The Roommate Study:
The Accuracy of Predicting Emotions Over Time
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Abstract

People interact with other individuals everyday, and these interactions provide basic to detailed information individuals use to form impressions of others. The current study investigated relationship closeness between random roommates and suitemates with shared experiences through analyzing how much empathy they display toward each other in conversation and how it might change over time. Fourteen undergraduate random roommates or suitemates (7 dyads) engaged in six emotionally induced conversations over a videoconference link, completed emotion ratings after each conversation, and completed forms about their relationship with their roommate. The experiment was then repeated about two months later. The results indicated that time was not a significant predictor of empathy. However, the total number of activities roommates do together, how well they know each other, and how close they feel to each other were significant predictors of empathy. This suggests that how individuals in close relationships spend their time together is more important than the amount of time they spend together.
The Roommate Study:

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We encounter people everyday whether through work, leisure, or day-to-day exchanges. Lasting from a few mere seconds to hours, these interactions provide basic to detailed information individuals use to form impressions of others. At the same time these interactions feature a type of symmetry or coordination that allows some conversations to be smoother than others. How do individuals form initial impressions of others; what affects these judgments; and what characterizes a close connection between two individuals? The present study examines these questions and specifically investigates how the amount of time that two individuals spend together and their shared experiences affect their coordination in conversation and relationship satisfaction. In doing so, we intend to find a paradigm for studying interactions between individuals with shared experiences in order to develop a basic model of general interactions and apply this knowledge to help individuals having difficulties with interactions.

In exploring people’s interactions, it is important to recognize what information is being shared. Johnson (1981) examined self-report measures of personality to understand whether people use these measures to provide accurate self-information, known as self-disclosure, or share information that explains how they wish to be perceived, self-presentation. Participants completed self-report personality measures, and consistency scores were calculated for the twelve items that appeared twice on the measurement. Variables predicting self-disclosure were socialization, responsibility, and self-control; in contrast, extraversion, perceptual conformance, and social acuity predicted self-presentation. Self-presentation variables correlated significantly with consistency, which implies certain personality variables moderated the consistency of self-
description. It was more likely for extraverted individuals who perceive their social situations as their peers do to employ a self-presentation mode of reporting their personality. Moreover, the study noted that the correlations for the conclusion were low supporting the self-presentation mode of test taking, and it was difficult to make generalizations about how people perform on personality questionnaires.

Noting that people have a tendency to behave in the manner they would like to be regarded, a question arises as to how a stranger forms an impression of another individual and how accurate this impression may be. Borkenau and Liebler (1993) investigated this question by asking whether strangers form impressions through external cues that are linked to personality traits or whether strangers are unable to form accurate impressions because people self-present relative to a particular setting. To test the accuracy of strangers’ judgments, videotapes of fifty pairs of cohabiting people individually reading a standard text were analyzed. The videotaped individuals then completed self-report personality and intelligence questionnaires, in addition to completing personality and intelligence questionnaires describing their partner. Later the 90-second videotapes were shown to independent judges, who provided personality and intelligence ratings. The judges were divided into two groups, a group that watched the clips with audio and another group that watched the clips without audio. An intelligence questionnaire was given as a comparison to the personality questionnaires, since this test measures performance unlike the perceptual nature of personality questionnaires. The study’s results revealed that self-other agreement rises with acquaintance, and strangers’ ratings of personality were positively correlated with their targets. Of the five targeted personality traits, agreement between targets and strangers was higher for extraversion and conscientiousness than for agreeableness; emotional stability and culture that did not hold true for agreement between
targets and acquaintances. This finding suggests that in a brief interaction with a stranger, individuals are most apt to identify the stranger’s sociability and conscientiousness. There was also a convergence between stranger ratings on personality with target self-reports and acquaintances’ target reports, which discredits the self-presentation view of self-stranger agreement. This follows that if in the experimental setting the target behaves differently than outside this setting, ratings by strangers should not correlate with acquaintance ratings. The target intelligence ratings and acquaintance intelligence ratings completed about the target were highly correlated as well as the ratings of target intelligence by strangers in the sound-film and silent-film condition. These correlations reflect the high degree of shared information between the groups. Moreover, the judges of the sound-film condition were more accurate than those watching in the silent-film condition in rating the targets’ intelligence. There was a connection between judge ratings of intelligence and target self-reports and acquaintance reports of intelligence and a connection to targets’ actual performance on an intelligence measure. These findings help to validate the accuracy of judges’ ratings of targets in the five personality dimensions, since there was a connection between judge ratings of intelligence in the sound-film connection with target intelligence performance. Overall, this study finds that external cues are linked to personality traits; there is consistency in behaviors over time; and with acquaintance the accuracy of rating personality increases.

In knowing how acquaintanceship affects personality and behavior judgments, it is important to consider understanding how person perceptions are constructed. Employing behavioral prediction and matching personality judgments with relevant behaviors to assess the accuracy of personality judgments would be ideal, yet it is challenging and expensive (Funder et. al, 1995). However, examining interjudge agreement is possible, and it is manageable to study
acquaintance effects on these judgments. Funder et al. (1995) investigated interjudge agreement of personality by testing three hypotheses: The overlap hypothesis supposes that only when the target person is observed in the same setting do judges agree on personality judgments; the communication hypothesis proposes that judges develop a common understanding of a person and use this agreement to describe the individual’s personality; and the similarity hypothesis suggests that individuals tend to self-select and pick acquaintances based on their own self-formations, thus their accuracy in accessing their acquaintances’ personality is a result of their similarity to each other. Funder et al. (1995) reject all of these hypotheses. Acquaintances who observed a target person in different settings formed similar opinions of the targets’ self-view. This demonstrated that it is not imperative for individuals to see a target in the same context to form agreement of the target’s personality; nonetheless, individuals who viewed a target in an identical setting have stronger agreement. Next, the study noted that target-selected acquaintances were not more alike in personalities than randomly selected strangers. Thus self-selection was not supported, instead as an individual becomes more acquainted with another individual that person learns more about the other. Given these findings, it is concluded that interjudge agreement is based on shared accuracy in knowing the target.

