Additional Results

Fixed Effects of Stability

All results for the physiological stability paths are presented in Table S1.

Table S1

Parameter estimates for physiological stability main effect and interactions

Fixed Effect	Fixed effect component of this coefficient from Equation 1	Question Addressed by Fixed Effect	*b*	SE	t	df	p	95% CI	Partial R^2
Main effect of Receiver $IBI_{(t-1)}$	b_{1ijk}	Is there a main effect of stability?	0.14	0.03	4.43	100	< .001	0.09 to 0.21	.16
Interaction between Receiver $IBI_{(t-1)}$ and Role	b_{4ijk}	Does stability differ by role?	0.01	0.03	0.29	110	.77	-0.06 to 0.07	.001
Interaction between Receiver $IBI_{(t-1)}$ and Relationship Length	b_{7ijk}	Does stability differ by relationship length?	0.001	0.01	0.09	234	.93	-0.02 to 0.02	<.001
Interaction between Receiver $IBI_{(t-1)}$, Relationship Length, and Role	b_{10ijk}	Does stability differ by both relationship length and role?	-0.003	0.01	-0.29	250	.78	-0.03 to 0.02	<.001
Interaction between Receiver $IBI_{(t-1)}$ and quadratic term for Relationship Length	b_{13ijk}	Does stability differ by relationship length in a quadratic pattern?	-0.002	0.003	-0.64	403	.52	-0.007 to 0.004	.001
Interaction between Receiver $IBI_{(t-1)}$, quadratic term for Relationship Length, and Role	b_{16ijk}	Does stability differ by relationship length (in a quadratic pattern) and role?	-0.001	0.003	-0.31	423	.75	-0.01 to 0.005	<.001

Covariance Parameters

We estimated variance in stability and linkage slopes for doctors (we could not estimate slopes for patients), as well as a covariance between the two, allowing these effects to be independent from doctor to doctor (similar to the reciprocal one-with-many-design with

indistinguishable partners described in Kenny & Kashy, 2011). We also estimated variance in stability and linkage slopes for patients, as well as variance in the linkage slope for doctors (we could not estimate a stability slope for doctors), and all covariances between these effects, allowing these effects to be independent from dyad to dyad. Finally, we estimated variances in within-time-point residuals for doctors and patients, as well as the covariance between them, and we applied a first-order autoregressive structure to IBI responses over time (meaning that the within-person residuals at adjacent time points were correlated; Bolger & Laurenceau, 2013; Bolger & Shrout, 2007). We present results for these parameters in Table S2. We note that we could not estimate random intercepts for doctors and patients (at Level 3 and at Level 2)[1].

[1] We were able to estimate random intercepts for doctors and patients at Levels 3 and 2 in a model that did not use person-centered IBI responses as the outcome but rather raw IBI responses. All of the fixed effect results are consistent with those presented in the main text. The three-way interaction between senders' prior physiological responses, the quadratic term for relationship length, and role was significant, $b = 0.02$, $SE = .006$, $t(90.3) = 2.44$, $p = .017$, 95% CI: 0.003 to 0.03. For patients, we found that the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was significant, $b = -0.01$, $SE = 0.004$, $t(55.7) = -3.30$, $p = .002$, 95% CI: -0.02 to -0.005. For doctors, the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was not significant, $b = 0.001$, $SE = 0.004$, $t(57.8) = 0.28$, $p = .78$, 95% CI: -0.007 to 0.01. Only patients who were in their third to eighth consultation with their doctors showed significant linkage to their doctors. Doctors did not show significant linkage to patients, regardless of how many consultations they had with those patients.

