The Cooperation Link: Power and Context Moderate Verbal Mimicry

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Abstract

Drawing on theories of mimicry as a schema-driven process, we tested whether the degree of verbal mimicry is dependent on the congruence between interactants' power dynamic (symmetric vs. asymmetric), task type (cooperative vs. competitive) and interaction context (negotiation vs. social). Experiment 1 found higher verbal mimicry amongst dyads who successfully completed a cooperative problem-solving task compared to those who did not, but only under conditions of symmetric, not asymmetric, power. Experiment 2 had dyads complete either a cooperative or a competitive negotiation task, under conditions of symmetric vs. asymmetric power. Verbal mimicry was associated with improved negotiation outcomes under conditions of cooperation and symmetry, and competition and asymmetry. Experiment 3 completes this picture by separating cooperative-competitive orientation from the interaction context. Consistent with Experiment 2, verbal mimicry was associated with task success during a negotiation context with asymmetric power, and during a social interaction context with symmetric power. Our results point to the contextual link between verbal mimicry and task outcome.

Key Words: Language Style Matching, Cooperation, Interaction Context

Public Significance Statement:

This research tests the impact of various contextual influences on the relationship between verbal mimicry and task success; namely power dynamic (*symmetric vs. asymmetric dynamic*), task type (*cooperative vs. competitive*) and interaction context (*negotiation vs. friendly conversation*). Whereas the traditional view is that verbal mimicry elicits positive behaviors that lead to more successful interactions, we suggest that this view is too simplistic. Our findings aid in the understanding of the types of conditions under which verbal mimicry is associated with interaction success and when it is best controlled to avoid harming interactions.

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Verbal Mimicry

The words that we use to communicate with others play a critical role in determining the outcomes of those conversations, particularly when it comes to fostering cooperation. One particular characteristic of conversation, verbal mimicry, has been explored in depth (Gonzales, Hancock, & Pennebaker, 2009; Taylor et al., 2013; Van Baaren, Holland, Steenaert, & van Knippenberg, 2003). Despite this, the relationship between verbal mimicry and cooperation is not yet fully understood. While this relationship can be positive (Ireland et al., 2011; Taylor & Thomas, 2008), it can also be negative (Ireland & Henderson, 2014). Here we draw on schema theory (Dalton, Chartrand, & Finkel, 2010) to derive and test predictions about how context might moderate the relationship between verbal mimicry and cooperation as operationalized by task outcome. In a series of three experiments, we focus on one aspect of verbal mimicry, Language Style Matching (LSM), and manipulate three of the most common contextual factors implicated in language matching: power (i.e., whether the dynamic is symmetric or asymmetric); task type (i.e., whether the task is cooperative or competitive); and interaction context (i.e., a negotiation context or a social interaction context). In doing so, we develop a theoretical understanding of *why* verbal mimicry has sometimes been associated with positive and negative outcomes.

Theoretical accounts of verbal mimicry and its relationship with social outcomes, such as cooperation (Richardson, Taylor, Snook, Conchie & Bennell, 2014), liking (Ireland et al., 2011), and trust (Scissors, Gill, & Gergle, 2008), are well established. Communication Accommodation Theory (CAT; Giles & Coupland, 1991) suggests that speakers either increase or decrease the social distance between themselves and another by adjusting the content and timing of their speech (Cappella

& Panalp, 1981). Convergence reflects a desire for integration or identification with another, whereas divergence creates social distance when a conversation is not going well, or when the other party is disliked. Similarly, Garrod and Pickering's (2004) Interactive Alignment model (IAM) describes that, for successful dialogue to occur, speakers must align across multiple linguistic representations including semantic and syntactic expressions. Like other forms of behavioural mimicry (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012), this alignment typically occurs automatically and unconsciously through a basic form of imitation. Dyads who match on one linguistic feature of dialogue are more likely to match on other features leading to a 'common ground' that facilitates cooperation and goal achievement (Brennan & Clark, 1996). For example, dyads who converge on a spatial description scheme during a route-navigation task are more likely to show alignment on their mental representations of the route and subsequent task success (Garrod & Anderson, 1987; Garrod & Doherty, 1994). In the IAM account, therefore, alignment occurs irrespective of motivations around affiliation or liking, and is tied to the emergence of a shared understanding.

