# LINGUISTIC STYLE MATCHING IN SOCIAL INTERACTION

KATE G. NIEDERHOFFER
JAMES W. PENNEBAKER
*The University of Texas at Austin*

*Three experiments were conducted to determine the psychometric properties of language in dyadic interactions. Using text-analysis, it was possible to assess the degree to which people coordinate their word use in natural conversations. In Experiments 1 (*n *= 130) and 2 (*n *= 32), college students interacted in dyadic conversations in laboratory-based private Internet chat rooms. Experiment 3 analyzed the official transcripts of the Watergate tapes involving the dyadic interactions between President Richard Nixon and his aids H. R. Haldeman, John Erlichman, and John Dean. The results of the three studies offer substantial evidence that individuals in dyadic interactions exhibit linguistic style matching (LSM) on both the conversation level as well as on a turn-by-turn level. Furthermore, LSM is unrelated to ratings of the quality of the interaction by both participants and judges. We propose that a coordination-engagement hypothesis is a better description of linguistic behaviors than the coordination-rapport hypothesis that has been proposed in the nonverbal literature.*

For years social psychologists have exalted the power of the situation. We comfortably acknowledge that across different situations, with different people, we may act in a range of ways, or even talk using a variety of styles. Aware of this tendency, Gergen (1972) began his explorations of our shifting masks of identity. In writing letters to close friends, he realized that he came across as a "completely different person" in each letter. "In one, I was morose, pouring out a philosophy of existential sorrow; in another I was a lusty realist: in a third I was a lighthearted jokester" (p. 32). Based merely on his word choices, Gergen inadvertently varied his style to adapt to the recipients of his letters. This is a prime demonstration of our inherent knowledge of the mutability of our language with respect to varying social contexts.

---

AUTHORS' NOTE: *Correspondence should be sent to James W. Pennebaker, Department of Psychology, The University of Texas, Austin, TX 78712 (e-mail: Pennebaker@psy.utexas.edu).* *Preparation of this article was made possible by a grant from the National Institutes of Health (MH52391). We are deeply indebted to Christian Schulten for his help in running Experiment 2. Thanks are also extended to Tom Lay, Rebecca Swenson, and Katie Galloway for their help in the research.*

JOURNAL OF LANGUAGE AND SOCIAL PSYCHOLOGY,
Vol. 21 No. 4, December 2002 337-360
DOI: 10.1177/026192702237953

Intuitively when we interact with others, we adapt to them across a wide range of behaviors, especially language.

When two people are talking, their communicative behaviors are patterned and coordinated, like a dance. The nonverbal literature suggests that coordination may be a fundamental aspect of human behavior; most facets of communication, such as facial expression, nonverbal vocal behavior, kinesics, visual behavior and proxemics are coordinated (Harper, Wiens, & Matarazzo, 1978). In this article, we explore the degree to which two people in conversation coordinate by matching their word use.

Linguistic research originated searching for a set of rules to combine morphemes into sentences. More recently, linguistic research has attempted to ascertain a similar syntax or grammar of conversation (Clarke, 1983). Key to the assumption that there are rules governing all possible conversations is the definition of conversation as jointly managed (Slugoski & Hilton, 2001). Research devoted to this subject has succeeded in uncovering structural regularities not particular to the word level: categories of speech act types such as “questions,” “gives orientation,” and others that neglect the nuances of actual conversation. Furthermore, they must be coded by human judges.

Similar to nonverbal coordination, our definition of linguistic style matching (LSM) assumes that the words one person uses covary with those the other person uses on both a turn-by-turn level and on the broader conversational level (Cappella, 1996). However, because the language the interactants use is coordinated and reciprocal, it is often not clear who is leading or following. We propose that the words one speaker uses prime the listener to respond in a specific way. In this fashion, an interactant is influenced by her partner’s language at the word level in natural conversation in the same way one’s nonverbal behavior can be influenced by another’s movement (Chartrand & Bargh, 1999).

We are not proposing a temporal synchrony amongst conversants’ language, yet the theoretical underpinnings of this research are undoubtedly related to the nonverbal communication’s conception of synchrony. Research on synchronized interactions was strongly influenced by Condon and Ogston’s (1966; McDowall, 1978) initial work on behavioral entrainment. Through sound film microanalyses of speaking and listening behavior between mothers and infants, Condon and Ogston concluded synchrony was a fundamental, universal characteristic of human communication. Condon (1982) later suggested that individual differences in synchrony could be diagnostic of psychopathology. In his original studies, an absence of synchrony was observed in people with dyslexia and other learning disabilities (Condon, 1982).

Since then, research has continued to look primarily at physical, nonverbal behavior (gestures and postural behavior), affect, attitudes, and biological rhythms. Synchrony is defined as the matching of behaviors, the adoption of similar behavioral rhythms, the manifestation of simultaneous movement and the interrelatedness of individual behaviors (Bernieri & Rosenthal, 1991). Research has shown synchrony to be related to positive affect in interactions (Bernieri, Reznick, & Rosenthal, 1988) and interpersonal liking and smoothness of interactions (Chartrand & Bargh, 1999).

We hypothesized that interpersonal synchrony could analogously occur in a powerful form at the word level. Pennebaker and King (1999) demonstrated that the language people use to convey their thoughts and feelings is demonstrative of individual differences in self-expression and is reliable across time and situation. Based on the idea that language provides insight into the ways individuals perceive the world, if people are matched in their linguistic styles, this would signify that they are in harmony in the ways they organize their psychological worlds. According to Byrne's (1971) similarity-liking hypothesis, this similarity in life-orientation could potentially lead to a more profound bond between them.

Beyond establishing the degree of matching in word use, a second goal of the present study was to explore how it is related to the success or failure of the conversation. Many studies relevant to the present investigation have documented increased levels of attraction between unacquainted dyads that exhibit more coordination (as compared to dyads that are "not coordinated") on various nonverbal behaviors—including head movement, vocal activity (not verbal), facial expressions, and postural mirroring (Bernieri, Davis, Rosenthal, & Knee, 1994; Burgoon, Stern, & Dillman, 1991; Chartrand & Bargh, 1999; Giles, Coupland, & Coupland, 1991; Hatfield, Cacioppo, & Rapson, 1994; for detailed reviews see Cappella, 1997).

According to the coordination-rapport hypothesis (Tickle-Degnen & Rosenthal, 1987), attraction, satisfaction, attachment, longevity, and rapport should be positively correlated with "coordinated" interaction patterns. In theory, these findings should generalize to our own studies, leading to the prediction that LSM should correlate with liking, rapport, and social integration among the interactants.

Particularly relevant to our predictions concerning LSM is Giles's Communication Accommodation Theory (CAT) (Giles & Coupland, 1991). According to CAT, individuals adapt to each other's communicative behaviors to promote social approval or communication efficiency. The premise of the theory rests in individuals' ability to strategically negotiate the social distance between themselves and their interacting partners: creating, maintaining, or decreasing that distance (Shepard, Giles, & Le Poire, 2001). This can be done linguistically, paralinguistically, and nonverbally: for example, varying speech style, rate, pitch, or gaze. One specific strategy an individual can use is convergence, which involves modifications of accents, idioms, dialects, and code-switching to become more similar to an interaction partner (see Giles & Smith, 1979). However, most tests of the theory have not focused on word use per se.

