Supplementary Material

Method

Table 1

Tutoring Session Topics

Topic	Frequency
Biology	2
Calculus I	12
Calculus II	4
Chemistry	9
Computer Science	20
Financial Accounting	1
Physics	2
Economics	4
Statistics	6

Table 2

Undergraduate Majors for Students

Major	Frequency
Accounting	1
Africana Studies	1
Psychology	11
Biomolecular Science	1
Business	3
Civil Engineering	2
Computer Engineering	1
Computer Science	5
Economics	3
Electronics and Communication Engineering	1
English Education	1
Finance	1
Fluid Mechanics	1
Global Public Health	2
Individualized Study	2
Management	2
Mathematics	5
Metropolitan Studies	1
Music Technology	1
Media, Culture, and Communication	1
Neuroscience	6
Nutrition	1
Political Science	1
Linguistics	1
Public Policy	1
Undecided	1
Vocal Performance	1

Table 3

Undergraduate Majors for Tutors

Major	Frequency
Mathematics	6
Psychology	5
Metallurgical and Materials Engineering	1
Biology	2
Chemistry	3
Chemical and Biomolecular Engineering	3
Computer Engineering	4
Computer Science	16
Economics	6
Mechanical Engineering	3
Neuroscience	3

Table 4

Breakdown of Dyads by Student and Tutor Gender

	Tutor gender		
Student gender	Men	Women	Total
Men	10	7	17
Women	25	15	40
Total	35	22	57

Physiological Measures

Although these measures were not the focus of this paper, we also collected physiological data from students and tutors participating in the study. Upon arrival at the lab, participants were taken into separate rooms and research assistants placed physiological sensors on their necks and torsos. We measured sympathetic nervous system activity through cardiac pre-ejection period (PEP), which quantifies the amount of time in the cardiac cycle between the moment when the heart's left ventricle contracts and the aortic valve opens (Mendes, 2016). PEP is one of the purest measures of sympathetic nervous system activity (Schachinger, Weinbacher, Kiss, Ritz, & Langewitz, 2001), the branch of the autonomic nervous system that mobilizes the body for action

(Fox, 2016). We employed electrocardiography (ECG) and impedance cardiography (ICG) to obtain measurements of cardiac pre-ejection period (PEP).

Coding Procedures

Friendliness

Friendliness was also coded using a thin-slice approach, in the same way that engagement and confidence were rated by outside observers. When judging friendliness, the two coders were provided with the following instructions: "Overall, how friendly is the participant in the segment you just watched?" Reliability was assessed as above, using a two-way mixed consistency average measures ICC. The ICC value was in the "good" range (Cicchetti, 1994; ICC = .68). We proceeded as above in order to obtain a single value for each participant's level of friendliness.

Additional Results

Behavioral Engagement

Talk Time Ratio

We estimated the (co-)variance parameters listed in Table 5a. The Level 3 variance due to tutor estimates the degree to which the tutor's talk time ratio stays consistent across groups of people with the same tutor and the degree to which the tutors' talk time ratio is different in groups of people with different tutors. The Level 3 variance due to student estimates the degree to which the student's talk time ratio stays consistent across groups of people with the same tutor and differs from the student's talk time ratio in groups of people with a different tutor. The Level 2 variance due to tutor estimates the degree to which the tutor's talk time ratio is consistent in the same dyad and the degree to which tutors' talk time ratios are different in different dyads. We tried to estimate a Level 2 variance due to student but could not. Finally, we estimated variances in within-time-point residuals for students and tutors, as well as the covariance between them,

and we applied a first-order autoregressive structure to ratings over time (meaning that the within-person residuals at adjacent time points were correlated; Bolger & Shrout, 2007; Bolger & Laurenceau, 2013).