One particular method of studying the link between verbal mimicry and task outcome is Language Style Matching (LSM). LSM is a distinct form of verbal mimicry in that its focus is on function words rather than content words (Pennebaker, Mehl, & Niederhoffer, 2003). Whereas words relating to content (e.g., nouns, regular verbs) convey "*what*" the speaker wishes to say, function words shape "*how*" something is said (Groom & Pennebaker, 2002). As such, function words, which include articles, adverbs, auxiliary verbs, conjunctions, prepositions, pronouns, and quantifiers, occur irrespective of the topic of dialogue and require a shared social knowledge to be understood (Meyer & Bock, 1999). Like IAM, LSM is largely unconscious (Richardson et al., 2014) and the assumption is that, when two speakers are making similar function word choices, they have adopted a common conceptualization of the world (Pennebaker, 2011). In both IAM and LSM, the focus is on the matching of word *categories* rather than individual words; participants who are matched in their linguistic style can display a word match (i.e., '*I*' with '*I*'), or they can match on a word from the same category ('*me*', '*my*').

LSM has been shown to associate positively with cooperative outcomes such as success in romantic relationships (Ireland, et al., 2011), increased cohesion and improved task performance in groups (Gonzales et al., 2010), and confessions in police interviews (Richardson et al., 2014). However, researchers do not always find this positive relationship. In three studies, Ireland and Henderson (2014) found that LSM was negatively correlated with negotiation process and outcome. Increased LSM was related to less efficiency (more words and time required to reach agreement in a negotiation) and decreased outcome success (less chance of reaching an agreement when language matching was high). The absence of a straightforward relationship between LSM and cooperation has also been shown by Babcock, Ta, and Ickes (2014), who found high levels of LSM were present when dyads experienced strong positive *or* negative engagement within an interaction. Equally, by showing that levels of accommodation vary due to personality and status within dyads, Muir, Joinson, Cotterill, and Dewdney (2016) propose that individual differences (e.g., personality) and contextual variations (e.g., social power) influence the conditions under which verbal mimicry occurs.

Schema-driven mimicry

The contrasting pattern of results observed by different authors can be understood by conceptualizing mimicry as a schema-driven process (Dalton et al., 2010). The schema account of mimicry argues that people incorporate information and rules regarding mimicry into schemas (i.e., organizational frameworks that guide our expectations) in much the same way that we use schemas to organize information about our environment and other people (Baldwin, 1992). Specifically, when our schematic expectations about mimicry are violated, it is likely to have a negative impact on the interaction and associated outcomes. For example, in the presence of someone we like (e.g., a peer or a friend), we expect that they will mimic us, and, in turn, we will respond by displaying high levels of mimicry. Being mimicked by a person we dislike may be perceived as counter-schematic; we do not expect them to mimic us. In this counter-schematic case, greater effort is required to interpret and make sense of that person's behavior.

In an initial test of this idea, Dalton et al., (2010) had participants experience an interaction that either conformed to their expectations of mimicry or violated them. Schematic expectations of mimicry were operationalized by having a confederate (a student peer) either mimic the participant (conforming expectations) or not mimic the participant (violating expectations). They found that participants who were not mimicked by the confederate (i.e., experienced a violation of mimicry) showed a reduction in self-control as measured by a subsequent increase in junk food consumption. Their results are consistent with current models of self-control (e.g., Schmeichel & Inzlicht, 2013), which suggest that a schema violation may lead to deleterious effects by virtue of the cognitive effort of interpreting the violation.

Mimicry can also be used unconsciously as an attempt to repair a social situation that violates schematic expectations. For example, Lakin, Chartrand, and Arkin (2008) showed that participants who were socially excluded by an in-group member tended to mimic more in a subsequent interaction with an in-group member, compared to those who were not excluded. That this unconscious repair mechanism was not found when their partner was perceived as an out-group member supports the proposition that there are schematic rules underlying mimicry behavior.

Seemingly counter to the idea that similarity breeds more mimicry, research on behavioral synchrony has shown that dissimilarity between interaction partners may encourage more synchrony. Miles, Lumsden, Richardson, and Macrae (2011) found that participants were more likely to display behavioral synchrony when interacting with a member of a different minimal group compared to a member of the same group. They suggest that in this case, mimicry may be functional, namely, to repair communication when it becomes difficult. Taken together, the effects of mimicry, or spontaneous behavioral synchrony, appear to depend on both the social dynamics between parties and the wider goals of communication. Importantly, the particular aspects of social dynamics and communication goals that impact on mimicry have not yet been identified.

