Supplementary Materials

Long gaps between turns are awkward for strangers but not for friends

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Github repository for this project: https://github.com/emtempleton/LongGaps

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Study 1

Transcription Details

We defined gap lengths based on the timestamps in each conversation transcript. Here we detail exactly what the transcripts contained and our decisions about what constituted a speech 'turn.'

Format. Below is a screenshot of the first few turns in one transcript, to illustrate the format of the transcripts. Each turn included (i) speaker information (S1 or S2), (ii) a START timestamp, (iii) an END timestamp, and (iv) text of the words spoken.

To compute gap length, we subtracted the END timestamp of the previous turn from the START timestamp of a given turn.

```
S1: 00:00:00.000 How's it going? END 00:01.335 END
S2: 00:00:02.236 I'm okay. How are you? END 00:03.215 END
S1: 00:00:03.123 Yeah, I'm good. It's been a busy... END 00:05.599 END
S2: 00:00:05.636 It's been a week. END 00:06.043 END
S1: 00:00:06.397 Yeah, honestly. With rush. Did you rush? END 00:08.880 END
S2: 00:00:08.761 I dropped on Monday. END 00:09.686 END
S1: 00:00:09.582 You dropped? Oh, I'm sorry. END 00:10.731 END
S2: 00:00:10.388 Yeah, I didn't get callbacks. END 00:11.686 END
S1: 00:00:12.067 Oh, okay. END 00:12.432 END
```

Transcription Company. The transcriptions (and therefore the timestamps) that were for the long gap length analyses were performed by one company -- Scribie (https://scribie.com/). More details about the transcription that was completed for each individual conversation video can be found in the Supplement folder of this project's Github repository (ConversationDatasetDetails.doc).

Speaker-switches vs speaker-stays

In two-person conversations, people typically take turns back and forth. After one person stops speaking, the other person begins speaking. Occasionally, the speaker who last spoke is the one who decides to speak again next. This would be an example of a 'speaker-stay' (vs a 'speaker-switch'). Some researchers may consider this gap in between speaker-stay turns as a silence within a turn rather than an inter-turn gap. Because the focus of this paper is on gaps that are more than 2 seconds long (10x longer than the modal gap length in conversation), we believe it is likely that these long gaps are still *experienced* as gaps by the participants.

We examined the frequency of speaker-switches vs speaker-stays for the turns surrounding the long gaps in our stranger and friend datasets. Strangers had 14 instances of speaker-stays vs 248 instances of speaker-switches. Friends had 19 instances of speaker-stays vs 183 instances of speaker stays. Given the rarity of these events (~7% of long gaps), we did not run any analyses comparing turns with speaker-switches vs speaker-stays. However, we have included this speaker-switch information for each long gap in the Github repository for this project.

Because instances of speaker-stays were rare and because long gaps are likely to be experienced as gaps even when there is a speaker-stay, we included all instances of long gaps in our Study 1 analyses. Note that for Study 2, none of the clips used had gaps that were speaker-stays (all were speaker-switches).

Additional laughter analyses

We investigated whether laughter during the long gap might mediate the effect between relationship type (friend vs stranger) and change in connection. We examined the video footage

of all of the long gaps and annotated whether participants laughed during the gap. We first tested for an effect of relationship type on change in connection and found significant effects when entering a long gap (b = 1.03, SE = 0.35, p = 0.004). We next tested for the effect of relationship type on laughter and found a significant effect, such that friends tend to laugh more during long gaps than strangers (b = -0.47, SE = 0.22, p = 0.032). Finally, we tested for the effects of relationship type and laughter on change in connection. When accounting for the effect of laughter, the effect of relationship type still significantly predicted changes in connection when entering a long gap (b = 0.95, SE = 0.35, p = 0.007). This suggests that laughter does not mediate the effect between relationship type and change in connection. Causal mediation analyses confirmed no evidence of a mediation effect (indirect effect = -0.06, p = 0.080).

Exploratory semantic analyses

Previous research using stranger dyads has demonstrated that "minimal responses" (responses that fail to advance the topic) tend to happen *before* a long gap and that question asking tends to *follow* long gaps (Dindia, 1986; McLaughlin & Cody, 1982). These findings align with our own observations of long gaps between strangers.

