Making the Connection: Social Bonding in Courtship Situations[1]

Daniel A. McFarland and Dan Jurafsky
Stanford University

Craig Rawlings
University of California, Santa Barbara

Sociologists have long argued that the force of a social bond resides in a sense of interpersonal connection. This is especially true for initial courtship encounters when pairs report a sense of interpersonal chemistry. The authors explore the process of romantic bonding by applying interaction ritual theory, extended and integrated with methods from computational linguistics, to the study of courtship encounters and, specifically, heterosexual speed dating. The authors find that the assortment of interpersonal moves associated with a sense of connection characterizes a conventionalized form of initial courtship activity. The game is successfully played when females are the point of focus and engaged in the conversation and males demonstrate alignment with and understanding of the female. In short, initial heterosexual courtship encounters are associated with a sense of bonding when they reflect a reciprocal asymmetrical performance in which differentiated roles are mutually coordinated.

INTRODUCTION

Social bonds are a central topic of sociology because they are the social glue of society. What renders social bonds distinct from other forms of inter-

[1] This article was prepared for presentation at the American Sociological Association meeting in Las Vegas, Nevada, August 21, 2011. Special thanks to Rajesh Ranganath, Sonal Nalkur, and Tanzeem Choudhury for assistance and advice on data collection and Sandy Pentland for a helpful discussion about feature extraction. This work received

0002-9602/2013/11806-0004$10.00

personal contact is the significant value attributed to the relationship, a value that is often forged through meaningful interaction (Scheff 1994; Fuhse 2009).

To date, most explanations of social bond formation concern processes of selection that occur at the outset of an encounter. These explanations relate how actors select partners who are not only homophilous and socially similar but distinctive and have desirable attributes (Webster and Driskell 1983; Ridgeway and Berger 1986; McPherson, Smith-Lovin, and Cook 2001). Typically, persons form close relations with members of the same race and class, as well as with those with the same lifestyles and attitudes (Rosenfeld 2005; Hitsch, Hortaçsu, and Ariely 2010). They are also attracted to persons with greater material wealth and desired physical characteristics like a low body mass index (BMI), above average height, and symmetrical facial features (Kurzban and Weeden 2005). When it comes to intimate heterosexual bonds, in particular, men and women seek different status characteristics in their partners: men select thin attractive women, and women select tall wealthy men (Eastwick and Finkel 2008; Fisman et al. 2008).

Other explanations contend that persons form bonds in accordance with their motives and skills (Becker 1991). The general argument is that bond formation is a function of whether individuals want to forge a new relationship to begin with (Eastwick et al. 2007; Eastwick and Finkel 2008) and whether they have built up experiences and skills at forging such ties that can be drawn on in the current encounter (e.g., habitus; for a review, see McFarland and Thomas 2006). But here again, we have a process of trait selection: individual characteristics act as inputs that correspond with and explain the likelihood of a social bond as an output. Because these models of trait selection focus mainly on the outset of an encounter, they ignore or downplay the role of communication in bond formation.[2]

It may seem obvious that relating is more than a matter of selecting on individual traits, motives, and experiences and that meaningful interaction

partial funding from a Google Research Award, a Spencer Foundation training grant, and National Science Foundation awards 0624134, 0835614, and 1159679. Direct correspondence to Daniel McFarland, School of Education, Stanford University, 485 Lasuen Mall, Stanford, California 94305-3096. E-mail: mcfarland@stanford.edu

[2] Other mechanisms of tie formation have been presented in social network research: e.g., proximity (propinquity), balance, and closure (Lubbers and Snijders 2007). Proximity shapes ties by affording social opportunities for communication, whereas balance and closure are network pressures present in triads and larger configurations of ties. In this article, the focus is squarely on communication within the dyad, so mechanisms of balance and closure do not apply, and our use of pairwise, face-to-face encounters between strangers renders propinquity irrelevant. Network theories of tie formation characterize communication at a more abstract level than the more specific forms of dyadic communication (like mirroring or collaborative completions) described in this article. Future work (by the authors) explores points of consistency and synergy across network and interactionist depictions of relationships.

plays a key role in forging a sense of interpersonal connection. However, the large assortment of relationship guides (Gray 1993; Fein and Schneider 1995; Strauss 2005) and endless mass media discussions about how persons can initiate and nurture desirable relationships are all a testament to the fact that there is a great deal of uncertainty on what our signals mean and how we can best forge a sense of interpersonal connection (Pentland 2008).

In this article, we focus our attention on the process of bonding in heterosexual dating, arguably the relationship of greatest discussion and confusion in the mainstream media. We explore a variety of interrelated questions about relating in heterosexual dates and, specifically, how some encounters result in a sense of connection while others do not. The first question we ask is, *does interaction matter*? We ask this because it is possible that our initial intuitions are incorrect and that our sense of interpersonal chemistry is merely a function of appearances and input factors that act as a precursor to dating encounters. However, prior research suggests that communication does matter (Bosson et al. 2006; Eastwick et al. 2007), so this leads us to our second question: *what qualities of interaction correspond with a sense of connection in initial relational encounters*? Here we draw on interaction ritual theory to help us identify qualities of interaction that are salient to social bonds (Durkheim 1912; Collins 2004), and we assess whether various expressions of emotional excitement and interpersonal alignment develop a sense of connection in pairs of actors.

Our third and final question concerns the activity of courtship itself. We ask, *whose interaction matters for whom—is there a coordinated pattern of ritual expression, or convention of courtship, that corresponds with a sense of interpersonal bonding across genders*? Prior research on communication suggests that the interpretation and experience of ritual expressions is contingent on the context and activity in which they are uttered and heard (Goffman 1974, 1981; Tannen 1993, p. 173). As such, it is likely that much of the confusion in heterosexual dating stems from incongruent understandings of what the activity of courtship entails and how actors and partners are supposed to communicate with one another. To sort this out, we study whether the sense of bonding corresponds with particular patterns of ritual expression that are sent and received by the actor. For example, do participants approach courtship as a solo act and only respond to the signals they send? Or is courtship a coordinated performance in which actors respond to certain behaviors they send to and others they receive from their partners? Do participants experience a connection when they mirror actions or when they reinforce distinct roles? In short, we ask, what is the game of courtship that participants seek out and respond to?

In order to explore these questions, we study over 2,000 reports of interpersonal connection in speed-dating encounters using acoustic, transcript,

and survey information. We use interaction ritual theory as a sensitizing guide and apply novel methods from computational linguistics to identify forms of communication that most likely correspond with expressions and experiences of social bonding. We use dyadic data analysis techniques (Kenny, Kashy, and Cook 2006) to identify actor and partner uses of communication that correspond with a sense of interpersonal connection. The pattern of actor and partner communication effects across genders reveals the courtship norms of heterosexual dating.

THEORETICAL FRAMEWORK

Social Bonding as a Communicative Experience

It is almost too obvious to state that a sense of interpersonal connection and bonding entails some form of dyadic experience and dyadic perspective taking. It is this characteristic that sets bonding apart from mere attraction. When individuals believe they have clicked or connected with another person, they read the experience as something mutual and as existing in more than just their own imagination. In contrast, when individuals find someone attractive, this perspective can reside solely in the head of the individual. As such, the perception of a social bond involves reading both one's own and the other's behavior. But what qualities of actor and partner actions most correspond with the experience of interpersonal solidarity?

A myriad of possible qualities could apply, and this is why we rely on social theory as a guide to sensitizing concepts. In particular, we follow a long line of theoretical work from Émile Durkheim to Randall Collins, called interaction ritual theory, that describes how interpersonal rites can forge a sense of community and social bonding (Durkheim 1912; Collins 2004). Durkheim pioneered the core concepts of this theory in his research on religious totems. He recognized that religious rituals directed at supernatural forces were a powerful force that promoted social solidarity at the societal level (Durkheim 1912, p. 196). Central to Durkheim's argument were interpersonal dynamics that gave religious rites their power to unite persons. The collective rites organized sense perceptions and representations, and they allowed persons to interact on the basis of shared experiences and concepts.[3] By mutual coordination and intensifying action in an encounter, participants felt a rush of energy or collective effervescence—the "idea of social force at its birth" (Shilling and Mellor 1998, p. 196)—and the source of this energetic shared experience was attributed to the collective representations targeted by the interaction (e.g., totems). The value attributed to totems

[3] The notion of synchronization is echoed in writings about "common conceptual ground" (Clark 1996), "shared intentionality" (Searle 1995), "forms of life" (Wittgenstein 1953), and "joint attentional formats" (Bruner 1983). See Tomasello (2008) for a review.

retained force well after the ritual passed and thereby served to promote solidarity. The totem worshipped was not a supernatural force but a social force generated by the interaction dynamic of sacred rites.

Importantly, Durkheim noted that this process extended well beyond religious rites. Even in day-to-day interactions, people still experience a "rush of energy" evident in acts "that express the understanding, esteem and affection characteristic of positive neighboring relations" (Durkheim 1912, p. 215; Shilling and Mellor 1998, p. 197). Contemporary sociologists like Erving Goffman (1967) built on Durkheim's insight and identified ritual forms of interaction in a variety of everyday social encounters, from simple greetings and apologies to elaborate con games and face contests. Randall Collins (2004) synthesized and systematized Durkheim's and Goffman's views into interaction ritual theory and directly related it to the experience of social solidarity.

Collins's theory affords guiding propositions we can use to identify features of interaction most likely associated with a sense of interpersonal bonding. He argues that focused encounters such as dinner parties and romantic dates are joint attentional formats that focus attention and coordinate behaviors ("mutual attunement"; see Scheff 1994; Turner 2002). Successful encounters are ones we embrace and from which we derive a sense of solidarity. In order for the interaction to generate this experience, it has to exhibit certain qualities. First, there must be a *synchronization* of interpersonal moves into various interaction ritual chains. When this occurs, interactions are smooth and predictable, and persons feel they understand one another (Parks 2007, pp. 113–14). When this synchronization is accompanied by increasingly positive emotional expressions—*intensification* (or excitement)—the two serve to generate a sense of connection, or sense of social effervescence. This interpersonal charge has been referred to in a variety of ways such as "interpersonal chemistry," "having clicked," or a "sense of connection" (Markovsky and Lawler 1994; Eastwick et al. 2007).[4] In what follows, we describe *emotional intensification* in more detail and draw on microinteractional research to describe synchronization as involving interrelated features of *targeting*, *situational alignment*, and *interpersonal alignment*.

Emotional intensification is an important element of social bonding because it stamps the current interaction as important (Collins 2004). It gives sacredness and value to an exchange that is otherwise mundane. Prior work suggests that heightened emotional expression and enjoyment is exhibited through changes of pitch, loudness, rate of speech, and even laughter (Gregory 1986; Muehlenhard et al. 1986; Gregory, Webster, and

[4] Conversely, an interaction that lacks coordination and fails to intensify emotions drains emotional energy (Collins 2004, chaps. 1–3).

Huang 1993; Goodwin 1996; Gregory and Webster 1996; Scherer 2000, 2003). In many instances, the increased frequency of these prosodic signals corresponds with a sense of solidarity (Kemper and Collins 1990), common fate, and shared responsibility in pairs and groups (Magee and Tiedens 2006, pp. 1704, 1714; Roth and Tobin 2010).

Ritual synchronization refers to the coordination across turns of interaction. Synchrony can be accomplished in several ways. The first form of synchrony concerns the coordination of interactional *targets*. Most micrortituals (e.g., greetings, courtesies, and apologies) target certain statements and identities as the object of focus, and successful coordination of this target across turns makes it stand out from the noise of random events as a point of mutual focus (Goffman 1981). Many linguistic resources are available to achieve targeting; among them are the use of pronouns and other indexical forms that make reference to some object (Halliday and Hasan 1976; Gumperz 1982; Grosz, Joshi, and Weinstein 1995). In dating conversations, the synchronization of targets arises when pairs of actors focus on one of the two participants and coordinate the use of "I" and "you" pronouns. A lack of target synchronization might arise when parties fail to consistently focus on a single participant and cue competing targets by using the same pronouns (e.g., both focusing on "I").

A second form of synchrony occurs through interpersonal and situational alignments. Interpersonal alignments are typically used to signal support for another's turn of action (Goffman 1971). In contrast, situational alignments are typically used to signal engagement in one's own turn (Holmes 1986; Schriffin 1987; Fox Tree and Schrock 2002). Interpersonal alignments are frequently characterized by multiple coordinated turns, or pair parts, and they can be expressed in positive or negative forms. In dating, participants frequently express positive forms of interpersonal alignments, such as when persons express appreciation and sympathy for one another (see Goffman 1971, chap. 3, "Supportive Interchanges"). These are supportive interchanges because the speaker is responding to a prior turn by aligning with the partner. By contrast, negative interchanges redirect action and impose on others, for example, by interrupting in ways that may violate speaking rights or by using questions that redirect the conversation and call on the partner to subordinate in response (although, as we will discuss below, the linguistics literature suggests that these conversational devices can sometimes be used in positive ways; Brown and Levinson 1987; Cupach and Metts 1994; Pentland 2005). It follows for dating then, that the frequent use of supportive interchanges and infrequent usage of negative interchanges may be associated with a sense of social bonding (Goffman 1971, chap. 3; Grammer 1990, p. 210).

Whereas interchanges link successive distinct parts, other forms of synchrony can be performed in which persons play successive identical parts.

These forms of alignment often entail the repetition of positive emotions, like mimicked laughter or various forms of accommodation (Bilous and Krauss 1988; Chartrand and Bargh 1999; Wiltermuth and Heath 2009). Recent work suggests that accommodation happens on a subconscious level of prosody (e.g., rate of speech) and word usage (e.g., function words like articles or pronouns) that persons are not immediately aware of (Gregory 1986; Niederhoffer and Pennebaker 2002). The general finding is that persons repeating the same style of interaction tend to like one another (Natale 1975; Gregory et al. 1993; Nenkova, Gravano, and Hirschberg 2008; Abrego-Collier et al. 2011; Ireland et al. 2011). Therefore, for dating, it is likely that repeating or mimicking the partner is a form of alignment that corresponds with a sense of connection.

The focus on interaction rituals sensitizes our inquiry to situational alignments as well. When speakers align with the situation, they demonstrate *engagement* with the conversation at hand. In general, engaged speakers tend to speak louder and use more varied pitch (Liscombe, Venditti, and Hirschberg 2003; Mairesse et al. 2007; Gravano et al. 2011). Speakers also sustain engagement in a conversation by cueing their own talk or cueing their partner's understanding of her talk. Discourse markers like "I mean" and "you know," respectively, are used in these ways. Lay observers sometimes regard these markers as conversational ticks, but linguistics research indicates they are interpersonal cues that signal self-engagement and other engagement in the conversation (Holmes 1986; Schriffin 1987; Fox Tree and Schrock 2002; Gibson 2010; Ireland et al. 2011).[5] Conversely, actors also use certain discursive moves to signal distance from a conversation or even from their own remarks. Hedges and disclaimers are frequently cited as examples of distancing markers (Stokes and Hewitt 1976; Schriffin 1987). In dating, we assume frequent expressions of engagement and infrequent expressions of distancing correspond with a sense of interpersonal connection.

Dating Conventions

Prior work offers less guidance on the role that context and convention play in defining communication and participants' reaction to it.[6] The activity of dating not only defines which forms of communication are salient; its conventions determine how communication should be configured across participants so as to successfully forge a sense of connection. Works by Goffman

[5] This and other features will be elaborated in the section describing variable construction.

[6] By "context," we mean activity (cognitive frame), and by "convention," we mean the participation framework that defines the pattern in which participation statuses interrelate so as to accomplish an activity (normative frame). This resultant pattern is often referred to as a participation structure (Goffman 1981).

(1974, 1981), Brown and Levinson (1987), Gumperz (1982), and Tannen (1993) all indicate that discourse strategies are polysemous, and their meaning and true "intention" cannot be derived from the examination of their surface linguistic features alone (whether lexical, grammatical, or prosodic): "In trying to understand how speakers use language, we must consider the context . . . the speakers' conversational styles, and, most crucially, the interaction of their styles with each other" (Tannen 1993, p. 183). The relevance of context is easily intuited when we consider how the same interpersonal ritual (e.g., laughter or teasing) can have a positive effect in one activity (dating) and a disastrous effect in another (funeral). Therefore, the meaning of human interaction rests on the interpretive framework in which an utterance is expressed.

When it comes to dating, it is unclear whether the above expressions of excitement (intensification) and synchronization (coordination) are always used and interpreted in the same way so as to generate close social bonds or whether participants use and respond to them in certain patterns. At issue is the participation framework and whether the activity of heterosexual dating presumes that genders occupy different participation statuses that have a particular arrangement. For example, do both genders experience a romantic connection when men tease women, or is teasing mutually expected, or is it merely something the speaker responds to? Who is expected to communicate how? If we knew the game of courtship, then we would be able to infer what styles of interaction and their combination most correspond with a sense of connection.

So what is the participation framework for heterosexual courtship? As said earlier, the game of courtship and the means of successfully playing it are not clear to most people and the mainstream media. People sense an interpersonal connection when the game is played well, but they struggle to articulate the game play that brought that sense of connection about. We posit there are several types of patterns by which heterosexual interactions could be organized so as to correspond with a sense of interpersonal connection. We begin with the simplest case, or null hypothesis, that there is no coordination game afoot in dating encounters and that participants merely enact *solo performances*. Such a model is not very farfetched for the most jaded daters. Most recollect dates in which their partner seemed self-absorbed and made no attempt to coordinate their behavior or reciprocate gestures. If dating is approached as a solo performance, then actors would regard their expression of excitement and positive forms of alignment as signs that they hit it off and their partner's expressions as irrelevant.