Over the past several years, we have developed a computer-based text analysis program called Linguistic Inquiry and Word Count (LIWC) (Pennebaker, Francis, & Booth, 2001). LIWC analyzes one or more text files on a word-by-word basis comparing each word in a given file to 2,290 words and word stems in an internal dictionary. The words in the internal dictionary have been rated by groups of judges as representing a variety of different psychological or linguistic dimensions. The word categories include standard linguistic measures such as word count, pronouns, and articles; psychological processes, such as affective or emotional, cognitive, and sensory processes; categories that tap references to space, time, and motion; and a group of dimensions that measure a variety of personal concerns including references to sex, death, television, and occupation (for a more complete review see Pennebaker et al. [2001]). For any given text file, then, LIWC calculates the number of words that match each of the LIWC dimensions—expressed in percentages of total words in the text.

In recent years, LIWC analyses have demonstrated that the ways individuals use language are relatively reliable over time and are linked to health behaviors (Pennebaker & King, 1999; Pennebaker, Mayne, & Francis, 1997), suicide proneness (Stirman & Pennebaker, 2001), and how individuals talk after an emotional upheaval such as the death of Princess Diana (Stone & Pennebaker, 2002).

It should be noted that LIWC is capable of analyzing a conversation between two people in at least three ways: all the words within the entire conversation (based on one large file); the separate language use of each interactant for the conversation (based on one file for each speaker), and language use for each person for each turn of the conversation (e.g., 50 turns in a conversation would yield 100 separate files). No studies to date have been able to quantify the degree to which word use is coordinated nor have studies shown that linguistic dimensions may be serve as the best markers of coordination. The primary goal of these studies, then, was simply to determine the psychometric properties of language in ongoing interactions.

A secondary goal of the current project was to learn the degree to which LSM reflected perceptions of rapport or "clicking." If an interaction among relative strangers goes well, we might see this in the ways the two are showing comparable word use. If we detect unmatched patterns of language between two people, we might deduce conflict within the interaction. CAT might predict this is another form of convergence that leads to satisfaction and quality of communication (see Giles & Smith, 1979). The coordination-rapport hypothesis might similarly predict LSM to signify mutual adaptation and result in positive rapport; additionally, expectancy violations theory (Burgoon, 1993) might predict coordinated linguistic styles signify the more intimate linguistic response expected of communication partners who believe their partner is rewarding.

To test these ideas, we conducted three experiments analyzing the words individuals used in two-person interactions. The first two experiments were laboratory studies wherein strangers got to know one another by interacting in live computer chat rooms. The third study was an archival analysis of 15 of the original Watergate transcripts secretly recorded in the White House wherein President Richard Nixon had a series of one-on-one discussions with H. R. Haldeman, John Erlichman, or John Dean. These natural and historic interactions allowed us to compare LSM among adult speakers and, unlike the lab studies, allowed us to examine conversational leadership.

Because the first two studies relied on very similar methodologies, the methods and results will be presented together before introducing the Watergate study.

## THE LABORATORY STUDIES: EXPERIMENTS 1 AND 2

In the first two experiments, college students were recruited to participate in an ongoing computer-based chat interaction in laboratories in the Department of Psychology.

### EXPERIMENT 1 METHODS

The first experiment sought to establish the degree to which turn length and word use was related to the quality of an ongoing computer-based chat interaction between two strangers. In addition, we sought to learn if having an anonymous screen name, as is common in naturalistic Internet chat-room use, would result in different types of interactions than having a screen name identifying the interactant's real name.

### Participants

A total of 130 Introductory Psychology students at the University of Texas at Austin (52 men and 78 women, mean age = 20.8 years) participated in the study as part of an Introductory Psychology experimental option. Individuals were randomly assigned chat partners, resulting in 28 mixed sex, 25 all female, and 12 all male conversational dyads. Three conversations (2 all male and 1 all female dyads) were not included in the analyses due to computer errors during the study, thus resulting in 62 dyads.

## Procedure

Participants initially signed up for one of two group experiments that were scheduled at the same time in different rooms. On arrival to one of the two rooms, students were randomly directed to one of several desk computers. Unbeknownst to the participants, each computer was directly connected to a computer in the other lab. The computer pairs were connected via a private chat-room software program (available for download at http://tucows.wau.nl/circ95.html). The privately licensed chat program is a multiple application program enabling private virtual communities with live interaction.

Participants were told that they would be chatting with a person on another part of campus but would not meet this person. Measures were taken to assure that participants did not see each other before the experiment began. After consenting to participate in the experiment, each participant received a brief demographic survey with 10 questions regarding levels of experience with and usage of computers and Internet chat rooms.

After being logged on to their computers, half the participants were randomly assigned (on the computer screen) to enter their real name, whereas the other half were given the opportunity to invent "a screen name of their choice." Both members of each dyad were in the same real name/invented name condition.

After approximately 45 minutes, participants completed the Interaction Rating Questionnaire (IRQ). This scale contains 3 items forming the "click index" as well as 12 exploratory items assessing the degree to which participants enjoyed the conversation, and various measures of their comfort level. The click index was based on the degree to which participants felt the interaction went smoothly, they felt comfortable during the interaction, and they truly got to know the other participant. After completing the questionnaire, participants were debriefed and thanked for their participation.

The transcripts of the interactions were saved and ultimately printed with all identifying information removed. Independent judges rated the transcripts using a modified version of the IRQ (IRQ-Judge). The IRQ-Judge includes questions similar to the IRQ, including the same three questions forming the click index as well as items regarding the perceived levels of fluidity, liveliness, and perceived enjoyment.

# EXPERIMENT 2 METHODS

Experiment 2 served as a partial replication of Experiment 1. In addition, we sought to learn if the various markers of clicking would hold up during a series of 15-minute interactions. Interactions were therefore arranged using a round-robin methodology to track individual's linguistic consistency and potential for clicking across multiple interactions with different partners.

## Participants

Experiment 2 involved 32 (21 male, 11 female) beginning college students. Mean age was 18.2 years. Because participants were run in groups of four, speaking to each of the other three people in the group for 15 minutes each, data from a total of 48 computer chat conversations were collected. Overall, 19 interactions were mixed gender, 22 were male-male, and 7 were female-female. Data from all interactions were included in the analyses.

## Procedure

Individuals signed up for experiments in groups of four, with the understanding that they not know any other potential participants in their time slot. On arrival at the lab, prior to any interactions, participants were escorted into separate cubicles with individual computers in a laboratory suite. Each computer was running Microsoft Chat Software (downloaded from www.microsoftchat.com), which allowed the experimenter to create separate chat rooms that only two of the participants could enter during any 15-minute interaction period.

After being seated in the lab cubicles, participants were assigned an identification number as their screen name so as to prevent recognition by another participant. Each participant interacted with the other three participants for 15 minutes each. The students were individually instructed to "try to get to know the other participant." There were no limitations on conversation content. At the end of each 15-minute period, the participants completed a brief questionnaire and the experimenter reconfigured their software programs to be certain that they would be interacting with a different participant during the next 15-minute interaction period.