As a preliminary investigation into the content of what participants tend to say near a long gap, we examined the text of the turns immediately preceding and immediately following each gap. Gaps were categorized based on their lengths (>2000ms (indicating a long gap) and ≤ 2000ms (all other gaps)). We coded for (i) the number of words (as a proxy for minimal responses) and (ii) the presence of a question mark (as a proxy for question asking).

We found that strangers asked more questions and spoke more words after a long gap (> 2000ms, Fig S6) compared to friends. We take this as preliminary evidence that strangers may be

“overcompensating” for a long gap by speaking more (as evidenced by the increased word count) and changing the topic (as evidenced by the increased number of questions). However, more comprehensive semantic analyses are needed to better contextualize these initial results.

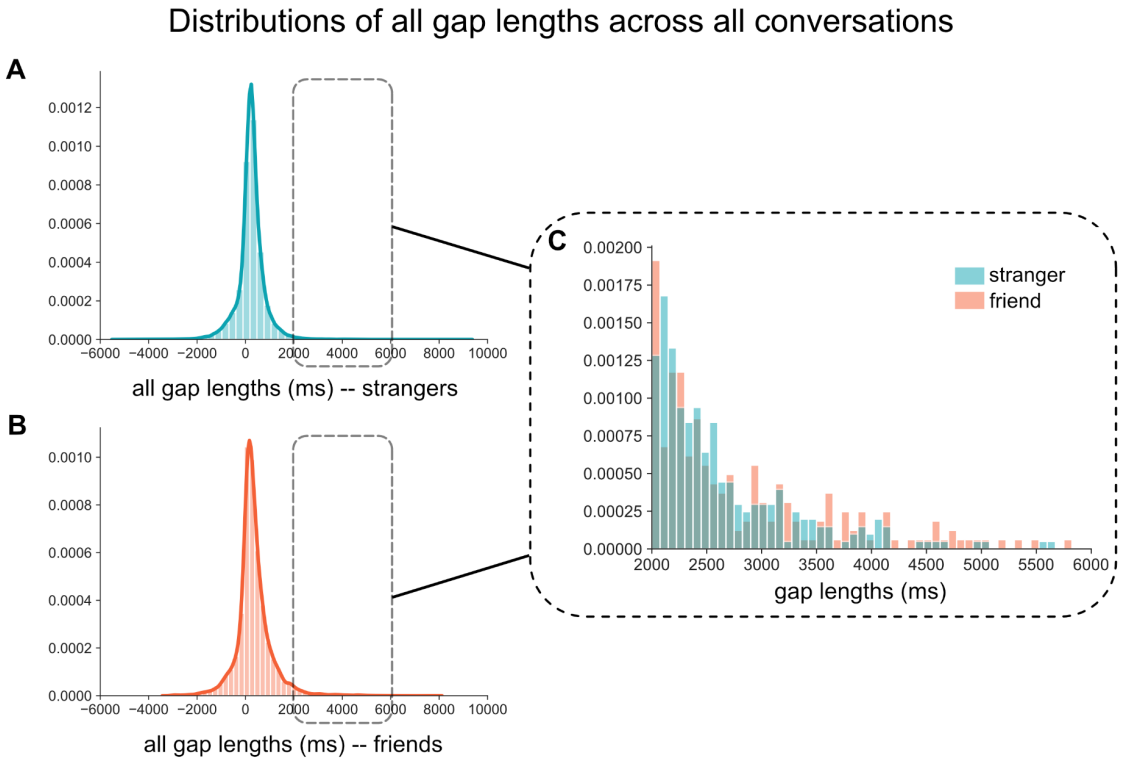

Figure S1. (A) Distributions of all gap lengths across all stranger conversations. (B) Distributions of all gap lengths across all friend conversations. (C) A zoomed-in version of the group distributions highlights the fact that friend conversations contain a greater proportion of long gaps. Note that there are many more stranger conversations compared to friend conversations—261 vs 65, respectively.