Table 5a

Variance and Covariance Parameters for Talk Time Ratio Model

Random effects ([co-]variances)	**Estimate**	***SE***	***z***	***p***
Level 3 (Between groups of people with the same tutor)				
Variance due to tutor	420.83	93.65	4.49	< .001
Variance due to student	423.21	91.89	4.61	< .001
Covariance of student and tutor intercepts	-424.30	92.06	-4.61	< .001
Level 2 (Between dyads, within groups of people with the same tutor)				
Variance due to tutor	6.50	8.06	0.81	.210
Level 1 (Within dyads, within groups of people with the same tutor)				
Variance of tutor within-time-point residuals	711.94	21.69	32.82	< .001
Variance of student within-time-point residuals	632.25	19.26	32.83	< .001
Covariance of student and tutor within-time-point residuals	-574.88	18.64	-30.84	< .001
Within-person first-order autocorrelation of within-time-point residuals	0.484	0.01	40.36	< .001

Questions asked

Questions Asked by Students

We estimated the variance parameters listed in Table 5b. The Level 2 variance in the intercept estimates the degree to which the number of questions asked by students were

consistent for students who had the same tutor and the degree to which they differed from the number of questions asked by students who had a different tutor. The Level 1 variance in the intercept estimates the residuals within question type for students.

Table 5b

Variance Parameters in Model for Questions Asked by Students

Random effects ([co-]variances)	**Estimate**	**SE**
Level 2 (Between dyads with the same tutor)		
Variance due to student	0.214	0.140
Level 1 (Within groups with the same tutor)		
Variance of student residuals	0.086	0.125

Questions Asked by Tutors

We estimated the variance parameters listed in Table 5c. The Level 2 variance in the intercept estimates the degree to which the number of questions asked by tutors was consistent for tutors across different students. The Level 1 variance in the intercept for the residuals within question type for tutors did not estimate.

Table 5c

Variance Parameters in Model for Questions Asked by Tutors

Random effects ([co-]variances)	**Estimate**	**SE**
Level 2 (Between dyads with the same tutor)		
Variance due to tutor	0.172	0.079

Coded engagement

We estimated the (co-)variance parameters listed in Table 5d. We tried to estimate Level 3 (between groups of people with the same tutor) variances due to student and tutor, but we could not. We also tried to estimate Level 2 (between-dyads) variances due to student and tutor but could not. We estimated variances in within-time-point residuals for students and tutors, as well as the covariance between them, and we applied a first-order autoregressive structure to ratings over time.

Table 5d

Variance and Covariance Parameters in the Growth Curve Model for Engagement

Level 1 (Within dyads, within groups of people with the same tutor)	**Estimate**	***SE***	***z***	***p***
Variance of tutor within-time-point residuals	1.02	0.12	8.86	< .001
Variance of student within-time-point residuals	1.11	0.12	8.86	< .001
Covariance of student and tutor within-time-point residuals	0.54	0.09	5.78	< .001
Within-person first-order autocorrelation of within-time-point residuals	0.25	0.06	3.96	< .001

Affective Experiences During the Tutoring Session

Self-reported Negative Affect

We estimated the (co-)variance parameters listed in Table 6a. The Level 2 variance due to tutor estimates the degree to which tutors' ratings of negative affect are both consistent across different students and different from other tutors' ratings of negative affect. The Level 2 variance due to student estimates the degree to which students who have the same tutor are consistent in their ratings of negative affect with the same tutor and the degree to which students who have the same tutor are different in their ratings of negative affect from students with other tutors. We tried to estimate the covariance between these two intercepts, but the model would not converge. There are two error variances—one for students' ratings of the tutor and another for tutor's ratings of their students—and the covariance between them.

Table 6a

Variance and Covariance Parameters in the Mixed Model for Negative Affect

Random effects ([co-]variances)	**Estimate (SE)**	***z***	***p***	**Lower CI**	**Upper CI**
Level 2 (Between groups of people with the same tutor)					
Variance due to student	0.33 (1.38)	0.24	.81	0.00009	1223.81
Variance due to tutor	0.15 (0.95)	0.15	.88	0.0000004	50615.69
Level 1 (Within groups with the same tutor)					
Variance of tutor residuals	1.39 (0.96)	1.45	.15	0.36	5.37
Variance of student residuals	1.92 (1.37)	1.40	.16	0.48	7.79
Covariance of tutor-student residuals	0.13 (0.25)	0.50	.62	-0.37	0.62

Self-reported Confidence

We estimated the (co-)variance parameters listed in Table 6b. The Level 2 variance due to tutor estimates the degree to which tutors' ratings of confidence are both consistent across different students and different from other tutors' ratings of confidence. The Level 2 variance due to student could not be estimated. There are two error variances—one for students' ratings of the tutor and another for tutor's ratings of their students—and the covariance between them