After each conversation, participants completed a 10-item Interaction Rating Questionnaire (IRQ) (see description in Experiment 1). After the final interaction, participants were debriefed en masse, thanked, and excused.

As in Experiment 1, all the transcripts of the 48 interactions were saved, and after removing any identifying information, were printed. Four independent judges rated the individual transcripts of the chatroom interactions using a modified version of the Interaction Rating Questionnaire (IRQ-Judge) (see Experiment 1).

## RESULTS

The results from Experiments 1 and 2 are divided into four different categories. In the first section, we discuss the basic features of the conversations. The second section summarizes the basic psychometric properties of the self-reports and judges' ratings of interaction quality, or clicking. The next section focuses on the psychometric aspects of language. We conclude with the comparison of click ratings with the various linguistic elements hypothesized to be related to clicking.

### Content of Conversations

In Experiment 1, participants interacted with only one other individual for a full 45 minutes while seated in a large computer lab surrounded by other people. Experiment 2 was a round-robin methodology wherein participants interacted in three separate dyads, each for 15 minutes, in solitary experimental cubicles. Perhaps because of the different methodologies, the substance of the interactions among participants in the two studies was somewhat different.

Each conversation was coded according to topic. As can be seen in Table 1, the lengthier sessions in Experiment 1 resulted in individuals' talking about 6.56 topics compared with only 2.90 topics in Experiment 2. In Experiment 1, individuals chatted about fairly standard topics over the 45 minutes. The typical interaction covered such topics as where the participants were from, their majors, their classes and instructors, certain features of their social lives, and living situations. Some of the topics could be construed as slightly flirtatious or personal.

Due, perhaps, to the brevity of the interactions in Experiment 2 and the fact that the students were younger and more recently new to the university, a high percentage of the discussions were centered on people's hometowns, their old high schools, and their current classes in comparison to Experiment 1 participants. The most striking difference in the two studies was sexual tone of the interactions. Not one of the 62 conversations in Experiment 1 was sexual in tone. In Experiment 2, approximately 18.8% of the interactions involved overt invitations for sex, explicit sexual language, or discussion of graphic sexual escapades.[1]

## LINGUISTIC STYLE MATCHING

A central question of this project was simply to establish the degree to which the participants of an interaction match their linguistic styles. This can be explored in two general ways. The first is on the conversation level. That is, using between-subjects analyses, we can simply correlate the degree to which one person in the dyad uses a comparable number of words and types of words as the other person. The

Table 1
*Percentage of Conversations Discussing Each Topic*

| TOPIC | Experiment 1 | Experiment 2 | Experiment 1 Adjusted | Experiment 2 Adjusted |
|---|---|---|---|---|
| Classes | 64.5 | 41.7 | 9.82 | 14.38 |
| College major | 85.4 | 16.7 | 13.01 | 5.76 |
| Ethnicity | 16.1 | 4.2 | 2.45 | 1.45 |
| Family | 21.0 | 2.1 | 3.20 | 0.72 |
| Gender | 24.2 | 14.6[a] | 3.69 | 5.03 |
| Girlfriend/boyfriend | 37.1 | 8.3 | 5.65 | 2.86 |
| Greek life | 32.3 | 20.8 | 4.92 | 7.17 |
| Hometown | 82.3 | 54.2 | 12.54 | 18.69 |
| Jobs | 12.9 | 2.1 | 1.96 | 0.72 |
| Leisure activities | 41.9 | 4.2 | 6.38 | 1.45 |
| Living situation (dorm/apt.) | 69.4 | 43.8 | 10.57 | 15.10 |
| Movies | 11.3 | 0 | 1.72 | 0.00 |
| Music | 14.5 | 2.1 | 2.21 | .72 |
| Nightlife | 25.8 | 10.4 | 3.93 | 3.59 |
| High school | 25.8 | 20.8 | 3.93 | 7.17 |
| Plans to meet again | 8.1 | 0[b] | 1.23 | 0.00 |
| Psychology experiments | 19.4 | 6.3 | 2.96 | 2.17 |
| Reasons for coming to college | 21.0 | 2.1 | 3.20 | 0.72 |
| Religion | 1.6 | 0 | .24 | 0.00 |
| Sex | 0 | 18.8 | .00 | 6.48 |
| Sexual orientation | 3.2 | 4.2 | .49 | 1.45 |
| Sports | 21.0 | 6.3 | 3.20 | 2.17 |
| Summer | 4.8 | 2.1 | .73 | 0.72 |
| Weekend plans | 12.9 | 4.2 | 1.96 | 1.45 |

*Note*. Numbers in the unadjusted columns total more than 100% because multiple topics were generally discussed. The average number of conversational topics in Experiment 1 = 6.57 and in Experiment 2 = 2.90. The numbers in the two adjusted columns control for number of conversations and thus sum to 100%.
a. In Experiment 2, although gender was directly questioned ("are you a girl or a guy") in 14.6%, each conversation began with "who is this" or "what's your name," which in most cases clearly indicated gender.
b. In Experiment 2, many participants ended their conversations with phrases such as "see you outside"—but made no further plans to meet again for further interactions.

second strategy is to see the degree to which the two participants' language is synchronous on a turn-by-turn level.[2]

As noted in the introduction, one of the difficult issues in studying language is in determining which dimensions of language to explore. Although LIWC is able to calculate more than 70 language variables, for the purposes of this project, we will examine only those variables with good reliability over time that have been previously discussed in detail by Pennebaker and King (1999).

As is apparent in Table 2, both conversation-level and turn-level synchrony is apparent for most linguistic variables. Not surprisingly, the magnitude (but not significance level) is generally much higher for

Table 2
*Linguistic Markers of Synchrony*

| | Experiment 1 | | | Experiment 2 | | |
|---|---|---|---|---|---|---|
| | Conversation *r* | Mean Turn *r* | Max Turn *r* | Conversation *r* | Mean Turn *r* | Max Turn *r* |
| Linguistic categories | | | | | | |
| Word count | .75**** | .23**** | .34**** | .13 | .15**** | .29**** |
| Words greater than 6 letters | .39**** | .04**** | .15**** | .28 | .06*** | .21**** |
| Negations | .31*** | .05**** | .16**** | .12 | .01 | .12**** |
| Articles | .38**** | .05**** | .14**** | .08 | .02 | .15**** |
| Prepositions | .28*** | .06**** | .14**** | .48**** | .03 | .18**** |
| Past tense verbs | .39**** | .16**** | .27**** | .39**** | .15**** | .31**** |
| Present tense verbs | .48**** | .05**** | .15**** | .08 | .04 | .17**** |
| Social/affect categories | | | | | | |
| First-person singular | .11 | –.02 | .08**** | –.05 | .01 | .15**** |
| Social | .56**** | .06**** | .17**** | .28*** | .05*** | .21**** |
| Positive emotion | .17 | .09**** | .20**** | .26 | .04 | .18**** |
| Negative emotion | .31**** | .04**** | .14**** | .20 | .05*** | .18**** |
| Cognitive categories | | | | | | |
| Causation | .02 | .03 | .11**** | –.05 | .06*** | .17**** |
| Insight | .33**** | .07**** | .17**** | .37**** | .07*** | .19**** |
| Discrepancy | .25*** | .07**** | .15**** | .37**** | .07*** | .21**** |
| Tentative | .33**** | .04*** | .13**** | .19 | .02 | .15**** |
| Certainty | .10 | .02 | .08**** | .04 | .04*** | .14**** |
| Inclusive | .25*** | .06**** | .18**** | .28 | .05 | .24**** |
| Exclusive | .27*** | .03 | .14**** | –.12 | .04 | .20**** |