Power Dynamic

Power dynamics are inherent in many social interactions and can influence both the direction and quantity of mimicry. In their analysis of arguments between justices and lawyers in the Supreme Court, Danescu- Niculescu- Mizil, Lee, Pang, and Kleinberg (2012) found that speakers use language mimicry differently depending on their role and the power dynamics within the context. Low power participants displayed greater language matching in an asymmetric power dynamic than high power participants. This is consistent with Cheng and Chartrand (2003), who demonstrate that high, but not low self-monitors, mimicked their superiors and peers more than their subordinates. It is also consistent with Dalton et al. (2010), who found impaired performance on a subsequent self-regulatory task when participants in a low power condition (worker) were mimicked by those in a high power position (leader).

Looking specifically at LSM and power dynamics, Niederhoffer and Pennebaker (2002) reported similar patterns of matching in their analysis of recorded conversations between Nixon and his aides during the Watergate affair. The general pattern was for Nixon's aides to match the President's language style. The exception was the final conversation between Nixon and one of his aides, John Dean, following the realization by Dean that he was being set up as Nixon's 'fall guy.' During this period, when there was a shift in the relationship towards one of symmetry, Dean no longer showed matching of Nixon's language use demonstrating that the power dynamics within a social interaction can influence mimicry.

Three recent studies further demonstrate the importance of schematic expectations by testing the impact of symmetric vs. asymmetric power on the relationship between LSM and cooperation. Taylor and Thomas (2008) studied high-stakes hostage negotiations where there is typically an asymmetric dynamic because the police authorities are in the position of power. In these interactions, peaceful outcomes were associated with the negotiators achieving greater coordination of turn taking, reciprocation of positive affect, and a focus on the present rather than the past. Richardson et al. (2014) examined the role of LSM in a suspects' willingness to confess to police interviewers. They found that confessions tended to occur when the interviewer controlled the language content and the suspect re-aligned his or her language to match their interviewer (see also Giebels, Oostinga, Taylor, & Curtis, 2017; Ormerod, Barrett, & Taylor, 2008). These results suggest that asymmetric power may accommodate a positive relationship between LSM and cooperation but only when that asymmetry is consistent with schematic expectations.

Task Type

Another aspect of the interaction that has an important influence on LSM is the social context, or the type of task and its associated motivations (Fusaroli et al., 2012). Whereas it has traditionally been assumed that mimicry is linked with cooperative interactions, Naber, Pashkam, and Nakayama (2013) found that mimicry occurs even in highly competitive tasks. They showed that during a competitive arcade game, participants' movements and reaction times were highly synchronized to the point that not even the incentive of a financial reward for quick completion prevented players from imitating their slower opponents.

This is part of an emerging body of evidence showing that the type of task (e.g., cooperative or competitive) impacts verbal mimicry (Curhan & Pentland, 2007; Scissors, Gill, & Gergle, 2008; Swaab, Maddux, & Sinaceur, 2010). For example, the interpersonal synergies account of verbal mimicry points towards alignment as being structurally organized at the level of the interaction. Thus, task-orientation plays a critical role in constraining processes related to alignment (Fusaroli & Tylen, 2016). In this approach, verbal mimicry is not indiscriminate, as in the case of IAM, but it is task specific. For example, in an analysis of competitive exchanges among romantic partners, Gottman (1979, 1980) found that partners in conflict often exhibit coordination of negative behaviour, including raised tone of voice and angry posturing. Bowen, Winczewski, and Collins (2016) further demonstrated the importance of task type on the relationship between LSM and cooperation in a study of romantic dyads. They found that higher LSM was associated with lower subjective perceptions of responsiveness and less positive emotion for partners when discussing relationship stressors (i.e., a competitive context), but more positive emotion for partners discussing social support (i.e., a cooperative context).

This research supports the idea that, while LSM can signal rapport or liking, it can also serve a specific function related to type of task and the power dynamics present between interlocutors. While the presence of mimicry in face-to-face interactions can help communicators develop trust and integrate information for mutual benefit (Swaab, Galinsky, Medvec, & Diermeire, 2012; Swaab et al., 2010), mimicry that occurs in an antagonistic relationship has the potential to exacerbate ill feeling and disagreement. Thus, in cases where competition is already present between speakers, mimicry may serve to intensify aggression and competitive spirit (Olekalns & Smith, 2005). These task-specific schematic expectations are also likely to interact with power dynamics, such that participants interacting with a peer in a symmetric power dynamic will likely display affiliation and rapport, and high levels of mimicry (Giles & Coupland, 1991; Dalton et al., 2010). By contrast, competition within a symmetric relationship is likely to be characterized by a decrease in natural affiliation, and so a high level of mimicry in this situation violates schematic expectations (Scissors et al., 2008).