Understanding that being acquainted with an individual increases the accuracy of personality judgments is significant, and it is important to consider what other factors influence behavior and personality judgments. Forming accurate judgments may help individuals establish satisfying connections and veer away from toxic relationships. Ambady and Gray (2002) studied the effects of negative mood on the accuracy of social judgments and suggested two ways that mood affects social decision-making. The first method proposes that negative social judgments result in systematic distortions and reduced accuracy in accessing social cues. The second
method indicates that negative affect can influence information processing strategies. To test how initial impressions are formed through induced emotions, the researchers used short individual samples of nonverbal behavior known as thin-slice judgments to be viewed by the participants. Nonverbal behavior occurs out of awareness and automatically. The results of this study validated the first method and noted that sadness impairs individuals’ ability to form impressions of others based on brief observations. As well, chronic sadness was associated with poorer awareness of others’ goals and emotions and taking a longer time to complete tasks. Finally, the last result suggested that when depressed participants’ cognitive and attentional resources were limited they perform more accurate judgments. This supports a view that sadness is linked to lower social judgment accuracy and that distraction can correct for these effects. All of these findings support that depressed individuals employ a more cautious and deliberate method to form judgments, and this excessive rumination can lead to poorer judgment accuracy. This study noted that affect plays a powerful role in social judgment accuracy, perhaps leading to a diminished ability to interpret the social world.

Thus far, the research discussed has focused on how individuals overtly form person judgments—whether through external cues, acquaintance, or mood effects. Yet, it is reasonable that automatic and unconscious actions also affect these judgments. LaFrance (1979) conducted the first study to reliably examine coordination through synchrony in interactions and its effect on rapport. Teachers and students in a summer course participated through class video recordings and later the students completed class rapport questionnaires following the recordings. When the videos were coded, synchrony was operationalized as posture sharing when the student’s arm and torso positions were mirror images of his or her teacher. Posture sharing did not involve participants dynamically changing postures simultaneously. The results revealed that
posture sharing and rapport are likely to be positively related and continuous over time. Behavioral similarities occur automatically among individuals and by facilitating rapport, they convey feelings of liking and empathy (Chartrand and Dalton, 2009).

Building on LaFrance’s work, Bernieri (1988) examined physical interpersonal coordination on rapport within teacher-student dyads by constructing a composite score of simultaneous movement, tempo similarity, coordination and dance-like smoothness, and behavior matching. Movement synchrony was defined as the timing and coordination of movements occurring simultaneously with the timing and rhythm of another’s movements. Next, behavior matching was operationalized as the degree the movements of one interactant matched the other, similar to LaFrance’s definition of postural sharing. Bernieri’s results reported movement synchrony as correlated with rapport; yet, behavior matching was not correlated with rapport instead correlating with anxiety. However, Bernieri noted the discrepancy between LaFrance’s study finding behavior matching correlations and suggested that his testing method and lack of a composite score of behavior matching might have been a reason for his failure to replicate her results. The results of these studies highlight that there are likely to be instinctive ways in which individuals interact that facilitate rapport, thereby affecting person judgments and the bonds people form with others.

Teacher-student interactions or other prescribed interactions do not facilitate understanding how emotions play a role in dyadic interaction. The effects of negative mood on perception may be large, but how do other emotions affect perception in an actual interaction? Knobloch (2008) connected the Emotion-in-Relationships Model (ERM) to conversation. This model proposes that an individual experiences emotions when a partner facilitates or interferes in achieving the individual’s goal. Facilitation by the partner allows the goal to be met, while
interference by the partner hinders the goal. This study of 125 married couples tested over two conversations reported that interference from partners was associated with uncoordinated conversation, disassociated messages, unfavorable cognitive appraisals, and negative emotional reactions. Moreover, interference from partners appeared to result in less affiliation and liking. Knobloch’s study concluded that an individual encouraging or deterring his or her partner from reaching his or her goals affects his or her daily interaction with the partner. This acknowledges the power people give others when working toward their aspirations and the importance of being surrounded by encouraging individuals.

Beyond knowing the importance individuals place in other’s support of their goals during interactions, it is also important to consider which contexts prompt more emotion sharing in conversation and look further into how emotions are shared. Anderson and Leaper (1998) studied emotion talk; the true words and emotion terms people employ, in sharing private thoughts and feelings in conversation. For this experiment, coders analyzed emotional content, type of speech, emotional directness, the experiencer of the emotion, and the source or target of the emotion in conversations between dyadic friend pairs. The dyadic friend pairs were either all female, all male, or mixed gender; and gender composition of the dyad was not associated with the study findings. Instead the self-disclosure conversation topic, how the participants’ family relations had changed since they entered college, was associated with more references to emotion than the unstructured conversation, while there were no gender variations in findings. Thus the topic of the conversation, self-disclosure versus unstructured conversation, influenced the emotional content of the conversation. Across topics, negative emotions were discussed more than positive emotions, and most emotion citations were indirect. Importantly, the finding that self-disclosure prompts more emotion sharing has been linked with relationship satisfaction and
individual psychological adjustment (Anderson and Leaper, 1998). Therefore in conversation, beneficial exchanges involve more emotion sharing which in turn fosters relationship satisfaction.