*Note*. Conversation *r* refers to the between-subject correlations on the mean word categories for each participant. Significance levels are based on 60 *df* in Experiment 1 and 46 *df* in Experiment 2 (two-tailed tests). Mean turn *r* refers to the mean within-dyad correlation between the two participants for each language variable across the multiple turns within the dyad's interaction. For each dyad, correlation coefficients were computed between Person A (Turn 1) and Person B (Turn 1) as well as for Person B (Turn 1) and Person A (Turn 2). These two correlations were then averaged for each dyad yielding a dyad mean correlation for each language variable. The sample dyad mean correlation coefficients were then averaged and tested against the null hypothesis that the sample correlation mean was greater than zero, using a single-sample *t* test (61 *df*, 47 *df*, two-tailed tests). Maximum turn *r* refers to the higher of the two correlations between Person A (Turn 1) – Person B (Turn 1) and Person B (Turn 1) – Person A (Turn 2), which were calculated in the Mean turn *r* analyses. Significance levels were based on single-sample *t* tests (61 *df*, 47 *df*, two-tailed tests).
***$p \leq .05$. ****$p \leq .01$.

conversation-level analyses. These analyses are based on the entire conversations of each dyadic partner irrespective of turn. Consequently, in Experiment 1, for example, the more words that Person A uses in the entire interaction, the more that Person B uses ($r(60) = .75$, $p < .01$). By the same token, the more that one person uses insight words, the more the other does.

In many ways, the turn-level analyses are more intriguing—albeit much more complex in their calculations. For each dyad, the first person to begin typing on their computer was defined as Person A. Recall that for each interaction, a separate text file was created for each turn, for each person. On average, each participant in Experiment 1 exchanged 44.5 (*SD* = 21.0) turns; given the shorter length of Experiment 2, participants exchanged a mean of 21.5 (*SD* = 7.7) turns each. Each text file was subsequently LIWCed. These LIWCed data were then reassembled on a turn level so, for example, on the first line of the data file the LIWC variables for both persons A and B were included. This allows us to correlate the number of positive emotion words for A and for B across the multiple turns of the interaction. The unit of analysis, then, is the within-conversation correlation coefficient for each language dimension.

Unfortunately, this strategy ignores an important feature of an ongoing interaction. What Person A says at Time 1 influences what Person B says at Time 1. But what Person B says at Time 1 also directly influences what Person A says (in response) at Time 2. To capture this problem, two sets of correlations were computed within each conversation. The first was the simple correlation between A and B. The second required lagging B's statements by one turn, resulting in a correlation between Person B (Time 1) with Person A (Time 2). Note that, in theory, these different correlations could allow us to see which of the two participants was most likely "leading" the conversation.

Because we were attempting to capture matching, two correlations ultimately emerged for each dyad for each linguistic variable. The first was the mean turn *r*, which is based on the mean of the two correlations: Person A (Time 1) with Person B (Time 1) and Person B (Time 1) with Person A (Time 2). The second correlation that we report is based on the higher (positive valence), or maximum, correlation of these two-turn correlation coefficients. The maximum correlation is valuable in cases where one person is conversationally dominant throughout and continually dictates what his/her partner says in response. For example, assume that Person A essentially parrots what Person B says. In the case of word count, we might find that the correlation between A (Time 1) and B (Time 1) is –.20, whereas the correlation between B (Time 1) and A (Time 2) is .70. The average of the two correlations (.25 in this case) would obscure the very high degree of matching between the two participants.[3]

As can be seen in Table 2, the mean turn *r*s are low but consistently positive and, generally, significantly greater than zero. The maximum turn *r*s are, of course, higher and significant. This suggests that the way one person constructs a sentence and uses words primes the other person to do the same.

Looking at the anonymous versus named condition in Experiment 1, participants' levels of matching were not significantly different from

Table 3
*Psychometrics of Ratings of Clicking*

| | Participant Agreement | Judge Agreement | Participant-Judge Agreement |
|---|---|---|---|
| Experiment 1 | .36**** | .45**** (.76) | .42**** |
| Experiment 2 | .22† | .45**** (.77) | .12 |

*Note.* Participant agreement refers to the simple correlation of self-reports of clicking between the two participants. Judge agreement refers to the mean within-judge correlation of ratings of clicking. Numbers in parentheses refer to Cronbach alphas across the four judges. Participant-Judge agreement is the simple correlation between the mean of the participants' ratings of click with the mean of the judges' click ratings. All correlations for Experiment 1 are based on 60 *df* and for Experiment 2, 46 *df*. All tests of significance are two-tailed.
****$p \leq .01$. †$p = .11$.

each other with the one exception of word count on the turn level. Participants who used a pseudonym exhibited significantly lower matching on word count than participants who identified themselves with their real names (mean $r_{pseudo} = .19$, mean $r_{name} = .28$; $F(1, 61) = 4.84$, $p < .05$). Participants demonstrated similar levels of matching across all other dimensions, both on the conversation and turn levels.

The turn-level analyses raise the broader question of whether LSM is a unidimensional construct. Perhaps the same dyads that are synchronous on positive emotion words are synchronous on most of the other variables. To test for this, the mean turn correlation coefficients for each dyad were correlated with each other to assess their internal reliability. The within-turn correlations for the 16 variables in Table 2 averaged .02 (for mean turn *r*) and .06 (for maximum turn *r*). In short, some dyads are synchronous for some variables but not others.

## Psychometrics of Subjective Clicking

For both experiments, participants completed a three-item click index that tapped their perceptions of the quality of each interaction. In addition to the self-report click scale, four independent judges rated each transcript along the same three dimensions. Overall, both the self-reported and judges' click scales were internally consistent for both Experiment 1 (alphas for self-reports = .79; judges = .89) and Experiment 2 (self-reports = .74, judges = .83).

As can be seen in Table 3, the click scales completed by the two participants were modestly related to each other in Experiment 1 and 2. Ironically, the judges' evaluations of clicking were in higher agreement than participants'.

In general, participants seemed to enjoy conversing with one another. Out of a possible score of 21, participants' mean click score in

Experiment 1 was 14.1 ($SD$ = 2.25); judges' mean click was 12.1 ($SD$ = 2.2). Similarly in Experiment 2, participant's mean click score was 14.3 ($SD$ = 2.81) and judges', 11.9 ($SD$ = 2.1). Participants using a pseudonym as compared to those using their real names did not differ in the extent to which they rated clicking in conversations. For the remainder of the analyses, the two participants' self-ratings on the click scales were averaged, yielding a dyad click self-report rating. Similarly, the mean of the four judges' ratings of click were averaged. As can be seen in the far right column of Table 3, the simple correlations between dyad self-ratings and judge ratings of click were computed. Although the self-judge click correlation was significant for Experiment 1 ($p < .01$), it did not attain significance for Experiment 2.