Most research, however, argues that social bonding arises from reciprocal forms of association. The most commonly discussed form consists of *reciprocal symmetrical performances* that occur in activities like marching, choral speech, sharing a cigarette, or playing the same music together

(Durkheim 1912; Schutz 1964; Collins 2004; Magee and Tiedens 2006; Wiltermuth and Heath 2009; Martin 2010). For example, Wiltermuth and Heath find that military drills and choral voices instill a sense of solidarity among participants. Much like Durkheim's studies of religious rites, the emphasis is placed on mirroring and uniform collective actions. This approach echoes the ideas of Dale Carnegie (1937)—namely, that persons can win and influence others by imitating their gestures. If this convention is true, then actor and partner expressions of excitement and synchronization need to mirror one another before the actor and partner experience a sense of connection.[7]

Other research suggests that social bonding can arise in activity systems in which participants assume *reciprocal asymmetrical performances*. In such a system the coordination of complementary but distinct parts leads to the successful performance of an enjoyable conversation, song, or even dance (Goffman 1967, 1971, 1974). In certain regards, this notion is reflected in Mead's characterization of games and how different positions are coordinated in a larger social structural arrangement (Mead 1934). There, in a game like baseball, players perform different tasks, but they are interrelated in certain patterns of participation.[8] A similar argument is at work in asymmetrical roles. For example, Brown and Levinson (1987) draw attention to differential ritual behaviors and find they often correspond with differences in social power. They describe how higher-status persons interrupt and speak more baldly to lower-status persons, and lower-status persons speak more indirectly in return.[9]

For dating, it is unclear whether there is a power or status differential and how that might encourage participants to perform reciprocal asymmetrical forms of interaction. For example, Blau's exchange theory (1964) argues that romantic relationships are often rooted in asymmetries of power in which the more romantically invested member of the relationship is at a disadvantage across a number of bargaining situations. But does this favor men or women in initial encounters? Recent work suggests

[7] There is something intuitively dissatisfying about the solo and mirror game. The solo game eschews a long line of work on accommodation and interactional coordination (Tomasello 2008). And the mirror game only makes sense when we consider mutual expressions of excitement. However, the mirroring of targets and of aligning actions seems odd. Were that to occur, the conversation might resemble one of two children playing "copycat" or two persons competing to talk about themselves (e.g., both say "I").

[8] In certain regards, the notion of solo performances reflects Mead's notion of role play, while games reflect reciprocal (and often asymmetrical) forms of coordination (Mead 1934).

[9] Many role systems rest on the mutual coordination of differential power, such as that between teacher and student, parent and child, or even doctor and patient. Even strong ties can commence in asymmetrical forms in which one party is more invested in the relation than the other, and over time they balance (Simmel and Wolff 1950).

that women are more selective in their dating partners (Kurzban and Weeden 2005; Finkel and Eastwick 2009). If this is true, then we might expect heterosexual dating encounters to place women in favored interactional statuses that are mutually sustained. As such, men and women experience a sense of connection when they successfully coordinate alignments toward women and from men and when women are engaged in the encounter.

Other research on gender suggests the opposite, however. Women experience prejudice and are subordinated in various social encounters, especially public ones (R. Lakoff 1973; Tannen 1993; Ridgeway 2009). Gender ideals may be such that men are expected to dominate and women are expected to play supporting roles. Again, if this is true, then we might expect daters to experience a sense of connection when they mutually place men in a favored interactional status during the encounter. Understanding which of these interaction scenarios actually corresponds with heterosexual dating activity is an important question for understanding the formation of these kinds of social bonds.

SPEED-DATING STUDY

In order to study the communicative bases of social bonding, we look to initial heterosexual dating encounters—courtship situations—and the experience of "clicking" or forging a sense of connection. We ask three questions: Does interaction matter? What qualities of interaction (rituals) matter? And in what pattern do these interaction rituals occur?

We address these questions in the empirical context of speed-dating events. People attend speed-dating events so as to meet a large array of strangers in an abbreviated time period for the purpose of finding a romantic partner (Finkel and Eastwick 2008, p. 193). Each date is typically a few minutes long, and when each is over, the men rotate on to the next date for around 20 of these rounds. In most events, the participants fill out a "score card" expressing whether they would like to exchange contact information with their partner. If the pair matches, then their contact information is exchanged. If they do not match, then nothing is exchanged. Despite such artificial staging, speed dates still have many of the same characteristics of initial romantic conversations in other settings: people meet and greet one another, they try to reveal positive features of themselves and learn about the other, they engage in efforts to relate and connect with one another, and they experience (a)symmetries of attraction.

Speed-dating contexts have been repeatedly studied in social science research papers (see Finkel et al. [2007] for a review). These studies generally use enormous samples of persons and seek to identify individual selection factors corresponding with mate selection. They almost invariably ig-

nore qualities of communication. We see several advantages to using speed dating as a context in which to study initial dating encounters and the experience of social bonding. First, unlike artificial lab contexts, speed dating is an activity that commonly occurs in the real world. Such events are now so frequently held that individual companies that sponsor these events have records totaling well over 58 million separate dating encounters.[10] Second, speed dating often draws strangers, and this random assignment of pairs helps researchers overcome selection issues (Finkel and Eastwick 2008, p. 193). Because of this, we are better able to identify communicative mechanisms associated with bonding experiences. Last, speed dates are brief initial dating encounters, and they allow us to observe a large sample of initial pair experiences so as to identify factors most associated with a nascent sense of bonding.

Data Collection

We ran multiple speed-dating events for graduate students at an elite private American university in 2005 (Madan, Caneel, and Pentland 2005; Pentland 2005). The graduate student participants volunteered to be in our study and were promised e-mail addresses of persons with whom they reported mutual liking.[11] Each date was conducted in an open setting. All participants wore audio recorders on a shoulder sash, thus resulting in two audio recordings of each of the approximately 1,100 four-minute dates. In addition to the audio, we collected pretest surveys, event scorecards, and posttest surveys. This is the largest sample we know of in which audio data and detailed survey information were collected on a natural encounter, let alone an initial courtship encounter. The rich survey information included date perceptions and follow-up interest, as well as respondent preferences and self-reported age, height, and weight, hobbies and interests, dating experience, and demographic information.

The data (Speed Date Corpus) also include audio files and transcripts. Since both speakers wore microphones, most dates had two recordings, one from the male recorder and one from the female recorder. We acquired acoustic information by taking the acoustic wave file from each recorder and manually segmenting it into a sequence of wave files, each corresponding to one four-minute date. The wave files for each date were transcribed by a transcription service, producing a "diarized" transcript (i.e., identify-

[10] We learned of this large number of recorded encounters in correspondence with a company called SpeedDate.Com.

[11] Speed-dating events usually cost a nominal fee. In our study, we merely required the completion of our surveys.

ing the speaker of each turn) that marked words as well as other conversational phenomena like laughter, filled pauses, speaker overlap, and restarts. The transcribers time-stamped the beginning and end of each turn. Because of ambient noise, the speaker wearing the recorder was clearer on his or her own recording. The transcribers were instructed to base their transcription on whichever of the two recordings sounded clearer and to use the other recording to clear up unintelligible words in the primary recording. A sample extract from the transcripts is shown below:

0:01:55.1	0:01:56.8	F: Well what about you, what are you passionate about?
0:02:05.7	0:02:11.8	M: Um, I am passionate about probably two things.
0:02:03.2	0:02:03.8	F: Uh-huh.
0:02:12.4	0:02:15.3	M: Well, many things, but two that come to mind straightaway. One is travel.
0:02:06.8	0:02:07.3	F: Okay.
0:02:15.5	0:02:17.2	M: I like see different parts of the world—
0:02:08.5	0:02:09.2	F: Uh-huh.
0:02:17.6	0:02:27.9	M: —experience lots of different things. And I also— recently, I've got into exercise, and, um, just different things, so riding a bike, and swimming, and running.
0:02:18.5	0:02:20.1	F: Oh, okay. Uh-huh.
0:02:28.3	0:02:30.3	M: I did my first track run on the weekend.
0:02:21.7	0:02:22.9	F: Oh, you did? How was it?
0:02:31.9	0:02:33.0	M: It was hard.
0:02:24.3	0:02:27.0	F: [*laughter*] Yeah, I heard it's really hard.
0:02:35.6	0:02:37.1	M: But I definitely recommend it.

Due to mechanical, operator, and experimenter errors, 19 dates were lost completely, and for an additional 130 we lost one of the two audio tracks and had to use the remaining track to extract features for both interlocutors.

The current study focuses on the 947 dates for which we had audio and transcripts. These dates were on average 812 words long (i.e., on average 406 words from each speaker) and took on average 93 turns. Because some of the participants did not provide Likert ratings for some of their judgments (38 of the participants, e.g., failed to complete certain attitudinal items on scorecards), we ran multiple imputations and averaged our empirical results in ensuing models (following Allison 2002).

Dependent Variables—Having "Clicked" and Willingness to Date

We study two types of relational experiences actors have in their dates with partners. The first concerns the actors' sense of having clicked with their partner during the date. This item is placed on the scorecard being filled out by participants after each date. On the scorecard, actors report how well they click with their partner on a scale of 1–10, from "not at all" to

"very much." We term this *Clicking*. The second item concerns whether the actor wants to go on a date with a partner or not (1, 0). This item is also on the scorecard and filled in at the end of each date. We term this *Willingness*.

Prior research focuses almost exclusively on actors' willingness to date since it corresponds with notions of mate selection and "real preferences." However, Willingness is inadequate on its own as an indicator of social bonding because it tends to be highly correlated with physical appearance and the sense of attraction. The sense of having clicked is also confounded by appearances, but less so than Willingness. Moreover, Clicking corresponds with the notion of having experienced a sense of connection and bonding—a feature that entails reflection on both self and other within an encounter. Therefore, our analyses focus on Clicking and illustrate how speech acts are salient to the sense of bonding. Then we demonstrate how mate selection (Willingness) is similar to Clicking, and the speech acts associated with Willingness are mediated by perceptions of Clicking.

Feature Extraction

For each conversation side (one speaker in one date), we extract a variety of features that reflect theoretically identified constructs of interaction rituals—emotional intensification, targeting, situational alignment, and interpersonal alignment. To detect these characteristics of ritual interaction, we extract acoustic features from wave files and discourse and dialogue features from transcripts.[12]

Emotional intensification.—In the linguistic and speech literature, intensification has been associated with particular aspects of a speaker's prosody (see Scherer [2003] for a review). Prosody is modeled via three acoustic properties of speech: pitch, energy, and duration.[13] For example, intensified or positively valenced emotional speech is associated with high or more variable pitch and with louder speech (Liscombe et al. 2003; Mairesse et al. 2007; Gravano et al. 2011). The literature measures these properties in a variety of ways, from their averages and variances to their high-low range. We extract two groups of prosodic features from each conversation side, using scripts in Praat—a software package commonly used for extracting acoustic features (Boersma and Weenink 2012).

The first group of acoustic features we extract is related to high and low pitch. Increases and decreases in pitch, as well as more variable pitch, are

[12] For each feature, we discuss relevant research in linguistics that describes a feature's association to social bonding or experiences like it. In addition, we relate when the association is inconsistent, suiting certain genders and contexts over others.

[13] Instead of the technical term f0, we will often use the more intuitive term *pitch*. In all cases, the reader should take the word *pitch* as referring to the acoustic measurement of f0, rather than the perceptual category.

related to emotional expression (Scherer 2003). Our pitch features are based on the fundamental frequency (f0) of the speech waveform, the rate of vibration of the vocal cords as measured from fundamental oscillations in the sound wave. Since the start and end of each turn are time-stamped by hand, each feature is first extracted over each turn in the conversation side, and then averages and standard deviations are taken over the turns in an entire conversation side.

We extract features related to the floor (minimum), mean (average), and ceiling (maximum) for pitch, as well as a number of different measures of variation in pitch. Thus, for example, the feature *Pitch min* (minimum f0, or pitch floor) for a conversation side is computed by taking the minimum f0 value of each turn in that conversation side (not counting zero values of f0) and then averaging these values over all turns in the side. For f0 we extract the measure for the minimum, maximum, and mean values of the conversation side (*Pitch min*, *Pitch mean*, *Pitch max*). No outliers are excluded. An example from the labeling by the Praat software is shown in figure 1.

We code a number of measures of f0 variation, each one taking a slightly different perspective on the variation in a speaker's frequency or pitch. The first is a standard deviation measure computed for each f0 variation. Thus for Pitch min, Pitch mean, and Pitch max described above, we compute their standard deviation; *Pitch mean SD* is the standard deviation across turns from the global f0 mean for the conversation side, measuring how variable the speakers mean f0 is across turns. We also compute a within-turn measure: *Pitch SD* is the standard deviation within a turn for the f0 mean, averaged over turns, telling us how variable the speaker's f0 is within a turn. *Pitch SD SD* measures how much this within-turn f0 variance varies from turn to turn, offering another measure of cross-turn f0 variation. Finally, we compute the pitch range. Pitch range is the difference between the maximum and minimum pitch for a turn. The variable *Pitch range* is thus computed as f0 max − f0 min per turn, averaged over turns. *Pitch range SD* measures how much the speakers pitch range varies from turn to turn, giving yet another measure of cross-turn f0 variation.

We also extract a second class of acoustic measures associated with the perception of loudness and softness. For these we extract the *energy*, computed as the root mean squared (RMS) amplitude of the speech waveform. From this basic value, we then compute *Energy min*, *Energy max*, and *Energy mean* values by averaging RMS amplitude over all turns in a conversation side. We then include a measure of variation in energy: *Energy min SD*, *Energy mean SD*, *Energy max SD*. There are 18 raw acoustic features (see table 1). While it is known that aspects of prosody like pitch and loudness are important means of expressing emotional intensification and engagement, the literature affords multiple related measures

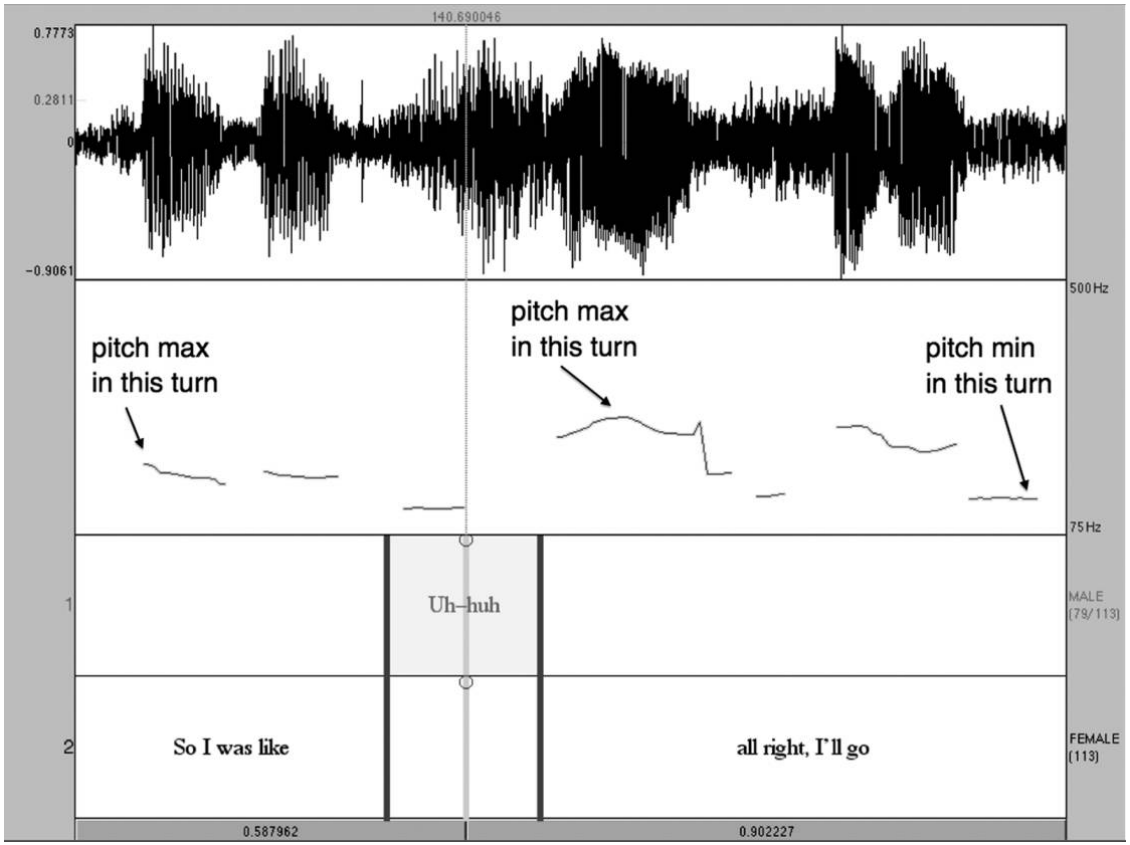

FIG. 1.—A 1.49-second extract showing three short turns from a conversation, as displayed by Praat software (Boersma and Weenink 2012). *Top*, waveform (with amplitude on the *Y*-axis); *middle*, pitch trace (with hertz on the *Y*-axis); *bottom*, transcription (with speaker gender on the *Y*-axis). Shared *X*-axis shows time in seconds. Some sample raw pitch features (max and min pitch) are shown for two of the turns.