As emotions are shared in conversation between friends or married couples, a question arises as to whether these emotions become shared between the individuals or transmitted from one individual to the other. Anderson et. al (2003) conducted three studies measuring emotional convergence in close relationships. The first study noted that dating partners who were close in emotional responses during the initial assessment became more alike after six months, consistent with the idea that their emotions converged over time. However, their personality assessments did not become more similar over time, so the emotional convergence could not be attributed to a similarity between partners’ personality traits. The partners’ emotional convergence was skewed: the partner with reduced power altered his or her emotions to be more similar to the partner with greater power. Finally, this study concluded that having more similar emotions benefited the couple through increased likelihood of staying together and greater relationship satisfaction. The second study reported that this emotional convergence generalized beyond romantic relationships to platonic relationships. The second study also noted that emotional convergence could occur in relationships with partners who were not initially emotionally similar. Finally, the third study proposed that emotional convergence could occur even if relationship partners were prevented from witnessing each other’s emotional reactions. In summary, these studies conclude that emotional convergence is possible, that power plays a role in how emotions are transmitted, and that having similar emotions benefits established relationships.

As relationships become closer and emotions are shared, consideration must be placed in understanding how partners’ perception of each other changes. Kenny and Acitelli (2001) studied accuracy and bias in the perception of a partner in a close relationship. Previous research
noted that individuals might be motivated to view their partners in their own idealized way and might not be as accurate as predicted. Also, individuals might realize that they are well acquainted with their partner and stop continually monitoring their partners’ behaviors. Accuracy ratings were greater than bias for items less relevant to the relationship such as partner’s job satisfaction and feelings about family while less accurate for items directly relevant to the relationship. This result demonstrates that perceptions are more likely to be accurate when topics are less threatening while perceptions that are more likely to relate to the intimacy of the relationship are more biased and avoided. Perceptions that might threaten the relationship are likely to be avoided, but individuals also have an inclination to maintain positive perceptions about their partners and the relationship—an effect known as positive illusions (Sternglanz and DePaulo, 2004). Sternglanz and DePaulo studied the accuracy of perception of nonverbal emotion cues between strangers, close friends, and less close friends. They noted that friends were more accurate than strangers when identifying their friends’ emotions. However, less close friends were more skilled at rating concealed sadness and anger than close friends. Thus close friends in this study were motivated to not interpret cues that partners were shielding from them or interpret them in a more positive way than they actually should be. Moreover, these two studies conclude that individuals in a close relationship are not more accurate in their judgments of each other than their judgments of strangers.

Given the research on how individuals form impressions of others, how they find a connection, and the characteristics that comprise a close connection; the present study examines how two individuals who have recently started living together as randomly assigned college roommates form initial impressions of each other, how this changes over time, and how this relates to relationship closeness. Do individuals with shared experiences show more or less
accuracy and bias in the perception of their partner over time? Do individuals with shared experiences display a smoother, more synchronized conversation over time? We propose the following hypotheses to determine relationship closeness. The listener in the conversation will be more accurate in identifying the speaker’s feelings, thus the listener will exhibit more empathy toward the speaker, based on higher ratings for a combination of variables including the following: the total number of activities roommates do together in a typical week, how well the roommates know each other, how well the roommates knew each other during the first experiment session, how close the roommates feel to each other, and how much the roommates enjoy spending time together. Also we hypothesize that time will have an effect on the empathy such that for the second session of the experiment roommate pairs will be more accurate in predicting each other’s emotions than in the first session. Thus, over time, there will be a difference in how roommates will interact and the information that they share with each other.

Method

Participants

Participants were 22 students (18 females, 4 males, \( M = 17.91 \) years, \( SD = 0.29 \), age range: 17-18) who were recruited from an undergraduate psychology research participant pool through a set of pre-selection criteria, and they received class credit for participation. All participants were native English speakers. For incoming first year students, the university either randomly assigns them a same sex roommate that they do not know, or first year students have the option of requesting a roommate who they already know. The pre-selection criteria included: (1) being a first year university student, (2) having a randomly assigned roommate or suitemate enrolled in an undergraduate psychology class with a participant pool credit requirement, (3)
bringing the random roommate or suitemate to the experiment as his or her conversation partner, (4) possessing normal 20/20 vision, (5) having the ability to hear normally, (6) having no neurological conditions, and (7) participating in two sessions of the experiment. The first session was held during the first month of university classes, and the second session occurred about two months later. The average number of days elapsed between sessions was 50.3 (SD = 4.11, days elapsed range: 49-62). All of the 11 dyads were same sex dyads. One female dyad failed to appear for the second session of the experiment despite two repeated efforts to reschedule. Another female dyad needed to be rescheduled twice for the second session but was ultimately able to participate a second time. All nine other dyads did not need to be rescheduled for the second session. Only data from the dyads that participated in both sessions were used for the analysis. Although the pre-selection criteria were detailed and explicit, not all of the dyads fully met the criterion of having a random roommate or suitemate. There were seven dyads that were random roommates who shared the same room and fulfilled all of the pre-selection criteria. There were two dyads that lived in the same suite (lived in the same hall or floor) and each had different roommates. As well, there was one dyad that lived in separate single-occupancy bedrooms with a shared entrance and bathroom; this dyad had known each other for 4 years before the experiment and so were excluded from analyses. All participants reported in the current study read and signed informed consent forms approved by the relevant Institutional Review Board. Data for the conversations were incomplete for two dyads in session 1 of the experiment because there was not enough time to complete each of their final two conversations. Data for the conversations were complete for all of the dyads in session 2.

Apparatus
During dyadic conversations four types of time-synchronized data were recorded from each participant: (1) magnetic motion tracking, (2) video, (3) audio, and (4) questionnaires. Only questionnaire data will be reported here, but the full procedure is described for completeness.

