Language Style Matching, Engagement, and Impasse in Negotiations

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Abstract

Humans and animals alike are known to mirror the behavior of both allies and opponents. However, existing models of behavior matching focus primarily on its prosocial functions. The current study explores whether both prosocial and adversarial sides of behavior matching can be found at different stages of an egoistic negotiation. In negotiations conducted over instant messenger, 64 dyads attempted to reach an agreement on four issues within 20 minutes while focusing solely on personal gain. We measured behavior matching with the language style matching (LSM) metric, which quantifies function word (e.g., pronouns, articles) similarity between partners. Although pairs with higher LSM throughout negotiations were more socially engaged, they were also less focused on the task and more likely to reach an impasse during the negotiation. Furthermore, early but not late style matching predicted more positive, socially attuned interactions. Implications for negotiation and mimicry research are discussed.

When people in a conversation match each other's language use or nonverbal behavior, they tend to benefit in a number of ways. Behavior matching has been proposed to function as the *social glue* that binds together pairs, groups, and society as a whole. Strangers, coworkers, and current or potential relationship partners all appear to communicate more fluently, like each other more, and stay together longer to the degree that they mirror each other's verbal and nonverbal behavior (Chartrand & van Baaren, 2009; Giles & Coupland, 1991; Ireland & Pennebaker, 2010; Ireland et al., 2011; Pickering & Garrod, 2006). Yet the conflict management and negotiation literatures are mixed on the subject of whether matching the opposition's actions and emotions will result in positive or negative consequences.

Recent negotiation studies have largely found a positive relationship between behavior matching and negotiation outcomes. In laboratory negotiations, participants who were instructed to strategically mimic their partners' nonverbal (e.g., gestures, posture) and verbal behavior (e.g., metaphors, jargon) to achieve better negotiation outcomes claimed a greater percentage of the final deal than did negotiators who did not attempt to mimic their partners (Maddux, Mullen, & Galinsky, 2008; Swaab, Maddux, & Sinaceur, 2011). In those studies, partners' greater reported trust in those who mimicked them mediated the influence of mimicry on agreement value. In naturalistic hostage negotiations as well, discussions are

more likely to end peacefully when police negotiators and hostage takers consistently match each other's language styles (Taylor & Thomas, 2008).

Behavioral data from studies of more contentious conversations paint a much different picture of the social consequences of behavior matching. For example, negotiators have been found to reciprocally threaten and punish each other in conflict spirals that worsen as negotiations go on (Youngs, 1986; see De Dreu, 1995 for a review). Players in an online social dilemma game are more likely to defect to the degree that they match partners' references to negative emotions (e.g., *bad*, *unfortunately*; Scissors, Gill, Geraghty, & Gergle, 2009). Spouses increasingly match each other's heart rates, skin conductance levels, and blood pressures as arguments escalate (Levenson & Gottman, 1983), and unhappy romantic partners use more closely matched verbal strategies during disagreements than well-adjusted partners do (Ting-Toomey, 1983). In the animal literature as well, rivals mimic each other's actions and vocalizations during intraspecies mate competition and interspecies competition over territory boundaries (Cody, 1973; Payne & Pagel, 1997). Outside of academic research, competitive postural and vocal mimicry and coordination are readily observed during shouting matches between real and fictional people, at sporting events both before (e.g., American football) and during (e.g., tennis) competitive play (see Semin & Cacioppo, 2009), and in play fighting between pets such as cats and dogs.

Conceptually, there is room for both positive and negative behavior matching in the theories proffered by the behavioral and social sciences. Although no one theory explicitly predicts that mimicry will be found in both intensely positive and negative interactions, both verbal and nonverbal mimicry researchers have long viewed coordination as a phenomenon that both causes and results from increased attention to one's interaction partner (Chartrand & Bargh, 1999; Pickering & Garrod, 2006). Bellicose interactions are rare in real life and in laboratory experiments; thus, when mimicry is introduced into neutral, everyday contexts, positive affect and prosocial behavior are the usual results (Chartrand & van Baaren, 2009; van Baaren, Holland, Kawakami, & van Knippenberg, 2004). In contrast, situations in which interpersonal matching has been linked with increased negative affect tend to be those that were adversarial at baseline, such as conversations between unhappy spouses or negotiators with diametrically opposed interests (Levenson & Gottman, 1983; Ting-Toomey, 1983; Youngs, 1986). The evidence suggests that matching magnifies existing social cues rather than introducing positive or negative affect that was absent to begin with. In other words, matching hypothetically reflects engagement or increased attentional focus and emotional arousal, which can be either positive or negative depending on the context.