## Linguistic Style Matching and Clicking Measures

At this point, we have independently established LSM (correlated at the turn and conversation level) and subjective click ratings. Regardless of participants' motivations, and regardless of the ways in which their language covaries, each construct exists separately. In comparing the correlations with judges and self-reports in Table 4, we attempted to establish ways in which they relate.

In general, we find that subjectively rated clicking is not consistently related to LSM on the selected dimensions across studies. Independent of the quality of interactions, partners instinctively converged in the number of words used by turn, a phenomenon that was also not perceived by judges. In terms of self-reports, there were no consistent similarities. This suggests clicking is experienced independently of the extent to which conversants match one another across most dimensions of language, or independently of the extent to which their language appears to click objectively. Similarly, judges were largely not reliant on participants' LSM to rate click, with the exception of positive emotion. In both experiments, judges' ratings were significantly correlated with the correlation of positive emotion words between partners (Experiment 1: $r = .30$, $p < .01$; Experiment 2: $r = .38$, $p < .01$). Although it is difficult to imagine that judges were aware of equal usage of positive emotion among conversants, it is objectively reasonable for conversants that reciprocate levels of positive emotion to have high quality interactions.

Within experiments, we see more similarities in the relationship between LSM and clicking by both types of evaluation in Experiment 1. Self-reports and judges' ratings are significantly correlated with objective LSM in preposition usage (self-report $r = -.30$, $p < .01$; judge $r = -.24$, $p < .05$) as well as insight words (self-report $r = .22$; judge $r = .22$, $p < .05$). Although we are not suggesting participants or judges are conscious of the extent partners were matched on insight word usage and unmatched on prepositions, it is possible that these attributes may

Table 4
*Subjective Click and Linguistic Style Matching*

| | Correlation of Aggregate Ratings With Mean Correlations | |
|---|---|---|
| | Experiment 1 | Experiment 2 |
| Correlated linguistic categories | | |
| Word count | –.02 | .07 |
| Words greater than 6 letters | –.01 | –.19 |
| Negations | –.19 | .13 |
| Articles | –.06 | .01 |
| Prepositions | –.32**** | –.06 |
| Past tense verbs | –.17 | –.09 |
| Present tense verbs | –.08 | –.15 |
| Social/affect categories | | |
| First-person singular | .06 | –.06 |
| Social | .06 | .06 |
| Positive emotion | .17 | .22 |
| Negative emotion | .12 | –.17 |
| Cognitive categories | | |
| Causation | .08 | –.17 |
| Insight | .26*** | .02 |
| Discrepancy | –.11 | .11 |
| Tentative | .04 | –.18 |
| Certainty | –.10 | .13 |
| Inclusive | .07 | .08 |
| Exclusive | –.04 | .24 |

*Note*. The correlations are based on the mean of the self-report and judges' ratings of interaction quality (clicking) with the mean turn-by-turn correlation coefficients within each dyad. The degrees of freedom for the correlation are 60 for Experiment 1 and 46 for Experiment 2.
***$p \leq .05$. ****$p \leq .01$.

signify another aspect of conversations that is more clearly related to clicking. Unfortunately, such findings did not hold across experiments. However, in both experiments, the total number of insight words used (regardless of the correlation) was significantly correlated with self-reports of clicking (Experiment 1: $r = .32$, $p < .01$; Experiment 2: $r = .28$, $p < .05$). Although Experiment 2 revealed no significant similarities across types of evaluations, this is understandable given the differences in methodologies. Subsequent analyses revealed similarly inconsistent relationships (see Table 5).

## Discussion of Experiments 1 and 2

By far, the most striking findings of the first two experiments is the degree to which participants converge in the types of language they use. This pattern holds for word counts as well as a variety of linguistic devices that are unrelated to content. That is, no matter what the

Table 5
*Watergate as Compared to Laboratory Experiments*

| | Conversation-Level Correlations | | |
|---|---|---|---|
| | Watergate | Experiment 1 | Experiment 2 |
| Linguistic categories | | | |
| Word count | –.49** | .75**** | .13 |
| Words greater than 6 letters | .53*** | .39**** | .28 |
| Negations | –.27 | .31*** | .12 |
| Articles | .34 | .38**** | .08 |
| Prepositions | .63**** | .28*** | .48**** |
| Past-tense verbs | .75**** | .39**** | .39**** |
| Present-tense verbs | .66**** | .48**** | .08 |
| Social/affect categories | | | |
| First-person singular | .33 | .11 | –.05 |
| Social | .58*** | .56**** | .28*** |
| Positive emotion | .34 | .17 | .26 |
| Negative emotion | .55*** | .31**** | .20 |
| Cognitive categories | | | |
| Causation | .21 | .02 | –.05 |
| Insight | .55*** | .33**** | .37**** |
| Discrepancy | .21 | .25*** | .37**** |
| Tentative | .52*** | .33**** | .19 |
| Certainty | –.26 | .10 | .04 |
| Inclusive | .90**** | .25*** | .28 |
| Exclusive | .37 | .27*** | –.12 |
| *n* | 15 | 62 | 48 |

*Note*. The correlation coefficients are based on the entire corpus of words used by each of the two members of the interaction. *n* refers to number of interactions on which the correlations were based (hence, the degrees of freedom for each column is $n - 2$).
**$p = .06$. ***$p \leq .05$. ****$p \leq .01$.

participants are discussing, the ways in which they are selecting words are impressively similar.

A second important result concerns the failure to find a clear pattern between LSM and ratings of interaction quality—from either the interactants or the judges. On the surface, these effects would appear to contradict earlier results from the nonverbal literature—wherein participants who demonstrate a matching in nonverbal behaviors report liking one another more. Closer inspection of the results suggest that both LSM and, we suspect, nonverbal synchrony may not be related to ratings of interaction quality across a wide range of interactions. Consider, for example, an interaction between two people who are clearly annoyed with one another:

A: Do you chat often?
B: No, not really.
A: Me neither.
B: I used to be hooked on it.

A: Really, I have always found it really annoying and found people always pretending to be something they aren't.
B: Oh. I just found some really weird people so I quit.
A: So since we HAVE to find out about each other, what is your major?
B: Pharmacy, you?
A: Business, I wouldn't want to stand around all day.
B: Well there's more to it than just standing, we actually do stuff.

Not surprisingly, the two people reported that they did not get along with each other and the judges concurred (Click ratings [out of 21]: A = 9; B = 13; Judges = 11). However, they are clearly matched in how they are using language (e.g., mean word count correlation = .44). We suspect that if this had been a face-to-face interaction, their respective body languages would have been matched as well. Person A may have crossed his arms and Person B might have followed.

Self-ratings of clicking in this study, then, appear to be tapping the overall positivity of the relationship—not how well-coordinated it is. For this reason, self-reports were inconsistently related to linguistic style matching. Judges' ratings of clicking also were not fine tuned to detect linguistic style matching. Instead, they seemed to pick up on a reciprocation of positive emotion, as is demonstrated by the correlation between judges' evaluations of clicking and participants' LSM on positive emotion words. We presume that participants and judges alike could be trained to detect LSM, yet our subjective scales were designed to tap mutual liking. In short, we see here that our common sense definition of a coordinated interaction is different from a mathematically matched interaction. It is therefore understandable that liking is unrelated to LSM because, as we demonstrated in our linguistic analyses, we unconsciously and unintentionally match our language independent of liking.