TABLE 1
Raw Acoustic Features

	Description
Pitch min	Pitch min: minimum (nonzero) f0 per turn, averaged over turns
Pitch min SD	Pitch min SD: standard deviation from f0 min
Pitch max	Maximum f0 per turn, averaged over turns
Pitch max SD	Standard deviation from f0 max
Pitch mean	Mean f0 per turn, averaged over turns
Pitch mean SD	Standard deviation (across turns) from f0 mean
Pitch SD	Standard deviation (within a turn) from f0 mean, averaged over turns
Pitch SD SD	Standard deviation from the f0 SD
Pitch range	f0 max − f0 min per turn, averaged over turns
Pitch range SD	Standard deviation from mean pitch range
Energy min	Minimum RMS amplitude per turn, averaged over turns
Energy min SD	Standard deviation from RMS min
Energy max	Maximum RMS amplitude per turn, averaged over turns
Energy max SD	Standard deviation from RMS amplitude max
Energy mean	Mean RMS amplitude per turn, averaged over turns
Energy mean SD	Standard deviation from RMS amplitude mean
Turn duration	Duration of turn in seconds, averaged over turns
Turn duration SD	Standard deviation of turn duration

Note.—RMS = root mean squared.

of each with no clear single best metric. Acoustic features like average loudness and maximum loudness are highly correlated. We therefore conduct exploratory factor analysis to see whether latent dimensions organize the pattern with which the features correlate. Six orthogonal (uncorrelated) factors explain 85% of the variance in our 18 acoustic features. All have eigenvalues over 1, and there is a break between six and seven factors in the scree plot, suggesting that six is an optimal number to use. In addition, nearly identical results hold when generating oblique (correlated) factors, suggesting that the results are stable. The same factor pattern arises when we run the models separately by gender. Only the order of the factors shifts.

The resulting six factors are then used instead of the 18 raw prosodic variables in all further analyses. Table 2 shows the factor loadings for the six factors. The factors are generally consistent with previous linguistic and social psychological literature relating to excitement and emotion. Factor 1 is a measure of maximum f0 and also pitch range. It increases with higher max f0, higher mean f0, and pitch range; in general, speakers increase pitch range by raising their maximum f0. Prior work finds that heightened pitch is associated with expressions of positive emotion (Liscombe et al. 2003; Li and Wang 2004; House 2005; Mairesse et al. 2007; Gravano et al. 2011), as well as with flirtatiousness in women's voices (Puts et al. 2011). Factor 2 measures loudness; it increases with mean, max, and min loudness. Prior work finds that softer speech is associated with more agreeable personali-

TABLE 2
ROTATED FACTOR SOLUTION FOR ACOUSTIC FEATURES

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Turn duration	20	5	−18	−1	91*	−21
Turn duration SD	6	1	−5	2	95*	−7
Pitch min	−34	12	84*	−3	−23	8
Pitch min SD	−16	0	91*	2	−2	18
Pitch max	92*	10	1	3	22	−7
Pitch max SD	−75*	−5	−17	6	−2	53*
Pitch mean	59*	19	67*	−1	−6	−3
Pitch mean SD	12	−4	30	10	−14	73*
Pitch SD	91*	−8	−21	1	−3	20
Pitch SD SD	−34	−10	−1	5	−20	76*
Energy min	−1	51*	13	−66*	−10	20
Energy min SD	−5	22	8	66*	7	16
Energy max	9	91*	2	−1	7	−14
Energy max SD	1	−59*	0	70*	−6	10
Energy mean	4	94*	12	−23	−1	−1
Energy mean SD	4	−29	−2	89*	−9	5
Pitch range	90*	5	−25	4	26	−8
Pitch range SD	−74*	−5	15	8	7	51*

NOTE.—18 variables reduce to six factors, explaining 85% of the variance.
* Loadings greater than 40.

ties, while louder speech has been associated with extroverted personalities (Mairesse et al. 2007). Factor 3 measures minimum f0; it increases with minimum and mean f0 and its variance. Lower minimum pitch has been associated with judgments of masculinity (Feinberg et al. 2005). Factor 4 measures variable loudness, increasing with the standard deviation on minimum, mean, or maximum loudness. Variable loudness has been associated with extroversion (Mairesse et al. 2007). Factor 5 measures turn length, increased with the turn duration in seconds and its standard deviation. Longer turns reflect engagement and potential dominance of the conversational floor (Edelsky 1981). Finally, factor 6 measures f0 variation, increasing with the standard deviation in pitch mean, pitch max, and pitch range. Expanded pitch range has been associated with likability and engagement (Gravano et al. 2011). Furthermore, women generally use larger ranges than men, suggesting that pitch range as well as higher pitch may be related to projections of femininity (Collins and Missing 2003; Feinberg et al. 2008; Jones et al. 2010; Puts et al. 2011).

We constructed additional features reflecting excitement. First, for each speaker we measure the average duration of the turn in seconds (averaging over all turns in a conversation side) and the total time for a speaker in each conversation side (summed over all turns), and from that we derive the speaker's *Rate of speech* (measured in words per second, averaged over turns). Second, laughter is marked in all the transcripts by the transcribers ("[*Laugh*]"), and we extract it as a count. Both rate of speech

TABLE 3
PROSODIC/INTENSIFICATION FEATURES

	Description
F1—max pitch	Higher max and mean f0 and pitch range
F2—loudness	Higher mean, max, and min loudness
F3—min pitch	Higher min f0 and its variation and mean f0
F4—variable loudness	More variable min, mean, max loudness
F5—turn duration	Longer turns
F6—variable pitch	More variable f0 mean, max, and pitch range
Rate of speech	Number of words in turn divided by duration of turn in seconds, averaged over turns
Laugh	Count of laughter in conversational side

and laughter reflect excitement, so they are included in our eventual set of eight intensification features (see table 3). For dating, we expect that expressions of excitement will correspond with a sense of interpersonal connection. However, as the aforementioned literature suggests, some of these emotional expressions will have masculine and feminine forms, and speakers may draw on different forms of prosody in expressing excitement.

Conversational synchronization can be identified in the coordination of targets and engagement expressions across sides of a conversation and via interpersonal alignments that take place across conversational turns. In what follows, we will take each in turn and explain how each feature we develop is a proxy for these forms of synchrony.

Targets.—Targets of communication are detected by examining referential expressions and the most central or frequent referent mentioned. The most frequent referential cues, and the simplest to detect, are pronouns (Chung and Pennebaker 2007). We assume that if one of the speakers is the topic, he or she will be referred to more often pronominally in the conversation (the topical participant or "actor" says "I," and the partner says "you"). We therefore developed features that detect all first-person singular and second-person singular pronouns from simple word sets: "I"—I, me, my, mine, myself; "You"—you, your, yours, yourself.[14] Prior work finds that pronoun usage acts as a contextualization cue and places persons in active/passive roles (Gumperz 1982). In dating, it is possible that both parties want

[14] We also explored a wide variety of lexical features, following the psychological and computational literature (Pennebaker and King 1999; Mairesse et al. 2007; Pennebaker, Booth, and Francis 2007) and the literature on computational sentiment analysis (Pang and Lee 2008), which finds that word usage is often indicative of social meaning. However, we found that few of the lexical sets corresponded with daters' sense of bonding. Moreover, we realized early on that an infinite number of word sets could be proposed, and eventually some would correspond, and many would lack sensible explanation. In the end, we decided to develop features of interaction rituals because the theory was relevant and the features seemed to predict bonding experiences.

to be the target of discussion, or they may coordinate their pronoun usage in certain directions mutually targeting one gender over another when experiencing a sense of romantic connection.

Interpersonal alignments.—Interpersonal alignments are typically expressed via successive turns in interaction. We focus on two forms of interpersonal alignment: *complementary* and *mirrored* forms. Complementary forms of alignment are sequences of interaction in which speakers assume distinct but interrelated parts. We often observe synchronization across distinct parts in ritual interchanges and dialogue acts. Such synchronized dialogue acts are structured into two or more turns of interaction across speakers. We extracted a variety of these alignment features, drawing from conversation analysis, sentiment analysis, and computational dialog act literatures discussed below.[15] We extracted forms of alignment that tend to be supportive and positive (aligning) as well as those that might have a negative or controlling (distancing) function.

Questions and interruptions are dialogue acts that cue an interchange via a first-part pairing and, depending on the situation of use, may either redirect conversations (Edelsky 1981; West 1985) or express engagement (Edelsky 1981; James and Clarke 1993, p. 259). We therefore code both questions and interruptions in all conversations. *Questions* are common in speed dates; indeed, about 21% of all turns are questions. Transcribers were instructed to place question marks on all questions except those that were cut off or interrupted. We then extract questions by looking for all sentences ending with question marks and use additional patterns to find cutoff questions without marks by looking for cases of auxiliary inversion (do you, did you, are you, can you, could you, etc.). The variable thus codes the total number of questions used by the speaker in the conversation side. Prior research interprets questions in opposite ways. On the one hand, some studies argue that questions indicate interest in the interlocutors and their emotions (Cameron, McAlinden, and O'Leary 1989). On the other, studies find that questions control the floor and redirect the topic of conversation and impose on the partner's face (Edelsky 1981).

As with questions, prior work has found mixed results on the valence of interruptions in talk (Tannen 1993, p. 175). Some of it finds that interruptions are control efforts used by men to commence topics (Zimmerman and West 1975; West 1985), while other work finds that women are just as likely to interrupt as men and argues that interruptions are often used to create shared meaning signaling alignment and engagement (James and

[15] We explored a variety of other features, e.g., the total amount of talk (number of words), positive emotion words, negative emotion words, but found few were related to perceptions of clicking.

Clarke 1993, p. 259; Tannen 1994; Coates 1996, 1997) and a collaborative floor (Edelsky 1981).

There are a variety of methods for defining and coding interruptions and overlaps. Like most researchers, we attempt to distinguish between overlaps in talk that are violations of the speaking rights of the interrupted speaker and those that are nonviolating overlaps. Our methodology is closest to that of Zimmerman and West (1975), who defined an interruption as simultaneous speech that constituted a violation of the turn-taking mechanism of Sacks, Schegloff, and Jefferson (1974). Zimmerman and West (1975) distinguished two kinds of simultaneous speech. What they call overlaps (nonviolations) result from mistiming errors: the second speaker slightly miscalculates the end of the first speaker's turn and speaks a few syllables too soon. By contrast, they defined interruptions as true violations of the turn-taking rules, when a new speaker speaks at a nontransition place in the current speaker's turn. Their definition of interruptions thus excludes simultaneous speech for acknowledgment tokens or back channels like *uh*, *huh*, and *yeah*, which do not constitute true turns at speech.

Other researchers offer more context-sensitive definitions of interruption. Tannen (1994) and others, for example, point out that the discourse role of interruptions is important in defining what constitutes a violation of norms. Thus "procedural" interruptions like "Don't touch that" or "Pass the salt" may not be perceived as violations. Murray (1985) suggests that whether an interruption occurs depends on many details of speaking rights, such as the exact place in the discourse where an interruption occurs, or how fully a point has been made, or who has authority to speak on a particular topic. He proposes a scheme that distinguishes multiple classes of violations, from severe violations like interrupting a speaker midclause in his or her first turn of the discourse to less severe interruptions like breaking into a later utterance in the discourse or marginal violations like interrupting after a turn-ceding discourse marker.

Despite their differences, the syntactically defined Zimmerman-West model and the more contextually defined methods have significant commonality. Okamoto et al. (2002) compared interruptions coded by the Zimmerman and West criteria with those coded by culture experts using full context to mark what they perceived as an interruption. Their factor analysis found a single factor underlying both measurements of interruptions, suggesting a common underlying understanding of interruptions, but also found some differences between the two kinds of coding, as well as individual differences between coders based on their gender and conversational style. A more nuanced coding of interruption would thus also take into account these subtle issues of gender and conversational style (for both coder and speaker). Finally, a definition of interruptions may also want to include what James and Clarke (1993) call "silent interruptions," wherein the second

speaker interrupts the first speaker exactly at a word boundary and the first speaker cuts off, resulting in an interruption with no overlapping speech.

We coded interruptions in a two-step process that draws mainly on the intuitions of Zimmerman and West, although we also draw from other researchers. Our transcribers first marked potential interruptions in two situations: (1) when the first speaker uttered a complete turn but the second speaker's turn overlapped acoustically with part of it and (2) when the first speaker's turn was perceived as cutoff or incomplete due to the second speaker either overlapping or exactly latching with the first speaker's turn. Thus, following James and Clarke (1993), we included as interruptions those silent interruptions in which the first speaker cut off her speech in between word boundaries just as the second speaker began speaking.

We then coded a specific subset of these potential interruptions as true interruptions. Following Zimmerman and West, we excluded overlaps within one word of a transition-relevance place, which we defined as a sentence boundary or, following both Zimmerman and West (1975) and Murray (1985), as a discourse marker with turn-relinquishing function (so, um, uh, or, well, but). We also did not code the second speaker's utterance as an interruption if it consisted of a back channel (acknowledgment token) or similar utterances of one or two words, most of which are tokens of *Yeah*, *Uh-huh*, *Okay*, *Right*, or *Oh, really?* or appreciations like *That's great*. The set of interruptions we coded were thus inspired by the previous literature, with the goal of excluding mistiming and back channels but including silent interruptions. Because we were not able to differentiate the procedural interruptions of Tannen (1994) and did not distinguish overlaps on the basis of their position in the discourse, our interruptions as coded would presumably include at least some situations that a coding scheme following Murray (1985) or Tannen (1994) might call noninterruptions.

Thus in the following example, the female interrupts the male:

> Male: Do you really get a lot of information from—
> Female: It's really in the development stages so far so I haven't applied it to a field application at all.

In this case the woman is coded as having a single interruption, and our variable for interruption codes the total number of interruptions taken by the speaker in the conversation side.

In the case of both questions and interruptions, it is unclear whether they will be features that correspond with a sense of connection or features that undermine it. If they are negatively associated with clicking, then we will find evidence that they are negative rites that disrupt the tendency toward synchrony, and if they positively correspond with clicking, then we will find evidence that they express interest and engagement.

Should both genders use them in the same way, we can view their usage as symmetrical across sides of a conversation. If they are used and expected of the partner in a directional manner (say only for men), then we can view their usage as reciprocal and asymmetrical.

Extracting richer dialog acts such as supportive interchanges requires more complex algorithms.[16] One such dialog act is an assessment, a conversational turn that expresses the actor's sentiment toward the partner's recent utterance. We code two types of assessments: positive assessments, often called "appreciations," and negative assessments, which we called "sympathy" since they often have a sympathetic stance. Negative (sympathetic) assessments are phrases like "That must be tough on you" or "Well, that sort of sucks"; the following exchange shows an example in context:

Female: Where do you go with that? Like where does that— ?
Male: Well, I could, . . . probably into management consulting, which is the last thing I want to do.
Female: Oh, that's too bad.

Positive assessments (appreciations) are phrases like "That's awesome!" or "Good for you!" or like the following example in context:

Female: I played in the orchestra.
Male: Oh that's cool.

We extract assessments by designing *regular expressions*, formal descriptions of word sequences that can be embedded in software scripts to auto-

[16] In this article, our focus on dialogue acts mostly concern what Goffman termed "supportive interchanges" (1971, chap. 3). Supportive interchanges are positive interpersonal rites that are affirming and show interest in the other (e.g., greetings and apologies as signals of courtesy, ratification, and reassurance). Like discourse markers, these are normative moves because when someone offers a sign of alignment and interest in another, it behooves the recipient to show that the message has been received and appreciated. Many cases of supportive interchange are pair sequences in which an initiator begins with a positive attribution aimed at the recipient, and the recipient confirms its reception (Goffman 1967; Brown and Levinson 1987). Some place emphasis on the initiator, or first pair part, and his or her identity claim. In other interchanges, the response, or second pair part, has greater influence. Recent work suggests that indirect efforts at inducing a supportive second pair part ("fishing for compliments") may be less risky in cases of "social jeopardy." Everyone knows of times when persons fish for compliments and lure positive interchanges. Because there is greater definitional power in the second pair part, drawing a compliment or positive attribution is often of greater strategic value than claiming one for yourself (Leifer 1988; Leifer and Rajah 2000). Luring positive interchanges may thus lead to more successful behavior than an overt claim. This latter form of interaction ritual thus may lead to more of a behavioral configuration than an overt claim (West and Zimmerman 1987, pp. 134–35). The acquisition of appreciations and sympathy is likely an instance of this.

matically extract instances. We design the expressions on the basis of the literature on assessments (Goodwin and Goodwin 1987; Goodwin 1996; Jurafsky et al. 1998) and computational analysis of the positive assessments (appreciations) in a publicly available hand-labeled database of conversations, the Switchboard (Jurafsky, Shriberg, and Biasca 1997; Calhoun et al. 2010). These previous studies and our analysis of the Switchboard corpus suggest that both positive and negative assessments often have the following form:

pro term + copula + (intensifier) + assessment adjective.