Language Style Matching

One recently developed measure of behavior matching during conversation is language style matching (LSM; Ireland & Pennebaker, 2010). LSM is a simple and unobtrusive means of measuring stylistic similarity dynamically as conversations progress. Language style (i.e., how individuals communicate rather than what they say) is defined by function words such as pronouns and prepositions (Table 1). Function words reliably reflect speakers' psychological states and traits, ranging from honesty and social status to depression and Big Five personality dimensions (Fast & Funder, 2008; Hancock, Curry, Goorha, & Woodworth, 2007; Rodriguez, Holleran, & Mehl, 2010; see Tausczik & Pennebaker, 2010; for a review). Unlike content words, such as nouns and verbs, function words have little meaning out of context and are processed rapidly and largely nonconsciously (Bell, Brenier, Gregory, Girand, & Jurafsky, 2009). Therefore, whereas it is possible to deliberately match the content of a conversation partner's speech (e.g., vocabulary level, jargon; Giles & Coupland, 1991), people are normally not able to match the language style of a partner or text when asked (Ireland & Pennebaker, 2010; Tausczik, 2012).

People who match each other's language styles more tend to work better together in the short term and stay together longer in both platonic and romantic contexts. For example, experimental and real-life coworkers report liking each other more to the degree that they match each other's language styles while

Table 1

Function Word Categories Analyzed in LSM

Category	LIWC variable	Examples
Personal pronouns	ppron	*I*, *she*, *they*
Impersonal pronouns	ipron	*that*, *those*, *it*
Articles	article	*a*, *an*, *the*
Auxiliary verbs	auxverb	*is*, *will*, *can*
High frequency adverbs	adverb	*too*, *very*, *quite*
Conjunctions	conj	*and*, *while*, *because*
Prepositions	preps	*in*, *about*, *before*
Quantifiers	quant	*tons*, *some*, *few*
Negations	negate	*no*, *not*, *never*

Note. LIWC, Linguistic Inquiry and Word Count; LSM, language style matching. All categories are from LIWC2007 (Pennebaker, Booth, et al., 2007).

collaborating (Gonzales, Hancock, & Pennebaker, 2010; Tausczik, 2009), and both new and established romantic relationships are more stable to the degree that partners match each other's language use in natural conversation (Ireland & Pennebaker, 2010; Ireland et al., 2011). These results are consistent with the view that the primary purpose of behavior matching is to strengthen social ties (Chartrand & van Baaren, 2009) and fit with communication accommodation theory's premise that people match each other's communication styles to be liked and increase rapport (Giles & Coupland, 1991; Hewett, Watson, Gallois, Ward, & Leggett, 2009). However, other studies have found that LSM does not straightforwardly reflect interaction quality, but rather, consistent with the hypothesis that matching reflects social engagement, appears to occur equally in hostile and friendly interactions (Niederhoffer & Pennebaker, 2002).

Bolstering the idea that behavior matching reflects social engagement rather than rapport, Tausczik (2012) found that a simple attentional manipulation effectively modulated LSM during live online chats. Specifically, group members collaborating in an online chatroom matched each other's language styles more after receiving automated feedback advising them to pay more attention to their partners. Furthermore, Baddeley (2011) demonstrated that individuals with major depressive disorder, which is triggered and maintained by negative attentional bias (Gotlib, Krasnoperova, Neubauer Yue, & Joormann, 2004) and social withdrawal (Schaefer, Kornienko, & Fox, 2011), match close friends' language styles less in emails written during depressive episodes than in remission, despite using similar degrees of positive language (e.g., *love*, *great*) in both periods. These findings were presumably due to depressed individuals' social disengagement rather than lessening of positive regard. Both Tausczik's (2012) and Baddeley's (2011) findings supported the notion that LSM is highest when individuals are paying close attention to each other. Furthermore, each is consistent with psycholinguistic evidence that matching a partner's mindset and word choices during dialogue facilitates information transfer independent of affiliative motives (Brown-Schmidt, 2009; Chang, Dell, Bock, & Griffin, 2000; Pickering & Garrod, 2004).

A wealth of interpersonal communication research supports the view that matching and understanding a partner's mindset in conversation often but not always result in optimal outcomes, particularly in mixed-motive conversations such as negotiations. Specifically, the interactional framing literature posits that frame congruence in negotiations (i.e., adopting a common construal of the negotiation's purpose and tone) generally improves mutual understanding and the likelihood of agreement, whereas frame dissonance generally has the opposite effects (Dewulf, Gray, Putnam, & Bouwen, 2011; Putnam, 2010). The primary function of framing, as it emerges and is shaped throughout negotiations or interpersonal conflicts, is to help conversation partners make sense of each other's behavior and plan their actions accordingly. Thus, if one person misconstrues what was intended to be a cooperative negotiation as competitive, for example, he or she may fail to compromise and collaborate effectively and may drive down the agreement value for both sides (Dewulf et al., 2011).

