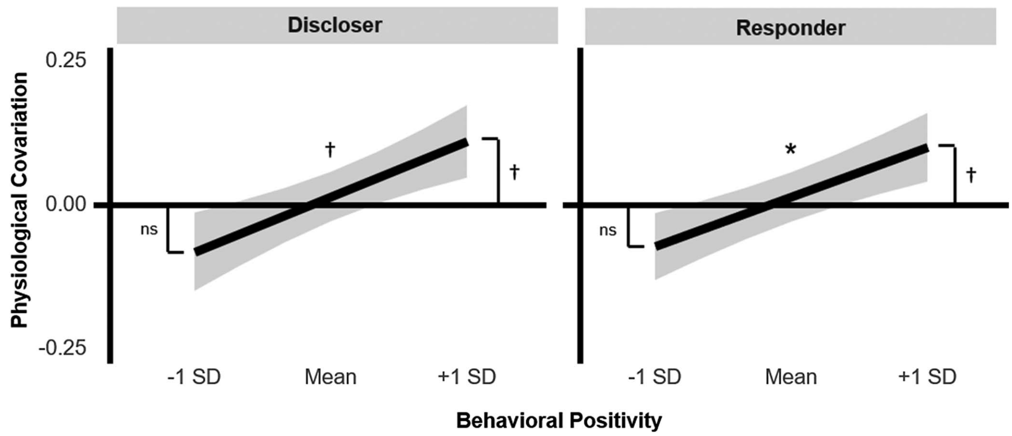
Figure 6

Dyadic Physiological Covariation at High and Low Levels of Neglect/Withdrawal



Note. Gray bands indicate standard errors. Brackets indicate whether covariation was significantly different from zero. † .05 < *p* < .10. ns *p* > .10. Exact *p* values are in the text.

Figure 7
Dyadic Physiological Covariation at High and Low Levels of Behavioral Positivity



Note. Gray bands indicate standard errors. Brackets indicate whether covariation was significantly different from zero. $^{\dagger}p < .10$. $^{*}p < .05$. $^{ns}p > .10$. Exact p values are in the text.

cannot distinguish between these possibilities (or others), but they clearly highlight that talk time is not a sure-fire catalyst for positive physiological synchrony. At a time when many scholars are trying to understand what synchrony means and why it occurs, these data in combination with other work illustrate that even the same behavior can be differentially associated with synchrony depending on the situation and the process underlying the behavior.

When hearing their partners' disclosures of good news, people have a key opportunity to demonstrate responsiveness by exhibiting enthusiasm, interest, and attentiveness, thereby signaling their support for their partner's aspirations (Gable & Reis, 2010; Peters et al., 2018a). Accordingly, in this study, we found that responders' behaviors played an important role in couples' physiological synchrony: Greater behavioral positivity and less neglect and withdrawal from responders were associated with more dyadic synchrony. Consistent with decades of research on partner responsiveness (Finkel et al., 2017; Peters et al., 2018a; Reis & Gable, 2015), these results show the importance of people's responses toward their partners, not just for subjective experiences or relationship outcomes, but for physiological processes as well.

Disclosers' behavioral positivity was also positively associated with covariation; though the relationship was marginally significant, the magnitude was similar to that of the relationship between responders' behavioral positivity and covariation. This warrants testing in future research to discern whether the present study was underpowered to detect the effect. If so, this is consistent with other work highlighting the importance of *shared* states of positive emotion for physiological synchrony (Chen et al., 2021; Fredrickson, 2016). Nonetheless, because our analyses included both discloser and responder behaviors, these results indicate that exhibiting behavioral positivity predicts covariation above and beyond whatever effects their partners' behaviors have for both individuals. Thus, these data raise an interesting question regarding the importance of role. In conversations where there are distinguishable roles, like those here, some behaviors might be tied to synchrony only when they are exhibited by a partner in a particular role—for example, as in the case of talk time and neglect/withdrawal in this study. Others, like behavioral positivity here, may matter for synchrony regardless of which partner exhibits them.