Interaction Context

The idea of viewing language as a context-dependent phenomenon is not a new one. In face-work, speakers use utterances to attack, defend or to restore identity depending on the context (Goffman, 1967; Rogan & Hammer, 1994). In the literature on interaction 'frames', communication models highlight the importance of managing relational distance by altering the 'closeness' of the utterance (Donohue, Sherry, & Idzik, 2016). In this way, the outcome of the interaction depends on appropriate matching of interaction frame by speakers (Taylor, 2002). In cases where a speaker is focused on instrumental gain (i.e., seeking a resolution) it is counterproductive, or even detrimental, to emphasize relational goals (i.e., trust and affiliation) (Taylor & Donald, 2007).

Communication Accommodation Theory (CAT) identifies two behavioural strategies—convergence and divergence—that are intertwined with speakers' current social motivations. Speakers do not accommodate indiscriminately, but they do so based on motivations that encompass power, status and the social relationship (Giles & Coupland, 1991). Accommodation allows speakers a covert and subtle means of renegotiating their social position or roles. Culpepper, Bousfield, and Wichmann's (2003) study of the interaction between traffic wardens and drivers returning to their immobilized car found that traffic wardens did not mimic the change in voice pitch and loudness shown by the driver. In this case, this process of 'talking under' is used as a signal of power and control whereas, in British Police Training, talking under is often used to signal empathy to deescalate a highly emotive situation. The same behaviour (divergence) is used to achieve different ends (control of the communication vs. empathy) depending on the context of the interaction.

Whilst the wider interaction context is clearly important in understanding the likely impact of language behaviour, there is currently no systematic test of the link between mimicry and interaction context. These findings highlight the importance of variations in task type and interaction context on mimicry and support the idea that LSM does not always signal rapport or liking per se, and is likely context specific.

The Present Research

Our experiments are the first to examine how language mimicry is modulated across conditions of power, task type, and interaction context both individually and in combination. As part of a growing perspective, our work addresses mounting evidence that an association between LSM and positive outcome is too simplistic, and that patterns of LSM are likely to change depending on interactants' power dynamic, task type and the wider context of the communication. Conceiving mimicry as a schema-driven process, we conducted three experiments that examined whether the congruence between interactants' power dynamics (symmetric vs. asymmetric) and task success affected levels of LSM. We did so while exploring the consistency of this effect across cooperative and competitive tasks and the interaction context in which the conversation occurs.

Experiment 1: LSM x Power

Given the conflicting results regarding power and LSM in the literature, we began by testing the effect of power dynamics on the relationship between LSM and task success. Specifically, we manipulated participants' power dynamic during a problem-solving task by creating dyadic pairings with either symmetric or asymmetric power. We hypothesized that LSM should show a different pattern in relation to task success when partners have either a symmetric or asymmetric power dynamic.

Method

Participants. Eighty participants (self-reported 40 males and 40 females; age range 19-65 yrs) were recruited via the University online participation system and paid £5 for their participation. All participants gave written and verbal consent. Ethical approval was granted from the University of Stirling Research Ethics committee. All dyads were mixed sex (*male-female*). Half of the dyads were allocated to interactions with symmetric power (n = 20) and the other half to interactions with asymmetric power (n =20). Sample size was based on a power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007), which indicated that 64 participants would be needed to detect a medium effect ($\eta^2 = .30$) with 80% power using an F test with alpha at .05.

Materials. The problem-solving task was a modification of the Communication Conflict Situation (CCS: Blakar, 1981). Each participant is given a map of a schematic street grid, such as that shown in Figure 1. The Director's map includes a marked route that outlines a designated start and end-point (Blakar, 1981). The task requires the Director to describe the route to the Follower such that the Follower can draw the route between the start and end points marked on his or her map, which is otherwise blank. Participants completed 4 simple maps and 1 conflict map. The conflict map contained a discrepancy in what the Director and Follower received; they differ by one street, which is present on the Director's map but absent on the Follower's map (for a full description, see Gillespie & Richardson, 2011). Dyads were not advised of the discrepancy between the maps, which makes the task impossible to solve unless participants communicate successfully.