Paying attention to, mirroring, and understanding a partner's mental states do not always optimize the negotiation process or outcome, particularly when negotiators' primary goals are to defeat each other (Bodtker & Jameson, 1997). Indeed, increased attention to an opponent's thoughts and feelings in negotiations that are predominantly competitive may lead to what relational order theory refers to as a competition or aggression pattern, in which negotiators become increasingly interdependent and interpersonally engaged as their resistance to compromise increases (Donohue, 1998; Hammer, 2001). Thus, whether LSM, and the psychological congruence that it implies, will facilitate prosocial or adversarial behavior theoretically depends on the negotiation's structure and affective tone as well as the point at which matching occurs (see Donohue & Hoobler, 2002). LSM should be particularly volatile in ambiguous conversations that can be flexibly construed as either cooperative or competitive, such as negotiations. We further predict that LSM will be especially consequential during later stages of a negotiation, when behavioral similarity is likely to reflect communication processes that are specific to negotiations (e.g., impasse), rather than during the more universal processes that relate to getting to know a new acquaintance (e.g., introductions).

Concepts and Terms

Until now, we have used the terms coordination, mimicry, and matching as though they are interchangeable and have not discussed related terms, including entrainment, contagion, and interaction alignment. We have done so because, for the aggregate measures of behavioral similarity over the course of an interaction that this article focuses on, any of these terms are equally appropriate and all are assumed to reflect the same basic processes of mental state similarity and increased attention to one's interaction partner (Garrod & Pickering, 2009; Ireland & Pennebaker, 2010; Semin & Cacioppo, 2009). In language matching measured by word count approaches in particular, these distinct kinds of behavior similarity are indistinguishable. For example, negotiators who respond to "I can't pay you any more" with "You'll have to match my price" are not mimicking their partners' word choices or syntax verbatim. However, they are using personal pronouns (*you*, *I*, *my*) and words referring to money (*pay*, *price*) at identical rates, suggesting that they are thinking about a common topic in similar ways (Tausczik & Pennebaker, 2010).

Throughout this article, any behavioral similarity, encompassing verbatim mimicry, subtle stylistic or thematic similarity (e.g., responding to *can* with *will* and *pay* with *money*), and coordination (e.g., responding to *you* with *I*), will be referred to as language or behavior matching. We are not denying that the distinctions between each type of behavioral similarity matter. For example, the fact that subtle linguistic similarity (i.e., LSM), in contrast with verbatim mimicry, is very difficult for either speakers or listeners to judge and modulate has clear consequences for how these topics must be studied. Yet each process tends to be highly automatic, and both are associated with similar outcomes (Chartrand & van Baaren, 2009; Ireland & Pennebaker, 2010). Therefore, here we provisionally assume that subtle linguistic forms of mimicry and coordination provide the same information about negotiators' underlying psychological processes and refer to both as *behavior matching*.

Overview

The hypothesis that behavior matching reflects engagement rather than rapport has received little empirical attention in the context of negotiation and conflict management. The following study analyzes the natural language of competitive negotiations to explore the three primary components of engagement in interpersonal conversations: Emotional engagement (references to positive and negative emotions), social engagement (references to one's conversation partner), and task engagement (references to the negotiation issues and options). In agreement with Donohue (2003) and a number of researchers outside of the negotiation literature (e.g., Danescu-Niculescu-Mizil, Lee, Pang, & Kleinberg, in press; Fiedler, 2008; Michel et al., 2011; Pennebaker, Mehl, & Niederhoffer, 2003; Sanford, 1942; Weintraub, 1981), we argue that language is a psychometrically valid data source in itself, independent of questionnaire data or

observer reports. Although each of those data sources is critical in the behavioral and social sciences, records of behavior throughout an interaction have primacy over self-reports insofar as they are real-time and not retrospective measures (Donohue, 2003). Linguistic data, in particular, have the advantage of being easily quantified and related to mental states such as attentional focus and emotional engagement.

The following study explores the relationship between language matching, attentional and emotional engagement, and impasse during a competitive individualistic negotiation. Analyses test the following predictions: (a) During the final stages of negotiations and overall, opponents who match each other's language use more will be more likely to reach an impasse; (b) throughout negotiations, style matching will predict greater attention to social aspects of the negotiation but less attention to the task; (c) early in negotiations, when negotiators have not yet discovered their partners' diametrically opposed interests, style matching will reflect greater positivity; and (d) in the last stages of negotiations, when partners' nonoverlapping interests are obvious, matching will reflect greater negative affect.

Method

Sixty-four dyads (59% female, 33% mixed) participated in partial fulfillment of a course requirement.[1] To instill egoistic motivation, the instructions emphasized that all participants should pursue only their own individual interests while negotiating (see O'Connor & Carnevale, 1997; for similar instructions). Instructions also informed participants that a cash prize ($100) would be awarded to an individual at the end of the semester and that their chance of winning the prize would be based on their negotiation performance. Financial incentives of this kind have been found to reliably increase emotional investment during negotiation (Volkema, 2007).

Negotiation Exercise

This study relied on a modified version of a commonly used negotiation exercise developed by Thompson and DeHarpport (1998). To reinforce individuals' egoistic motivation, we modified Thompson and DeHarpport's *vacation* exercise, which originally focused on two good friends going on a vacation, to involve two casually acquainted coworkers going on a business trip. The exercise included four issues (mode of transportation, hotel quality, length of stay, and conference type). Each participant was paired with another participant during the negotiation, and all subjects were informed that they needed to agree with their partner on a single option for each issue.