On average, couples demonstrated positive physiological synchrony during these conversations, indicating that both partners' IBI reactivity generally tracked with each other. However, it is important to note that there were also couples in our sample that experienced negative physiological synchrony, such that one partner's above-average IBI was linked to the other partner's below-average IBI at the same time point. This pattern of negative covariation could be conceptualized in two different ways. One is that these couples are having different experiences and this discrepancy is reflected in their mismatched physiological responses. However, negative covariation could also arise if partners follow the same general pattern, but there is a time lag in their shared experience. Although both cases would result in a negative synchrony estimate, the social interactions might feel different. We were not able to assess which of the two cases (or others) is more reflective of the couples in this study, but it would be important to investigate these in the future.

Another future direction of the current work is to explore whether physiological synchrony in couples' conversations might predict longer term relational outcomes, such as later commitment and satisfaction in the relationship above and beyond behaviors or subjective experiences. Other work examining synchrony in lab-based discussions found long-term health and well-being consequences, which suggests couples' dynamics in the moment can impact their long-term outcomes (Pauly et al., 2021). Although the present study did not examine long-term outcomes of synchrony, future research might test whether couples who experienced synchrony when discussing their relationship's future left with a sense of shared understanding with their partner on their future trajectory. It is possible that physiological synchrony could have a unique role in promoting couples' future coordination and commitment to each other or may be a marker of shared psychological processes that predicts longer term coordination and commitment. Understanding the role that physiological synchrony plays in future relationship outcomes might help identify important mechanisms or precursors to relational change.

Constraints on Generality

It should be noted that the current conclusions are drawn from a sample of young couples in relatively newer relationships who participated in a one-time lab discussion task about the future of their relationship. Although the nature of the discussions was highly relevant for these young couples as many would face this specific situation postgraduation (Domene et al., 2012), the conversations were hypothetical. So, some couples may not have had to address these challenges yet or even considered them. Furthermore, this paradigm and conversation topic might not be as salient of a discussion for older couples in more longer term, committed relationships. Nonetheless, throughout a relationship, partners face many instances of competing goals, interests, or desires that might be similarly resolved through both partners compromising or one partner making a sacrifice (Fitzsimons et al., 2015; Kumashiro et al., 2008; Rusbult & Van Lange, 2003; Van Lange et al., 1997). So, although the content of the exact conversations may be different for older couples, similar situations will occur throughout their relationship in which the current paradigm may apply. Future studies may seek to generalize findings to other conversations, such as social support discussions, in which partners also assume discloser and responder roles, to examine whether similar behavioral processes facilitate synchrony. It is also important to acknowledge that, in real life, conversations on these topics likely do not follow strict conversational roles and represent more fluent exchanges across partners.

The current work examined the behaviors associated with synchrony in a single 5-min conversation, but we were not able to examine how synchrony fluctuates with these behaviors across time. One interesting question would be to test whether the behaviors examined influence synchrony differently at different points in these conversations; however, we were underpowered to detect such interactions. In addition, the topics of the conversations are complex issues that likely cannot (and should not) be solved in a single discussion (Challiol & Mignonac, 2005). Realistically, couples return to these topics multiple times over the course of the relationship. Therefore, we were not able to assess the function of synchrony as couples continue to navigate these discussions and coordinate their needs with one another. Although some behaviors that facilitated synchrony in the current discussions may yield synchrony across time (e.g., behavioral positivity), other behaviors, such as talk time, may have different consequences. For example, as our results might suggest, disclosers who talk more in the initial revealing of news may inhibit synchrony as they do not adequately consider their partner's perspective. However, disclosers who talk more in the long term, such as by bringing up the topic multiple times over the course of a month, might be demonstrating their investment in the relationship and commitment to solving an issue (Rusbult et al., 2012). This could yield greater synchrony as couples have more opportunities to plan for and establish their future together. Furthermore, when examining synchrony long term, conceptual models have pointed to understanding synchrony in social interactions as a flexible process, meaning there are some times when synchronization is beneficial, but other times when people prioritize independence from a partner (Mayo & Gordon, 2020). In the current context of future-based conversations, both processes may be utilized: synchrony when partners are focusing on their relationship, but also times of segregation from one another when an individual needs to work on their personal goals.