Table 6b

Variance and Covariance Parameters in the Mixed Model for Confidence

Random effects ([co-]variances)	**Estimate (SE)**	***z***	***p***	**Lower CI**	**Upper CI**
Level 2 (Between groups of people with the same tutors)					
Variance due to tutor	0.79 (0.46)	1.74	.083	0.26	2.46
Level 1 (Within groups with the same tutors)					
Variance of tutor residuals	0.50 (0.38)	1.32	.19	0.11	2.21
Variance of student residuals	1.56 (0.30)	5.20	<.001	1.07	2.28
Covariance of tutor-student residuals	-0.18 (0.20)	-0.94	.35	-0.57	0.20

Coded Confidence

We estimated the (co-)variance parameters listed in Table 7. We tried to estimate Level 3 (between groups of people with the same tutor) variances due to student and tutor but could not. We also tried to estimate Level 2 (between-dyads) variances due to student and tutor but could

not. We estimated variances in within-time-point residuals for students and tutors, as well as the covariance between them, and we applied a first-order autoregressive structure to ratings over time.

Table 7

Variance and Covariance Parameters in the Growth Curve Model for Confidence

Random effects ([co-]variances)	**Estimate**	***SE***	***z***	***p***
Level 1 (Within dyads, within groups of people with the same tutor)				
Variance of tutor within-time-point residuals	1.18	-0.13	8.88	< .001
Variance of student within-time-point residuals	1.19	0.13	8.88	< .001
Covariance of student and tutor within-time-point residuals	0.38	0.11	3.40	< .001
Within-person first-order autocorrelation of within-time-point residuals	0.24	0.06	3.75	< .001

Coded friendliness

Fixed Effects

There was no main effect of actor gender on how friendly the participants were seen, $t(115) = -1.49$, $p = .14$, no main effect of role, $t(77.5) = 1.32$, $p = .19$, and no interaction between actor gender and role, $t(117) = -0.19$, $p = .85$. There was also no main effect of partner gender, $t(115) = -1.16$, $p = .247$, and no interaction between partner gender and role, $t(115) = 0.45$, $p = .66$.

(Co-)variance Parameters

We estimated the covariance parameters listed in Table 8. We tried to estimate Level 3 (between groups of people with the same tutor) variances due to student and tutor but could not. The Level 2 between-dyads variance due to student estimates both the degree to which ratings of

students' friendliness are consistent in the same dyad and the degree to which ratings of students' friendliness are different in different dyads. We tried to estimate a Level 2 variance due to tutor but could not. Finally, we estimated variances in within-time-point residuals for students and tutors, as well as the covariance between them, and we applied a first-order autoregressive structure to ratings over time (meaning that the within-person residuals at adjacent time points were correlated; Bolger & Shrout, 2007; Bolger & Laurenceau, 2013).

Table 8

(Co-)variance Parameters in the Growth Curve Model for Friendliness

Random effects ([co-]variances)	**Estimate**	***SE***	***z***	***p***
Level 2 (Between dyads, within groups of people with the same tutor)				
Variance due to student	0.04	0.07	0.60	.27
Level 1 (Within dyads, within groups of people with the same tutor)				
Variance of tutor within-time-point residuals	0.85	0.10	8.65	< .001
Variance of student within-time-point residuals	0.65	0.10	6.78	< .001
Covariance of student and tutor within-time-point residuals	0.39	0.07	5.77	< .001
Within-person first-order autocorrelation of within-time-point residuals	0.28	0.08	3.42	< .001

Partner Gender Effects

Talk Time Ratio

We did not find an effect of partner gender, b = 0.98, SE = 1.69, $t(70.3) = 0.58$, p = .57, 95% CI [-2.40, 4.35], R_{β}^2 =.005, on the percentage of time participants spent speaking. We also did not find an interaction between partner gender and role, b = -1.19, SE = 1.69, $t(69.9) = -.71$, p =.48, 95% CI [-4.57, 2.18], R_{β}^2 =.007.

Types of Questions Asked

Questions Asked by Students. We did not find a significant effect of partner gender, $F(1,106) = 0.19$, $p = .66$, $R_\beta^2 = .002$, nor an interaction between partner gender and the type of questions asked, $F(2, 106) = 1.37$, $p = .26$, $R_\beta^2 = .03$.