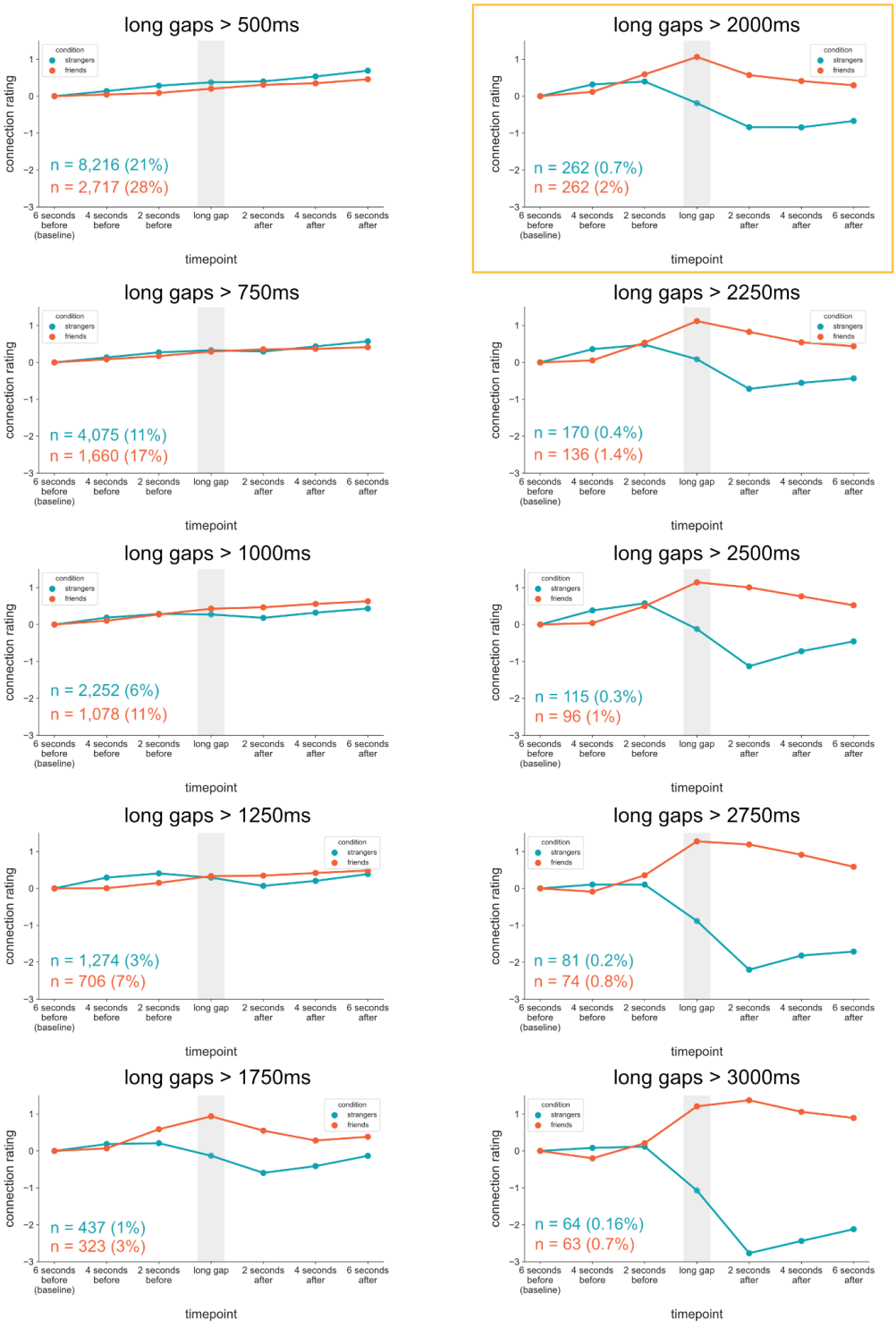

Figure S2. Each plot depicts the average temporal dynamics of subjective feelings of connection when entering and exiting long gaps starting at an initial baseline 6 seconds prior to the gap. We plot the trajectories separately for strangers and friends. Each plot has a different threshold for defining a "long" gap. The text in blue details the number of long gaps included for strangers with each definition (and what percentage of total gaps that number represents). The text in

orange details the number of long gaps included for friends with each definition (and what percentage of total gaps that number represents). Note that these values differ slightly from Table S1 because turns included here can not occur earlier than 6 seconds from the start of the conversation or later that 6 seconds from the end of the conversation. The yellow box indicates the threshold used in the main text. In general, the pattern of results gets stronger as the threshold increases, but note a tradeoff between threshold and number of observations.