Conclusion

Among romantic couples having a discussion about their future, we examined physiological synchrony in partners' cardiac IBI. We also explored variability in synchrony in terms of relevant behaviors from each partners' unique role in the discussion. Synchrony emerged when disclosers of good news talked less, when responders to this news exhibited less withdrawal, and when both partners displayed greater positive emotion. These findings contribute to ongoing discourse on the diverse contexts in which synchrony occurs and the various psychological and behavioral processes that facilitate this experience.

References

Bell, M. A. (2020). Chapter six—Mother–child behavioral and physiological synchrony. In J. B. Benson (Ed.), *Advances in child development and behavior* (Vol. 58, pp. 163–188). Elsevier Academic Press. https://doi.org/10.1016/bs.acdb.2020.01.006

Beltzer, M. L., Nock, M. K., Peters, B. J., & Jamieson, J. P. (2014). Rethinking butterflies: The affective, physiological, and performance effects of reappraising arousal during social evaluation. *Emotion*, *14*(4), 761–768. https://doi.org/10.1037/a0036326

Berntson, G. G., Cacioppo, J. T., & Quigley, K. S. (1993). Cardiac psychophysiology and autonomic space in humans: Empirical perspectives and conceptual implications. *Psychological Bulletin*, *114*(2), 296–322. https://doi.org/10.1037/0033-2909.114.2.296

Bolger, N., Zee, K. S., Rossignac-Milon, M., & Hassin, R. R. (2019). Causal processes in psychology are heterogeneous. *Journal of Experimental Psychology: General*, *148*(4), 601–618. https://doi.org/10.1037/xge0000558

Brown, C. L., & Fredrickson, B. L. (2021). Characteristics and consequences of co-experienced positive affect: Understanding the origins of social skills, social bonds, and caring, healthy communities. *Current Opinion in Behavioral Sciences*, *39*, 58–63. https://doi.org/10.1016/j.cobeha.2021.02.002

Challiol, H., & Mignonac, K. (2005). Relocation decision-making and couple relationships: A quantitative and qualitative study of dual-earner couples. *Journal of Organizational Behavior*, *26*(3), 247–274. https://doi.org/10.1002/job.311

Chen, K.-H., Brown, C. L., Wells, J. L., Rothwell, E. S., Otero, M. C., Levenson, R. W., & Fredrickson, B. L. (2021). Physiological linkage during shared positive and shared negative emotion. *Journal of Personality and Social Psychology*, *121*(5), 1029–1056. https://doi.org/10.1037/pspi0000337

Coutinho, J., Pereira, A., Oliveira-Silva, P., Meier, D., Lourenço, V., & Tschacher, W. (2021). When our hearts beat together: Cardiac synchrony as an entry point to understand dyadic co-regulation in couples. *Psychophysiology*, *58*(3), Article e13739. https://doi.org/10.1111/psyp.13739

Creavy, K. L., Gatzke-Kopp, L. M., Zhang, X., Fishbein, D., & Kiser, L. J. (2020). When you go low, I go high: Negative coordination of physiological synchrony among parents and children. *Developmental Psychobiology*, *62*(3), 310–323. https://doi.org/10.1002/dev.21905

DiGiovanni, A. M., Peters, B. J., Tudder, A., Gresham, A. M., & Bolger, N. (2024). Physiological synchrony in supportive discussions: An examination of co-rumination, relationship type, and heterogeneity. *Psychophysiology*, *61*(7), Article e14554. https://doi.org/10.1111/psyp.14554

Domene, J. F., Nee, J. J., Cavanaugh, A. K., McLelland, S., Stewart, B., Stephenson, M., Kauffman, B., Tse, C. K., & Young, R. A. (2012). Young adult couples transitioning to work: The intersection of career and relationship. *Journal of Vocational Behavior*, *81*(1), 17–25. https://doi.org/10.1016/j.jvb.2012.03.005

Finkel, E. J., Simpson, J. A., & Eastwick, P. W. (2017). The psychology of close relationships: Fourteen core principles. *Annual Review of Psychology*, *68*(1), 383–411. https://doi.org/10.1146/annurev-psych-010416-044038

Fitzsimons, G. M., Finkel, E. J., & vanDellen, M. R. (2015). Transactive goal dynamics. *Psychological Review*, *122*(4), 648–673. https://doi.org/10.1037/a0039654

Fredrickson, B. L. (2016). Love: Positivity resonance as a fresh, evidence-based perspective on an age-old topic. In L. F. Barrett, M. Lewis, & J. M. Haviland (Eds.), *Handbook of emotions* (4th ed., pp. 847–858). Guilford Press.

Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology*, *21*(4), 572–583. https://doi.org/10.1037/0893-3200.21.4.572

Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality*, *74*(1), 175–222. https://doi.org/10.1111/j.1467-6494.2005.00373.x

Gable, S. L., Gonzaga, G. C., & Strachman, A. (2006). Will you be there for me when things go right? Supportive responses to positive event disclosures. *Journal of Personality and Social Psychology*, *91*(5), 904–917. https://doi.org/10.1037/0022-3514.91.5.904

Gable, S. L., & Impett, E. A. (2012). Approach and avoidance motives and close relationships. *Social and Personality Psychology Compass*, *6*(1), 95–108. https://doi.org/10.1111/j.1751-9004.2011.00405.x

Gable, S. L., & Reis, H. T. (2010). Good news! Capitalizing on positive events in an interpersonal context. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 42, pp. 195–257). Academic Press. https://doi.org/10.1016/S0065-2601(10)42004-3

Gere, J., Schimmack, U., Pinkus, R. T., & Lockwood, P. (2011). The effects of romantic partners' goal congruence on affective well-being. *Journal of Research in Personality*, *45*(6), 549–559. https://doi.org/10.1016/j.jrp.2011.06.010

Girme, Y. U., Peters, B. J., Baker, L. R., Overall, N. C., Fletcher, G. J. O., Reis, H. T., Jamieson, J. P., & Sigal, M. J. (2021). Attachment anxiety and the curvilinear effects of expressive suppression on individuals' and partners' outcomes. *Journal of Personality and Social Psychology*, *121*(3), 524–547. https://doi.org/10.1037/pspi0000338

Goldstein, P., Weissman-Fogel, I., & Shamay-Tsoory, S. G. (2017). The role of touch in regulating inter-partner physiological coupling during empathy for pain. *Scientific Reports*, *7*(1), Article 3252. https://doi.org/10.1038/s41598-017-03627-7

Gottman, J. M., & Driver, J. L. (2005). Dysfunctional marital conflict and everyday marital interaction. *Journal of Divorce & Remarriage*, *43*(3–4), 63–77. https://doi.org/10.1300/J087v43n03_04

Hagiwara, N., Penner, L. A., Gonzalez, R., Eggly, S., Dovidio, J. F., Gaertner, S. L., West, T., & Albrecht, T. L. (2013). Racial attitudes, physician–patient talk time ratio, and adherence in racially discordant medical interactions. *Social Science & Medicine*, *87*, 123–131. https://doi.org/10.1016/j.socscimed.2013.03.016

Hale, M. E., Morrow, K. E., George, A. M., Gayer, A., Caughy, M. O., & Suveg, C. (2023). Maternal negative affect moderates behavioral and physiological synchrony in Latinx and Black mother–child dyads. *Developmental Psychobiology*, *65*(5), Article e22394. https://doi.org/10.1002/dev.22394

Helm, J. L., Miller, J. G., Kahle, S., Troxel, N. R., & Hastings, P. D. (2018). On measuring and modeling physiological synchrony in dyads. *Multivariate Behavioral Research*, *53*(4), 521–543. https://doi.org/10.1080/00273171.2018.1459292

Helm, J. L., Sbarra, D., & Ferrer, E. (2012). Assessing cross-partner associations in physiological responses via coupled oscillator models. *Emotion*, *12*(4), 748–762. https://doi.org/10.1037/a0025036

Joel, S., Eastwick, P. W., Allison, C. J., Arriaga, X. B., Baker, Z. G., Bar-Kalifa, E., Bergeron, S., Birnbaum, G., Brock, R. L., Brumbaugh, C. C., Carmichael, C. L., Chen, S., Clarke, J., Cobb, R. J., Coolsen, M. K., Davis, J., de Jong, D. C., Debrot, A., DeHaas, E. C., … Wolf, S. (2020). Machine learning uncovers the most robust self-report predictors of relationship quality across 43 longitudinal couples studies. *Proceedings of the National Academy of Sciences*, *117*, 19061–19071. https://doi.org/10.1073/pnas.191703611

Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence*. Wiley.