This CCS task was selected for two reasons. First, it allows for the creation of asymmetric power dynamics between speakers. The Director is in control of leading the task and is the only one who can see the correct route (see, Gillespie & Richardson, 2011; Louwerse, Dale, Bard, & Jeuniuex, 2012). Second, task success is dependent on cooperation and effective information sharing between parties. This enables us to relate variation in verbal mimicry to success on the conflict map, which served as our outcome measure.

Procedure. On arriving at the laboratory, dyads were given printed instructions regarding their task and they gave informed consent. Participants were seated across from each other in full view, but with their map shielded from view by a clipboard. Their goal was to complete the task correctly within a 30-minute time limit.

Participants within the dyad were randomly assigned to the role of '*Director*' or '*Follower*,' and were each provided with a schematic map of a street grid (Blakar, 1981). The relative power held by participants was manipulated through control of task information (van Kleef, De Dreu, & Manstead, 2006; Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Magee, Galinsky, & Gruenfeld, 2007). In the asymmetric power condition, Followers are dependent on Directors to share information accurately and to lead the task. In the symmetric power condition, participants switch task roles. For example, following trial 1, participants exchange roles on trial 2 such that the Follower becomes the Director and the Director becomes the Follower, and so forth for the remaining 3 trials. In this way, power was fluid; both partners take a turn at being in the higher power position.

Participants were given 15 minutes to complete 4 simple practice routes and 30 minutes to complete the conflict route. To account for the extra time offered on the final map, participants were advised that the final path was longer than in previous trials (i.e., from A-E, rather than A-B). Due to the ease with which the practice maps were completed (< 6 minutes for all), these data were not analyzed. Participants were fully debriefed about the nature of the experiment at the end of the study.

Language Style Matching

The data were orthographically transcribed and an overall LSM score calculated for each dyad (Ireland et al., 2011). First, transcripts were segmented by speaker to produce two speaker-specific text files, one set for each dyadic interaction. These transcripts were then submitted to analysis by the text analysis software Linguistic Inquiry and Word Count (LIWC, 2011; Pennebaker, Booth, & Francis, 2007). LIWC analyzes text documents on a word-by-word basis to calculate the proportion of total words that match a range of linguistic categories, including the nine function word categories that are used to calculate LSM (i.e., *articles, adverbs, auxiliary verbs, conjunctions, indefinite pronouns, prepositions, personal pronouns, quantifiers and negations*). The resulting LIWC scores for the nine function word categories are then submitted to the following formula to derive category-specific LSM scores (the category articles is used here as an example):

$$LSM_{articles} = 1 - [(|articles_D - articles_F|) / (articles_D + articles_F + .0001)],$$

where $articles_D$ is the percentage of articles used by the Director, and $articles_F$ is the percentage of articles used by the Follower. The denominator of .0001 is used to prevent division by zero (see Ireland et al., 2011; Niederhoffer & Pennebaker, 2002). Because we were interested in the overall pattern of function word matching, rather than the unique effect of any individual categories, the resulting nine category-specific scores were then averaged to produce a single language style matching score (Carrick, Rashid, & Taylor, 2016). This score is bounded by .00 and 1.00, with a higher score indicating greater LSM between the Director and Follower.

To help with the interpretation of LSM across the conditions, we also calculated the level of LSM that would occur by chance given the kinds of interactions we observed. First, this 'baseline LSM' was derived by randomly pairing two speakers irrespective of experimental condition (Louwerse, Dale, Bard, & Jeunieux, 2012), and calculating the LSM measure on their texts. This process was repeated for 10,000 iterations to provide a distribution of what LSM would be observed given two random speakers. We also compared what was observed in our conditions by randomly pairing each speaker from the same experimental condition and calculating a condition specific baseline score.

Results and Discussion

For both symmetric and asymmetric power conditions, the task was scored as successful only when both participants identified the discrepancy in the maps within the 30-minute time limit (Gillespie & Richardson, 2011). This created two groups: those that were successful at the task and those that were unsuccessful. Seventeen of the 20 symmetric dyads were successful, while only 2 of the 20 asymmetric dyads were successful. Figure 2 shows the mean LSM score as a function of task outcome and dyadic power balance.