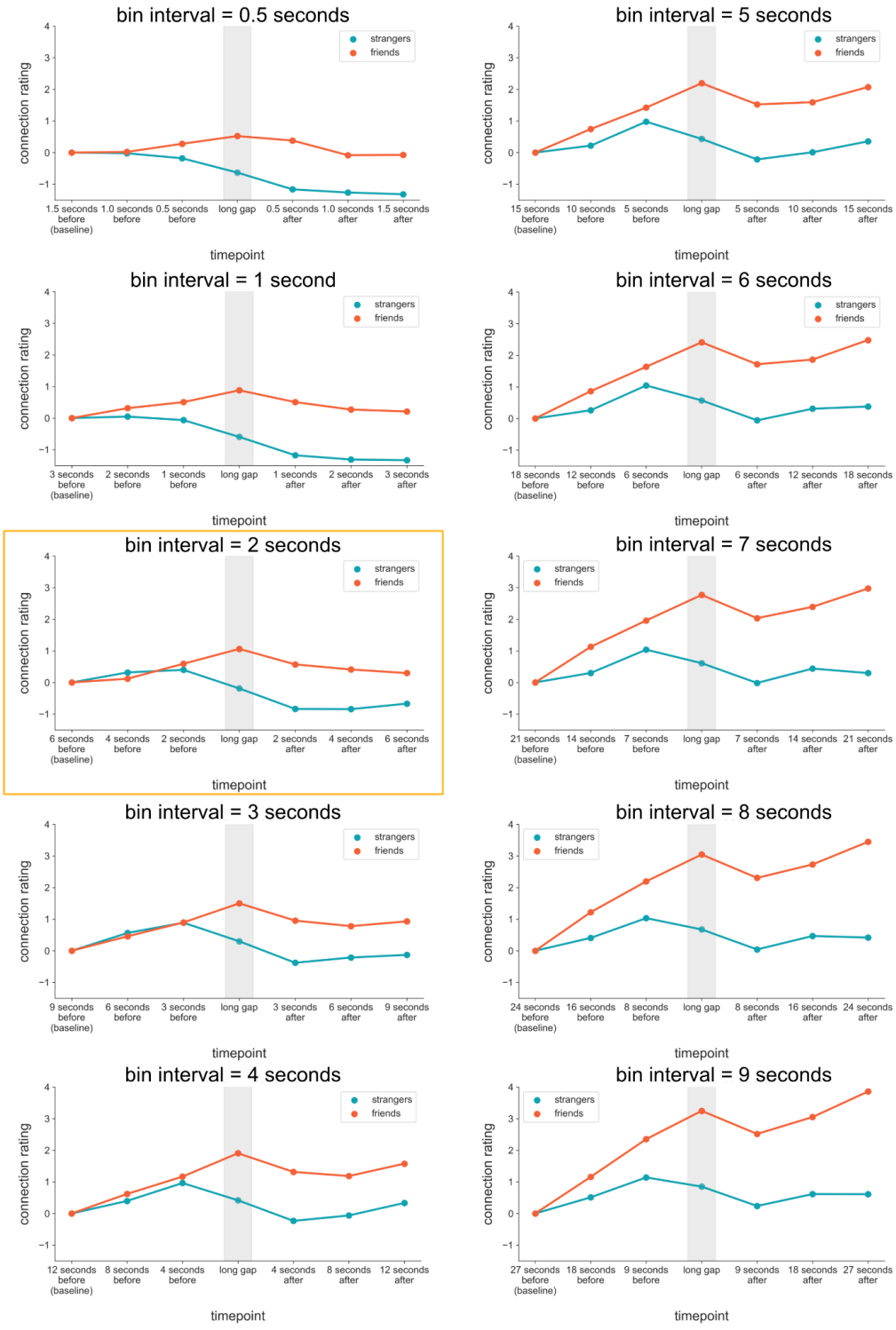

Figure S3. How do different bin sizes surrounding the long gaps impact the change in connection scores? Each subplots considers long gaps to be all gaps greater than 2 seconds. The subplots differ on how much time is included in each of the 6 timepoints surrounding the long gap (3 before and 3 after). The pattern of results in these subplots are quite similar to the interval

used in the main text (2 seconds, highlighted with a yellow box). This demonstrates that our main effects are quite robust to the choice of interval size.