The magnetic motion tracking system was installed in two rooms, each with a 3.7m x 2.4m non-magnetic wooden stage built 0.3m off the concrete floor. An 18-sensor Ascension Technologies, Inc. (ATI) MotionStar motion-tracker was used. ATI pulsed DC magnetic field Long Range Transmitters with a range of approximately 3m was placed on 1.4m tall rigid stands at the edge of the stage so that the stage was covered by the magnetic field. Each 1.5cm x 1.5cm sensor returned 3 degrees of freedom of position and three degrees of freedom of orientation sampled at 81 Hz. Each sensor produced a very weak electrical signal (much weaker than produced by a single AAA battery) that was converted to digital files by a computer.

Video was recorded from small, color video cameras placed directly in front of and in full view of the participants. Audio was recorded microphones placed in full view of the participants.

Participants (N=22, 4 male, 18 female) had 8 sensors attached and were informed that the sensors measure “magnetic fields during conversation”. The participants were led onto the second motion tracking stage which was partitioned as one 2.5m x 2.5m room with a back-projection screen as one wall of the room and a small video camera located just in front of the screen. The participant was seated on a wooden chair approximately 1.5 m from the projection screen, and was fitted with lightweight plastic headphones. An overhead view of booth and its components is depicted in Appendix A.

Procedure
Participants were told together that the study would investigate how people participate in conversations over a video link and that they would see and hear their roommate over a videoconference set-up. They were told that they would be talking about times when they felt a certain emotion and listen to their roommate describe similar memories. As well, they were informed to describe a memory of which their roommate was not aware. We alerted them that we would attach a sensor to them and that we were “measuring magnetic fields during conversation.” Participants were next informed that they would complete a ratings questionnaire after each conversation and at the end of the experiment would complete a self-personality assessment and roommate personality assessment. Additionally, participants were asked to return for a second session of the experiment in about two months. They were then asked to read and sign an Informed Consent Agreement.

Next, participants were directed to put on a harness that would be used to attach the sensors. They then were led to videoconference booths that were located in two separate rooms, each with its own entrance. In the separate videoconference booths, each participant was seated on a wooden chair facing a projection screen, and was fitted with lightweight plastic headphones. Afterwards, the experimenter instructed the participant how to place the sensors on the harness. The participant was informed that he or she would engage in six short conversations for two minutes each and one “getting to know you” conversation lasting five minutes. The participant was also instructed to speak for the entire two minutes and if she or he had extra time to continue conversing with his or her roommate. During the conversations, he or she would be able to hear his or her roommate over the headphones and see his or her roommate on the projection screen. The participant was also assigned a participant number 1 or 2 for videoconference booth 1 or 2. During the conversations the prompt would ask participant 1 or 2 to begin the conversation. The
participant was given six Describe Emotions questionnaires on a clipboard with a pen (See Appendix B for Questionnaires) and was asked to fill out the entire form when prompted by the speaker after each conversation. The experimenter then left the room, and the closed circuit video and audio channel were connected allowing the two participants to see and hear each other. The participants were instructed over headphones to spend five minutes in conversation “getting to know each other,” and this conversation was used to familiarize and make the participants comfortable with the video conferencing set-up.

Then the video and audio were turned off, so the participants could not hear or see each other. Next, the audio was turned on, and participants were asked to describe a recalled experience in which their roommate was not present that elicited one of three chosen mood adjectives: Happy, Sad, or Disappointed. A three-sentence definition and example memory was provided for each mood adjective, so that participants would interpret the mood adjective in the same way and be primed to think of an experience eliciting that adjective. For instance, “Sadness is defined as a feeling of sorrow or regret. People who feel sad may be miserable, desolate, dejected, mournful or melancholy. People feel sad after the death of a family member, friend, or pet.”

Each participant was given two minutes to relate his or her recollected personal experience to the other participant. One participant was assigned to be the speaker and started telling his or her experience when prompted. During this time, the participant who was listening was asked to “Listen attentively and be sympathetic to the other person. In two minutes we will ask you to describe the same emotion that was felt when your roommate was present and the other person will be asked to listen.” Both participants were given the same mood adjective to recall. The order of the speaker versus listener was randomized between dyads and across the
sessions. After each two minute conversation segment for the same mood adjective, the video and audio were turned off, and the participants completed a Describe Emotions questionnaire (See Appendix B for Questionnaires) concerning their conversational partner’s and their own emotions during the conversation. The questionnaire was comprised of 24 adjectives the participant rated on he or she felt and acted during the conversation, and with the same 24 adjectives the participant rated on how his or her roommate felt and acted. All of the adjectives were rated on a 10-point Likert scale (1- extremely inaccurate, 9- extremely accurate). The 24 adjectives were derived from Feldman’s circumplex model of affect (1995).

The procedure was repeated for the remaining mood adjectives. The order of the three mood adjectives was counterbalanced within and between sessions.

After the final conversation segment, the motion capture sensors and harness were removed from each participant. Then the participants completed a personality questionnaire about themselves, a personality questionnaire about their roommate, and a short pre-debrief questionnaire. The data from these three questionnaires are not reported here, but are described for completeness. The personality questionnaires were comprised of 40 adjectives the participant rated on a 10-point Likert scale (1- extremely inaccurate, 9- extremely accurate). The personality questionnaire was Saucier’s 40-Item Mini-Maker Set, and it has been previously shown to accurately and reliably measure the Big-Five personality factors (Saucier, 1994). In the short pre-debriefing questionnaire, the participants were asked basic demographic questions and the questions about weight and height. These questions are included since weight and height affect the dynamics of people’s movements. When the experimenter gave the participant the materials release form, the participant was informed that during the conversations his or her video, audio, and motions were recorded and that the participant would have the option of
sharing or not sharing this information. Next, the participants were partially debriefed since the study occurred over two sessions. They were told that we are investigating how people communicate and that when we converse we gesture and move while talking and listening.