Kraus, M. W., & Mendes, W. B. (2014). Sartorial symbols of social class elicit class-consistent behavioral and physiological responses: A dyadic approach. *Journal of Experimental Psychology: General*, *143*(6), 2330–2340. https://doi.org/10.1037/xge0000023

Kumashiro, M., Rusbult, C. E., & Finkel, E. J. (2008). Navigating personal and relational concerns: The quest for equilibrium. *Journal of Personality and Social Psychology*, *95*(1), 94–110. https://doi.org/10.1037/0022-3514.95.1.94

Lane, S. P., & Hennes, E. P. (2018). Power struggles: Estimating sample size for multilevel relationships research. *Journal of Social and Personal Relationships*, *35*(1), 7–31. https://doi.org/10.1177/0265407517710342

Ledermann, T., Macho, S., & Kenny, D. A. (2011). Assessing mediation in dyadic data using the actor-partner interdependence model. *Structural Equation Modeling*, *18*(4), 595–612. https://doi.org/10.1080/10705511.2011.607099

Levenson, R. W., & Gottman, J. M. (1983). Marital interaction: Physiological linkage and affective exchange. *Journal of Personality and Social Psychology*, *45*(3), 587–597. https://doi.org/10.1037/0022-3514.45.3.587

Lunkenheimer, E., Tiberio, S. S., Skoranski, A. M., Buss, K. A., & Cole, P. M. (2018). Parent–child coregulation of parasympathetic processes varies by social context and risk for psychopathology. *Psychophysiology*, *55*(2), Article e12985. https://doi.org/10.1111/psyp.12985

Manfredi, M., Yumi Nakao Morello, L., Marques, L. M., & Boggio, P. S. (2022). When humor is a matter of heart: Effects on emotional state and interbeat interval. *Social Neuroscience*, *17*(4), 329–338. https://doi.org/10.1080/17470919.2022.2095019

Marci, C. D., & Orr, S. P. (2006). The effect of emotional distance on psychophysiologic concordance and perceived empathy between patient and interviewer. *Applied Psychophysiology and Biofeedback*, *31*(2), 115–128. https://doi.org/10.1007/s10484-006-9008-4

Marshall, E. M., & Gere, J. (2023). Congruence and goal sharing of health-related goals among newly dating individuals explaining goal importance and commitment. *Psychology & Health*, *38*(12), 1623–1634. https://doi.org/10.1080/08870446.2022.2037849

Marzoratti, A., & Evans, T. M. (2022). Measurement of interpersonal physiological synchrony in dyads: A review of timing parameters used in the literature. *Cognitive, Affective & Behavioral Neuroscience*, *22*(6), 1215–1230. https://doi.org/10.3758/s13415-022-01011-1

Mayo, O., & Gordon, I. (2020). In and out of synchrony—Behavioral and physiological dynamics of dyadic interpersonal coordination. *Psychophysiology*, *57*(6), Article e13574. https://doi.org/10.1111/psyp.13574

Mayo, O., Lavidor, M., & Gordon, I. (2021). Interpersonal autonomic nervous system synchrony and its association to relationship and performance—A systematic review and meta-analysis. *Physiology & Behavior*, *235*, Article 113391. https://doi.org/10.1016/j.physbeh.2021.113391

McAssey, M. P., Helm, J., Hsieh, F., Sbarra, D. A., & Ferrer, E. (2013). Methodological advances for detecting physiological synchrony during dyadic interactions. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *9*(2), 41–53. https://doi.org/10.1027/1614-2241/a000053

Mendes, W. B. (2016). Emotion and the autonomic nervous system. In L. F. Barrett, M. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (4th ed., pp. 166–181). Guilford Press.