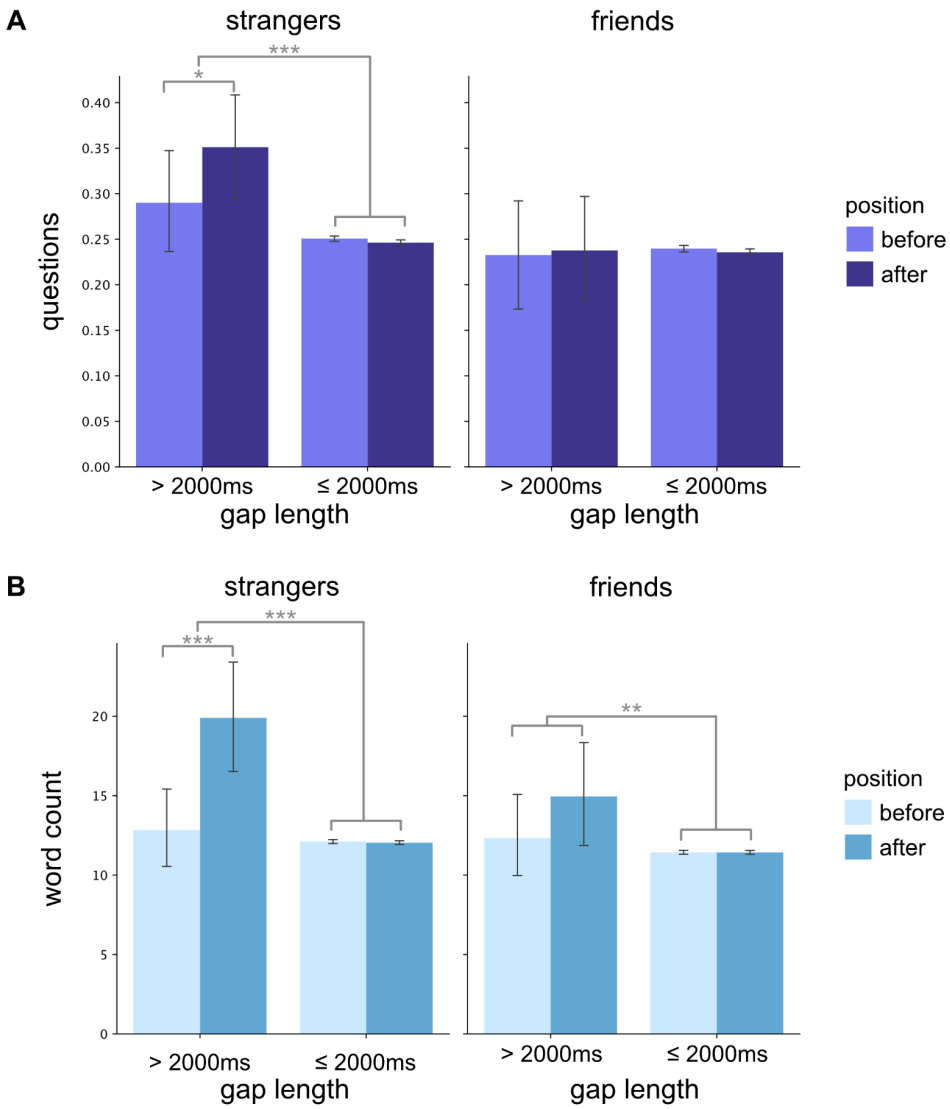

Figure S4. (A) Percentage of turns containing a question mark split by relationship type (stranger vs friend), gap length (> 2000ms (indicating a long gap) vs ≤ 2000ms) and position (before the gap vs after the gap). (B) Word count of turns containing a question mark split by relationship type (stranger vs friend), gap length (> 2000ms (indicating a long gap) vs ≤ 2000ms) and position (before the gap vs after the gap). Strangers are more likely to use turns with question marks and higher word counts immediately after a long gap. Error bars depict 95% confidence intervals. * $p < .05$, ** $p < .01$, *** $p < .001$