The entire experiment was repeated with the same participants several weeks later. All of the procedures remained the same except the first session pre-debriefing questionnaire was exchanged with a second session pre-debriefing questionnaire asking questions about the participants’ relationship with their roommates and the activities they do together (See Appendix C for Pre-Debriefing Questionnaire). The questions from the second session pre-debriefing questionnaire on activities the roommates do together were derived from Berscheid, Snyder, and Omoto (1989) Relationship Closeness Inventory and were used as a measure of the amount of time the dyad spent together in a typical week. At the end of the second session, participants were fully debriefed on the purpose of the experiment. They were told that during the conversation their head movements and facial expressions were being recorded to a computer. Also, they were told that the study was investigating the interaction between auditory perception, visual perception, emotional expression, and motor sequencing during conversation.

Analysis

To evaluate the hypotheses, the experimenter created composite scores from the Describe Emotions questionnaire to represent the speaker’s feelings or present emotions and the listener’s empathy for the speaker. To create the speaker’s feelings or present emotions composite score, the ratings for the adjectives (surprised, sad, cheerful, hostile, irritable, amazed, joyful, lonely, astounded, blue, delighted, disgusted, angry, happy, astonished, and downhearted) “describing how you felt during the most recent conversation” were summed. To create the listener’s
empathy for the speaker composite score, the ratings for the adjectives (surprised, sad, cheerful, hostile, irritable, amazed, joyful, lonely, astounded, blue, delighted, disgusted, angry, happy, astonished, and downhearted) “describing how your conversational partner felt during the most recent conversation” were summed. Next, the experimenter used five questions from the second pre-debriefing questionnaire as predictor variables of the listener’s empathy score (See Appendix C for Pre-Debriefing Questionnaire). These questions include how well the roommates know each other, how well the roommates knew each other during the first session, how close the roommates feel to each other, how much the roommates enjoy spending time together, and how many activities they do together in a typical week. The numerical value for how many activities roommates do together in a typical week was created by summing the activities that the roommates checked for question six: “The following describes activities that people may participate in during the course of a week, please check those activities each week that you typically engage in with your conversational partner.” The final predictor of the listener’s empathy score was the variable for the first or second session, thus comparing the questionnaire ratings for a dyad from the first to second session.

Results

Descriptive statistics are reported in Table 1 of Appendix D. During the first session of the experiment, two dyads did not have sufficient time to complete the experiment; so the experiment was shortened. For one dyad only one conversation was omitted and for another dyad two conversations were omitted. All of the omitted conversations had the topic Happy. For the second session of the experiment, all conversations were completed for all dyads. The data were assessed for statistical significance at $\alpha = .05$. The multiple regression model significantly predicted the outcome variable empathy, $F(6,96) = 13.60, p < .001$. This suggests that we can
predict part of the accuracy of the listener in identifying the speaker’s feelings or empathy scores based on the participant responses to selected statements from the second pre-debriefing form. Examination of the regression coefficients indicates that there were two predictors with large effects, one predictor with a small effect, and three predictors with no effects. The two predictors with large effects were how well the roommates know each other and how close the roommates feel to each other. The one predictor with a small effect was the total number of activities roommates do together in a week. The three predictors with no effects were the first or second session, how well the roommates knew each other during the first session, and how much the roommates enjoy spending time together. The estimate multiple regression equation is as follows: 

\[ \hat{Y}_i = 33.37 - 2.91X_1 - 9.31X_2 + 22.97X_3 + 2.44X_4 - 29.33X_5 + 9.65X_6 \] (See Appendix D for Source Table for Regression Coefficients). While accounting for the other variables in the multiple regression equation, the variable first or second session \( (X_1) \) predicts a 2.91 units decrease in empathy score \( (Y) \). The variable total number of activities roommates do together in a typical week \( (X_2) \) predicts a 9.31 units decrease in empathy score \( (Y) \). The variable how well the roommates know each other \( (X_3) \) predicts a 22.97 units increase in empathy score \( (Y) \). The variable how well the roommates know each other during the first session \( (X_4) \) predicts a 2.44 units increase in empathy score \( (Y) \). The variable how close the roommates feel to each other \( (X_5) \) predicts a 22.33 units decrease in empathy score \( (Y) \). The variable how much the roommates enjoy spending time together \( (X_6) \) predicts a 9.65 units increase in empathy score \( (Y) \). With no time spent together doing activities, without being familiar with his/her roommate, without feeling close to his/her roommate, and without enjoying the time he/she spends with his/her roommate; the empathy score \( (Y) \) is estimated to be 33.37. The model predicts that time
spent together, doing activities jointly, getting to know his/her roommate, roommate closeness, and enjoying time together accounts for 46.47% of the variance in empathy scores. Confidence intervals were also estimated around the intercept and variables $X_1, X_2, X_3, X_4, X_5,$ and $X_6$. It was revealed that around the intercept 95% of the values will fall between 30.03 and 36.71. It was revealed that around the variable first or second session ($X_1$) 95% of the values will fall between -7.28 and 1.46. It was revealed that around the variable total number of activities roommates do together in a typical week ($X_2$) 95% of the values will fall between -18 and -0.61. It was revealed that around the variable how well the roommates know each other ($X_3$) 95% of the values will fall between 14.47 and 31.48. It was revealed that around the variable how well the roommates know each other during the first session ($X_4$) 95% of the values will fall between -3.08 and 7.97. It was revealed that around the variable how close the roommates feel to each other ($X_5$) 95% of the values will fall between -38.89 and -19.77. It was revealed that around the variable how much the roommates enjoy spending time together ($X_6$) 95% of the values will fall between -0.62 and 19.91.

Bivariate plots revealed no anomalies to violate regression assumptions. Residual plots also demonstrate no anomalies to violate regression assumptions (See Appendix E).