Questions Asked by Tutors. We did not find a significant effect of partner gender, F(1, 52) = 0.57, $p = .45$, $R_\beta^2 = .01$, nor an interaction between partner gender and the type of questions asked, $F(1, 52) = 0.31$, $p = .58$, $R_\beta^2 = .006$.

Coder's Ratings of Engagement

We did not find an effect of partner gender, $b = -0.007$, $SE = 0.07$, $t(116) = -0.11$, $p = .92$, 95% CI [-0.14, 0.13], $R_\beta^2 = .00009$, nor an interaction between partner gender and role, $b = -0.01$, $SE = 0.07$ $t(116) = -0.20$, $p = .85$, 95% CI [-0.15, 0.12], $R_\beta^2 = .0003$.

Self-reported Anxiety

We did not find an effect of partner gender, $b = -0.16$, $SE = 0.14$, $t(74.16) = -1.16$, $p = .25$, 95% CI [-0.43, 0.11], $R_\beta^2 = .0005$, and we did not find a significant interaction between partner gender and role, $b = 0.08$, $SE = 0.14$, $t(73.67) = 0.61$, $p = .54$, 95% CI [-0.19, 0.36], $R_\beta^2 = .005$.

Self-reported Confidence

There was no effect of partner gender, $b = 0.14$, $SE = 0.12$, $t(106.59) = 1.14$, $p = .26$, 95% CI [-0.10, 0.37], $R_\beta^2 = .01$, and we did not find an interaction between partner gender and role, $b = 0.02$, $SE = 0.12$, $t(107.11) = 0.17$, $p = .86$, 95% CI [-0.22, 0.26], $R_\beta^2 = .0003$.

Coder's Ratings of Confidence

There was no main effect of partner gender, b = 0.14, SE = 0.08, $t(122) = 1.74$, p = .085, 95% CI [-0.02, 0.29], R_β^2 = .02, nor was there an interaction between partner gender and role, b = 0.01, SE = 0.08, $t(122) = .13$, p = .90, 95% CI [-0.15, 0.17], R_β^2 =.0001.

Tutors' Ratings of Their Own Performance

We did not find a main effect of partner (student) gender, β = - 0.11, SE = 0.10, $t(54) = -1.10$, p = .28, 95% CI [-0.31, 0.09], R_β^2 = .02, indicating that tutors with women students did not rate their own performance differently than tutors with men students.

Ratings Made by Students of the Tutor's Performance

We did not find an effect of tutor gender on students' evaluations of tutor performance, b = 0.001, SE = .16, $t(54) = - 0.007$, p = .99, 95% CI [-0.31, 0.39], R_β^2 = .0009, and we did not find an effect of student gender on students' evaluations of tutor performance, b = 0.04, SE = .17, $t(54) = 0.225$, p = .82, 95% CI [5.43, 6.15], R_β^2 = .00002.

Correlations between Variables for Students

Table 9a

Correlations between Variables for Students

Variable	1	2	3	4	5	6	7	8
1. Talk time ratio	-							
2. More information questions	-0.12	-						
3. Feedback questions	-0.03	0.59**	-					
4. Repeat questions	0.12	0.16	0.36**	-				
5. Coded engagement	0.28	0.19	-0.03	0.17	-			
6. Anxiety	0.05	- 0.03	-0.05	-0.10	0.03	-		
7. Confidence	- 0.23*	0.08	0.10	0.20*	-0.29*	-0.50**	-	
8. Coded confidence	0.26	0.26	0.13	0.22	-0.66*	-0.18	- 0.05	-

** p <.01, * p <.05

Correlations between Variables for Tutors

Table 9b

Correlations between Variables for Tutors

Variable	1	2	3	4	5	6	7	8
1. Talk time ratio	-							
2. Clarification questions	0.10	-						
3. Knowledge questions	-0.04	0.21**	-					
4. Coded engagement	0.36**	0.24*	-0.003	-				
5. Anxiety	0.31**	0.001	-0.25**	-0.07	-			
6. Confidence	-0.33**	-0.02	0.31**	0.03	-0.70**	-		
7. Ratings of own performance	-0.27*	-0.12	0.29**	0.16	0.29**	0.51**	-	
8. Coded confidence	-0.12	-0.002	0.29**	0.41**	-0.32**	0.51**	0.50**	-