Table S1: Friends have more instances of long gaps across a variety of thresholds. In the main text, we use a threshold of 2 seconds to define a "long" gap. We selected our use of 2 seconds because it is 3 SD from the mean gap length across our datasets. However, our threshold is just one way to define a long gap. Here we test whether the frequency of long gaps differs between friends and strangers across a wide range of different thresholds. The results are consistent: Friends have more long gaps than strangers. We used a zero-inflated negative binomial regression to predict the number of long gaps based on relationship type (friend or stranger). Because different conversations had different numbers of turns, we included the total number of gaps for each conversation as an offset parameter. Because subjects could participate in multiple conversations, subject ID was included as a random intercept.

Threshold (ms)	Frequency: Strangers	Frequency: Friends	Condition Effect
500	8,508 (22%)	2,812 (30%)	b = -0.36, SE = 0.04, $p < .001$
750	4,197 (11%)	1,717 (18%)	b = -0.62, SE = 0.05, $p < .001$
1000	2,316 (6%)	1,122 (12%)	b = -0.83, SE = 0.07, $p < .001$
1250	1,315 (3%)	741 (8%)	b = -1.00, SE = 0.08, $p < .001$
1500	755 (2%)	476 (5%)	b = -1.10, SE = 0.10, $p < .001$
1750	455 (1%)	343 (4%)	b = -1.32, SE = 0.11, $p < .001$
2000	274 (0.7%)	218 (2%)	b = -1.51, SE = 0.15, $p < .001$
2250	178 (0.5%)	150 (1.6%)	b = -1.47, SE = 0.16, $p < .001$
2500	122 (0.3%)	108 (1.2%)	b = -1.53, SE = 0.18, $p < .001$
2750	84 (0.2%)	85 (0.9%)	b = -1.65, SE = 0.19, $p < .001$
3000	66 (0.17%)	70 (0.7%)	b = -1.68, SE = 0.21, $p < .001$

Table S2: Inter-Rater Reliability (IRR) scores for each variable in Study 2.

Variable name	IRR Method*	IRR Score	Typical Interpretation**
awkward	Intraclass correlation coefficient (ICC3k)	0.872	Good reliability
connected	Intraclass correlation coefficient (ICC3k)	0.838	Good reliability
topics	Intraclass correlation coefficient (ICC3k)	0.931	Excellent reliability
laughter	Cohen's Kappa (average)	0.845	Almost perfect agreement
laughter_who	Cohen's Kappa (average)	0.615	Substantial agreement
laughter_genuine	Intraclass correlation coefficient (ICC3k)	0.736	Moderate reliability
gestures	Cohen's Kappa (average)	0.366	Fair agreement

* https://scikit-learn.org/stable/modules/generated/sklearn.metrics.cohen_kappa_score.html
* https://pingouin-stats.org/generated/pingouin.intraclass_corr.html
** Viera, A. J., & Garrett, J. M. (2005). Understanding interobserver agreement: the kappa statistic. *Fam med*, *37*(5), 360-363.
** Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of chiropractic medicine*, *15*(2), 155-163.

Table S3: Effect of condition (stranger vs friend) on each variable in Study 2. For categorical variables, we used a chi-square test to examine differences in ratings by condition. We took the modal response from the independent raters for each video clip as the "consensus response". For continuous variables, we used this model: scale(variable) ~ condition + (1 | rater ID) which allowed us to use all the ratings, while still accounting for the fact that different raters might have used the continuous scales differently from each other.

Variable name	**Scale**	**Strangers**	**Friends**	**Effect**
awkward	0 = Not at all awkward, 100 = Extremely awkward	M = 43.29	M = 26.15	b = 0.59, SE = 0.11, p < .001 ***
connected	0 = Not at all connected, 100 = Extremely connected	M = 44.80	M = 65.10	b = -0.75, SE = 0.11, p < .001 ***
topics	0 = The turns were on completely different topics, 100 = The turns were on the same topic	M = 59.35	M = 70.50	b = -0.29, SE = 0.11, p = .011 *
laughter	Yes / No	13 / 37	26 / 24	X^2 (1, N = 100) = 6.05, p = .014 *
laughter_who	One person / both people	8 / 18	5 / 8	X^2 (1, N = 39) = 0.01, p = .904
laughter_genuine	1 = Not at all genuine, 9 = Extremely genuine	M = 5.73	M = 6.66	b = -0.48, SE=0.19, p = .011 *
gestures	Yes / No	16 / 34	16 / 34	X^2 (1, N = 100) = 0, p = 1.00