## THE WATERGATE PROJECT: EXPERIMENT 3

The first two experiments demonstrated the existence of LSM between paired strangers participating in an artificial chat-room experience. The third experiment was an attempt to generalize these basic findings to more natural conversations in real world settings. Rather than rely on controlled laboratory data, we sought to learn if similar markers of LSM could be established among participants in some of the most widely known tape recordings of the 20th century: Watergate.

In the Watergate tape transcripts, which were released in 1974 (Nixon, 1974), 15 were extended one-on-one conversations between Nixon and either John Dean, John D. Erlichman, or "Bob" Haldeman. Two other features of these interactions are relevant to the current investigation. First, the status relationship in the interactions was clear-cut—President Nixon was the dominant force. This allowed us to determine linguistically the degree to which Nixon versus the other interactant was "leading" the interaction. Second, Dean's role in the interactions evolved rather quickly. Whereas Erlichman and Haldeman have always been considered to be very loyal followers of Nixon, Dean was increasingly suspicious of Nixon (and vice versa) as the scandal grew. Indeed, by their last recorded interaction, Dean testified in later congressional hearings that he felt that he was being set up as "the fall guy" (Woodward & Bernstein, 1974). The current investigation, then, allowed us to explore how Dean's changing role may have affected markers of LSM over time relative to Nixon's interactions with Erlichman and Haldeman.

## Procedure

The transcripts of 49 secretly taped conversations and phone calls made in the White House by Richard Nixon were released as part of the Watergate hearings. Of the 49 transcripts, 15 of the conversations involved individual conversations that Nixon had with Haldeman ($n$ = 5), Dean ($n$ = 6), or Erlichman ($n$ = 4) between June 1972 and July 1973. The remaining transcripts involved more than two people, were with another individual, and/or were taped telephone conversations. These 15 transcripts were scanned, converted into text files, and LIWCed on both the conversation level and turn-by-turn for each interactant.

### RESULTS

The Watergate conversations differed considerably from those in the above two experiments in nature and content. Unlike the lab studies, they were face-to-face, verbal interactions involving established interpersonal relationships with blatant discrepancies in social status. As a result, they consisted of noticeably more concrete issues and were more extensive. Whereas the average number of turns was equivalent to those in Experiment 1 (49.7 vs. 44.5 turns for Watergate and Experiment 1, respectively), the average number of words exchanged per turn was almost three times higher in the Watergate interactions (32.2 words) than in the first experiment (12.5).

Yet in light of the discrepancies in the number of words spoken, the Watergate conversations appear almost indistinguishable from those in the laboratory studies. As can be seen in Table 5, the one difference concerns the direction of effects for the word count variable. This can be easily explained by the discrepancy in social status of the conversants. That is, Nixon led the conversations; the more Nixon said, the fewer

Table 6
*Mean Turn-by-Turn Correlations for Watergate and Lab Studies 1 and 2*

| | Nixon-Led | Aide-Led | Watergate Means | Studies 1 and 2 Means |
|---|---|---|---|---|
| Linguistic categories | | | | |
| Word count | –.13**** | –.07 | –.10*** | .19**** |
| Words greater than 6 letters | .06 | .03 | .04 | .05**** |
| Negations | –.05 < | .11 | .03 | .03*** |
| Articles | .04 | .12**** | .08 | .04*** |
| Prepositions | .06 | .07 | .06 | .05*** |
| Past-tense verbs | .25**** | .15 | .20**** | .16**** |
| Present-tense verbs | .18**** | .14 | .16**** | .05*** |
| Social/affect categories | | | | |
| First-person singular | .07 | .03 | .05 | –.01 |
| Social | .12**** | .05 | .09**** | .06**** |
| Positive emotion | .15*** > | –.05 | .05 | .07**** |
| Negative emotion | .12*** | .04 | .08 | .05**** |
| Cognitive categories | | | | |
| Causation | .00 | .03 | .01 | .05*** |
| Insight | .08 | .06 | .07 | .07**** |
| Discrepancy | .08 | .02 | .05 | .07**** |
| Tentative | .09 | .10**** | .10*** | .03*** |
| Certainty | –.07 | .08 | .06 | .03*** |
| Inclusive | .11 | .04 | .08*** | .06*** |
| Exclusive | .01 | .04 | .02 | .04*** |

*Note*. Turn-by-turn correlations refer to the mean within-dyad correlation between the two participants for each language variable across the multiple turns within the dyad's interaction. For the Nixon-led dyads, correlation coefficients were computed between Nixon (Turn 1) and his aide (Turn 1); for the aide-led dyads within the same conversation, the correlation was computed comparing the aide (Turn 1) with Nixon (Turn 2). Two sets of $t$ tests were computed based on these mean correlations. The first tested whether the distribution of correlation coefficients were significantly different from zero (two-tailed tests), where the degrees of freedom = 13. The second $t$ test was a matched paired $t$ test that determined if the two mean correlations were, in fact, different from each other. The arrows in the first column (>, <) denote that the differences were significant at $p < .05$ (two-tailed).

The Watergate means and the Studies 1 and 2 means columns are the mean with-dyad correlations averaged across the Nixon-led and Aide-led columns (Watergate means) and the mean of the within-dyad correlations for studies 1 and 2 (from Table 2). Significance levels are based on $t$ tests determining if the distribution of correlation coefficients was different from zero, based on 13 *df* for the Watergate study and 108 for Studies 1 and 2 (two-tailed).
***$p \le .05$. ****$p \le .01$.

words his aides responded with. Otherwise, we witness a striking number of similarities across the dimensions on which synchrony exists as compared to the other two experiments. For each dimension on which we demonstrate significant LSM in both Experiments 1 and 2 (prepositions, past tense verbs, social, and insight), the LSM is replicated in the Watergate data.

The pattern of LSM on the turn-by-turn level found in the first two studies was also replicated in the Watergate conversations. As can be seen in the two columns on the right side of Table 6, the mean within-interaction correlations among the studies is striking. The one deviation continues to be word count, wherein the more one individual speaks, the less the other speaks.

In many ways, the more revealing analyses are the comparisons between conversations led by Nixon and those led by his aides. Thus, in comparing the differences in correlations between conversations led by Nixon and those led by his aides, in the first two columns of Table 6, the trend is such that Nixon dominates on most dimensions (values in the first column). It is interesting that Nixon significantly dominates conversations on positive emotion ($t(14) = -2.67, p < .05$), whereas his aides contrarily dominate the conversation in negations ($t(14) = 2.47, p < .05$).

The Watergate transcripts also gave us the opportunity to investigate the evolution of Nixon and Dean's relationship in terms of how Dean's changing role may have affected markers of LSM over time. As noted earlier, their relationship deteriorated rapidly as the Watergate investigation progressed. Whereas the early tapes reveal Dean to be an active and willing member of Nixon's inner circle, the final tape and subsequent testimonies indicate that Dean was attempting to distance himself from the affair. It has also been argued that, in the last conversation, Nixon was attempting to shift the blame from his other aides onto Dean (Woodward & Bernstein, 1974). This conversation, then, was interesting because there were signs of deception and manipulation by both parties.