We presented each dyad member with a point schedule to indicate their preferences and priorities for each of the issues. While negotiators had opposing preferences on each of the issues, the negotiation had integrative (tradeoff) potential (i.e., two of the issues were of different importance to each negotiator, and two of the issues were of the same importance to each negotiator). Participants had no information about their opponent's point schedule, and the instructions specified that they should not share their specific point values with their opponent.

Prior research has shown that expectations of future interaction facilitate more prosocial interactions (e.g., Heide & Miner, 1992). Consequently, participants did not interact face-to-face or otherwise see each other, and the instructions emphasized that they would not interact with each other after the study ended. Participants negotiated via instant messenger (IM) for up to 20 minute. They were told that their main tasks were to reach agreement within the time limit and to earn as many points for themselves as possible from any agreement reached. Participants in our study were constantly aware of the time: Dyads' IM

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[1]Analyses pertaining to 39 dyads' joint outcome was described by Henderson and Trope (2009). Data on the remaining 25 dyads' joint outcome have not been published elsewhere. Joint outcome was not associated with any of the variables reported in this article, and none of the variables reported in this article were associated with any of the variables reported by Henderson and Trope (2009).

windows included a time stamp with every turn and showed a clear log of when the conversations began. These time stamps were considered sufficient for keeping participants aware of how much time remained without being overly obtrusive or interrupting the flow of conversation. On average, negotiations that reached agreement before the full time had elapsed lasted 14 minutes and 50 seconds (SD = 5 min 14 s).

Analytic Strategies

Language Style Matching

Chat transcripts were checked for spelling and typographical errors and aggregated into a single block of text per participant. Because word count-based text analysis methods are less reliable at lower word counts, we excluded four dyads in which one or both partners used fewer than 100 words. The 60 remaining transcripts were then analyzed using the Linguistic Inquiry and Word Count (LIWC), a computerized text analysis program that calculates the percentage of words in a given text that fall into one or more of over 80 linguistic (e.g., pronouns, prepositions), psychological (e.g., positive and negative emotion), and topical (e.g., death, money) categories (Pennebaker, Booth, & Francis, 2007). LIWC calculates nine basic-level function word categories that together make up the composite LSM score (Table 1). Separate LSM scores were initially calculated for each function word category as follows (personal pronouns, or *ppron*, are used as an example):

$$\text{LSM}_{\text{ppron}} = 1 - ((|\text{ppron}_1 - \text{ppron}_2|)/(\text{ppron}_1 + \text{ppron}_2 + 0.0001))$$

In the denominator, 0.0001 is optionally added to prevent empty sets that occur if the value for both texts is zero. The nine category-level LSM scores were finally averaged to yield a single number bounded by 0 and 1, where higher numbers indicate greater function word similarity.

To compare LSM during the first and final stages of a negotiation, the first and last 100 words were excerpted from each participant's aggregate chat transcript. Excerpts were first analyzed with LIWC, and LSM scores for early and late segments of negotiations were then calculated as above. We chose 100 words as the excerpt size for early and late segments to conduct the finest grained analysis possible while at the same time obtaining a psychometrically sound estimate of language similarity.

Engagement Measures

We measured social, emotional, and task engagement linguistically. All engagement analyses controlled for whether dyads reached agreement by allowing intercepts to vary randomly between pairs who did and did not reach agreement in each hierarchical linear model.

We based *emotional engagement* on dyads' average proportion of positive (e.g., *yay*, *great*) and negative emotion words (e.g., *problem*, *sadly*), as indexed by LIWC. The emotion categories in LIWC have been established as valid measures of state and trait emotionality (Kahn, Tobin, Massey, & Anderson, 2007). Consistent with language use in other contexts (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007), positive emotion words were more common (M = 5.47, SD = 1.92) than were negative emotion words (M = 0.67, SD = 0.41).

We operationalized *social engagement* as the total use of personal pronouns (e.g., *you*, *we*, *I*) as measured by LIWC. At their most basic level, personal pronouns reflect attention to people rather than objects or concepts. Notably, focusing on social aspects of a negotiation does not mean that individuals have adopted a particularly affiliative or interdependent focus (see Docherty, 2001; Donohue, 1998). Personal pronouns usage merely indicates that negotiators are paying attention to people—specifically their own preferences and their partners'—rather than the structure of the task itself and does not specify *how* negotiators are thinking about themselves and their opponents.

Of the several types of personal pronouns, first-person singular (e.g., *I*, *me*, *my*) is an especially consequential and context-dependent category that may require justification as a measure of social attention

during negotiations. Although first-person singular often reflects a neurotic, depressed, or ruminative self-focus in emotional monologues (i.e., expressive writing, poems) or private interviews (Rodriguez et al., 2010; see Tausczik & Pennebaker, 2010), in natural conversation it is more likely to take the form of hedging (e.g., *I think*, *in my opinion*) and sharing private information (e.g., *I prefer*, *because I*; Brown & Levinson, 1987; Pennebaker, 2011). In such short and necessarily interdependent conversations, we argue that *I* signals attention to personal rather than task-oriented aspects of the negotiation and is unrelated to the dysphoric self-focus found in private writing. For example, a person saying, "*I* refuse to stay in a 1-star hotel, but *I* guess 2-star will work if you agree to go by bus," is framing the negotiation as a debate over personal preferences (see Donohue, 1998). In contrast, a person who avoids first-person singular, saying instead, "1-star is unacceptable, but 2-star will work if you agree to go by bus," is framing the negotiation as a relatively impersonal logical dilemma.