A 2(Power: symmetric vs. asymmetric) x 2 (Outcome: successful vs. unsuccessful) between-subject ANOVA with LSM score as the dependent measure and baseline LSM as a covariate, found no significant main effects, but a significant interaction between power and outcome, $F(1,36) = 5.23$, $p = .028$, $\eta^2 = .04$. As can be seen in Figure 2, asymmetric dyads showed greater LSM when unsuccessful ($M = .88$, $SD = .08$) compared to successful ($M = .78$, $SD = .03$), $t(17) = 4.53$, $p = .010$, $d = 2.77$. The reverse, non-significant pattern was found for symmetric power dyads (i.e., participants with an equal chance of leading the task) who showed greater LSM when successful ($M = .93$, $SD = .07$) compared to unsuccessful ($M = .84$, $SD = .07$), t (19) = .93, $p = .364$, $d = .380$.

The mean baseline LSM was .85 ($SD = .04$), suggesting that schema inconsistent interactions are associated with an LSM that is lower than that expected from random pairings of dialogue (and the opposite for schema-consistent pairings). This pattern points towards a schema-driven account in the link between mimicry and cooperation. A breakdown of baseline scores by condition was as follows: Asymmetric Unsuccessful, $M = .83$, $SD = .06$; Symmetric Unsuccessful, $M = .85$, $SD = .12$, Asymmetric Successful, $M = .82$, $SD = .12$; and Symmetric Successful, $M = .83$, *SD* = .07. It is important to note that, while cell sizes for outcome are unequal, the standard deviations are similar, thereby bolstering confidence in the above pattern of results. [1]

To investigate whether or not LSM predicted task outcome, we complemented our ANOVA analysis with a logistic regression. First, to ensure that our effects were attributed to dyadic LSM and not natural fluctuations in baseline, we ran a model to test the impact of each predictor (power, baselineLSM) on task success (successful vs. unsuccessful). A comparison of a constant only model to a model containing each predictor was not significant, $X^2(2) = .419$, $p = .519$, Nagelkerke's $R = .014$, indicating that the predictors did not distinguish between task outcomes. A second model with power (symmetric vs. asymmetric), baselineLSM and the interaction (BaselineLSM*Power) was not significant, $X^2(2) = .418$, $p = .518$, Nagelkerke's $R = .014$ indicating that neither individual predictors, or their interaction, reliably distinguished between task outcomes.

Next, we ran a model with LSM as a predictor. A comparison of a constant only model to a model containing each predictor (power, LSM), regressed onto task success (successful vs. unsuccessful), was not significant $X^2(2) = .945$, $p = .623$, Nagelkerke's $R = .032$. A second model with all predictors and the interaction among predictors (Power*LSM) was significant for the Power*LSM interaction only, $X^2(1) = 4.28$, $p =.038$, Nagelkerke's $R = .166$, indicating that the interaction between these predictors reliably predicted task success. The model comprised a significant Power*LSM interaction ($b = .02$, Wald = 4.40, $p = .046$).

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[1] Running the ANOVA with difference score (baseline LSM - LSM) as the dependent variable did not alter the pattern of results.

Simple main effects looking at LSM as a predictor of task success found that comparison of a constant only model to a model with LSM as the predictor was significant for the asymmetric, $X^2(1) = 3.86$, $p = .049$, Nagelkerke's $R = .242$, but not the symmetric power group, $X^2(1) = .947$, $p = .330$, Nagelkerke's $R = .062$. This suggests that the effect of task success is driven by differences in LSM in the asymmetric group.

On the face of it, these findings are at odds with research showing that LSM encourages cooperation in asymmetric power pairings (e.g., Taylor & Thomas, 2008; Richardson et al., 2014). We suggest that this arises due to a difference in task type. The communication conflict situation is a problem-solving exercise based around cooperation, in which participants must work together to achieve a shared goal (i.e., solving the route on the map). By contrast, lab-based negotiations require participants to compete by striving for the best individual outcome rather than the optimal joint outcome. Their default behavior is to work against one another (Weingart, Bennett, & Brett, 1993). [2]

Experiment 2: LSM x Power x Task Type

Because this difference in task type may explain the findings of Experiment 1, we conducted a second experiment to test whether the cooperative or competitive nature of the task interacts with LSM, power and cooperation. Specifically, we examined whether power and task type interact with language matching and task success. In situations of symmetric power, when participants interact with a peer, mimicry is likely to foster affiliation and rapport to meet collaborative, shared goals.