As depicted in Table 7, there are notable changes in the patterns of relations between Nixon and Dean's language in their last conversation. Most interesting is that, regardless of the conversational leader, their last conversation is the most negatively correlated on word count as compared to the other five conversations between them. Furthermore, when we look at the conversations in terms of dominance, we see that this case stands out as the only one in which there is no clear leader. In fact, we see evidence of the power terms across all conversations of each combination, on the conversation level and on the turn level, except the last conversation between Nixon and Dean where they are equally negatively correlated. Perhaps in feeling like he was being set up as "the fall guy," Dean is not letting Nixon assume his normal position of control in the conversation.

Also interesting is the significant difference in LSM on article use. Language characterized by an increased amount of article use signifies numerous references to concrete and impersonal objects or events (Pennebaker & King, 1999). That Dean leads Nixon in the last conversation on this dimension suggests Dean is asserting himself via his increasing concreteness ($t(33) = -2.15, p < .05$).

Table 7
*Turn-by-Turn Correlations for Nixon and Dean's Conversations*

| | Nixon-Dean Conversations ($n$ = 5) | | Last Conversation | |
|---|---|---|---|---|
| | Nixon-Led | Dean-Led | Nixon-Led | Dean-Led |
| Linguistic categories | | | | |
| Word count | –.15**** | .03 | –.32**** | –.29**** |
| Words greater than 6 letters | .04 | .11 | –.15**** | –.34**** |
| Negations | .08 | .13 | –.15**** | .03 |
| Articles | .20* | .15 | –.17**** | .35**** |
| Prepositions | .16 | .03 | .11**** | –.05 |
| Past-tense verbs | .20 | .02 | .42**** | .24**** |
| Present-tense verbs | .21 | .24* | .11**** | –.15**** |
| Social/affect categories | | | | |
| First-person singular | .12 | .16 | –.02 | .27**** |
| Social | .13 | –.02 | .19**** | .15**** |
| Positive emotion | .06 | –.07 | .08*** | –.20**** |
| Negative emotion | .23 | –.05 | –.07*** | –.07*** |
| Cognitive categories | | | | |
| Causation | .00 | –.03 | –.15**** | –.14**** |
| Insight | .04 | .20 | .02 | –.33**** |
| Discrepancy | .07 | .10 | –.03 | –.05 |
| Tentative | .24*** | .11* | –.06 | .08*** |
| Certainty | –.03 | .05 | .17**** | .00 |
| Inclusive | .18 | –.07 | .21**** | .12**** |
| Exclusive | .02 | .07 | –.07*** | –.08*** |

*Note*. All above correlations are on a turn-by-turn level meaning the mean within-dyad correlation between the two participants for each language variable across the multiple turns within Nixon and Dean's 6 interactions. Again, two sets of $t$ tests were computed based on these mean correlations. The first tested whether the distribution of correlation coefficients were significantly different from zero (two-tailed tests), where the degrees of freedom equals 4 for the first 5 conversations and 33 for conversation 6 (based on 35 turns each). The second $t$ test was a matched pair $t$ test that determined if the two mean correlations were, in fact, different from each other.
*$p < .10$. ***$p \leq .05$. ****$p \leq .01$.

## DISCUSSION

The results of the three studies offer convincing evidence that individuals in two-person interactions exhibit linguistic style matching on both the conversational level as well as on a turn-by-turn level. This coordinated use of language occurs at a remarkably basic level (i.e., classes of words) and appears to hold up across perceived quality of an interaction, the length of the interaction, whether face-to-face or on an Internet-like chat, and whether for experimental credit or to avoid impeachment and imprisonment.

Are the effects concerning LSM that we have found important or trivial? After all, individuals engaged in an interaction are, in theory, talking about the same topics at the same time. Mere inspection of the transcripts or listening to conversations in the hallway suggest conversations have a great deal of give and take. However despite the quickly changing topics and perspectives in a conversation, linguistic styles remain quite consistent. It is not coincidental, for example, that the conversation and turn-by-turn word counts are correlated as highly as they are. If one person interacts in brief bursts, the other tends to follow. The pair has constructed an interaction style that maintains itself. Similarly, the overall linguistic complexity and tone covary between the participants. If one person uses a high number of positive or negative words, words that signal concrete thinking (e.g., articles) or sentence complexity (e.g., prepositions), the other does too.

That this cooccurrence of words exists from one turn to the next is intriguing from both a social and an information-processing perspective. Socially, two people appear to fall into this coordinated way of interacting almost immediately—despite never having spoken to one another before. The magnitude of the turn-level coordination is as strong among pairs of strangers who interact for 15 minutes or 45 minutes as it is among longtime associates in Nixon's White House. Cognitively, this cooccurrence of particular language devices can be construed as a naturalistic form of priming. In normal conversation, people can easily speak 2 to 5 words per second (500 to 200 milliseconds per word). The listener, who is probably not hanging on every word, is undoubtedly influenced by dozens of linguistic primes set up by the speaker. All of this, of course, must occur on a nonconscious level and should also be sensitive to the differential power among the participants. That is, the less dominant participant will probably be more attentive to the more dominant speaker's words (cf. Giles & Coupland, 1991).

Our findings may provide a nonconscious analog of the more conscious processes of speech accommodation (convergence) in bilingual contexts among interethnic groups. For example, in an effort to get along better, an Anglo-Canadian will often address a Francophone Quebecois in French and, in turn, will be responded to in English (Giles, Taylor, & Bourhis, 1973). However, in the present study, the "convergence" we found between conversation partners on particular language devices occurs without motivation on more molecular and nonconscious levels.

An unexpected and revealing finding from this research was the lack of relationship between perceived interaction quality—or clicking—and linguistic style matching. Neither self-reports of the interaction nor the judges' ratings were consistently related to the ways people used language. On the surface, the findings are inconsistent with the coordination-rapport hypothesis (e.g., Tickle-Degnen & Rosenthal, 1990)—wherein it has been argued that the more two people like one another, the more their nonverbal behaviors should be coordinated. However, Tickle-Degnen and Rosenthal propose that rapport is characterized by three nonverbal components: attentiveness, positivity-negativity, and coordination. The coordination component of rapport signifies the mutual influence and adaptation of each person in relation to their identities, interpersonal thoughts, and emotions. Perhaps a readiness to receive information about another's identity, and a positive evaluative response to the interaction with the other is not fully possible in online communication. Thus, coordination could still possibly be an aspect of interactions that are negative in tone.

Accordingly, we propose a coordination-engagement hypothesis as an alternative to the nonverbal coordination-rapport hypothesis. That is, the more that two people in a conversation are actively engaged with one another—in a positive or even negative way—the more verbal and nonverbal coordination we expect. Two people who are angry with one another are highly likely to talk in the same way and mimic each other's nonverbal behaviors. However, if either or both are simply not engaged in the conversation, including not listening, thinking about something else, and/or under the influence of psychoactive agents, we would expect a significant drop in both verbal and nonverbal coordination. Degree of engagement, then, rather than rapport should be predictive of both linguistic and nonverbal coordination. This is consistent with CAT, which allows for interactional complexity whereby people can converge on some communicative features to meet social needs, but diverge on others for identity management. For example, one can diverge in accent but converge in lexical diversity (H. Giles, personal communication, June 28, 2001).