Discussion

In our study we hypothesized that the listener in the conversation would be more accurate in identifying the speaker’s feelings, thus exhibit more empathy toward the speaker, based on higher ratings for a combination of variables including the following: the total number of activities roommates do together in a typical week, how well the roommates know each other, how well the roommates knew each other during the first experiment session, how close the
roommates feel to each other, and how much the roommates enjoy spending time together. We also hypothesized that time would have an effect on the empathy scores such that during the second session of the experiment roommate dyads would be more accurate in predicting each other’s emotions. Our first hypothesis was supported which suggests that we can predict part of the accuracy of the listener in identifying the speaker’s feelings or empathy scores based on the participant responses to selected variables. However, not all predictors were significant. Two predictors, how well the roommates know each other and how close the roommates feel to each other, were found to have large effects; and the predictor, the total number of activities roommates do together in a typical week, was found to have a small, but statistically significant independent effect. Both variables, total number of activities roommates do together in a typical week and how close roommates feel to each other, were negative predictors while how well the roommates know each other was a positive predictor. The variables, how well the roommates knew each other the first session and how much the roommates enjoy spending time together, were not significant and thus did not support the hypothesis. Yet, it is acknowledged that all of the variables were correlated, and multicollinearity could have impacted the results. Surprisingly, the second hypothesis was not supported; and ratings from the second session were not found to be more accurate than ratings from the first session, thus time did not have an effect on empathy scores.

These results revealed that listeners exhibited more empathy to their roommate if they knew each other well and felt close to each other and was supported by the work of Anderson and Leaper (1998). Anderson and Leaper studied emotion talk and found that self-disclosure prompts more emotion sharing, and it has been linked with relationship satisfaction and individual psychological adjustment. Thus with more emotional information shared between
roommates during the conversations in the experiment because they feel comfortable around each other and have shared similar information in other settings; they would feel more satisfied with their relationship and show more empathy towards each other.

However, despite the significant findings for many of the hypotheses, it is important to consider why the second session versus the first session was not found to be a significant predictor of empathy scores. I think this finding highlights the differences between this study and many of the studies described in the introduction. In this experiment the roommates were assigned to live together or live on the same floor of a dormitory building, and the time between the first and second session was about two months. However, many of the studies referenced in the introduction featured participants who were married couples, non-married couples, or friends of at least six months. Thus these individuals chose to spend time together and selected their partner versus being assigned someone with whom to spend time. This suggests that time is not the important factor in becoming acquainted with another individual, but what an individual does with the time he or she has with another individual is the significant factor. In the present experiment the predictors found to be significant were the total number of activities roommates do together in a typical week, how well the roommates know each other, and how close they feel to each other. These predictors denote characteristics beyond just sharing a room or common space with another individual. They signify spending quality time together with another individual and the results of that time spent getting to know each other. In relating this research finding to research with couples or friendships, the length of time people in close relationships have known each other might not be a significant predictor of relationship satisfaction. Therefore, couples married for a long time might not be necessarily happier and closer than
couples married for a short period of time. It is most important to understand what people do with their time together and how that time benefits the relationship.

Besides the difference between selecting and being assigned a partner, there were other significant differences between the present study and studies mentioned in the introduction that should be noted. With opposite sex married and non-married couples, there is likely romantic love involved, and it is difficult to tease apart how this type of relationship might differ from a platonic relationship. Would participants in romantic relationships exhibit more empathy toward their partner because of their romantic love? Also would these participants have a different set of ratings for the question of how much they enjoy spending time together and readily choose the highest rating? I would wonder whether the act of being in love can affect the accuracy of emotional judgments as seen from Ambady’s and Grady’s (2002) research on the affects of sadness on thin-slice judgments. It would be interesting in future studies to consider comparing interactions between platonic and romantic relationships.

Another key difference between the present study and the former studies was whether the participant actually engaged in a conversation with another participant versus watching a short clip of a recorded conversation and then providing ratings. The majority of the former studies relied on participants viewing recorded videotapes. The present study used participants engaged in conversations and rating their own conversations. This difference aided in the present participants’ ability to accurately rate their conversational partners as empathetic. Through a conversation, the participants receive feedback via verbal and nonverbal expressions. It is likely that this contact heightens participants’ ability to make accurate and reliable ratings.
Moreover, beyond taking into account these differences, acknowledging the limitations of the present study is necessary. The videoconference paradigm with booths and motion sensors attached to the participants is not desirable to compare to a normal face-to-face conversation. Participants might not have felt truly comfortable in this staged setting, and therefore these participants might have described superficial emotional experiences that would not lead them to perceive their conversational partner displaying empathy. It is challenging to generalize this interaction to intimate conversations between roommates. It would also be desirable to increase the sample size, since with more participants the variable, enjoy spending time together, might be found to be significant. However, it was challenging obtaining seven dyads for analyses since many possible participants did not meet all of the experiment’s pre-entry requirements. Our criteria for dyad analyses actually changed to include the suitemates even though these dyads did not initially meet the experiment pre-entry requirement of bringing their random roommate to the experiment. Thus the experiment findings do not just apply to random roommates but also random suitemates. Finally, another limitation in the experimental design was that the participants did not always have enough time to complete all of the conversations. Setting up the experiment took a variable amount of time (including putting on the harnesses and helping the participants to feel situated in the booth), and the amount of time the participants took completing the questionnaires after each conversation varied. This produced fewer overall results, and participants may have felt rushed during the experiment and not shared true emotion stories. However during the second session of the experiment, participants were accustomed to the experimental design; and all finished the experiment on time.

Another limitation in addition to experimental design limitations is the constructed variable denoting the speaker’s and listener’s feelings. The constructed variable included the
following adjectives: surprised, sad, cheerful, hostile, irritable, amazed, joyful, lonely, astounded, blue, delighted, disgusted, angry, happy, astonished, and downhearted. In accurately identifying the speaker’s feelings as defined by these adjectives, the listener is defined in this experiment as empathetic. However, other adjectives might be important to consider in describing empathy, and predicting someone else’s feelings using these adjectives might not be the same as actually understanding and sharing the feelings of another.