Table S2

(Co-)variance parameters

Random effects ([co-]variances)	**Estimate**	***SE***	***z***	***p***
Level 3 (Between groups of people with the same doctor)				
Variance of stability slope for doctors	0.003	0.005	0.69	.25
Variance of linkage slope for doctors	0.01	0.01	1.18	.12
Covariance between stability and linkage slopes for doctors	0.004	0.004	0.88	.38
Level 2 (Between dyads, within groups of people with the same doctor)				
Variance of stability slope for patients	0.0	0.01	1.92	.03
Variance of linkage slope for patients	0.02	0.02	1.55	.06
Variance of linkage slope for doctors	0.01	0.01	1.00	.16
Covariance between stability and linkage slopes for patients	0.01	0.01	0.96	.34
Covariance between stability slope for patients and linkage slope for doctors	-0.01	0.01	-1.13	.26
Covariance between linkage slope for patients and linkage slope for doctors	-0.01	0.01	-0.72	.47
Level 1 (Within dyads, within groups of people with the same doctor)				
Variance of doctor within-time-point residuals	1293.82	63.34	20.43	< .001
Variance of patient within-time-point residuals	1005.82	50.95	19.74	< .001
Covariance of doctor and patient within-time-point residuals	175.96	37.51	4.69	< .001
Within-person first-order autocorrelation of within-time-point residuals	0.22	0.04	5.52	<.001

Missing Data

In our primary model reported in the main text, the only variable on which we had missing data was participants' IBI responses. We examined whether likelihood of missingness was related to any of the predictors in our primary model. We found that likelihood of missingness was not predicted by role but that it was predicted by relationship length in a cubic pattern (see Figure S1 and Table S3). However, the linear, quadratic, and cubic terms for relationship length were not moderated by role, indicating that the pattern of missingness did not mimic the pattern for physiological linkage.

Figure S1

Percent of missing data across relationship length

Table S3

Model predicting likelihood of missingness of IBIs

Fixed effects	**Estimate**	***SE***	***t***	***Df***	***p***
Role	-0.02	0.17	-0.13	2551	.89
Relationship length (linear)	0.20	0.05	4.04	2551	< .001
Relationship length (quadratic)	0.05	0.03	1.87	2551	.06
Relationship length (cubic)	-0.01	0.004	-2.79	2551	.005
Role by relationship length (linear)	0.01	0.05	0.10	2551	.92
Role by relationship length (quadratic)	0.01	0.03	0.23	2551	.81
Role by relationship length (cubic)	-0.001	0.004	-0.23	2551	.82

To account for missing data, we also conducted a version of our primary model using maximum likelihood (ML) estimation, which is a common method for providing parameter estimates that account for missing data. (This is in contrast to restricted maximum likelihood estimation, which is the estimation method we used in the main text because it is better at providing unbiased estimates of covariance parameters specifically; [Raudenbush & Bryk, 2002]). We chose to use ML estimation as a strategy for dealing with missing data instead of multiple imputation because it is simpler, it produces a deterministic result, it involves making fewer decisions about one's data, and everything is done under one model. For these reasons and others, scholars have argued that ML estimation is better than, or at least equally as good as, multiple imputation (Allison, 2012; Hox et al., 2015; von Hippel, 2016).

All results using ML estimation were consistent with those presented in the main text. The three-way interaction between senders' prior physiological responses, the quadratic term for relationship length, and role was significant, $b = 0.02$, $SE = .001$, $t(116) = 2.92$, $p = .004$, 95%

CI: 0.01 to 0.03. For patients, we found that the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was significant, b = -0.01, SE = 0.004, t(77.4) = -3.31, p = .001, 95% CI: -0.02 to -0.006. For doctors, the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was not significant, b = 0.003, SE = 0.004, t(98.7) = 0.85, p = .40, 95% CI: -0.005 to 0.01. Only patients who were in their third to eighth consultation with their doctors showed significant linkage to their doctors. Doctors did not show significant linkage to patients, regardless of how many consultations they had with those patients.

Sensitivity Analyses

In one sensitivity analysis, we examined whether there were any higher-order (i.e., cubic) non-linear effects of relationship length on physiological linkage. As noted in the main text, the two-way interaction between senders' prior physiological responses and a cubic term for relationship length was non-significant, b < 0.001 , SE = .001, t(98.5) = 0.24, p = .81, 95% CI: -0.002 to 0.002, indicating that physiological linkage did not vary as a function of relationship length in a cubic pattern. Furthermore, the three-way interaction between senders' prior physiological responses, a cubic term for relationship length, and role was nonsignificant, b < 0.001, SE = .001, t(99.9) = -0.09 , p = .93, 95% CI: -0.002 to 0.002, meaning that the association between physiological linkage and relationship length (in a cubic pattern) did not differ by role.