We build regular expressions on the basis of these classes, using assessment adjectives from the Switchboard corpus and from a first investigation of the Speed Date Corpus. A negative version of this regular expression extracts examples of *Sympathy* like "It's very weird," "That's kind of weird," or "Oh, that sucks"; a positive version extracts *Appreciations* like "That's amazing," "That's so logical," or "That's really cool." We also hand label some of these instances, allowing us to augment the regular expression with assessments displaying other kinds of structures (e.g., "Amazing!" "Awesome," "Good for you!" "I can imagine," for Appreciations, and "Oh no," "Oh dear," "I had the same problem," for Sympathy). Notably, these expressions presuppose a prior turn by partners in which they express a complaint (Sympathy) or brag (Appreciation). As such, the expressions capture the second part in a reciprocal asymmetrical interchange. The literature on supportive interchanges suggests they are used in an effort to align and connect with partners (Goffman 1967, 1971), when speakers forge a sense of trust through exchanging expressions of deference and demeanor.

Another, perhaps even older, line of research suggests that persons feel connected when they mirror turns of interaction (Carnegie 1937)—a process described as accommodation or entrainment (Giles, Coupland, and Coupland 1991). As summarized earlier, actors adjust their linguistic production in a number of ways to make their utterances more similar to (or occasionally more different from) their partner, and this accommodation is positively associated with feeling a sense of connection or liking. Previous speed-dating research has also shown a relationship between accommodation and romantic attraction (Ireland et al. 2011). Drawing on this literature, we construct several indicators of actor accommodation to the partner's speech: *Rate of speech mimicry*, *Function word mimicry*, and *Laughter mimicry*.[17] All these features concern subconscious aspects of speech and likely reflect deeply held intentions and sentiments that the

[17] We examined a variety of different metrics for mimicry, and few came up significant (pitch mirroring, energy [loudness] mirroring, content mimicry, etc.).

speaker may not even be aware of (Natale 1975; Nenkova et al. 2008; Abrego-Collier et al. 2011; Beňuš, Gravano, and Hirschberg 2011; Levitan and Hirschberg 2011).

Rate of speech mimicry is a measure of how similar an actor's rate of speech is to the partner's rate of speech. Recall that the rate of speech for a given turn is the number of words the speaker uttered per second, using the turn boundaries labeled by the transcribers to compute turn duration in seconds and the transcript to compute the number of words. For each speaker, we compute a vector of these rates of speech for the turns in their conversation side. We then compute the Pearson's correlation between the two vectors of successive turns. A high correlation indicates that actors change their rate of talk as their partners change their rate.

Function word mimicry measures how often speakers use a function word that was also used in their partner's previous turn. A *function word* is a word like an article or preposition that plays a strong grammatical role and a weaker topical role in a sentence, as opposed to *content words* like nouns or verbs. Following prior work, we use a list of 193 such function words (Niederhoffer and Pennebaker 2002; see table 4). For each function word w in a given speaker's turn, if w also occurs in the immediately preceding turn of the alter, we count w as an accommodated function word. The variable function word mimicry is then the total number of these accommodated function words over every turn in the speaker's conversation side.

Finally, we compute *Laughter mimicry* by summing over all turns in which a speaker laughed and his or her partner also laughs in the immediately preceding turn.[18] As with function-word mimicry, we assume these are both forms of interpersonal alignment in which speakers mirror their partner. If these alignments target one gender over another, then there is evidence of asymmetrical coordination in which one side is placed in an ad-

[18] We extracted a variety of other dialogue features but found they were unrelated to clicking. An obvious one is the total words spoken in a side. This variable had little relation to the outcome and was correlated with some variables, so it was dropped. However, its inclusion or omission did not affect results. Other features include (1) clarification or repair questions: these are turns in which a speaker signals lack of hearing or understanding and have also been called NTRIs (next turn repair indicators) in the literature (Schegloff, Jefferson, and Sacks 1977)—What? Sorry, Excuse me, Huh? Who? Pardon? Say again? What's that? (2) We extracted two different laughter variables on the basis of the position of laughter in the speaker's turn. *Initial laughter* were cases of laughter that occurred at the beginning of the turn (or the entire turn). We hypothesized these would be cases of laughing at the alter. *Turn-medial/final laughter* were laughs that occurred in the middle or the end of a turn. We hypothesized these would be cases of speakers laughing at themselves. (3) Content mimicry is effectively the same measure as function word mimicry, except that we use all the nonfunction words (as a proxy of topic uptake; Nystrand 1997). (4) We also tried disfluencies (um, uh), backchannels (uh-huh), negations, etc.—all to no avail.

TABLE 4
FUNCTION WORDS

	Words
Auxiliary and copular verbs	able am are aren't be been being can can't cannot could couldn't did didn't do don't get got gotta had hadn't hasn't have haven't is isn't may should should've shouldn't was were will won't would would've wouldn't
Conjunctions	although and as because cause but if or so then unless whereas while
Determiners, predeterminers, and quantifiers	a an each every all lot lots the this those
Pronouns and Wh-words	anybody anything anywhere everybody's everyone everything everything's everywhere he he'd he's her him himself herself his how how'd how's I I'd I'll I'm I've it it'd it'll it's its itself me my mine myself nobody nothing nowhere one one's ones our ours she she'll she's she'd somebody someone someplace that that'd that'll that's them themselves these they they'd they'll they're they've us we we'd we'll we're we've what what'd what's whatever when where where'd where's wherever which who who's whom whose why you you'd you'll you're you've your yours yourself
Prepositions	about after against at before by down for from in into near of off on out over than to until up with without
Discourse particles	ah hi huh like mm-hmm oh okay right uh uh-huh um well yeah yup
Adverbs and negatives	just no not really too very

vantaged participation status. Should the alignments be used consistently across genders, then there is evidence of symmetrical coordination.

Situational alignments.—More complex forms of dialogue can be used to align or distance persons from the situation. One such mechanism is the use of discourse markers, which bracket talk and help the speaker and hearer jointly make sense of what has been said.

We investigate two classes of discourse markers that reveal how speakers align with or engage in the situation and their own talk: *Self-markers* and *Hedges*. "Y'know" and "I mean" are self-markers with complementary functions of maintaining attention on what the speaker says. "Y'know" invites hearer attention and assessment of what the speaker says, displays the speaker's orientation to the same remark, and is associated with narrative and opinionated talk (Holmes 1986; Schriffin 1987, pp. 309–11; Fox, Tree, and Schrock 2002). "I mean" displays the speakers' orientation to their own talk, projecting an upcoming reassessment, and invites the hearer's assessment of what was said.

Male: Yeah, I'm like *you know* one step at a time . . . .
Female: Yeah. Definitely. It's exciting. *I mean* once I decide, it will be fine

Both "Y'know" and "I mean" function to draw the partner's attention to the speaker's talk (and face). Both markers signal a willingness to align and suggest that the speaker has been allowed to render his or her self and face a point of concerted focus.[19]

In contrast with engagement markers like "I mean" and "Y'know," speakers use a variety of discourse markers to signal distance from what they say. These hedges allow the speakers to represent themselves in two roles—one as animator and another as the author who is distant from the statement (Goffman 1981). *Hedges* are words or phrases that weaken the force of assertions or indicate uncertainty, marking that some sort of criterion for category membership is weak or lacking (G. Lakoff 1973). A hedge can be an adverb that modifies adjectives (e.g., "a little" in "a little easier" or "a little closer") or a premodifier that quantifies nouns (e.g., "a little hiking"). Like the disclaimers studied by Hewitt and Stokes (1975; "I know this sounds stupid, but . . ." or "I realize I'm being anthropomorphic"), hedges have a distancing function. But whereas disclaimers act only to "ward off . . . negative typifications," hedges distance the speaker from the force of any kind of utterance, not just those utterances that "serve as the basis for typifying them" (Hewitt and Stokes 1975, p. 3). Moreover, unlike disclaimers, hedges are extremely frequent in natural conversational speech.

The hedges in our data tended to be used as verb phrase or sentential modifiers, expressing the speaker's lack of commitment to an entire proposition.

> I'm sort of just finishing up some work right now . . .
> It's sort of a different side of the education scene
> Yeah, I kind of know that area
> It was actually I guess really nice . . . Yeah, that's kind of awkward I guess . . .
> It's going to happen I think.

The pragmatic distancing in hedges functions as a metapragmatic comment on the situation of an utterance. This distancing leads us to suspect that hedges are a sign of asynchrony and misalignment in the conversation.

Hedges have an alternative function, however, as devices for mitigation or downplaying. This mitigation or softening function allows hedges to act as a marker for both positive and negative politeness (Brown and Levinson 1987; Miskovic-Lukovic 2009). This may lead them to be associated with less strident assertions and more modest positions, which might be associated with positive bonding. Holmes (1990, 1993) also finds that hedges like *sort of* and *kind of* can be used affectively to reduce social distance by expressing "the speaker's desire for a relaxed relationship with the addressee" (Holmes 1993, p. 101). Brown and Levinson (1987) suggest that

[19] We use simple regular expressions based on surrounding context to automatically eliminate cases of the verb "know" and extract only the discourse marker "Y'know."

TABLE 5
Speech Variables

	Example/Description
"I"	I, me, my, mine, myself
"You"	You, your, yours, yourself
Self-marker	Y'know and I mean
Hedge	I guess, probably, sorta, kinda, etc.
Appreciation	Wow that's great!
Sympathy	That's tough, you must be sad
Question	"?'s"
Interruption	Violating interruptions
Speech rate mimicry	Correlation of actor rate with preceding partner rate
Function word mimicry	Correlation of actor function words with preceding partner function words
Laughter mimicry	Sum of actor's turns laughing right after the partner's laugh

hedges are less likely to be used by empowered actors speaking to subordinate partners. Understanding whether the mitigating/affective function or the distancing role is more significant in these dating interactions is important for modeling the early stages in social bonding. See table 5 for a list of our speech variables that code linguistic features related to targeting, situational alignment, and interpersonal alignment.

Individual and Dyadic Traits

One of our goals is to assess whether speech characteristics are significantly associated with participants' sense of connecting net of other individual and dyadic traits. Hence, we include a variety of individual and dyadic traits in our models as controls. Most of the individual traits reflect characteristics that prior work has identified as status characteristics, motives, and skills (see table 6). Foreign birth is included as a control for speech differences. It would require an entirely separate study to explain how foreign speakers alter their speech acts. Also included is a variable in which participants retrospectively report on the amount of time it took them to come to a dating decision on each partner (*Time to match*). We include this variable to illustrate how our dependent variable is associated with decisions that require communication.

We also include a variety of dyadic traits in our models to test for homophily, prior familiarity, and event fatigue. They too have straightforward coding (see table 6). In sum, we use a variety of control variables to account for other explanations and reasons why persons might report a sense of clicking. Clearly, there are many other variables we could construct and include, but these proved most relevant. Given that our sample

TABLE 6
INDIVIDUAL AND DYADIC TRAITS

	Example/Description
Individual trait:	
Male gender	1, 0
Height	In inches
BMI	Body mass index = (mass [pounds] × 703) / (height [inches])^2
Foreign born	If born in another country, then = 1, 0 if a U.S. native
Dating experience	How often they date from 1 to 7—never to several times a week
Looking to date	If they reported they were looking for a serious relationship or to get a date at the event = 1, 0 if they had casual interest
Time to match	After each date ends, they report on the time it took to decide whether to select that partner or not (1 = immediate, 2 = first minute, 3 = second minute, 4 = third minute, 5 = fourth minute, and 6 = later in the evening [they came back to it later in the event])
Dyadic trait:	
Order	Order in the evening (1–20)
Prior familiarity	Control variable for how well they know the partner (from 1 to 6—never met to very familiar)
Hobby difference	Sum of difference in Likert scale on 17 different hobbies

is finite and our statistical power limited, we decided to only include control variables that were either significantly related to the outcome or theoretically relevant.[20]

METHOD—DYADIC DATA ANALYSIS

We use dyadic data analysis to predict when subjects in the speed-dating experiment report having clicked with their partner and when they report a willingness to date their partner. The extracted features of each actor's speech and individual traits are used as independent variables. The class of models we employ is known as the actor-partner interdependence model (Kenny et al. 2006, chap. 7). These models are becoming increasingly common, especially in the study of relationships, because they distinguish intrapersonal "actor" effects from interpersonal "partner" effects, while al-

[20] An obvious variable to include is age or even age difference. Another is race homophily. We tried including these variables in our models, but none were significantly associated with the outcomes of clicking and willingness to date. In part, this is likely due to the fact that most participants were of similar age. Also, our sample of 110 persons does not allow for much racial comparison. *Foreign born* became a proxy for an assortment of racial and linguistic differences, and it was included. Even though our sample is large for a data set on communication (~2,000 dates), it is relatively small in comparison with studies on comparative traits in which every combination of racial matching is had in samples of hundreds of thousands of persons. Because of this, we are somewhat limited in the types of tests we can perform.

lowing for complex correlation structures. The approach is particularly well suited to explaining when men and women think they clicked with one another because it allows the researcher to distinguish between actor and partner effects—that is, when certain behaviors correspond with an actor believing they clicked or when those behaviors predict the partner believing they clicked. For example, an increase in the actors' pitch may be associated with their believing they clicked with a given partner, but it may have no association with whether the partner believes they clicked. In addition, these models allow us to incorporate systematic gender differences to examine when certain actor or partner effects are contingent on gender.

Figure 2 illustrates how this approach pertains to a given dyad in the Speed Date Corpus. It shows a male-female dyad and the relationship between a speech behavior (X) during the date and the subsequent report of having "clicked" after the date (Y). Each member of the dyad is both an actor and a partner in the model, so that there are two actor effects (denoted by arrows labeled "a") and two partner effects (denoted by arrows labeled "p"). If we consider actor 1 as male and actor 2 as female, then the effect of a_{11} is the male actor effect in this dyad so that a certain antecedent speech behavior (X) may be positively or negatively related to a male believing he clicked with a female partner. The same speech behavior may also have a positive or negative male-female partner effect (denoted p_{12}). These effects may be consistent for the female actor effect (a_{22}) and the female-male partner effect (p_{21}), or these effects may be contingent on gender. The model incorporates two correlations—one for the predictors (represented by the line between X1 and X2) and a second for the residual nonindependence in the outcome variable (Y1 and Y2).

We employ multilevel models—also known as mixed or hierarchical models (see Singer 1998)—to estimate our dyadic approach (Kenny et al. 2006, pp. 158–61). These take the general form of a two-level model in

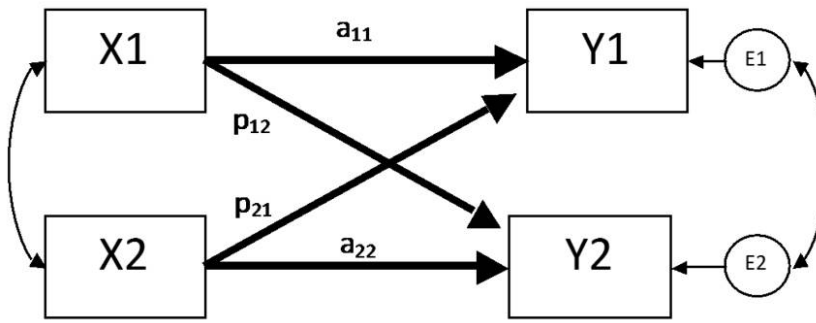

FIG. 2.—Actor-partner interdependence model

which the first level estimates an actor believing they clicked as a function of both actor and partner speech patterns:

$$\begin{aligned}\text{clicked}_{ij} = {} & \beta_0 + \beta_1(\text{actor speech}) + \beta_2(\text{partner speech}) \\ & + \beta_3(\text{female}) + \beta_4(\text{actor speech} \times \text{female}) \\ & + \beta_5(\text{partner speech} \times \text{female}) + r_{ij},\end{aligned} \tag{1}$$

where the intercept is the predicted probability of clicking when all predictors are zero (which, because of mean centering, is the average for the entire speed-dating sample), plus a vector of effects for an actor's speech patterns, his or her partner's speech patterns, an overall gender effect, and interactions between gender and speech patterns.

The level 2 model provides a random component to account for the nonindependence of actor and partner effects and a measure of the intraclass correlation—the degree to which clicking varies from dyad to dyad after accounting for the effects of speech patterns and gender:

$$\beta_0 = \gamma_{00} + \upsilon_0. \tag{2}$$

Individual actor scores are treated as repeated measures within the dyad, and compound symmetry treats the variances of the intercepts for the members of each dyad as equal.[21] Models are estimated using restricted maximum likelihood. The same model is used for Willingness, except that the outcome is binary and we use a multilevel logit to estimate the odds of actors reporting their willingness to contact a partner for a date.

Our sample has some missing data (~10% for certain survey items). To treat this concern, we use multiple imputation techniques (Allison 2002, p. 27). Multiple imputation uses information gleaned from other variables and respondents in the data set to create predicted values for missing cases. In this manner, values are as close as possible to what would be there if all respondents fill out the questionnaire. We impute five samples from the original data set and run predictive models separately on each, averaging the results across them. Nonimputed results with list-wise deletions produce very similar values. As such, imputation does not change our story but affords results less biased by missing data.