Despite the limitations of this experiment, this experiment featured a novel design and investigated how the interaction and ability to show empathy changes for two people assigned to share a space over time and has not been previously addressed in the psychological literature. The experiment was comprehensive with many measures including motion sensor data, emotion questionnaires, personality assessments, and questions about the participant’s relationship with his or her roommate. The measures not analyzed in this study can be examined in future research.

Future Directions

In future experiments, it would be advantageous to analyze more of the information gathered in the experiment. For example, when Johnson (1981) studied self-report measures of personality, he discovered that whether people used the measures to provide accurate self-information or present themselves in a favorable way through self-presentation depended on their motivations of responsibility and self-control versus extraversion and perceptual conformance. In future versions of our study, studying whether individuals present themselves via traits, self-disclosure, or self-images, self-presentation, would be valuable to evaluate. I would predict that the listeners would be more empathetic to the speakers who are high in self-disclosure.
In addition, evaluating the personality questionnaires from each experiment session could reveal the consistency of personality traits over time as supported by Borkenau and Liebler (1993) through comparing the responses from the first and second session. Besides identifying personality consistency over time, these measures can tell researchers about the similarities and differences between participants. Funder et. al (1995) investigated personality questionnaires from targets, college acquaintances, and strangers and found that college acquaintances were no more alike to each other in their personalities than randomly selected strangers from the same college. Thus I would predict that roommates who have higher ratings of the following variables: the total number of activities roommates do together in a typical week, how well the roommates know each other, how well the roommates knew each other during the first experiment session, how close the roommates feel to each other, and how much the roommates enjoy spending time together would not have more similar personality ratings even in comparison to those roommates with lower ratings for these variables. Therefore, higher empathy score ratings would not be related to more similar personality self-reports.

Next, analyzing the motion sensor data would help to identify how movements in interactions are coordinated and how these movements relate to empathy scores. LaFrance (1979) studied coordination through synchrony in interactions and found it to positively relate to participant feelings of rapport. Furthermore in 1988, Bernieri conducted his own studies of physical interpersonal coordination on rapport and replicated LaFrance’s findings. With Bernieri’s definition of movement synchrony as the timing and coordination of movements occurring simultaneously with the timing and rhythm of another’s movements, I hypothesize that those roommates who display more movement synchrony will have more rapport than other
Roommate Study

Roommates; and this rapport will be correlated with higher empathy scores between the roommates.

Besides analyzing more of the information collected in the experiment, including a brief questionnaire evaluating the roommates’ current mood would be useful. Ambady and Gray (2002) investigated the effect of negative mood on the accuracy of social judgments and found that sadness impairs individuals’ ability to form impressions of others based on brief observations. By including a questionnaire evaluating the roommates’ current mood, I could omit from analyses dyads with current low affective states to have stronger reliability and accuracy for the overall analyses. In this manner, I would only include dyads with moderate to positive affective states and be able to confirm that these dyads would have a high probability of completing all of the ratings in the experiment as accurately as possible. This would help to increase the statistical power for the experiment and ensure that participants would complete the experiment with similar judgments.

In adding to the experiment protocol, also including a questionnaire about power in the relationship, whether or not the individual’s roommate hinders or facilitates his or her goal achievement, and relationship satisfaction. Knobloch (2008) studied how emotions and goal facilitation play a role in dyadic interaction and found that interference from partners in reaching a set goal was correlated with uncoordinated conversation, disassociated messages, unfavorable cognitive appraisals, and negative emotional reactions. Thus I would predict that roommates with higher empathy scores would have more goal facilitation and coordinated conversational synchrony. Relating to the question of power, Anderson et. al (2003) conducted studies examining emotional convergence in close relationships and how power affects this convergence. The results of these studies noted that the partner with reduced power altered his or her emotions
to be more similar to the partner with greater power. With this finding, I would hypothesize that for roommates with a power imbalance during the second session if their ratings of activities done together and closeness are high, then they would have more similar empathy ratings than during the first session. I would also predict that once the power imbalance is ameliorated then the relationship satisfaction between the roommates will be higher.

Next to further the findings of this initial study, it would be beneficial to study the roommates again after a year has past, especially since many of the prior research on interactions in relationships involves individuals who have been together for at least six months. When Kenny and Acitelli (2001) studied accuracy and bias in the perception of a partner in a close relationship, they discovered that topics that might be seen as a threat to the relationship are related to poorer accuracy ratings while topics that are less relevant to the relationship are perceived more accurately. Sternglanz and DePaulo (2004) specifically named these effects positive illusions, perceptions that might threaten the relationship are likely to be avoided and individuals have an inclination to maintain positive perceptions. Thus if I included another experiment session and included a conversation topic of what did you (the roommates) find was the most difficult and greatest experience he or she had as a roommate, I would predict that the there would be higher empathy scores for the positive experience as a roommate and lower empathy scores for the negative experience as a roommate. I hypothesize that it would be more challenging for the participants to discuss their negative experiences as roommates and would thus not be as accurate in rating each other for this conversation.