Likewise, although first-person plural (e.g., *we*, *our*) is often associated with interdependence (e.g., communal coping; Rohrbaugh, Shoham, Skoyen, Jensen, & Mehl, 2012), we believe that it should not be used as the sole index of social engagement. Particularly in work settings, which the negotiation task simulated, first-person plural is more likely to reflect dominance than social sensitivity (Kacewicz, Pennebaker, Davis, Jeon, & Graesser, in press; Pennebaker & Ireland, 2008). For example, "*We*'re moving on to issue 2" indicates that the speaker believes he or she is in control of the negotiation. In contrast, "*I*'d like to move on to issue 2" makes no assumptions about whether the partner will fall in line. Thus, one additional benefit of including all personal pronouns rather than focusing solely on *we* is that we are able to index social engagement irrespective of negotiators' relative social status.

Task engagement was measured with a custom LIWC dictionary (i.e., a word list used to search texts) comprising all common content words used in negotiation transcripts and the task instructions to refer specifically to some aspect of the negotiation exercise (e.g., *hotel*, *employee*). We included all task-relevant words in the dictionary that were used at least once in the experimental instructions and that made up at least 0.05% of participants' total language use, as calculated by WordSmith (Scott, 2008). To determine whether ambiguous words referred to the task, we searched the instructions and transcripts for context. We excluded words from the final dictionary that were used at similar rates in both task-relevant and off-topic contexts (e.g., *type* of music, *type* of transportation). The complete dictionary is available in Table 2 and as a LIWC dictionary file from the authors. Task-oriented words made up a large percentage of the total words that each person used on average but were highly variable (M = 19.8%, SD = 5.8%, Min = 9.4%, Max = 35.6%).

Results

The aims of this study were to explore the relationship between LSM and dyads' likelihood of reaching agreement before a deadline and to test whether LSM reflects different components of emotional and attentional engagement as negotiations unfold over time. Identifying factors that predict whether negotiators reach agreement versus impasse is a vital concern for the negotiation domain (e.g., Beersma & De Dreu, 1999; Dajani, 2004; Kristensen & Gärling, 1997; Moore, Kurtzberg, Thompson, & Morris, 1999; Pesendorfer & Koeszegi, 2007). Impasse is not inherently a negative outcome. Under certain circumstances, reaching no agreement at all may be superior to reaching a suboptimal agreement. However, given that reaching an agreement was required to enter into a cash lottery in this study, we are interpreting failure to reach agreement as an undesirable outcome.

In the analyses, focusing on attentional and emotional engagement, we aimed to compare early, late, and overall style matching with engagement measures that are at the same aggregate level as our primary outcome, impasse. Impasse summarizes in a single measure whether a negotiation successfully produced an agreement. Similarly, pairs' mean usage of social, emotional, and task-related language provide conversation-level indices of how negotiators divided their attention over the course of the entire negotiation.

Table 2

Custom Task Engagement LIWC Dictionary

academy	departments	interns	plans	three
affiliation*	driv*	investor*	point	ticket
agree*	E	issue	points	tickets
air	earn	issues	preference*	time
airplane	earned	item	priorities	total
apply*	earning*	items	prize	train
application*	earns	job	reach	trains
arrangement*	employ*	jobs	reached	transportation
association*	entrepreneur*	learn*	reaches	travel*
attend*	expensive*	length	reaching	trip
B	experience*	lottery	role	trips
bill	extra*	minutes	salary	two
bus	faster	mode	satisfactory	united
buses	first*	modes	save	value
business*	five*	money	saved	van
C	flew	motor	saving*	vans
car	flies	negotiat*	schedule	via
cash	flown	number*	scheduled	week*
cheap*	fly	objective	schedules	win
comfortable	flyer*	one	seven	winner
company	flying	option	short	winning
compet*	four	options	shorter	wins
conference*	future	outcome	shortest	won
connection*	gas	outcomes	shuttle*	work*
cost*	home*	paid	six	worth
D	hotel*	partner*	society	zero
day	incentive	pay*	spend*	
days	information	plan	star	
decided	instructions	plane	stay*	
decision*	interests	planning	take*	

Note. LIWC = Linguistic Inquiry and Word Count. Asterisks indicate word stems. The dictionary comprises 146 total words and stems. Task words were counted by loading the custom dictionary into LIWC2007.