Last, for ease of presentation, we standardize all coefficients. We do not standardize the dependent variables but mean center Clicking for the sample. Hence, coefficients are read as follows: for a 1 standard deviation increase in X from the sample average, there is a predicted change in Y (Clicking) beyond the sample mean of b. For the dyadic logit models, it is

[21] Repeated measures are used because partner and actor variables can be positively or negatively correlated, and random effects models only allow for positive correlations (Kenny et al. 2006).

read as follows: for a 1 standard deviation increase in X from the sample average, there results a predicted change in the odds of Y (Willingness). The only exceptions to this are BMI and Height, which are mean centered within genders, so their effect is relative to the mean of their gender. Also, Foreign born is a dummy variable and not mean centered, so it merely denotes the effect of being foreign born in comparison to being native born.

RESULTS

Table 7 presents descriptive statistics. Here we see the array of features we intend to use in the ensuing multivariate dyadic models. It is important to reiterate the fact that we distinguish genders and actor-partner features in their dates. In this manner, for each gender, we are able to assess the effects of both the actor's and the partner's traits and styles of speech on the actor's sense of connection and mate selection.

Tables 8 and 9 present our core results for Clicking and Willingness, respectively. Three models are presented in which the effects for men and women are separately related.[22] The first presents simple bivariate regressions in which each feature is regressed on the dependent variable without controls. This offers some sense of the main effect and correlation each trait has with the outcome. The second model includes only the speech features of the actor and partner. We run this model because we are especially interested in the effects communication has on perceptions of connection and mate selection. In the third and final model, we include precursor and selection factors like individual and dyadic traits. Notably, we do not include the partner's attitudes. We omit them partially in the interest of parsimony (they fail to have an effect) but also because we thought it sensible that the actor is unable to perceive the partners attitudes except through the partner's speech, which we include in the model anyway.

There are many specific associations in these tables that deserve remark, but we will limit our discussion to the general pattern so a clear narrative emerges. Let us begin by summarizing the results of Clicking in table 8 and figure 3. First, the intercepts for each gender show a marked difference from the sample means. In the multivariate models, men and women differ in their reports of Clicking by 1/3 (model 1) to 3/5 of a unit (model 2). Women notably report lower rates of clicking than men do. This is consistent with prior work that found women are more selective than men, and this suggests there may be a power differential that favors women.

[22] These models show main effects for each gender. In supplemental models, we also tested whether genders have significantly different slopes. Those results support obvious differences in tables 8 and 9: when male and female main effects and significances differ, their slopes almost always are significantly different.

Second, traits clearly matter. Actor and partner traits all have larger standardized effects on Clicking than does most every speech characteristic. In supplemental models, we find that traits explain nearly twice as much variance as features of speech (15% of the variance explained vs. only 7.5%). Looking to model 3, we see that a man reports more of a connection when he is tall, motivated to date, experienced at dating, and U.S. born. Men report more of a connection with women who share their hobbies and, especially, with women who are thin. Similarly, a woman reports clicking more with men when she is motivated to date, experienced at dating, and U.S. born. Distinct from men, women report more of a connection when they have a higher BMI than average. Therefore, on average, a man in our sample reports greater connection with the opposite sex when he has a higher status characteristic (taller height), but a woman reports greater connection when she has a lower status characteristic (heavier weight). This suggests that women may open themselves up more when they depart from the physical ideal and that men are more attracted when women approach it.

Women seek additional characteristics in their partner than men do. Like men, they seek ideal status characteristics of appearance (taller height, but only mildly so) and men with whom they share hobbies. However, different from men, women sense a connection with familiar partners and those they encounter early in the evening before they become fatigued. Both genders' sense of connection correlates with expected motives, experience, and the search for ideal status characteristics and homophilous interests (vertical and horizontal preferences of status and homophily). Bodies are a point of focus for both genders, but there is a mutual positive response to male height, while there is an inverse response to female weight. Moreover, while women are more selective, they appear to connect more with men who are familiar.

Third, the results indicate that both genders feel they connect more when it takes longer to decide whether to select their date. A 1 standard deviation change in Time to decision (i.e., from deciding in the first minute to deciding in the second or third minute) results in a .4 and .6 increase in perceived Clicking for men and women, respectively. This result is very significant and suggests that Clicking is not solely a function of traits and is greatly associated with interaction. In fact, the longer it takes actors to decide, the more they report having a bonding experience with their partner.

Net of actor, partner, and dyad traits, we find significant effects for characteristics of speech. Even though traits explain 15% of the variance in Clicking, speech characteristics still bring an additional 7.5% of explained variance—and this is within the narrow time period of four-minute dates. In supplemental models using only the first minute of each date, the effects

TABLE 7
DESCRIPTIVE STATISTICS

	ALL		MEN		WOMEN	
	Mean	SD	Mean	SD	Mean	SD
Dependent variable:						
Clicked	4.69	2.14	5.00	2.10	4.37	2.13
Willingness	.47	.50	.56	.50	.37	.48
Actor speech:						
F1—max pitch	.00	1.01	.01	.76	−.01	1.21
F2—loudness	.00	.99	.00	1.09	.00	.88
F3—min pitch	.00	1.01	−.02	.93	.02	1.08
F4—variable loudness	.00	.99	−.01	.97	.01	1.02
F5—turn duration	.00	.99	−.06	.95	.06	1.02
F6—variable pitch	.00	1.00	−.02	.90	.02	1.10
Rate of speech	.00	1.19	.15	1.34	−.15	.99
Laugh	.00	3.95	−1.31	2.67	1.31	4.55
"I"	.00	10.43	−.73	9.73	.73	11.05
Self-marker	.00	2.95	.07	3.09	−.07	2.80
Appreciation	.00	1.18	.04	1.19	−.04	1.17
Sympathy	.00	.42	.00	.42	.00	.41
"You"	.00	3.74	.21	3.81	−.22	3.66
Hedge	.00	3.38	.10	3.42	−.10	3.34
Question	.00	5.42	.66	5.78	−.67	4.95
Interruption	.00	1.87	−.06	1.82	.06	1.92
Function word mimicry	.00	12.46	−.33	12.40	.34	12.51
Laughter mimicry	.00	.96	.01	.93	−.01	.98
Rate mimicry	.00	.17	.00	.18	.00	.16
Actor trait:						
Male gender	.00	1.00	1.00	.00	−1.00	.00
Body mass index (BMI)	.00	2.56	.00	2.10	.00	2.95
Height	.00	2.52	.00	2.55	.00	2.48
Foreign born	.25	.44	.32	.46	.18	.39
Looking to date	.00	.49	.11	.46	−.11	.50
Experience dating	.00	1.34	−.05	1.14	.05	1.51
Time to decision	.00	1.41	−.03	1.31	.03	1.50
Partner speech:						
F1—max pitch	.00	1.01	−.02	1.21	.02	.76
F2—loudness	.00	1.00	.00	.89	.00	1.09
F3—min pitch	.00	1.00	.02	1.07	−.02	.93
F4—variable loudness	.00	.99	.01	1.01	−.01	.96
F5—turn duration	.00	1.00	.06	1.03	−.06	.97
F6—variable pitch	.00	1.00	.02	1.10	−.02	.89
Rate of speech	.00	1.19	−.15	.99	.15	1.34
Laugh	.00	3.94	1.30	4.54	−1.31	2.66
"I"	.00	10.53	.76	11.19	−.76	9.76
Self-marker	.00	2.96	−.06	2.81	.06	3.10
Appreciation	.00	1.18	−.04	1.17	.04	1.19
Sympathy	.00	.42	.00	.41	.00	.43
"You"	.00	3.76	−.21	3.68	.00	3.82
Hedge	.00	3.38	−.10	3.33	.10	3.42
Question	.00	5.43	−.68	4.96	.68	5.79
Interruption	.00	1.86	.07	1.93	−.07	1.80
Function word mimicry	.00	12.50	.34	12.59	−.34	12.40
Laughter mimicry	.00	.96	−.01	.98	.01	.94

TABLE 7 (*Continued*)

	All		Men		Women	
	Mean	SD	Mean	SD	Mean	SD
Rate mimicry	.00	.17	.00	.16	.00	.18
Partner trait:						
BMI	.00	2.55	.00	2.93	.00	2.11
Height	.00	2.52	.00	2.48	.00	2.56
Dyad trait:						
Order in evening	.00	5.33	−.16	5.27	.17	5.38
Prior familiarity	.00	.47	.00	.46	.00	.48
Hobby difference	.00	10.90	−.05	10.92	.05	10.89

NOTE.—N = 1,883 sides, 947 dates, and 110 individuals (56 men and 54 women). All variables are grand mean centered and represent the sample average, except for BMI and height, which are gender mean centered. Therefore, many variables and their effects begin with an average person in the sample and then account for unit increases from there. Data are from the Speed Date Corpus.

of speech are greatly diminished. With each additional minute of communication, we find that speech gains in salience and effect. The more communication is performed, the more interaction breaks the scope conditions of trait explanations. As such, the longer operation of feedback loops builds up collective effervescence and supports the suggested relevance of interaction ritual theory.

Table 8 shows how each speech feature corresponds with a sense of having clicked. The first set of speech features reflect emotional intensification. Both men and women experience a sense of connection when they express forms of excitement, but they seem to draw on slightly different gender ideals. For example, men use laughter, vary their loudness (F4), and reduce their pitch variance (F6). This reduction in pitch variance is consistent with the generally narrower use of the pitch space by men in American English, suggesting that this reduction has the role of leading the man's prosody toward a masculine ideal. Women also signal excitement but toward a feminine ideal (Collins and Missing 2003; Feinberg et al. 2008; Jones et al. 2010; Puts et al. 2011): they raise (F1) and vary their pitch (F6), speak softer (F2) and vary their loudness (F4), and take shorter turns (F5). Women use more forms of prosodic expression than do men, and their use of a wider pitch range is also distinctive.

The second set of speech features ("I," "you," self-markers, hedges) are chosen to reflect targeting and situational alignments. We hypothesized that a consistent use of pronouns would indicate whether one speaker is the target of conversation and that self-markers and hedges would be markers of social engagement and social distancing, respectively. We found that women (but not men) sense a connection with their dates when they render themselves the target of conversation and when they align with the

TABLE 8
DYADIC MODEL PREDICTING ACTOR'S SENSE OF HAVING "CLICKED" WITH PARTNER

	(1) BIVARIATE MODEL				(2) SPEECH MODEL				(3) FULL MODEL			
	Men		Women		Men		Women		Men		Women	
	b	SE	*b*	SE	*b*	SE	*b*	SE	*b*	SE	*b*	SE
Intercept	...	...	...	...	.10	.16	−.22	.16**	.16	.23	−.45	.20***
Actor speech:												
F1—max pitch	.15	.10^{+}	.19	.06**	.11	.12	.12	.07	.11	.12	.25	.06***
F2—loudness	.05	.06	−.14	.08^{+}	−.05	.07	−.20	.09*	−.07	.07	−.20	.09**
F3—min pitch	.12	.08^{+}	−.03	.07	.04	.09	−.02	.07	−.01	.09	−.02	.07
F4—variable loudness	.17	.07*	.51	.07***	.15	.08*	.39	.08***	.21	.08**	.39	.08***
F5—turn duration	−.10	.07	−.11	.07	−.04	.11	−.25	.10*	−.03	.10	−.25	.09**
F6—variable pitch	−.11	.08	.18	.06**	−.20	.09*	.16	.07*	−.20	.09*	.17	.06*
Rate of speech	.04	.05	.06	.07	.12	.06	.01	.07	.11	.06	.01	.07
Laugh	.25	.03***	.25	.02***	.30	.04**	.08	.02	.31	.04**	.10	.02
"I"	.10	.01	.27	.01***	.12	.01	.13	.01	.12	.01	.22	.01*
Self-marker	.06	.02	.26	.02***	.01	.03	.23	.03**	.01	.02	.22	.03**
Appreciation	.04	.06	.01	.06	.01	.06	−.05	.06	.01	.06	−.01	.06
Sympathy	.18	.16*	.17	.17*	.11	.17	.10	.17	.09	.17	.09	.15
"You"	.12	.02^{+}	.16	.02*	.06	.02	−.04	.02	.01	.02	.05	.02
Hedge	−.05	.02	.14	.02^{+}	.05	.02	−.03	.02	−.12	.02	−.15	.02*
Question	−.07	.01	−.20	.01**	−.02	.01	−.32	.02***	−.02	.01	−.17	.01*
Interruption	−.04	.04	.09	.04	−.13	.04^{+}	−.10	.04	−.12	.04	.00	.04
Function word mimicry	−.01	.01	.28	.01***	−.11	.01	.17	.01^{+}	−.15	.01	.08	.01
Laughter mimicry	.17	.07*	.20	.07**	−.02	.12	−.06	.11	.03	.11	−.08	.10
Rate mimicry	.01	.40	.13	.42^{+}	.01	.41	.10	.42	.05	.40	.10	.38^{+}
Actor trait:												
BMI	.02	.03	.28	.02***					−.01	.03	.21	.02**
Height	.20	.03**	.05	.03					.25	.03***	.04	.03
Foreign born	−.04	.07	−.09	.09**					−.26	.17***	−.33	.19***
Looking to date	.15	.15*	.19	.14**					.13	.16^{+}	.33	.14***
Experience dating	.22	.07**	.07	.05					.20	.07*	.19	.05***
Time to decision	.36	.05***	.60	.04***					.44	.06***	.60	.04***

Partner speech:												
F1—max pitch	.20	.06**	−.03	.10	.14	.07^{+}	.02	.10	.14	.07^{+}	.04	.10
F2—loudness	.12	.08^{+}	.06	.07	.09	.10	.00	.07	.12	.10	.07	.07
F3—min pitch	.10	.07	−.05	.08	.09	.08	−.02	.09	.12	.07	−.01	.08
F4—variable loudness	.09	.07	.28	.07***	−.05	.08	.09	.08	−.01	.08	.08	.07
F5—turn duration	.05	.07	−.08	.07	.18	.11^{+}	−.02	.10	.10	.10	−.09	.09
F6—variable pitch	.04	.06	.16	.08*	.04	.07	.12	.09	.03	.07	.04	.09
Rate of speech	−.02	.07	.08	.05	.02	.07	−.11	.05	−.01	.07	−.06	.05
Laugh	.15	.02*	.24	.03***	.08	.02	−.01	.04	.04	.02	−.08	.04
"I"	.19	.01**	.16	.01*	.24	.01*	.01	.01	.21	.01*	.01	.01
Self-marker	.12	.02^{+}	.12	.02^{+}	.05	.03	−.13	.02^{+}	.01	.03	−.09	.02
Appreciation	.14	.06*	.24	.06***	.08	.06	.16	.06*	.06	.06	.16	.05*
Sympathy	.11	.17	.23	.16***	.08	.17	.16	.16*	.09	.17	.12	.15^{+}
"You"	.16	.02*	.33	.02***	.11	.02	.11	.02	.08	.02	.15	.02*
Hedge	−.11	.02	.20	.02**	−.22	.02**	.07	.02	−.17	.02*	.04	.02
Question	.12	.01^{+}	.01	.01	.12	.02	−.23	.01**	.13	.02	−.14	.01^{+}
Interruption	.05	.04	.26	.04***	.01	.04	.16	.04*	−.03	.04	.17	.04*
Function word mimicry	.00	.01	.24	.01***	−.12	.01	.07	.01	−.04	.01	−.02	.01
Laughter mimicry	.17	.07*	.25	.07***	−.10	.11	.16	.11	−.11	.11	.21	.10*
Rate mimicry	.01	.42	.03	.39	.01	.43	.04	.38	−.02	.42	.05	.35
Partner trait:												
BMI	−.33	.02***	.05	.03					−.23	.03**	.04	.03
Height	.00	.03	.14	.03^{+}					.07	.03	.13	.03^{+}
Dyad trait:												
Order in evening	.04	.01	−.12	.01^{+}					.03	.01	−.19	.01**
Prior familiarity	.06	.16	.19	.15**					.07	.15	.20	.13**
Hobby difference	−.05	.01	−.33	.01***					−.13	.01^{+}	−.29	.01***

NOTE.—Full model N = 1,883 observations within 947 dyads. Unconditional models show that 8.5% of the variance occurs within the dyad, and 91.5% occurs between them. Many other variables were explored with no effect (mimic content words, back channels, alter is foreign born, etc.). Model covariances help identify degree to which actor and partner variance is explained: 14% and 4% for speech and 30% and 12% for full model. Data are from the Speed Date Corpus.