** p <.01, * p <.05

Syntax

Negative affect (SPSS)

```
MIXED
   negative_affect_composite_1_00 WITH gender_1_00 gender_2_00 role student_as1
tutor_as1 BY role_cat
   /FIXED = gender_1_00 gender_2_00 role
   gender_1_00*role
   gender_2_00*role
   /PRINT = SOLUTION TESTCOV CORB COVB G  R
   /RANDOM student_as1 tutor_as1 | SUBJECT (tutor_unique_id) COVTYPE (VC)
   /REPEATED role_cat | SUBJECT(tutor_unique_id*dyad) COVTYPE(UN).
```

Confidence (SPSS)

```
MIXED
   confidence_composite_1_00 WITH gender_1_00 gender_2_00 role student_as1
tutor_as1 BY role_cat
   /FIXED = gender_1_00 gender_2_00 role
   gender_1_00*role
   gender_2_00*role
   /PRINT = SOLUTION TESTCOV  CORB COVB G  R
   /RANDOM  tutor_as1 | SUBJECT (tutor_unique_id) COVTYPE (VC)
   /REPEATED role_cat | SUBJECT(tutor_unique_id*dyad) COVTYPE(UN).
```

Ratings of tutor performance (SPSS)

```
MIXED
overall_session_composite_1_00 with gender_1_00 gender_2_00
  /FIXED = gender_1_00 gender_2_00
  /PRINT = SOLUTION TESTCOV.
```

Behavioral coding (SAS)

```
** friendly;
proc mixed covtest method=REML  scoring=15;
CLASS dyad  seg role_cat;
model friendly_time3_1_00  =
gender_1_00
gender_2_00
role
gender_1_00*role
gender_2_00*role
/cl s ddfm=KR solution ;
RANDOM student_as1 /gcorr sub=dyad*tutor_unique_ID type = vc;
REPEATED role_cat seg  /type=un@ar(1) sub=tutor_unique_id*dyad;
run;
```

```
** confident;
proc mixed covtest method=REML  scoring=15;
CLASS dyad  seg role_cat;
model confident_time3_1_00  =
gender_1_00
gender_2_00
role
gender_1_00*role
gender_2_00*role
/cl s ddfm=KR solution ;
REPEATED role_cat seg  /type=un@ar(1) sub=tutor_unique_id*dyad;
run;

** engaged;
proc mixed covtest method=REML  scoring=15;
CLASS dyad  seg role_cat;
model engaged_time3_1_00  =
gender_1_00
gender_2_00
role
gender_1_00*role
gender_2_00*role
/cl s ddfm=KR solution ;
REPEATED role_cat seg  /type=un@ar(1) sub=tutor_unique_id*dyad;
run;
```

Talk time ratio (SAS)

```
proc mixed covtest method=REML  scoring=15;
CLASS dyad  seg role_cat;
model talk_time_ratio_1_00  =
gender_1_00
gender_2_00
role
gender_1_00*role
gender_2_00*role
/cl s ddfm=KR solution ;
RANDOM student_as1 tutor_as1  /gcorr sub=tutor_unique_ID type = un;
RANDOM tutor_as1  /gcorr sub=dyad*tutor_unique_ID type = un;
REPEATED role_cat seg  /type=un@ar(1) sub=tutor_unique_id*dyad;
run;
```

Type of questions asked (SAS)

```
** for tutors
PROC GLIMMIX;
 CLASS tutor_unique_id dyad;
```

```
 MODEL tutor_question =
  gender_1_00
  gender_2_00
  tutor_question_type
  gender_1_00*tutor_question_type
  gender_2_00*tutor_question_type
/ s DIST=negbin link=log;
 RANDOM intercept / SUBJECT=tutor_unique_id type=vc;
 RANDOM intercept / SUBJECT=id_1_00*tutor_unique_ID type=vc;
 Run;

** for students

PROC GLIMMIX;
 CLASS tutor_unique_id student_obs_id dyad type_cat student_question_type;
 MODEL student_question = gender_1_00  gender_2_00
  student_question_type
  gender_1_00*student_question_type
  gender_2_00*student_question_type
/ s DIST=negbin link=log;
RANDOM intercept / SUBJECT=tutor_unique_ID type=vc;
RANDOM intercept / SUBJECT=id_1_00*tutor_unique_ID type=vc;
RUN;
```

References

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