Agreement Versus Impasse

To test the hypothesis that LSM will negatively correlate with likelihood of reaching agreement during competitive negotiations, a variable indicating whether dyads reached agreement (0 = *no agreement*, 1 = *agreement*) was regressed on each of the three LSM variables (total, early, and late) separately in a series of three logistic regressions. All LSM scores were *z*-scored to increase the interpretability of odds ratios (ORs). Confidence intervals were constructed using two-tailed critical *t* values.

Total LSM significantly negatively predicted dyads' likelihood of reaching agreement ($\beta = -1.67$, 95% CI $[-2.63, -0.71]$, $SE = 0.48$, $OR = 0.19$, $p < .001$) as did late LSM ($\beta = -0.65$, 95% CI $[-1.25, -0.05]$, $SE = 0.30$, $OR = 0.52$, $p = .031$).[2] In other words, for every standard deviation increase in LSM throughout a conversation, dyads were about one fifth as likely to reach agreement, and for every

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[2]Negations (e.g., *not*, *never*, and *no*) are part of the standard composite LSM score. If partners match each other's every *no* and *not acceptable*, that alone could account for the finding that dyads with higher LSM were more likely to reach an impasse. Thus, we also conducted all impasse analyses with an eight-category LSM score that excludes negations. Tests yielded conclusions identical to those reported in the main text: Total LSM ($\beta = -1.91$, $SE = 0.60$, $OR = 0.15$, $p = .002$) and late LSM ($\beta = -0.81$, $SE = 0.32$, $OR = 0.45$, $p = .011$) both continued to strongly negatively predict the likelihood of reaching an agreement.

standard deviation increase in LSM during the last 100 words of negotiations, dyads were about half as likely to reach agreement. Early LSM was unrelated to agreement likelihood, $p = .366$.

Emotional Engagement

Dyads' mean positive and negative emotion word usage, as indexed by LIWC, was separately regressed on each LSM variable in a series of six regressions. In partial support of our prediction, early LSM marginally positively predicted references to positive emotions ($\beta = 0.21$, 95% CI [−0.03, 0.45], $SE = 0.12$, $t(57) = 1.86$, $p = .068$), but not negative emotions ($p = .309$). Contrary to our prediction, late LSM negatively predicted references to negative emotions ($\beta = −0.29$, 95% CI [0.03, 0.55], $SE = 0.13$, $t(48) = −2.33$, $p = .023$) and was unrelated to positive emotions, $p = .663$. LSM for the total negotiation was unrelated to either positive or negative emotional expression, each $p > .19$.

Social Engagement

Dyad-level social engagement, as indexed by dyads' mean personal pronoun usage, was regressed on early, late, and overall LSM in a series of three linear regressions. LSM for early stages of the negotiation ($\beta = 0.28$, 95% CI [0.02, 0.54], $SE = 0.13$, $t(57) = 2.24$, $p = .029$) as well as the total negotiation positively predicted social engagement ($\beta = 0.23$, 95% CI [−0.03, 0.49], $SE = 0.13$, $t(57) = 1.82$, $p = .075$), whereas late LSM did not, $p = .291$.

Task Engagement

Task engagement was operationalized as the mean dyad-level percentage of words used in each negotiation that referred to the instruction materials (e.g., *option*, *hotel*). Task engagement was regressed on each LSM variable as above. Total LSM ($\beta = −0.52$, 95% CI [−0.74, −0.30], $SE = 0.11$, $t(57) = −4.65$, $p < .001$) and early LSM ($\beta = −0.21$, 95% CI [−0.45, 0.03], $SE = 0.12$, $t(57) = −1.76$, $p = .083$), but not late LSM ($p = .819$), negatively predicted task engagement. (See Table 3 for examples of social and task engagement in chat transcripts.)

Additional Analyses

In the first set of exploratory analyses, we regressed whether dyads reached agreement on each linguistic engagement variable individually and then together in a single logistic regression model. Given that the study was correlational, the goal was not to test a causal mediation model but rather to explore how each linguistic variable measured in the study related to the primary behavioral outcome. Task engagement significantly positively predicted agreement ($\beta = 0.91$, 95% CI [0.21, 1.61], $SE = 0.35$, OR = 2.62, $p = .009$) as did positive emotional engagement ($\beta = 1.35$, 95% CI [0.49, 2.21], $SE = 0.43$, OR = 3.11, $p = .002$), whereas social engagement and negative emotional engagement did not, both $p > .50$.

When included in the same model, each significant individual predictor continued to predict agreement, although the main effect of task engagement was reduced to marginal significance: LSM predicted lower likelihood of reaching agreement ($\beta = −1.67$, 95% CI [−2.93, −0.41], $SE = 0.63$, OR = 0.19, $p = .008$), while task engagement and positive emotional engagement each predicted greater likelihood of reaching agreement (task $\beta = 0.91$, 95% CI [−1.99, 0.17], $SE = 0.54$, OR = 2.49, $p = .092$; positive emotion $\beta = 2.04$, 95% CI [0.80, 3.28], $SE = 0.62$, OR = 7.71, $p < .001$).