In a second sensitivity analysis, we examined whether effects were robust when adjusting for receivers' gender, age, smoking status, and exercise status, as well as patients' cancer stage, the valence of the news presented during the consultation, the length of the consultation, and patients' cancer type. All results are consistent with the ones presented in the primary model in the main text. The three-way interaction between senders' prior physiological responses, the

quadratic term for relationship length, and role was significant, b = -0.01, SE = 0.003, t(113) = -2.92 , p = .004, 95% CI: -0.02 to -0.003. For patients, we found that the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was significant, b = -0.01, SE = 0.004, t(75.6) = -3.31, p = .001, 95% CI: -0.02 to -0.006. For doctors, the two-way interaction between senders' prior physiological responses and the quadratic term for relationship length was not significant, b = 0.003, SE = 0.004, t(96.5) = 0.85, p = .40, 95% CI: -0.005 to 0.01. Only patients who were in their third to eighth consultation with their doctors showed significant linkage to their doctors. Doctors did not show significant linkage to patients, regardless of how many consultations they had with those patients.

Table S4

Sensitivity analysis: Parameter estimates for physiological linkage main effect and interactions

Fixed Effect	Fixed effect component of this coefficient from Equation 1	Question Addressed by Fixed Effect	*b*	*SE*	*t*	*df*	*p*	95% CI
Main effect of Sender $IBI_{(t-1)}$	b_{2ijk}	Is there a main effect of linkage?	0.05	0.03	1.53	77	0.13	-0.02 to 0.12
Interaction between Sender $IBI_{(t-1)}$ and Role	b_{5ijk}	Does linkage differ by role?	0.13	0.04	3.52	71.7	0.001	0.06 to .20
Interaction between Sender $IBI_{(t-1)}$ and Relationship Length	b_{8ijk}	Does linkage differ by relationship length?	0.03	0.01	2.45	84	0.02	0.01 to 0.05
Interaction between Sender $IBI_{(t-1)}$, Relationship Length, and Role	b_{11ijk}	Does the association between linkage and relationship length vary as a function of role?	0.04	0.01	3.07	82.2	0.003	0.01 to 0.06
Interaction between Sender $IBI_{(t-1)}$ and quadratic term for Relationship Length	b_{14ijk}	Does linkage differ by relationship length in a non-linear (quadratic) pattern?	-0.01	0.003	-1.94	115	0.055	-0.01 to 0.0001
Interaction between Sender $IBI_{(t-1)}$, quadratic term for Relationship Length, and Role	b_{17ijk}	Does the non-linear (quadratic) association between linkage and relationship length vary as a function of role?	-0.01	0.003	-2.92	113	0.004	-0.02 to -0.003

Table S5

Sensitivity analysis: Parameter estimates for physiological linkage main effect for patients and doctors at different relationship lengths

Relationship Length (Number of Consultations between Doctor and Patient, including Current Consultation)	Main Effect of Sender $IBI_{(t-1)}$ for Patients (i.e., Do patients show significant linkage to doctors?)			Main Effect of Sender $IBI_{(t-1)}$ for Doctors (i.e., Do doctors show significant linkage to patients?)			Interaction between Sender $IBI_{(t-1)}$ and role (i.e. Does linkage differ by role?)		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
1	-0.09	0.05	.10	-0.03	0.06	.64	-0.03	0.04	.49
2	0.04	0.04	.32	-0.05	0.05	.28	0.05	0.03	.15
3	0.14	0.05	.004	-0.07	0.05	.15	0.10	0.03	.003
4	0.21	0.05	< .001	-0.08	0.05	.13	0.14	0.04	< .001
5	0.24	0.06	< .001	-0.08	0.06	.14	0.16	0.04	< .001
6	0.25	0.06	< .001	-0.08	0.06	.18	0.17	0.04	< .001
7	0.23	0.06	< .001	-0.07	0.06	.27	0.15	0.04	.001
8	0.18	0.06	.006	-0.05	0.07	.46	0.12	0.05	.02
9	0.10	0.08	.19	-0.03	0.09	.76	0.07	0.06	.29
10	-0.005	0.11	.96	0.003	0.12	.98	-0.004	0.08	.96
11	-0.14	0.15	.35	0.04	0.16	.80	-0.09	0.11	.42
12	-0.31	0.21	.14	0.08	0.21	.68	-0.20	0.15	.19

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