Note: All results hold even when accounting for whether or not the individual raters personally knew someone in the video clip. This model was used to account for this information: variable ~ condition + rater_know + (1 | rater ID)

Appendix A

Post-conversation survey items for Study 1 (Strangers)

In this short survey, you will make ratings about the conversation you just had. Please answer the following questions about your experience as honestly and completely as possible. Your responses to these questions will be kept confidential and only identified by a numeric identifier, not your name.

1. How well did this conversation "flow"? *(0=Not at all, 100=Very)* **[**variable name = **convo_flow]**
2. How much did you enjoy the conversation you had with your study partner? *(0=Not at all, 100=Very much)* **[convo_enjoy]**
3. How much would you like to be friends with your study partner? *(0=Not at all, 100=Very much)* **[friends]**
4. Think about how much you and your study partner each talked during your conversation and indicate your relative contributions on the scale below *(0=My partner spoke much more than I did, 50=My study partner and I spoke the same amount, 100=I spoke much more than my study partner did)* **[speak]**

5. How well did you know your study partner before today? *(0=Not well at all, 50=Moderately well, 100=Extremely well)* **[knew_before]**
6. If you knew your study partner before today, in what capacity did you know them? *(free response)* **[knew_before_text]**
7. How well did you think you know your study partner now? *(0=Not well at all, 50=Moderately well, 100=Extremely well)* **[know_now]**

8. My study partner and I seemed to have a lot in common. *(0=Strongly disagree, 100=Strongly agree)* **[common]**
9. My study partner and I seemed to have similar personalities. *(0=Strongly disagree, 100=Strongly agree)* **[similar]**
10. My study partner is an attractive person. *(0=Strongly disagree, 100=Strongly agree)* **[attractive]**
11. I am physically attracted to my study partner. *(0=Strongly disagree, 100=Strongly agree)* **[attracted_to]**

12. My study partner seemed to be an extroverted person. *(0=Strongly disagree, 100=Strongly agree)* **[extraverted]**
13. My study partner was a fun person to talk to. *(0=Strongly disagree, 100=Strongly agree)* **[fun]**
14. My study partner disclosed a lot of personal information during our interaction. *(0=Strongly disagree, 100=Strongly agree)* **[disclosed]**
15. My study partner felt comfortable having a conversation with me. *(0=Strongly disagree, 100=Strongly agree)* **[comfortable]**

Please rate your agreement with the following statements, as they relate to the conversation you JUST HAD.

16. I was extroverted in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[extraverted_self]**
17. I was a fun person to talk to in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[fun_self]**
18. I disclosed a lot of personal information during that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[disclosed_self]**
19. I felt comfortable having a conversation with my study partner. *(0=Strongly disagree, 100=Strongly agree)* **[comfortable_self]**

The conversation you just had was about 10 minutes long. Sometimes people feel ready for a conversation to end before it actually ends. Sometimes people don't feel that way.

Think back to your conversation. Was there a point in the conversation when you felt ready for it to end? Or do you wish it had gone on longer?

20. How do you feel about the length of the conversation you just had? *(0=I wish it had been much shorter, 50=It was exactly the right length, 100=I wish it had been much longer)* **[length_self]**
21. How do you think YOUR PARTNER felt about the length of the conversation you just had? *(0=They wish it had been much shorter, 50=They thought it was exactly the right length, 100=They wish it had been much longer)* **[length_partner]**

Notes about these survey items.

- Questions **1-14** and **19** were asked across *all* round robins and were therefore the questions that we entered into the factor analysis
- Questions **20-21** were included for a collaborator and were not analyzed by us
- Round Robin **1** answered questions: **1-14**, **19**
- Round Robins **2** & **3** answered questions: **1-19**
- Round Robins **4**, **5**, & **6** answered questions: **1-21**

Appendix B

Post-conversation survey items for Study 1 (Friends)

In this short survey, you will make ratings about the conversation you just had. Please answer the following questions about your experience as honestly and completely as possible. Your responses to these questions will be kept confidential and only identified by a numeric identifier, not your name.