$^{+}$ $P < .10$.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

TABLE 9
DYADIC MODELS PREDICTING ACTOR'S WILLINGNESS TO DATE PARTNER

	(1) Bivariate Model				(2) Speech Model				(3) Full Model			
	Men		Women		Men		Women		Men		Women	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Intercept	. . .		. . .		1.24	.10***	.74	.10***	1.25	.11***	.64	.15***
Actor speech:												
F1—max pitch	1.13	.10	1.24	.06**	1.17	.14	1.21	.08	1.20	.15	1.46	.10**
F2—loudness	.95	.06	1.03	.08	.92	.08	1.02	.10	.99	.09	1.00	.12
F3—min pitch	1.11	.07	.89	.06^{+}	1.07	.09	.85	.08^{+}	1.05	.10	.82	.09*
F4—variable loudness	1.06	.07	1.25	.07**	1.11	.08	1.30	.09**	1.20	.10^{+}	1.31	.10**
F5—turn duration	.88	.07^{+}	1.16	.07*	1.12	.12	1.04	.11	1.16	.12	1.09	.12
F6—variable pitch	1.00	.08	1.21	.06**	.92	.09	1.24	.08*	.96	.11	1.28	.09**
Rate of speech	.89	.05^{+}	.91	.07	.95	.06	.81	.09*	.98	.06	.81	.10*
Laugh	1.37	.03***	1.11	.01	1.25	.05^{+}	1.08	.02	1.38	.05*	1.15	.02
"I"	1.03	.01	1.28	.01***	1.05	.01	1.17	.01	1.12	.01	1.37	.01**
Self-marker	1.06	.02	1.21	.02**	1.10	.03	1.15	.03	1.09	.03	1.13	.04
Appreciation	.94	.06	.84	.06*	.89	.06	.78	.07**	.88	.07	.79	.08*
Sympathy	1.04	.16	1.06	.16	.96	.18	1.09	.18	.95	.19	1.08	.20
"You"	.99	.02	1.12	.02^{+}	.95	.02	1.03	.02	.95	.02	1.16	.03
Hedge	.85	.02*	1.25	.02***	.88	.02	1.16	.03^{+}	.85	.03^{+}	1.05	.03
Question	.93	.01	.74	.01***	.91	.01	.73	.02***	.92	.02	.84	.02^{+}
Interruption	.97	.04	.89	.04	.94	.04	.78	.05**	.89	.05	.82	.05^{+}
Function word mimicry	.93	.01	1.21	.01**	.97	.01	1.02	.01	.91	.01	.91	.01
Laughter mimicry	1.23	.08**	1.06	.07	.95	.13	.92	.12	.95	.13	.86	.13
Rate mimicry	.96	.37	.99	.41	.98	.41	.95	.47	1.00	.43	.94	.53
Actor trait:												
BMI	.95	.03	1.22	.02**					.86	.04^{+}	1.13	.03
Height	.78	.03***	1.09	.03					.77	.03**	1.13	.04
Foreign born	1.05	.07	.93	.09*					.97	.10	.89	.13*
Looking to date	1.17	.14*	1.18	.14*					1.08	.18	1.41	.19***
Experience dating	.90	.06	.97	.05					.90	.08	1.05	.07
Time to decision	1.58	.05***	2.01	.05***					1.63	.06***	2.17	.06***

Partner speech:												
F1—max pitch	1.08	.05	1.01	.10	.96	.07	1.01	.13	.93	.08	1.02	.16
F2—loudness	1.05	.08	1.15	.06*	.96	.10	1.12	.08	1.08	.12	1.21	.09*
F3—min pitch	1.07	.06	.93	.07	1.06	.08	1.02	.09	1.09	.09	1.03	.10
F4—variable loudness	.98	.07	1.17	.07*	.87	.08^{+}	1.05	.09	.92	.09	1.09	.10
F5—turn duration	.90	.07	1.12	.07	.84	.10	1.17	.11	.85	.11	1.10	.13
F6—variable pitch	1.03	.06	1.14	.08^{+}	1.09	.07	1.10	.10	1.08	.08	1.01	.11
Rate of speech	.96	.07	1.03	.05	.98	.08	.90	.06	.97	.09	.98	.07
Laugh	1.15	.01*	1.12	.03	1.08	.02	1.19	.05	1.07	.02	1.17	.05
"I"	1.22	.01**	1.06	.01	1.56	.01***	1.05	.01	1.51	.01***	1.07	.01
Self-marker	1.05	.02	1.08	.02	1.06	.03	.99	.03	1.12	.03	1.03	.03
Appreciation	1.15	.06*	1.11	.06	1.08	.07	1.05	.06	1.08	.07	1.07	.07
Sympathy	.96	.16	1.12	.16^{+}	.93	.18	1.05	.18	.91	.19	1.01	.21
"You"	1.07	.02	1.15	.02*	1.06	.02	1.00	.02	1.07	.02	1.01	.02
Hedge	.87	.02*	1.07	.02	.80	.03*	.98	.03	.84	.03^{+}	.97	.03
Question	1.30	.01***	1.09	.01	1.27	.02**	1.01	.02	1.15	.02	1.19	.02^{+}
Interruption	1.06	.03	1.20	.04**	1.04	.04	1.20	.05*	1.02	.05	1.25	.05*
Function word mimicry	.90	.01	1.26	.01***	.86	.01	1.16	.01	.90	.01	1.07	.01
Laughter mimicry	1.35	.08***	1.06	.07	1.16	.13	.89	.12	1.16	.13	.93	.14
Rate mimicry	1.03	.40	1.04	.38	1.07	.45	1.05	.43	1.11	.48	1.04	.48
Partner trait:												
BMI	.59	.03***	1.00	.03					.60	.03***	1.02	.04
Height	.89	.03^{+}	1.21	.03**					.87	.04	1.29	.04**
Dyad trait:												
Order in evening	.84	.01*	.99	.01					.78	.01**	.92	.02
Prior familiarity	.92	.15	1.07	.14					.93	.17	1.14	.17
Hobby difference	1.06	.01	.68	.01***					.99	.01	.64	.01***
Model fitness:												
Scaled deviance	NA		NA		11,563				10,203			
Change in deviance	NA		NA		1,076				2,436			

NOTE.—Full model $N = 1{,}883$ observations within 947 dyads. Baseline model deviance = 12,639; odds = exp(b), or odds of selecting Y due to a 1 SD shift in X. Data are from the Speed Date Corpus.

$^{+}$ $P < .10$.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

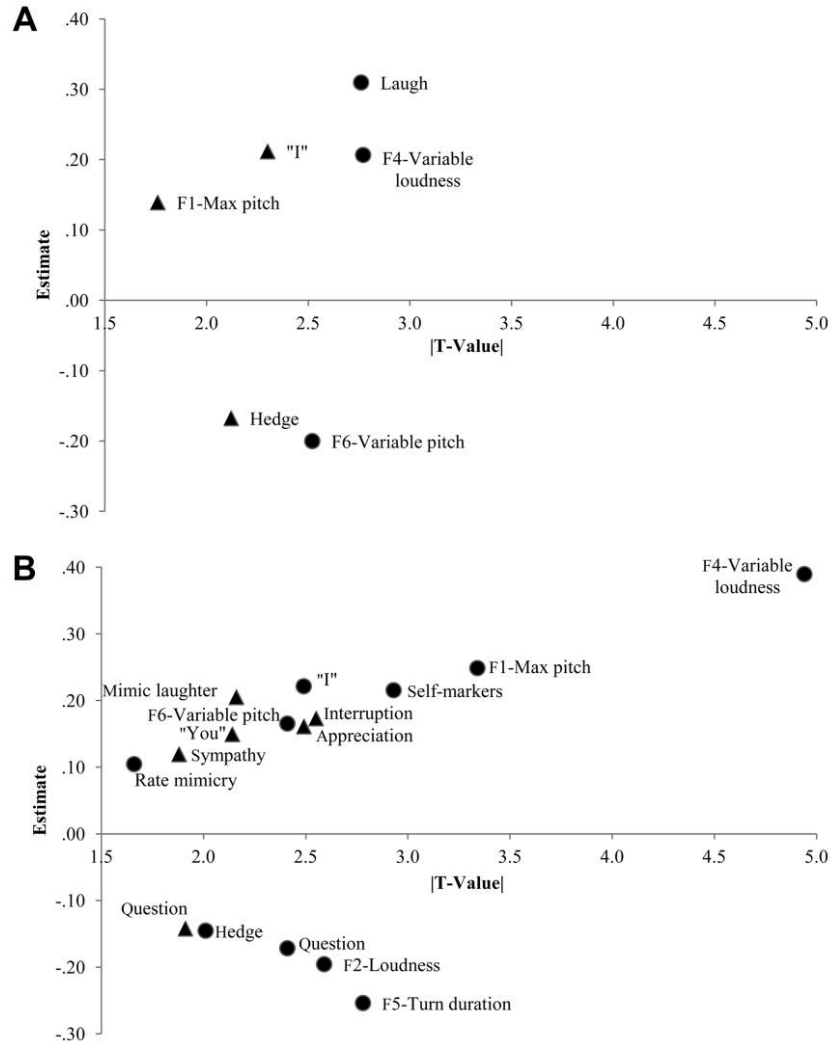

FIG. 3.—Predicted actor-partner effects for men (*A*) and women (*B*); circles = variables for actor speech; triangles = variables for partner speech.

situation. The use of "I" and self-markers ("Y'know" and "I mean") and avoidance of hedges correlates with the female's sense of connection. A man also reports connecting with a woman when she exhibits some of these features.

A post hoc investigation of the corpus reveals that the use of "I" and self-markers in speech tended to occur in very engaged narrative situations, when daters were passionately telling stories (rather than just answering

factual questions about their hobbies or backgrounds). We can see this in these randomly selected turns by different women who rely heavily on "I" and self-markers:

> Female 1: And no one ever asked questions and everyone was confused and no one would ask. And, *you know*, I'm thinking why didn't *I* ask questions back then, like, *I'm* sure everyone else—
>
> . . .
>
> Female 2: Yeah. *I mean I*'m proud of *my* craziness. *I mean* like, *I* define it as free and, *you know*, full of passion. And *my* best friend is very theatrical herself.

Our results counter the view that, because hedges are politeness markers that soften and downplay claims, they thereby potentially correspond with a successful dating conversation. The negative association between hedges and clicking is instead consonant with Ranganath, Jurafsky, and McFarland's (2013) finding that increased use of hedges is associated with judgments of awkwardness or situational discomfort. Ranganath et al. (2013) suggest that the function of hedges, indicating a lack of commitment to a proposition, extends metalinguistically to the pragmatic or social sphere and indicates the speaker's lack of commitment to the conversation as a whole. The reduced frequency of women's hedges in dates that click is also consonant with Brown and Levinson's (1987) finding that empowered speakers speak baldly toward lower-status individuals.

Our results from the first two sets of speech features indicate that men click with women who express excitement (e.g., raised pitch), are engaged ("I" and self-markers), and avoid hedging. These results suggest that women and men sense a connection when the female is rendered the target and is engaged in the situation. The male does not mirror the female's moves but, rather, reinforces the mutual coordination of their distinct participation statuses (i.e., a reciprocal asymmetrical performance).

The third set of speech features was chosen to reflect interpersonal alignments the participants take up with one another. Here, our constructs all reflect either the first or second part in pairwise interactions or ritual interchanges. Were these to show up as significant across genders, it would suggest that alignments are used in reciprocal symmetrical ways like a copycat game, and we see no evidence for this. Instead, we see that the features are significant mostly for one gender over the other (i.e., for women). First, we observe women connecting with male partners who assume a second-pair part in supportive interchanges. They connect with men who use more appreciations and sympathy and who accommodate and mirror the woman's laughter. These results are consonant with the increased use of self-markers and first pronouns by women; as the more selective party, women connect with men who support them as the focus of conversation, talking about their topics and aligning with their turns. As such, social bonding is greatly a

function of performing a reciprocal asymmetrical performance via the coordination of targets, engagement, and interpersonal alignments that place the female in favored participation status.

One unexpected finding is that women feel they click with male partners who interrupt them. As discussed above, previous results on the role of interruptions show conflicting tendencies, some scholars finding that they act as negative rites in which an imposition is made on the partner and others finding that they appear as a sign of engagement and turn overlaps. We therefore selected the female conversation sides associated with the highest value (the top decile) of the clicking variable (i.e., those conversation sides in which the woman felt the most clicking) and labeled the conversational function of the first 100 of the 327 total cases in these conversations in which her date interrupted her. We found between 80 and 90 of these 100 cases of interruption to be supportive turns in which the man interrupts as a way of demonstrating understanding. Men used a number of ways of demonstrating that they understand and share interests.

The most common function of interruptions was as part of a joint creation of meaning, in which men share similar stories to the one the woman just told, or extend an idea that the woman had, or bring up shared stances or opinions, or even complete their sentences collaboratively. Coates (1996, 1997), in her study of conversations among women friends, found that simultaneous speech of this sort was very common as they worked together to produce what she called "shared meanings" or a "shared text." Here is an example of an interruption from the speed dates:

> Female: No. I think the most amazing thing about the [*unintelligible*] is the architecture, and then the gardens themselves. But no actual—
> Male: And it was so nice outside.

Shared meanings can be built very explicitly when a speaker completes another's turn in what has been called a *collaborative completion* (Lerner 1991, 1996) or *joint construction of an utterance* (Coates 1996, 1997), such as these examples in our data:

> Female: So are you almost—
> Male: On my way out, yeah—
> . . .
> Female: I'm feeling a little silly. This is like—
> Male: A little silly. It's fun.
> . . .
> Female: —crazy like that? Ah, no, I—
> Male: not crazy.

Finally, a shared meaning can arise from offering a shared perspective, opinion or history, as in these examples:

Female: I didn't used to like it but now I'm—
Male: Oh same for me when I came.
. . .
Female: [*laughter*] Yeah. Yeah, I went there last year for Radio Head because they're like my all time—
Male: Oh yeah, Radio Head is great.
. . .
Female: Yeah and listen not devoting your full attention. Kind of like—
Male: [*laughter*] Exactly. Yeah I had those thoughts.

In addition to shared meanings, interruptions can demonstrate shared understandings by explicit assertions of understanding:

Female: Not necessarily male. I mean it happens to not necessarily be my thing, but there are plenty of—
Male: No, no, I understand your point.

Or interruptions can demonstrate shared understandings by doing what Clark and Schaefer (1989) call "demonstration"; repeating or reformulating the interlocutor's utterance to demonstrate understanding and ground the utterance, as in these examples:

Female: We're still on the low part—
Male: The low part, okay—
. . .
Female: So I've seen you at meetings and I feel like I've seen you at [*unintelligible*] stuff like that and been like, I know who that guy is and—
Male: I recognize that guy.
. . .
Female: I don't know [*laughter*]. It just started. My undergraduate—
Male: you're like as a little kid, like your parents tell you [*unintelligible*] like just—

In summary, we find that in the speed-dating scenario, these instances of interruption are used by men not as a means of conversational control and redirection but as a means of alignment and shared understanding in a collaborative floor (Edelsky 1981), and that is why women feel a sense of connection with them. It may also be significant that this conversational style of building a shared meaning or shared text is also exactly the one used by women friends among themselves (Coates 1996, 1997).

What about questions? The literature on questions finds that they can act either as a positive alignment strategy or as a negative mechanism for controlling the conversation. Our results show a negative association between questioning and clicking. Women feel disconnected when they have to ask men questions or when men ask them questions. We therefore examined some of these cases in which questions were linked with lack of bonding in our dates. We found that questions were used by women to

keep a lagging conversation going, and they were used by men who had nothing to say (e.g., "Where are you from?" "What major are you?" "How many brothers and sisters do you have?"). By contrast, successful dates were associated with coherent outputs of narratives from the two partners, with long runs of high-energy, shared stories and few questions.

Figure 3 affords a visual summary of results for each gender. In this figure, the *Y*-axis reflects the effect magnitude (1 SD change in X from the sample mean results in the presented change in Y), and the *X*-axis reflects the level of significance (e.g., absolute t-value). Circles represent variables for actor speech, and triangles represent variables for partner speech. Many of the aforementioned effect patterns emerge in these visuals but so do a few new ones. First, the circles have greater significance and magnitude than the triangles in both images. This means that while both actor and partner features matter, the actor responds more to his or her own speech than that of a partner.[23] Second, figure 3*B* has more significant speech features than does figure 3*A*. This shows that women give off and interpret more communicative signals (10 actor : 6 partner) than do men (3 actor : 3 partner). Third, looking across figures we see comparable sets of variables across genders that suggest shared views (e.g., reciprocal symmetry on variable loudness; reciprocal asymmetry on "I," "you," self-markers, hedges, max and variable pitch, appreciation, and sympathy). Last, the remaining differences suggest gender ideals are being taken up (e.g., females question less, take shorter turns, and speak quieter, while men speak monotone).

In sum, then, we find that men and women are using a variety of ritual maneuvers to establish alignments, targets, and synchronization—and they reveal a pattern reflective of heterosexual norms of dating. Both genders express excitement when they connect—but often by different means that correspond with gender ideals (West and Zimmerman 1987). Men vary their loudness, increase laughter, and become monotone. Women raise and vary their pitch and vary their loudness. Our results for alignments suggest that both genders experience a sense of connection when they mutually render the female a point of focus and men act in a supporting role. Women sense a connection when they are engaged, they express themselves, and men support and understand them. Both parties avoid signs of disconnect like questioning and hedging. In sum, the pattern of results suggests that dating is a reciprocal asymmetrical performance in which both genders express excitement according to gender ideals, and both sustain women in a favored participation status.

[23] This means there is a degree of misperception or exaggeration in the actor's sense of clicking. This can be considered a second-order reflection on mutual solidarity that arises when both sides project their own feelings on the label of a relationship.

Table 9 presents results for Willingness. Here we observe fewer significant associations, but most are consistent with the relations seen in table 8. For example, as before, women are significantly less likely to select a partner than are men. There are some differences, however. For example, male speech characteristics are far less relevant to their selection of a date than to their perception of clicking with their date. By contrast, women's results remain more consistent across models of Clicking and Willingness. This implies that men experience the activity of mate selection differently from women. Whereas women experience a greater significance for communication, men experience less of one, and neither may be fully aware of how they operate. Much like the prior literature suggests, male speech corresponds less with their decisions to date, and much of their choice is tied up in the woman's appearance.