In a final set of exploratory analyses, we investigated how negotiations' tone changed over time by comparing engagement and affective tone in early and late segments of negotiations. For these analyses, we selected participants who spoke at least 200 words during their negotiations, allowing for comparison of independent early and late segments. Task engagement and social engagement in the first 100

Table 3

Examples of High Task and Social Engagement

	Total LSM	Pers. pron. (%)	Task (%)
Socially engaged, high LSM			
A: hey so *we* have to go to this meeting *I* guess, how do *you* want to get there? *I* feel like it's kind of far away	0.88	13.1	11.54
B: Well, going by plane is pretty expensive, don't *you* think?			
A: yeah, but it's faster and a lot easier plus it could be cheaper than train and car if there's a deal like on Jet Blue			
B: *I* think *I* would prefer going by car, actually because that way *I* can control the situation more and *you* can see more places *I* am afraid of flying, so *we* got to find a compromise somewhere No bus for *you*?			
A: No, *I* get car sick, sorry! that's true, *we* can take the train *I* suppose, but *I* would much prefer plane, but *I* can see it being expensive			
Task-engaged, low LSM			
A: I would like to *travel* by *air*	0.83	7.8	15.6
B: that's really *expensive* I think we should by ground a *car* would be *cheapest*			
A: but really uncomfortable			
B: true			
A: what were you thinking? in terms of *travel motor home*?			
B: how about *train*?			
A: yeah, but a *train* can be really uncomfortable			
B: true			
A: *train* would be the quickest, easiest *save* on *gas motor home* is *expensive*			
B: no, not if we rent one just for a few … I could *drive* I love *driving*			

Note. LIWC = Linguistic Inquiry and Word Count; LSM = language style matching. Pers. pron. = personal pronouns; task = task-related words (italicized). Personal pronouns are part of the standard LIWC2007 dictionary; task words are from a custom dictionary. LIWC outputs percentages, and LSM is a weighted absolute difference score. LSM reported above is from the entire chat transcript, not the excerpt. Double spaces between statements indicate a line break in the instant messenger transcript.

words of the interaction correlated with these same categories in the final 100 words (task $\beta = 0.49$, 95% CI [0.27, 0.71], $SE = 0.11$, OR = 1.64, $p < .001$; social $\beta = 0.35$, 95% CI [0.11, 0.59], $SE = 0.12$, OR = 1.41, $p = .005$). The affective tone of early and late stages of negotiations was positively correlated for positive ($\beta = 0.52$, 95% CI [0.30, 0.74], $SE = 0.11$, OR = 1.68, $p < .001$) but not for negative emotion word usage, $p > .90$. The null effect for negative emotion was consistent across pairs that were and were not able to reach agreement within the allotted time, both $p > .50$. These findings suggest that negotiations with a negative affective tone were not necessarily more negative from the outset but rather became negative over time.

Discussion

Analyses of language use and impasse during a competitive laboratory negotiation support the social engagement theory of behavior matching. Consistent with our predictions and with past nonverbal mimicry research (e.g., van Baaren, Maddux, Chartrand, De Bouter, & van Knippenberg, 2003), partners who were more socially engaged and less task-oriented mirrored each other's language styles to a greater degree. However, in apparent contradiction of recent negotiation findings (Maddux et al., 2008; Swaab et al., 2011; Taylor & Thomas, 2008), partners who matched each other's language use more were *less* likely to reach an agreement before the deadline. Analyses of language matching during early and late stages of negotiations may shed light on the social dynamics underlying this finding. Early style matching

correlated with greater positivity and social engagement (see Swaab et al., 2011), whereas late style matching did not. Furthermore, late style matching predicted greater likelihood of reaching an impasse, whereas early matching did not.

Results are consistent with past findings that mimicry increases individuals' attention to social aspects of their environment (Chartrand & van Baaren, 2009). Building on this observation, the social engagement hypothesis posits that mimicry intensifies individuals' most salient motivational concerns during a conversation. That is, individuals who enter an interaction with neutral or affiliative goals and then mimic or are mimicked by a partner will increasingly focus on positive and prosocial aspects of the interaction, such as common interests. When people enter into interactions with proself (egoistic) motives, the reverse presumably occurs, and mimicry causes them to increasingly focus on antagonistic and selfish aspects of the interaction, such as opposing goals. The result of increased attention to social cues in competitive negotiations where interests are diametrically opposed would then be conflict spirals and, when time is limited, impasse.

Motivations for Matching

At first, our findings appear to contradict recent studies on mimicry in negotiation. In two sets of laboratory experiments, participants earned more individual points and elicited more trust from their partner when they were instructed to mimic their gestures, posture, and language use (Maddux et al., 2008; Swaab et al., 2011). In a study of verbal matching during naturalistic hostage negotiations, Taylor and Thomas (2008) found that police negotiators were more likely to successfully resolve conflicts without violence to the degree that they consistently matched hostage takers' language use. In that study, police negotiators who reached peaceful agreements seemed to have succeeded in framing otherwise hostile negotiations in terms of common interests and shared perspectives.