Miller, J. G., Armstrong-Carter, E., Balter, L., & Lorah, J. (2023). A meta-analysis of mother–child synchrony in respiratory sinus arrhythmia and contextual risk. *Developmental Psychobiology*, *65*(1), Article e22355. https://doi.org/10.1002/dev.22355

Overall, N. C., Fletcher, G. J. O., Simpson, J. A., & Sibley, C. G. (2009). Regulating partners in intimate relationships: The costs and benefits of different communication strategies. *Journal of Personality and Social Psychology*, *96*(3), 620–639. https://doi.org/10.1037/a0012961

Overall, N. C., & McNulty, J. K. (2017). What type of communication during conflict is beneficial for intimate relationships? *Current Opinion in Psychology*, *13*, 1–5. https://doi.org/10.1016/j.copsyc.2016.03.002

Palumbo, R. V., Marraccini, M. E., Weyandt, L. L., Wilder-Smith, O., McGee, H. A., Liu, S., & Goodwin, M. S. (2017). Interpersonal autonomic physiology: A systematic review of the literature. *Personality and Social Psychology Review*, *21*(2), 99–141. https://doi.org/10.1177/1088868316628405

Pauly, T., Gerstorf, D., Ashe, M. C., Madden, K. M., & Hoppmann, C. A. (2021). You're under my skin: Long-term relationship and health correlates of cortisol synchrony in older couples. *Journal of Family Psychology*, *35*(1), 69–79. https://doi.org/10.1037/fam0000809

Pek, J., Pitt, M. A., & Wegener, D. T. (2024). Uncertainty limits the use of power analysis. *Journal of Experimental Psychology: General*, *153*(4), 1139–1151. https://doi.org/10.1037/xge0001273

Peters, B. J., Reis, H. T., & Gable, S. L. (2018a). Making the good even better: A review and theoretical model of interpersonal capitalization. *Social and Personality Psychology Compass*, *12*(7), Article e12407. https://doi.org/10.1111/spc3.12407

Peters, B. J., Reis, H. T., & Jamieson, J. P. (2018b). Cardiovascular indexes of threat impair responsiveness in situations of conflicting interests. *International Journal of Psychophysiology*, *123*, 1–7. https://doi.org/10.1016/j.ijpsycho.2017.12.005

Pietromonaco, P. R., & Collins, N. L. (2017). Interpersonal mechanisms linking close relationships to health. *American Psychologist*, *72*(6), 531–542. https://doi.org/10.1037/amp0000129

Qaiser, J., Leonhardt, N. D., Le, B. M., Gordon, A. M., Impett, E. A., & Stellar, J. E. (2023). Shared hearts and minds: Physiological synchrony during empathy. *Affective Science*, *4*(4), 711–721. https://doi.org/10.1007/s42761-023-00210-4

R Core Team. (2021). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Reis, H. T., & Gable, S. L. (2015). Responsiveness. *Current Opinion in Psychology*, *1*, 67–71. https://doi.org/10.1016/j.copsyc.2015.01.001

Reis, H. T., Smith, S. M., Carmichael, C. L., Caprariello, P. A., Tsai, F.-F., Rodrigues, A., & Maniaci, M. R. (2010). Are you happy for me? How sharing positive events with others provides personal and interpersonal benefits. *Journal of Personality and Social Psychology*, *99*(2), 311–329. https://doi.org/10.1037/a0018344

Rusbult, C. E., Agnew, C. R., & Arriaga, X. B. (2012). The investment model of commitment processes. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 2, pp. 218–231). Sage Publications. https://doi.org/10.4135/9781446249222.n37

Rusbult, C. E., & Van Lange, P. A. M. (2003). Interdependence, interaction, and relationships. *Annual Review of Psychology*, *54*(1), 351–375. https://doi.org/10.1146/annurev.psych.54.101601.145059

Rusbult, C. E., & Van Lange, P. A. M. (2008). Why we need interdependence theory. *Social and Personality Psychology Compass*, *2*(5), 2049–2070. https://doi.org/10.1111/j.1751-9004.2008.00147.x

Shrout, M. R., Black, A. E., Wilson, S. J., Renna, M. E., Madison, A. D., Kiecolt-Glaser, J. K., & Reis, H. T. (2023). How aging couples' emotional and physiological associations change across positive, supportive, and conflictual discussions: Roles of capitalization and responsive behaviors. *Biological Psychology*, *177*, Article 108500. https://doi.org/10.1016/j.biopsycho.2023.108500