Looking at the effects of traits, we see that an average man is more likely to pick females when he is taller and takes longer to make a decision, and men are especially attracted to women with lower than average BMI. By contrast, an average woman is more likely to select a man when she is not a foreigner, she is looking to date, and she takes longer to make a decision. Women are especially attracted to men who share their hobby interests and are taller than average. Hence, again, we see persons selecting on gender ideals and interest homophily.

With regard to speech, a man signals his intent to select a woman when he laughs and uses variable loudness, and he is drawn to a woman who renders herself the target of conversation (women who say "I," "me," "my," "mine," and "myself" more than average). Female mate selections are far more associated with speech characteristics than are men's selections. A woman signals interest in a man when she raises and varies her pitch (F1, F6), varies her loudness (F4), uses the pronoun "I," and avoids using appreciations. In general, the woman signals excitement and expresses self-engagement. Women are attracted to a man who speaks loudly and interrupts them (interruptions that, as we show above, are used mainly to demonstrate alignment and shared understanding, are similar to the shared meanings created by women friends talking among themselves, and are hence a positive sign of alignment).

Models of Willingness provide less insight on the experience of social bonding than do models of Clicking. Not only are men less selective than women, but they act as if they are playing a different game. Men appear to pick more women and on the basis of appearance, while women appear to pick fewer men unless they fit masculine ideals (taller and louder) and excite and engage them.

In a final set of supplemental models for Willingness, we introduced the actor and partner reports of clicking. We did this so as to determine whether the speech features associated with mate selection are mediated

by a sense of dyadic effervescence, or bonding. Upon introducing Clicking into the model, we observe that only the actor's (perceiver's) sense of bonding matters, not the partner's. A 1 standard deviation increase in the actor's sense of clicking is associated with 5.74 and 4.06 greater odds of selecting a partner for men and women, respectively. This effect is five times greater than any other feature, and it holds net of reports on the partner's perceived attractiveness. Moreover, clicking mediates all the speech features, and they drop from significance in the model. By contrast, the effects of individual traits are not mediated by a sense of clicking. This pattern of results suggests that participants' sense of connection is more a function of communication than individual traits and their comparisons.

In sum, we believe mate selection in speed dates is an insufficient proxy for social bonding. The "game" of selecting a date is different from the game of experiencing a connection. Women have greater say, but neither party views matching as terribly serious. Given that most persons were matched with multiple individuals, only half of the matched dates actually followed up with an e-mail contact. By contrast, the sense of having clicked seems consistent with notions of social bonding and, especially, with experiences of social bonding and dyadic effervescence. The construct of Clicking is scaled continuously and affords greater variance to be explained than does Willingness. In addition, reports of having a connection seem to render communication a salient feature without displacing the effects of individual trait selection processes. The fact that clicking mediates speech effects on mate selection is further evidence that when bonding experiences matter for selection, the perception of clicking and the ritual features driving it are of great importance.

CONCLUSION

In this article we described how social bonding arises within initial courtship encounters. We interrelated theories of individual attributes and interaction rituals so as to provide a broader account of the social bonding process in courtship encounters. In particular, we highlighted communicative actions that correspond with a sense of dyadic effervescence, or the social force behind social ties. In this manner, we attempted to reveal how a key integrative mechanism of society can be forged communicatively.

While prior research has emphasized individual (statuses) and dyadic characteristics that bring couples together, our results reveal the importance of a courtship situation in which a sense of connection is had when both parties experience intensified emotions and mutually render the empowered individual the focus. We find that mutual excitement is associated with a sense of interpersonal chemistry but that this excitement is expressed in distinct ways for each gender. For example, men laugh and vary

their volume, while women raise and vary their pitch. We also find that participants in courtship encounters feel a sense of connection when they assume complementary parts and keep the empowered party's self in focus. When the subordinate suitor (male, in this case) reinforced this focus and aligned with the superordinate, and the empowered suitor (female) was engaged, they both regarded the encounter as a success and enjoyable. This occurred when men expressed sympathy and appreciation of their dates, and women targeted themselves as a subject ("I") and engaged the situation (e.g., by using self-markers).

We believe this sort of encounter—with differentially empowered individuals, complementary parts, and mixed motives—is actually quite common. Our findings likely share some semblance with encounters between employer and employee, doctor and patient, and teacher and student and even encounters between individuals with complex combinations of status characteristics (see Duneier and Molotch 1999; Duneier 2000, pp. 188–216; Pentland 2008). While there will be differences across contexts, some of the same logics will hold when the coordination game is one of maintaining focus on the superordinate and acquiring mutual excitement (see Gregory et al. [2000] and Roth and Tobin [2010] for examples). Whether this is beneficial to these relationships is another matter, as they likely reflect societal inequities. But, as with speed dates, these may also reflect politeness and deference displays that are specific to certain types of interaction orders and encounters (Goffman 1983) and, therefore, dependent on the definition of the situation and the cued roles that frame them. Future empirical work on asymmetrical roles and situations and their bonding experiences is needed to establish this generalization.

In summary, our work has advanced prior research in several regards. First, we broaden accounts of bond formation by placing attention on the social interactions and communicative efforts in initial courtship encounters. We do this through a unique study of speed-dating events in which we acquire large-scale, rich information on dating encounters in which both selection factors and communication come into view. Second, we synthesize prior accounts of courtship interactions and propose a conceptual framework through which initial courtship encounters may be understood and potentially expanded. Our approach identified the convention of heterosexual courtship, how it is a reciprocal asymmetrical performance, and how interaction rituals appropriate to it forge a sense of social bonding. Third, we further interaction ritual theory by showing that the mutual focus of attention differs by social situation: that is, dyadic interchanges are different from the church services and political rallies discussed in the Durkheimian model. This is particularly distinctive when the focus is on whether persons in a temporary dyad are concerned with whether they will establish a longer relationship (i.e., their mutual focus is on something in

the interaction itself). On one level this is asymmetrical with a focus on the female, but on a second level—what matters for interaction ritual theory—is the mutual focus on the same object or target and the recognition that each other is focusing on that.[24] Last, we bring to bear on the study of interaction the methods of computational linguistics. Our application of computational linguistic techniques allows us to explore the role of emotional expression, mimicry, ritual interchange, and discourse markers in bonding and, on equivalent empirical grounds (in terms of generalizability and validity), to selection variables and measurements.

Our results have several limitations and should be regarded as a first step forward in a line of research. First, our data were limited. Noise is common in our sample, and our time stamps are not fine grained enough to cleanly capture turn overlaps. Current techniques of online speed dates using video cameras and headsets would afford higher-quality audio. Automatic transcription alignments and additional funding for manual transcription would also improve data quality. Second, our audio recordings may miss certain communicative features that are very important to the sense of clicking and mate selection. In particular, we did not acquire video data, so we cannot determine whether perhaps women signal interest by laughing silently or whether interest is best conveyed by body positioning and physical gestures (see Grammer 1990). Third, we lack streaming perceptual data, so it is ultimately difficult for us to fully establish whether interactions cause attitudes or whether attitudes cause interaction. For this reason, we refrain from using causal language, and we believe it reasonable to argue that persons find certain interaction attractive and that it in some way leads them to sense a connection. When more fine-grained information is had, or more careful experimental conditions are established, the causal direction will be more fully established.

Last, our characterization of women as more selective has multiple potential explanations that we are unable to disentangle with the information at hand—the prime issue being that certain gender ideals are staged in speed-dating events (West and Zimmerman 1987; Ridgeway 2009). First, the encounter is named "speed *dating*" and is thereby clearly identified as a cursory exploration of romantic relationships in a conventionalized encounter. Interactants arrive at the events with this framing in-mind. Second, the dating encounter is partially scheduled and organized for the participants. All the dates entail opposite sex pairings, so gender distinctions are institutionalized in the dating structure. All the dates also have men move from one woman to the next, placing men in a social position of seeking women and women in the position of selecting men. Male rotation likely drove asymmetrical perceptions (Finkel and East-

[24] We thank our *AJS* reviewers for drawing this to our attention.

wick 2007).[25] Finally, speed dates call on participants to evaluate aspects of one another's attractiveness and performances using scorecards, and this is likely to further highlight in participants' minds how dates compare to gender ideals. In short, evidence from a wide variety of studies of gender in interaction suggests that, because the staging of the speed-dating context is meant to give participants a socially "safe" sense for what is and is not out of place with regard to courtship, this will favor conventional gender roles in which the man has less power in romantic selectivity.

This sort of gender staging likely extends well beyond speed dating and into many other natural settings like bars and, now, even to ubiquitous online dating sites. The foregrounding of one gender over the other is highly context dependent, and situations cue the salience of different forms of gender display (Ridgeway 2009). In the case of speed dating, we believe the staging hyperritualizes gender ideals—even for our highly educated graduate student sample. If the events were held at an all women's college and the women rotated across dates, then it is likely that the seeming appropriateness of certain gender ideals would change, and gender asymmetries in role performances could also shift in favor of the male role.[26] Regardless of why the power differential exists, the fact remains—in our results and in other studies—that one gender is more selective. Because of this, our story remains that social bonding in (these) speed dates arises from successfully playing a reciprocal asymmetrical performance focused on the woman.

Future work in this area would benefit from building off our article's empirical shortcomings. However, there are also various new directions in which researchers could proceed. For example, in performing this study we came across a large self-help literature focused on dating. Erving Goffman spent a great deal of his effort studying etiquette manuals, and it is likely that dating manuals are also worthy of study. We saw circumstantial evidence in support of our characterization of initial courtship encounters in these manuals. Distinct perspectives are consistently afforded each gender (Gray 1993). Male dating manuals come across as misogynistic and predatory with the goal of being attracted (e.g., with titles like "The Game"; Strauss 2005), and female dating manuals come across as describing means of being more attractive to the right sort of partner (with titles like "The Rules"; Fein and Schneider 1995).

Future research could also explore the processes by which ties form in initial encounters, develop, and then transition to other states (Parks 2007).

[25] Finkel and Eastwick (2009) ran speed-dating events in which they asked either men or women to rotate, and they found that the positional bias in which men are less selective occurs only when the men rotate.

[26] We are unable to assess other explanations like evolutionary psychological models based on evolutionary forces (Trivers 1972) or rational choice models based on income disparities in households (Becker 1993).

Little work has looked at changing power dynamics in such transitions, and a focus on communicative acts may be very insightful. Some initial work (Dahlander and McFarland 2013) suggests that the mechanisms forging social bonds (dating) may be different from the mechanisms that lead to a sustained and healthy relationship (marriage). Such work may help us better understand how power relations in courtship can flip toward those described in traditional heterosexual marriages (Sprecher and Felmlee 1997).

REFERENCES

Abrego-Collier, Carissa, Julian Grove, Morgan Sonderegger, and Alan C. L. Yu. 2011. "Effects of Speaker Evaluation on Phonetic Convergence." Pp. 192–95 in *Proceedings of the 17th International Congress of the Phonetic Sciences*, edited by Wai-Sum Lee. Hong Kong: City University.

Allison, Paul D. 2002. *Missing Data*. Thousand Oaks, Calif.: Sage.

Becker, Gary S. 1993. *A Treatise on the Family*. Cambridge, Mass.: Harvard University Press.

Beňuš, Štefan, Agustín Gravano, and Julia Hirschberg. 2011. "Pragmatic Aspects of Temporal Accommodation in Turn-Taking." *Journal of Pragmatics* 43 (12): 3001–27.

Bilous, Frances R., and Robert M. Krauss. 1988. "Dominance and Accommodation in the Conversational Behaviors of Same- and Mixed-Gender Dyads." *Language and Communication* 8 (3/4): 183–94.

Blau, Peter M. 1964. *Power and Exchange in Social Life*. New York: Wiley.

Boersma, Paul, and David Weenink. 2012. "Praat: Doing Phonetics by Computer," ver. 5.3.16. Computer program. http://www.praat.org/.

Bosson, Jennifer K., Amber Johnson, Kate Niederhoffer, and William Swann. 2006. "Interpersonal Chemistry through Negativity: Bonding by Sharing Negative Attitudes about Others." *Personal Relationships* 13:135–50.

Brown, Penelope, and Stephen C. Levinson. 1987. *Politeness: Some Universals in Language Usage*. Cambridge: Cambridge University Press.

Bruner, Jerome. 1983. *Child's Talk*. New York: Norton.

Calhoun, Sasha, Jean Carletta, Jason M. Brenier, Neil Mayo, Dan Jurafsky, Mark Steedman, and David Beaver. 2010. "The NXT-Format Switchboard Corpus: A Rich Resource for Investigating the Syntax, Semantics, Pragmatics and Prosody of Dialogue." *Language Resources and Evaluation* 44 (4): 387–419.

Cameron, Deborah, Fiona McAlinden, and Kathy O'Leary. 1989. "Lakoff in Context: The Social and Linguistic Functions of Tag Questions." Pp. 74–93 in *Women in Their Speech Communities*, edited by Jennifer Coates and Deborah Cameron. New York: Longman.

Carnegie, Dale. 1937. *How to Win Friends and Influence People.* New York: Simon & Schuster.

Chartrand, Tanya L., and John Bargh. 1999. "The Chameleon Effect: The Perception-Behavior Link and Social Interaction." *Journal of Personality and Social Psychology* 76 (6): 893–910.

Chung, Cindy K., and Pennebaker, James W. 2007. "The Psychological Function of Function Words." Pp. 343–59 in *Social Communication: Frontiers of Social Psychology*. New York: Psychology Press.

Clark, Herbert. 1996. *The Uses of Language*. Cambridge: Cambridge University Press.

Clark, Herbert, and E. F. Schaefer. 1989. "Contributing to Discourse." *Cognitive Science* 13:259–94.

Coates, Jennifer. 1996. *Women Talk: Conversation between Women Friends*. Oxford: Blackwell.

———. 1997. "The Construction of a Collaborative Floor in Women's Friendly Talk." In *Conversation: Cognitive, Communicative, and Social Perspectives*, edited by Talmy Givon. Amsterdam: Benjamins.
Collins, Randall. 2004. *Interaction Ritual Chains*. Princeton, N.J.: Princeton University Press.
Collins, Sarah A., and Caroline Missing. 2003. "Vocal and Visual Attractiveness Are Related in Women." *Animal Behaviour* 65 (5): 997–1004.
Cupach, William R., and Sandra Metts. 1994. *Facework*. Thousand Oaks, Calif.: Sage.
Dahlander, Linus, and Daniel A. McFarland. 2013. "Ties That Last: Tie Formation and Persistence in Research Collaborations over Time." *Administrative Science Quarterly* 58 (1). doi:10.1177/0001839212474272.
Duneier, Mitchell. 2000. *Sidewalk*. New York: Farrar, Straus & Giroux.
Duneier, Mitchell, and Harvey Molotch. 1999. "Talking City Trouble: Interactional Vandalism, Social Inequality, and the 'Urban Interaction Problem.'" *American Journal of Sociology* 104:1263–95.
Durkheim, Émile. 1912. *The Elementary Forms of Religious Life*. Translated by Carol Cosman. Oxford: Oxford University Press.
Eastwick, Paul, and Eli Finkel. 2008. "Sex Differences in Mate Preferences Revisited: Do People Know What They Initially Desire in a Romantic Partner?" *Journal of Personality and Social Psychology* 94:245–64.
Eastwick, Paul W., Eli Finkel, Daniel Mochon, and Dan Ariely. 2007. "Selective versus Unselective Romantic Desire: Not All Reciprocity Is Created Equal." *Psychological Science* 18:317–19.
Edelsky, Carole. 1981. "Who's Got the Floor?" *Language and Society* 10:383–421.
Fein, Ellen, and Sherrie Schneider. 1995. *The Rules: Time-Tested Secrets for Capturing the Heart of Mr. Right*. New York: Warner Books.
Feinberg, David R., Lisa M. DeBruine, Benedict C. Jones, and David I. Perrett. 2008. "The Role of Femininity and Averageness of Voice Pitch in Aesthetic Judgments of Women's Voices." *Perception* 37 (4): 615.
Feinberg, David R., Benedict C. Jones, Anthony C. Little, D. Michael Burt, and David I. Perrett. 2005. "Manipulations of Fundamental and Formant Frequencies Influence the Attractiveness of Human Male Voices." *Animal Behaviour* 69 (3): 561–68.
Finkel, Eli J., and Paul Eastwick. 2008. "Speed-Dating." *Current Directions in Psychological Science* 17 (3): 193.
———. 2009. "Arbitrary Social Norms Influence Sex Differences in Romantic Selectivity." *Psychological Science* 20 (10): 1290–95.
Finkel, Eli J., P. W. Eastwick, J. Matthews. 2007. "Speed Dating as an invaluable Tool for Studying Romantic Attraction: A Methodological Primer." *Personal Relationships* 14:149–66.
Fisman, Raymond, Sheena Iyengar, Emir Kamenica, and Itamar Simonson. 2008. "Racial Preferences in Dating." *Review of Economic Studies* 75 (1): 117–32.
Fox Tree, Jean E., and Josef C. Schrock. 2002. "Basic Meanings of You Know and I Mean." *Journal of Pragmatics* 34:727–47.
Fuhse, Jan A. 2009. "The Meaning and Structure of Social Networks." *Sociological Theory* 27 (1): 51–73.
Gibson, David R. 2010. "Marking the Turn: Obligation, Engagement, and Alienation in Group Discussions." *Social Psychology Quarterly* 73 (2): 132–51.
Giles, Howard, Nikolas Coupland, and Justine Coupland. 1991. "Accommodation Theory: Communication, Context, and Consequences." In *Contexts of Accommodation*, edited by Howard Giles, Justine Coupland, and Nikolas Coupland. Cambridge: Cambridge University Press.
Goffman, Erving. 1967. *Interaction Ritual: Essays on Face-to-Face Behavior*. New York: Pantheon.
———. 1971. *Relations in Public: Microstudies of the Public Order*. New York: Basic.