1. How well did this conversation "flow"? *(0=Not at all, 100=Very)* **[**variable name = **convo_flow]**
2. How much did you enjoy the conversation you had with your friend? *(0=Not at all, 100=Very much)* **[convo_enjoy]**
3. Think about how much you and your friend each talked during your conversation and indicate your relative contributions on the scale below *(0=My partner spoke much more than I did, 50=My study partner and I spoke the same amount, 100=I spoke much more than my study partner did)* **[speak]**

Please rate your agreement with the following statements:

4. My friend and I have a lot in common. *(0=Strongly disagree, 100=Strongly agree)* **[common]**
5. My friend and I have similar personalities. *(0=Strongly disagree, 100=Strongly agree)* **[similar]**
6. My friend is an attractive person. *(0=Strongly disagree, 100=Strongly agree)* **[attractive]**
7. I am physically attracted to my friend. *(0=Strongly disagree, 100=Strongly agree)* **[attracted_to]**

Please rate your agreement with the following statements:

8. My friend seemed extroverted in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[extraverted]**
9. My friend was a fun person to talk to in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[fun]**
10. My friend disclosed a lot of personal information during our interaction. *(0=Strongly disagree, 100=Strongly agree)* **[disclosed]**
11. My friend felt comfortable having a conversation with me. *(0=Strongly disagree, 100=Strongly agree)* **[comfortable]**

Please rate your agreement with the following statements, as they relate to the conversation you JUST HAD:

12. I was extroverted in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[extraverted_self]**
13. I was a fun person to talk to in that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[fun_self]**

14. I disclosed a lot of personal information during that conversation. *(0=Strongly disagree, 100=Strongly agree)* **[disclosed_self]**
15. I felt comfortable having a conversation with my friend. *(0=Strongly disagree, 100=Strongly agree)* **[comfortable_self]**

Please answer the following questions about the friend you just talked to.

16. How long have you been friends with them? *(0, 1, 2, 3, 4, 5yrs)* **[friends_years]**
    a. You indicated that you've known your friend for at least 5 years. If you've known them for LONGER than 5 years, please indicate that here: *(open response)* **[friends_years_extended]**
17. How frequently do you talk to this friend? *(0=Monthly, 50=Weekly, 100=Daily)* **[friends_talk]**
18. How would you characterize the nature of your friendship with this person? *(0=acquaintances, 25=friend, 75=close friend, 100=best friend)* **[friends_nature]**
19. Pick the gender that you most identify with: *(Female, Male, Other, Prefer not to answer)* **[gender]**

Appendix C

Questions asked after each video clip in Study 2

1. How awkward did the gap seem? *(0=Not at all awkward, 100=Extremely awkward)* **[**variable name = **awkward]**
2. How connected did the two people seem during the gap? *(0=Not at all connected, 100=Extremely connected)* **[connected]**
3. How closely related were the two turns surrounding the gap (e.g., the turn immediately before and the turn immediately after)? *(0=The turns were on completely different topics, 100=The turns were on the same topic)* **[topics]**
4. Did any laughter occur during the gap? *(Yes / No)* **[laughter]**
5. Who laughed? *(The person on the left / The person on the right / Both people)* **[laughter_who]**
6. How genuine did the laughter seem? *(1=not at all genuine, 9=extremely genuine)* **[laughter_genuine]**
7. During the gap, did either participant seem to use any gestures with the intent of communicating something? (e.g., an exaggerated facial expression, a 'thumbs up', nodding their head, etc.) *(Yes / No)* **[gestures]**
8. Please describe the gesture *(free response)* **[gestures_describe]**
9. Do you personally know either of the people in this video? *(Yes / No)* **[rater_know]**
10. How do you know them? *(free response)* **[rater_know_how]**
11. If you have anything else you want to share about this video clip, or your rating for this video clip, please do so here: *(free response)* **[notes]**

Note: Questions #5,6 only appeared if the rater selected 'yes' for question #4. Question #8 only appeared if the rater selected 'yes' for question #7. Question #10 only appeared if the rater selected 'yes' for question #9.