Thabane, L., Mbuagbaw, L., Zhang, S., Samaan, Z., Marcucci, M., Ye, C., Thabane, M., Giangregorio, L., Dennis, B., Kosa, D., Borg Debono, V., Dillenburg, R., Fruci, V., Bawor, M., Lee, J., Wells, G., & Goldsmith, C. H. (2013). A tutorial on sensitivity analyses in clinical trials: The what, why, when and how. *BMC Medical Research Methodology*, *13*(1), Article 92. https://doi.org/10.1186/1471-2288-13-92

Thayer, J. F., Hansen, A. L., & Johnsen, B. H. (2008). Handbook of physiological research methods in health psychology. In L. J. Luecken & L. G. Gallo (Eds.), *Handbook of physiological research methods in health psychology* (pp. 183–210). SAGE Publications. https://doi.org/10.4135/9781412976244.n9

Thorson, K. R., Forbes, C. E., Magerman, A. B., & West, T. V. (2019). Under threat but engaged: Stereotype threat leads women to engage with female but not male partners in math. *Contemporary Educational Psychology*, *58*, 243–259. https://doi.org/10.1016/j.cedpsych.2019.03.012

Thorson, K. R., Ketay, S., Roy, A. R. K., & Welker, K. M. (2021). Self-disclosure is associated with adrenocortical attunement between new acquaintances. *Psychoneuroendocrinology*, *132*, Article 105323. https://doi.org/10.1016/j.psyneuen.2021.105323

Thorson, K. R., West, T. V., & Mendes, W. B. (2018). Measuring physiological influence in dyads: A guide to designing, implementing, and analyzing dyadic physiological studies. *Psychological Methods*, *23*(4), 595–616. https://doi.org/10.1037/met0000166

Timmons, A. C., Margolin, G., & Saxbe, D. E. (2015). Physiological linkage in couples and its implications for individual and interpersonal functioning: A literature review. *Journal of Family Psychology*, *29*(5), 720–731. https://doi.org/10.1037/fam0000115

Tudder, A., Gresham, A. M., Peters, B. J., Reis, H. T., & Jamieson, J. P. (2020). The effects of dispositional restrictiveness on physiological markers of challenge and threat during a hypothetical transitional period in romantic relationships. *Psychophysiology*, *57*(10), Article e13624. https://doi.org/10.1111/psyp.13624

Van Lange, P. A. M., Rusbult, C. E., Drigotas, S. M., Arriaga, X. B., Witcher, B. S., & Cox, C. L. (1997). Willingness to sacrifice in close relationships. *Journal of Personality and Social Psychology*, *72*(6), 1373–1395. https://doi.org/10.1037/0022-3514.72.6.1373

Vigier, M., Thorson, K. R., Andritsch, E., Stoeger, H., Suerth, L., Farkas, C., & Schwerdtfeger, A. R. (2021). Physiological linkage during interactions between doctors and cancer patients. *Social Science & Medicine*, *284*, Article 114220. https://doi.org/10.1016/j.socscimed.2021.114220

Wang, L. P., & Maxwell, S. E. (2015). On disaggregating between-person and within-person effects with longitudinal data using multilevel models. *Psychological Methods*, *20*(1), 63–83. https://doi.org/10.1037/met0000030

West, T. V., Koslov, K., Page-Gould, E., Major, B., & Mendes, W. B. (2017). Contagious anxiety: Anxious European Americans can transmit their physiological reactivity to African Americans. *Psychological Science*, *28*(12), 1796–1806. https://doi.org/10.1177/0956797617722551

West, T. V., & Mendes, W. B. (2023). Chapter two—Affect contagion: Physiologic covariation and linkage offer insight into socially shared thoughts, emotions, and experiences. In B. Gawronski (Ed.), *Advances in experimental social psychology* (Vol. 67, pp. 73–129). Academic Press. https://doi.org/10.1016/bs.aesp.2022.11.002

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag.

Zee, K. S., & Bolger, N. (2023). Physiological coregulation during social support discussions. *Emotion*, *23*(3), 825–843. https://doi.org/10.1037/emo0001107

Zygmunt, A., & Stanczyk, J. (2010). Methods of evaluation of autonomic nervous system function. *Archives of Medical Science*, *6*(1), 11–18. https://doi.org/10.5114/aoms.2010.13500

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