With the possibly of future research, more measures can be tested and analyzed to help researchers develop a paradigm for normal interactions between individuals assigned to live together, friends, and romantic partners. Besides just understanding how people coordinate in
their interactions and how well they show empathy to their conversational partner, it is imperative to understand how these factors related to relationship satisfaction and individual psychological adjustment. This research has the possibility to help people better understand their interactions with the people around them in their daily lives and connecting this work to these individuals’ general life contentment and fulfillment is essential. This study has revealed that time is not an important factor in increasing the empathy participants display to one another, but what the participants do with their time together is a significant factor in increasing empathy. Relationships rely on the quality time people spend together and their satisfaction with how this time is spent.
References


Stern glanz, R. W., & DePaulo, B. M. (2004). Reading Nonverbal Cues to Emotions: The
Appendix B

ID Number ____________________  Conversation Number ____________________

Use the following rating scale for the items below.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Inaccurate</td>
<td>Very Inaccurate</td>
<td>Moderately Inaccurate</td>
<td>Slightly Inaccurate</td>
<td>Neither Inaccurate nor Accurate</td>
<td>Slightly Accurate</td>
<td>Moderately Accurate</td>
<td>Very Accurate</td>
<td>Extremely Accurate</td>
</tr>
</tbody>
</table>

Before each adjective please write a number from the rating scale indicating how accurately the adjective describes how you felt during the most recent conversation.

___ Surprised  ___ Irritable  ___ Astounded  ___ Angry  
___ Sad  ___ Amazed  ___ Blue  ___ Happy  
___ Cheerful  ___ Joyful  ___ Delighted  ___ Astonished  
___ Hostile  ___ Lonely  ___ Disgusted  ___ Downhearted

Before each adjective please write a number from the rating scale indicating how accurately the adjective describes how you acted during the most recent conversation.

___ Sympathetic  ___ Rude  ___ Cooperative  ___ Cold  
___ Uninterested  ___ Warm  ___ Withdrawn  ___ Friendly  

Before each adjective please write a number from the rating scale indicating how accurately the adjective describes how your conversational partner felt during the most recent conversation.

___ Surprised  ___ Irritable  ___ Astounded  ___ Angry  
___ Sad  ___ Amazed  ___ Blue  ___ Happy  
___ Cheerful  ___ Joyful  ___ Delighted  ___ Astonished  
___ Hostile  ___ Lonely  ___ Disgusted  ___ Downhearted

Before each adjective please write a number from the rating scale indicating how accurately the adjective describes how your conversational partner acted during the most recent conversation.

___ Sympathetic  ___ Rude  ___ Cooperative  ___ Cold  
___ Uninterested  ___ Warm  ___ Withdrawn  ___ Friendly
Appendix C

ID Number: Video Phone Study of Roommates – Session 2

Pre-Debriefing Questionnaire

1. __ Are you random roommates (live in the same room)?
   (a) If not, please describe how you know your conversational partner (hall mates, suite mates, etc.).

2. ___ How well do you know each other? (0-9, 0=do not know each other at all, 9=know each other like a family member)

3. ___ How well did you know each other when you participated in the first half of this experiment? (0-9, 0=do not know each other at all, 9=know each other like a family member)

4. ___ How close do you feel to each other? (0-9, 0=do not feel close, 9=feel as close as a family member)

5. ___ How much do you enjoy spending time together? (0-9, 0=do not enjoy spending time together, 9=spending time together is your favorite thing to do.)

6. The following describes activities that people may participate in during the course of a week. Please check those activities each week that you typically engage in with your conversational partner.
   (a) ___ watched TV together
   (b) ___ discussed things of a personal nature
   (c) ___ went to a party/social event together
   (d) ___ worked on homework together
   (e) ___ discussed things of a non-personal nature
   (f) ___ ate a meal together
   (g) ___ visited friends together
   (h) ___ exercised/participated in a sporting activity together
   (i) ___ played music/sang together
   (j) ___ went to a movie/concert together
   (k) ___ went for a walk together
### Table 1

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Mean</th>
<th>SD</th>
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<tr>
<td>Total Number of Activities Roommates Do Together in a Typical Week</td>
<td>5.39</td>
<td>2.32</td>
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<tr>
<td>How Well the Roommates Know Each Other</td>
<td>6.22</td>
<td>1.80</td>
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<tr>
<td>How Well the Roommates Knew Each Other during the First Session</td>
<td>4.28</td>
<td>1.67</td>
</tr>
<tr>
<td>How Close the Roommates Feel to Each Other</td>
<td>5.50</td>
<td>2.18</td>
</tr>
<tr>
<td>How Much the Roommates Enjoy Spending Time Together</td>
<td>5.50</td>
<td>2.33</td>
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### Source Table for Regression Coefficients

<table>
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<tr>
<th>(Intercept)</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t value</th>
<th>p value</th>
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<tr>
<td>Session number (first or second session)</td>
<td>-2.91</td>
<td>2.20</td>
<td>-1.32</td>
<td>0.189</td>
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<td>Total Number of Activities Roommates Do Together</td>
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<td>4.38</td>
<td>-2.12</td>
<td>0.036</td>
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<td>How Well Roommates Know Each Other</td>
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<td>4.28</td>
<td>5.36</td>
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<td>How Well Roommates Knew Each Other the First Session</td>
<td>2.44</td>
<td>2.78</td>
<td>0.88</td>
<td>0.382</td>
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<tr>
<td>How Close Roommates Feel to Each Other</td>
<td>-29.33</td>
<td>4.81</td>
<td>-6.09</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>How Much Roommates Enjoy Spending Time Together</td>
<td>9.65</td>
<td>5.17</td>
<td>1.87</td>
<td>0.065</td>
</tr>
</tbody>
</table>
Residuals vs Fitted

lm(disagreement ~ sessionID + sumactivities + howwellknoweachother + howwel ...
Theoretical Quantiles

$\text{lm}(\text{disagreement} \sim \text{sessionID} + \text{sumactivities} + \text{howwellknoweachother} + \text{howwel} ...$
\textbf{Scale-Location}

Fitted values

\texttt{lm(disagreement ~ sessionID + sumactivities + howwellknoweachother + howwel ...}
Leverage

Standardized residuals vs Leverage

lm(disagreement ~ sessionID + sumactivities + howwellknoweachother + howwel ...