In the grand scheme of things, what does a measure of LSM buy us? First, LSM measures may serve as sensitive measures of both conversational engagement and dominance that go beyond self-reports. These and related linguistic measures should, in theory, be applicable to computer-based communications such as chat rooms, e-mails, and bulletin boards, as well as transcripts of natural interactions. Based on some of our earlier work on linguistic styles, we should also be able to determine the degree to which some people are able to adapt to others within a novel conversational arena—an idea that is consistent with CAT.

More broadly, LSM is undoubtedly part of the broader coordination of any human interaction. As our words and meanings are shared and transformed, our accents, expressive behaviors, and body postures change. With these coordinated changes, we would also expect covariations in interactants' autonomic and hormonal activity. When one is truly in synch with a conversation partner, autonomic changes undoubtedly ensue. In the years to come, we hope to see more research on the interrelationships of all these features of the communication dance.

## NOTES

1. As an aside, the male experimenter who conducted the sessions debriefed the participants immediately after the interactions without reading the actual transcripts. He noted that the students were always low-keyed, unassuming, and moderately interested in the study. No participants appeared embarrassed, shocked, or in the slightest way, upset or angry. At the conclusion of the project, when he was given the opportunity to read the transcripts, he was astounded—even overwhelmed—to learn what these polite students had been saying to one another.

2. In addition to the analyses reported here, we also assessed matching in several other ways, including calculating the mean and absolute difference in language use by category both at the conversation and turn-by-turn level as well as examining raw word counts (rather than percentages). For all types of analyses, including correlations with click ratings, comparable patterns emerged.

3. Note also that in selecting for the higher of the two correlations, we chose the more positively valued number. Thus, there were some instances where higher valued numbers were neglected because they were negatively valenced.

## REFERENCES


Bernieri, F., Davis, J., Rosenthal, R., & Knee, C. R. (1994). Interactional synchrony and rapport: Measuring synchrony in displays devoid of sound and facial affect. *Personality and Social Psychology Bulletin*, *20*, 303-311.

Bernieri, F., Reznick, J. S., & Rosenthal, R. (1988). Synchrony, pseudosynchrony, and dissynchrony: Measuring the entrainments process in mother-infant interactions. *Journal of Personality and Social Psychology*, *54*, 243-253.

Bernieri, F., & Rosenthal, R. (1991). Interpersonal coordination: Behavior matching and interactional synchrony. In R. Feldman & B. Rime (Eds.), *Fundamentals of nonverbal behavior. Studies in emotion and social interaction* (pp. 401-432). New York: Cambridge University Press.

Burgoon, J. K. (1993). Interpersonal expectation, expectancy violations, and emotional communication. *Journal of Language and Social Psychology*, *12*, 13-21.

Burgoon, J., Stern, L., & Dillman, L. (1995). *Interpersonal adaptation: Dyadic interaction patterns*. New York: Cambridge University Press.

Byrne, D. (1971). *The attraction paradigm*. New York: Academic Press.

Cappella, J. N. (1996). Dynamic coordination of vocal and kinesic behavior in dyadic interaction: Methods, problems, and interpersonal outcomes. In J. Watt, & C. VanLear (Eds.), *Dynamic patterns in communication processes* (pp. 353-386). Thousand Oaks, CA: Sage.

Cappella, J. N. (1997). The development of theory about automated patterns of face-to-face human interaction. In G. Philipsen & T. Albrecht (Eds.), *Developing communication theories, SUNY series in human communication processes* (pp. 57-83). Albany: State University of New York Press.

Chartrand, T., & Bargh, J. (1999). The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*, *76*, 893-910.

Clarke, D. D. (1983). *Language and action: A structural model for behaviour.* London: Butterworth-Heinemann.

Condon, W. S. (1982). Sound-film microanalysis as a technique for the assessment of dysfunctional behavior. *Dissertation-Abstracts-International*, *43*(1-B), 278.

Condon, W. S., & Ogston, W. D. (1966). Sound film analysis of normal and pathological behavior patterns. *Journal of Nervous and Mental Disease*, *143*, 338-347.

Gergen, K. J. (1972). Multiple identity: The healthy, happy human being wears many masks. *Psychology Today*, *5*, 31-35, 64-66.
Giles, H., Coupland, J., & Coupland, N. (1991). *Contexts of Accommodation: Developments in applies sociolinguistics*. New York: Cambridge University Press.
Giles, H., & Coupland, N. (1991). *Language: Contexts and consequences*. Pacific Grove, CA: Brooks/Cole.
Giles, H. & Smith, P. M. (1979). Accommodation theory: Optimal levels of convergence. In H. Giles & R. St. Clair (Eds.), *Language and social psychology* (pp. 45-65). Oxford: Blackwell.
Giles, H., Taylor, D. M., & Bourhis, R. Y. (1973). Towards a theory of interpersonal communication through language: Some Canadian data. *Language and Society*, *2*, 177-192.
Harper, R. G., Wiens, A. N., & Matarazzo, J. D. (1978). *Nonverbal communication: The state of the art*. New York: Wiley.
Hatfield, E., Cacioppo, J. T., & Rapson, R. (1994). *Emotional contagion*. Cambridge: Cambridge University Press.
McDowall, J. J. (1978). Interactional synchrony: A reappraisal. *Journal of Personality and Social Psychology*, *36*, 963-975.
Nixon, R. M. (1974). *Submission of recorded Presidential conversations to the Committee on the Judiciary of the House of Representatives*. Washington, DC: Government Printing Office.
Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and word count (LIWC2001): A computer-based text analysis program*. Mahwah, NJ: Lawrence Erlbaum.
Pennebaker, J. W., & King, L. A. (1999). Linguistic styles: Language use as an individual difference. *Journal of Personality and Social Psychology*, *77*, 1296-1312.
Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, *72*, 863-871.
Shepard, C. A., Giles, H., & Le Poire, B. A. (2001). Communication accommodation theory. In W. P. Robinson & H. Giles (Eds.), *The new handbook of language and social psychology* (pp. 33-56). New York: Wiley.
Slugoski, B. R., & Hilton, D. J. (2001). Conversation. In W. P. Robinson & H. Giles (Eds.), *The New Handbook of Language and Social Psychology* (pp. 193-220). New York: Wiley.
Stirman, S. W., & Pennebaker, J. W. (2001). Word use in the poetry of suicidal and nonsuicidal poets. *Psychosomatic Medicine*, *63*, 517-522.
Stone, L. D., & Pennebaker, J. W. (2002). Trauma in real time: Talking and avoiding online conversations about the death of Princess Diana. *Basic and Applied Social Psychology*, *24*, 172-182.
Tickle-Degnen, L., & Rosenthal, R. (1987). Group rapport and nonverbal behavior. *Review of Personality and Social Psychology*, *9*, 113-136.
Tickle-Degnen, L., & Rosenthal, R. (1990). The nature of rapport and its nonverbal correlates. *Psychological Inquiry*, *1*, 285-294.
Woodward, B., & Bernstein, C. (1974). *All the president's men*. New York: Simon and Schuster.