The key difference between the present study and these recent studies of mimicry during negotiation may lie in negotiators' reasons for matching partners' behavior. In both sets of experimental studies, participants were told that they would "get a better deal" if they mimicked partners' nonverbal and verbal behavior, respectively (Maddux et al., 2008, p. 463; Swaab et al., 2011, p. 617). Similarly, in real-life hostage negotiations, police negotiators are trained to earn hostage takers' trust by emphasizing common interests (Taylor & Thomas, 2008). Thus, although the negotiations in these previous studies were certainly competitive, the most salient goal for at least one person in each was to convince the opposition, consciously or unconsciously, of their similarity and common ground. In contrast, negotiators in the present study were instructed to focus exclusively on personal gain. Partners' interests were also diametrically opposed, and negotiators were instructed not to reveal their specific point schedule to their partners. Negotiators in our study did undoubtedly share the goal of reaching an agreement before the deadline to enter the cash lottery. However, the instructions ensured that participants were not likely to have pursued that goal by emphasizing similarities with their partners.

Limitations and Future Research

The present studies were correlational, thus preventing any conclusions about the causal relationships among the variables that we studied. All published studies of language style similarity during natural dialogue share this limitation. Although Tausczik (2012) has succeeded in modulating style matching by asking online chat participants, via automated pop-up messages, to pay closer attention to conversation partners when LSM dips below a certain threshold, no experiment has yet succeeded in manipulating style matching independently of other cognitive variables. The automaticity of function word matching specifically—and most types of natural language matching generally—ensures that those variables are difficult to disentangle from correlated processes and behaviors. As noted earlier, function words tend to be short, frequently used, and have little meaning out of context; each of these features contributes

to function words' fluent and automatic processing. Training individuals to change a behavior that they rarely notice when listening or speaking is likely very difficult in real-time conversation. Indeed, style matching appears to be invisible to both trained judges and naïve participants and is difficult to carry out intentionally even during writing tasks that allow unlimited time for editing (Ireland & Pennebaker, 2010; Niederhoffer & Pennebaker, 2002).

Related mimicry research sheds some light on the chain of events that may have occurred as partners were matching each other's behavior throughout negotiations. A large body of experimental research has demonstrated that nonverbal mimicry and its prosocial consequences are bidirectionally related (see Chartrand & van Baaren, 2009, for a review). In real life, mimicry likely serves to both forge new affiliations and maintain existing relationships (Bernieri, 1988). We predict that verbal matching and social engagement have a similar relationship such that each variable reciprocally increases and sustains the other during conversations and throughout relationships.

Despite the acknowledged challenges, future researchers may wish to attempt to train individuals to monitor and control function word matching during conversation. Biofeedback techniques are able to give individuals some degree of control over other automatic processes, such as blood pressure and heart rate, simply by drawing their attention to their fluctuations (Xu, Gao, Ling, & Wang, 2007). These previous successes suggest that participants or confederates in future experiments may, with training, be able to intentionally vary levels of LSM in conversation, thus allowing researchers to test causal hypotheses regarding function word matching.

Another intriguing limitation of our research design that may warrant future research is whether the competitive or egoistic nature of the negotiation—or the combination of both elements—was responsible for the negative association between language matching and likelihood of agreement. Whereas competitive negotiators want their opponent to lose, egoistic negotiators merely want to maximize personal gain without taking opponents' outcomes into consideration (De Dreu & Boles, 1998). In the current study, egoism and competitiveness were perfectly conflated: Participants' preferences were diametrically opposed on each issue, and every negotiator was specifically instructed to disregard their partner's needs and to focus only on personal gain. Outside of this particular negotiation exercise, however, egoism and competition are often independent. That is, although competitive negotiations are inherently egoistic, not all egoistic negotiations are necessarily competitive. In negotiations where partners share some preferences and do not benefit from defeating each other, negotiators are free to pursue personal gain while allowing their partner to benefit as well.

Although the data do not allow us to disentangle egoistic and competitive motives, we provisionally assume that a competitive orientation—in other words, a desire to not only succeed personally but to also cause one's opponent to fail—is necessary for matching to result in impasse and similar counterproductive outcomes. In our study, negotiators presumably reached a sticking point in our exercise as a result of focusing on their shared mindsets—that is, their mutual desire to defeat each other—rather than the structure and requirements of the negotiation exercise.

Conclusion

The LSM metric is a simple, quantitative method of unobtrusively gauging the degree to which two individuals have matched each other's psychological states and traits over the course of a conversation. LSM predicts increased attention to social aspects of a negotiation, decreased attention to the task, and increased likelihood of impasse. Furthermore, style matching that occurs early, but not late, in negotiations reflects emotional positivity. Our findings support the social engagement hypothesis of behavior matching. Specifically, we argue that behavior matching serves to magnify both prosocial and adversarial social cues rather than only increasing liking and rapport. Our results stand to broaden the current conception of behavior matching in the behavioral sciences and encourage further research into the negative consequences of behavior matching.

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