———. 1974. *Frame Analysis: An Essay on the Organization of Experience*. Boston: Northeastern University Press.
———. 1981. *Forms of Talk*. Philadelphia: University of Pennsylvania Press.
———. 1983. "The Interaction Order." *American Sociological Review* 48:1–17.
Goodwin, Charles. 1996. "Transparent Vision." Pp. 370–404 in *Interaction and Grammar*, edited by E. Ochs, E. A. Schegloff, and S. A. Thompson. Cambridge: Cambridge University Press.
Goodwin, Charles, and Marjorie Harness Goodwin. 1987. "Concurrent Operations on Talk: Notes on the Interactive Organization of Assessments." *IPrA Papers in Pragmatics* 1 (1): 1–52.
Grammer, Karl. 1990. "Strangers Meet: Laughter and Nonverbal Signs of Interest in Opposite-Sex Encounters." *Journal of Nonverbal Behavior* 14 (4): 209–36.
Gravano, Agustín, Rivka Levitan, Laura Willson, Štefan Beňuš, Julia Hirschberg, and Ani Nenkova. 2011. "Acoustic and Prosodic Correlates of Social Behavior." Pp. 97–100 in *Interspeech 2011 Proceedings*. Florence: International Speech Communication Association.
Gray, John. 1993. *Men Are from Mars, Women Are from Venus: A Practical Guide for Improving Communication and Getting What You Want in Your Relationships*. New York: HarperCollins.
Gregory, Stanford W. 1986. "Social Psychological Implications of Voice Frequency Correlations: Analyzing Conversation Partner Adaptation by Computer." *Social Psychology Quarterly* 49 (3): 237–46.
Gregory, Stanford W., and Stephen Webster. 1996. "A Nonverbal Signal in Voices of Interview Partners Effectively Predicts Communication Accommodation and Social Status Perceptions." *Journal of Personality and Social Psychology* 70 (6): 1231–40.
Gregory, Stanford W., Jr., Brian E. Green, Robert M. Carrothers, Kelly A. Dagan, and Stephen Webster. 2000. "Verifying the Primacy of Voice Fundamental Frequency in Social Status Accommodation." *Language and Communication* 21:37–60.
Gregory, Stanford W., Jr., Stephen Webster, and Gary Huang. 1993. "Voice Pitch and Amplitude Convergence as a Metric of Quality in Dyadic Interviews." *Language and Communication* 13:195–217.
Grosz, Barbara, Aravind K. Joshi, and Scott Weinstein. 1995. "Centering: A Framework for Modeling the Local Coherence of Discourse." *Computational Linguistics* 21 (2): 203–25.
Gumperz, John. 1982. *Discourse Strategies*. Cambridge: Cambridge University Press.
Halliday, M. A. K., and Ruqaiya Hasan. 1976. *Cohesion in English*. London: Longman.
Hewitt, John P., and Randall Stokes. 1975. "Disclaimers." *American Sociological Review* 40 (1): 1–11.
Hitsch, Günter J., Ali Hortaçsu, and Dan Ariely. 2010. "What Makes You Click? Mate Preferences in Online Dating." *Quantitative Marketing and Economics* 8 (4): 393–427.
Holmes, Janet. 1986. "Functions of *You Know* in Women's and Men's Speech." *Language in Society* 15:1–21.
———. 1990. "Hedges and Boosters in Women's and Men's Speech." *Language and Communication* 10 (3): 185–205.
House, David. 2005. "Phrase-Final Rises as a Prosodic Feature in Wh-Questions in Swedish Human-Machine Dialogue." *Speech Communication* 46 (3–4): 268–83.
Ireland, Molly E., Richard Slatcher, Paul Eastwick, Lauren Scissors, Eli Finkel, and James Pennebaker. 2011. "Language Style Matching Predicts Relationship Initiation and Stability." *Psychological Science* 22 (1): 39–44.
James, Deborah, and Sandra Clarke. 1993. "Women, Men, and Interruptions: A Critical Review." Pp. 231–80 in *Gender and Conversational Interaction*, edited by Deborah Tannen. New York: Oxford.
Jurafsky, Dan, Elizabeth Shriberg, and Deborah Biasca. 1997. "Switchboard SWBD-DAMSL Labeling Project Coder's Manual, Draft 13." Tech. Rep. 97-02, University of Colorado Institute of Cognitive Science.

Jurafsky, Dan, Elizabeth Shriberg, Barbara Fox, and Traci Curl. 1998. "Lexical, Prosodic, and Syntactic Cues for Dialog Acts." Pp. 114–20 in *Discourse Relations and Discourse Markers: Proceedings of the Workshop*, edited by Eduard H. Hovy, Manfred Stede, and Leo Wanner. New Brunswick, N.J.: Association for Computational Linguistics.

Kemper, Theodore, and Randall Collins. 1990. "Dimensions of Microinteraction." *American Journal of Sociology* 96:32–68.

Kenny, David A., Deborah Kashy, and William L. Cook. 2006. *Dyadic Data Analysis*. New York: Guilford.

Kurzban, Robert, and Jason Weeden. 2005. "HurryDate: Mate Preferences in Action." *Evolution and Human Behavior* 26:227–44.

Lakoff, George. 1973. "Hedges: A Study in Meaning Criteria and the Logic of Fuzzy Concepts." *Journal of Philosophical Logic* 2 (4): 458–508.

Lakoff, Robin. 1973. "Language and Woman's Place." *Language in Society* 2 (1): 45–80.

Leifer, Eric. 1988. "Interaction Preludes to Role Setting: Exploratory Local Action." *American Sociological Review* 53:865–78.

Leifer, Eric, and Valli Rajah. 2000. "Getting Observations: Strategic Ambiguities in Social Interaction." *Soziale Systeme* 6:251–67.

Lerner, Gene H. 1991. "On the Syntax of Sentences-in-Progress." *Language in Society* 20 (3): 441–58.

———. 1996. "On the 'Semi-permeable' Character of Grammatical Units in Conversation: Conditional Entry into the Turn Space of Another Speaker." Pp. 238–76 in *Interaction and Grammar*, edited by E. Ochs, E. A. Schegloff, and S. A. Thompson. Cambridge: Cambridge University Press.

Levitan, Rivka, and Julia Hirschberg. 2011. "Measuring Acoustic-Prosodic Entrainment with Respect to Multiple Levels and Dimensions." In *Proceedings of the ACL 2011 Workshop on Relational Models of Semantics*, edited by Su Nam Kim et al. Portland, Ore.: Association for Computational Linguistics.

Li, Aijun, and Haibo Wang. 2004. "Friendly Speech Analysis and Perception in Standard Chinese." Pp. 897–900 in *Interspeech 2004*. Jeju Island: International Speech Communication Association.

Liscombe, Jackson, Jennifer Venditti, and Julia Hirschberg. 2003. "Classifying Subject Ratings of Emotional Speech Using Acoustic Features." Pp. 725–28 in *Eurospeech 2003 Proceedings*. Bonn: International Speech Communication Association.

Lubbers, Miranda J., and Tom A. B. Snijders. 2007. "A Comparison of Various Approaches to the Exponential Random Graph Model: A Reanalysis of 102 Student Networks in School Classes." *Social Networks* 29 (4): 489–507.

Madan, Anmol, Ron Caneel, and Alex Pentland. 2005. "Voices of Attraction." In *HCI International: Proceedings of 1st International Conference on Augmented Cognition*. Mahwah, N.J.: Mira.

Magee, Joe C., and Larissa Tiedens. 2006. "Emotional Ties That Bind: The Roles of Valence and Consistency of Group Emotion in Inferences of Cohesiveness and Common Fate." *Personality and Social Psychology Bulletin* 32 (12): 1703–15.

Mairesse, François, Marilyn A. Walker, Matthias R. Mehl, and Roger K. Moore. 2007. "Using Linguistic Cues for the Automatic Recognition of Personality in Conversation and Text." *Journal of Artificial Intelligence Research* 30:457–500.

Markovsky, Barry, and Edward Lawler. 1994. "A New Theory of Group Solidarity." Pp. 113–37 in *Advances in Group Processes*, vol. 11. Edited by Barry Markovsky, Jodi O'Brien, and Karen Heimer. Greenwich, Conn.: JAI.

Martin, John Levi. 2010. *Social Structures*. Princeton, N.J.: Princeton University Press.

McFarland, Daniel A., and R. Jack Thomas. 2006. "Bowling Young: How Youth Voluntary Associations Influence Adult Political Participation." *American Sociological Review* 71 (3): 401–25.

McPherson, J. Miller, Lynn Smith-Lovin, and James Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415–44.

Mead, George H. 1934. *George Herbert Mead: On Social Psychology*. Edited by Anselm Strauss. Chicago: University of Chicago Press.
Miskovic-Lukovic, Mirjana. 2009. "Is There a Chance That I Might Kinda Sort of Take You Out to Dinner? The Role of the Pragmatic Particles *Kind of* and *Sort of* in Utterance Interpretation." *Journal of Pragmatics* 41:602–25.
Muehlenhard, Charlene L., Mary Koralewski, Sandra Andrews, and Cynthia Burdick. 1986. "Verbal and Nonverbal Cues That Convey Interest in Dating: Two Studies." *Behavior Therapy* 17:404–19.
Murray, Stephen O. 1985. "Toward a Model of Members' Methods for Recognizing Interruptions." *Language in Society* 13:31–41.
Natale, Michael. 1975. "Convergence of Mean Vocal Intensity in Dyadic Communication as a Function of Social Desirability." *Journal of Personality and Social Psychology* 32 (5): 790–804.
Nenkova, Ani, Agustin Gravano, and Julia Hirschberg. 2008. "High Frequency Word Entrainment in Spoken Dialogue." Pp. 169–72 in *Proceedings of ACL-08*. Columbus, Ohio: Association for Computational Linguistics.
Niederhoffer, Kate G., and James Pennebaker. 2002. "Linguistic Style Matching in Social Interaction." *Journal of Language and Social Psychology* 21 (4): 337–60.
Nystrand, Martin. 1997. *Opening Dialogue: Understanding the Dynamics of Language and Learning in the English Classroom*. New York: Teachers College Press.
Okamoto, Dina, Lisa Slattery Rashotte, and Lynn Smith-Lovin. 2002. "Measuring Interruption: Syntactic and Contextual Methods of Coding Conversation." *Social Psychology Quarterly* 65:92–102.
———. 2002. "Measuring Interruption: Syntactic and Contextual Methods of Coding Conversation." *Social Psychology Quarterly* 65:95–102.
Pang, Bo, and Lillian Lee. 2008. "Opinion Mining and Sentiment Analysis." *Foundations and Trends in Information Retrieval* 2 (1–2): 1–135.
Parks, Malcolm R. 2007. *Personal Relationships and Personal Networks*. London: Earlbaum.
Pennebaker, James W., Roger J. Booth, and Martha E. Francis. 2007. "Linguistic Inquiry and Word Count: LIWC2007." Operator's manual, LIWC.net. Austin, Tex.
Pennebaker, James W., and Laura A. King. 1999. "Linguistic Styles: Language Use as an Individual Difference." *Journal of Personality and Social Psychology* 77 (6): 1296–1312.
Pentland, Alex. 2005. "Socially Aware Computation and Communication." *Computer* 38 (3): 33–40.
———. 2008. *Honest Signals: How They Shape Our World*. Cambridge, Mass.: MIT Press.
Puts, David A., Julia L. Barndt, Lisa L. M. Welling, Khylam Dawood, and Robert P. Burriss. 2011. "Intrasexual Competition among Women: Vocal Femininity Affects Perceptions of Attractiveness and Flirtatiousness." *Personality and Individual Differences* 50 (1): 111–15.
Ranganath, Rajesh, Dan Jurafsky, and Daniel A. McFarland. 2013. "Detecting Friendly, Flirtatious, Awkward, and Assertive Speech in Speed-Dates." *Computer Speech and Language* 27 (1): 89–115.
Ridgeway, Cecilia. 2009. "Framed Before We Know It: How Gender Shapes Social Relations." *Gender and Society* 23 (2): 145–60.
Ridgeway, Cecilia, and Joseph Berger. 1986. "Expectations, Legitimation, and Dominance Behavior in Task Groups." *American Sociological Review* 15:603–17.
Rosenfeld, Michael. 2005. "A Critique of Exchange Theory in Mate Selection." *American Journal of Sociology* 110 (5): 1284–1325.
Roth, Wolff-Michael, and Kenneth Tobin. 2010. "Solidarity and Conflict: Aligned and Misaligned Prosody as a Transactional Resource in Intra- and Intercultural Communication Involving Power Differences." *Cultural Studies of Science Education* 5: 807–47.

Sacks, Harvey, Emanuel A. Schegloff, and Gail Jefferson. 1974. "A Simplest Systematics for the Organization of Turn-Taking for Conversation." *Language* 50:696–735.
Scheff, Thomas J. 1994. *Microsociology: Discourse, Emotion, and Social Structure*. Chicago: University of Chicago Press.
Schegloff, Emanuel A., Gail Jefferson, and Harvey Sacks. 1977. "The Preference for Self-Correction in the Organization of Repair in Conversation." *Language* 53:361–82.
Scherer, Klaus R. 2000. "Psychological Models of Emotion." Pp. 137–62 in *The Neuropsychology of Emotion*, edited by J. Borod. Oxford: Oxford University Press.
———. 2003. "Vocal Communication of Emotion: A Review of Research Paradigms." *Speech Communication* 40:227–56.
Schriffin, Deborah. 1987. *Discourse Markers*. Cambridge: Cambridge University Press.
Schutz, Alfred. 1964. "Making Music Together: A Study in Social Relationship." Pp. 159–78 in *Collected Papers II: Studies in Social Theory*. The Hague: Nijhoff.
Searle, John R. 1995. *The Construction of Social Reality*. New York: Free Press.
Shilling, Chris, and Philip A. Mellor. 1998. "Durkheim, Morality and Modernity: Collective Effervescence, Homo Duplex, and the Sources of Moral Action." *British Journal of Sociology* 49 (2): 193–209.
Simmel, Georg, and Kurt H. Wolff. 1950. *The Sociology of Georg Simmel*. New York: Free Press.
Singer, Judith. 1998. "Using SAS PROC MIXED to Fit Multilevel Models, Hierarchical Models, and Individual Growth Models." *Journal of Educational and Behavioral Statistics* 24 (4): 323–55.
Sprecher, Susan, and Diane Felmlee. 1997. "The Balance of Power in Romantic Heterosexual Couples over Time from 'His' and 'Her' Perspectives." *Sex Roles: Journal of Research* 37:361–79.
Stokes, Randall, and John P. Hewitt. 1976. "Aligning Actions." *American Sociological Review* 41 (5): 838–49.
Strauss, Neil. 2005. *The Game: Penetrating the Secret Society of Pick-Up Artists*. New York: HarperCollins.
Tannen, Deborah. 1993. "The Relativity of Linguistic Strategies: Rethinking Power and Solidarity in Gender and Dominance." Pp. 165–88 in *Gender and Conversational Interaction*, edited by Deborah Tannen. New York: Oxford.
———. 1994. "Interpreting Interruptions in Conversation." Pp. 53–83 in *Gender and Discourse*. Oxford: Oxford University Press.
Tomasello, Michael. 2008. *Origins of Human Communication*. Cambridge, Mass.: MIT Press.
Trivers, R. L. 1972. "Parental Investment and Sexual Selection." Pp. 136–79 in *Sexual Selection and the Descent of Man*, edited by B. Campbell. Chicago: Aldine.
Turner, Jonathan. 2002. *Face to Face: Toward a Sociological Theory of Interpersonal Behavior*. Stanford, Calif.: Stanford University Press.
Webster, Murray, Jr., and James Driskell. 1983. "Beauty as Status." *American Journal of Sociology* 89 (1): 140–65.
West, Candace. 1985. *Routine Complications: Troubles with Talk between Doctors and Patients*. Bloomington: Indiana University Press.
West, Candace, and Don H. Zimmerman. 1987. "Doing Gender." *Gender and Society* 1:125–51.
Wiltermuth, Scott S., and Chip Heath. 2009. "Synchrony and Cooperation." *Psychological Science* 20 (1): 1–5.
Wittgenstein, Ludwig. 1953. *Philosophical Investigations*. Oxford: Blackwell.
Zimmerman, Don H., and Candace West. 1975. "Sex Roles, Interruptions and Silences in Conversation." Pp. 105–29 in *Language and Sex: Difference and Dominance*, edited by Barrie Thorne and Nancy Henle. Newbury, Mass.: Rowley House.