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[2] Another possible way of measuring task success was to compare the time taken to solve the task. We decided not to test this effect because most dyads in the asymmetric condition used the maximum time (*M*= 23 minutes and 55 seconds; 1412 seconds) to complete the task. This compared to symmetric dyads that showed more variability (*M*= 9 minutes; 538 seconds on average).

By contrast, when asked to compete with a peer, levels of affiliation and rapport are likely to be lower, such that high levels of mimicry in this condition violates people's schemas (Scissors et al., 2008). For example, Taylor and Thomas (2008) suggest that, in competitive situations, LSM serves to align speakers thought processes and help overcome differences. On the other hand, Ireland and Henderson (2014) suggest that LSM, which signals affiliation and liking, can interfere with peer-to-peer competition. Thus, we proposed that matching will be higher only when the task is cooperative and the power dynamic is symmetric, and when the task is competitive and the power dynamic is asymmetric. We predicted that high levels of LSM will be associated with different levels of task success in cooperative vs. competitive tasks with symmetric vs. asymmetric power. While there is indirect evidence for these hypotheses (Ireland & Henderson, 2014; Louwerse et al., 2012), this is the first systematic test that allows for direct comparison.

Method

Participants. One hundred and sixty participants were paid £4 for their participation. Participants were recruited at a different University from those in Experiment 1, again via the online participation system. All participants gave written and verbal consent. Ethical approval was granted from Lancaster University Research Ethics committee. Half of the participants (self-reported sex: 49 males, 31 females; age range: 19-43 yrs) took part in a cooperative version of a negotiation task while the remaining half (53 males, 33 females; age range: 19-49 yrs) took part in a competitive version of the same task. Participants were randomly assigned to dyad condition (either same-sex and mixed-sex), asked to confirm that they did not know each other, and then randomly assigned to either a symmetric (n = 40) or asymmetric (n = 40) power condition. Based on Experiment 1, we used a sample size of 152 to detect a medium effect (η^2 = .30) with 80% power using an *F* test with alpha at .05.

Materials and Procedure. On arriving at the laboratory, participants were paired and provided with instructions for the negotiation task. The task was a standard 8-issue employment negotiation (Olekalns & Smith, 2005), where participants were randomly assigned to the role of employer or employee and asked to work through the 8 issues relating to terms of employment. Each of the 8 issues (*salary, vacation, start date, package, location, contract, annual raise and assignment*) had 5 possible options (e.g., *Location: London, Edinburgh, Sheffield, Liverpool or Manchester*) on which participants were instructed to negotiate. Participants were provided a ‘payoff schedule’ that assigned ‘points’ to each option so that certain choices were favored. Of the 8 issues, 3 were distributive (participants’ preference and allocation of points were in direct opposition), 4 were integrative (the employer had a stronger preference for 2 of these issues, the employee for the other 2) and 1 was compatible, offering the same reward for each participant. Success in this task is contingent on negotiators discovering mutually beneficial trade-offs (i.e., exchanging issues of low priority for issues of high priority) and doing this either cooperatively, or competitively by taking more resources for themselves (Olekalns & Smith, 2005). Participants were seated across from each other in full view of their partner. Payoff schedules were presented on a stand on the table in front of each participant, thus each participant could view only their own payoff schedule. They were given 30-minutes to reach an agreement.

In the cooperative version of the task, participants were instructed that the aim was to work together and cooperate with their partner to secure the most joint points. In the competitive version of the task, participants were instructed that the aim was to compete against their partner, ensuring that they gained more points individually

(Maddux, Mullen, & Galinsky, 2008). Participants were incentivized by offering a reward for the individual with the highest amount of points in the competitive task and for the dyad with the highest amount of joint points in the cooperative task. At the end of data collection, all participants were sent an email informing them of the winning dyad.

Power manipulation. Power was manipulated through participant's control of task information. In the symmetric power condition, each participant saw only his or her own payoff schedule. In the asymmetric power condition, employers could view 4 of the 8 issues on the employee's schedule and the points awarded for them. Thus, participants could either use this additional information to benefit themselves (i.e., in the competitive task) or the dyad (i.e., in the cooperative task). It was at the participants' discretion how much to reveal about the information that they held.

Outcome measures. Dyads were scored as having succeeded at the task if they reached an agreement on all 8 issues within the 30-minute time limit. Dyads who ran out of time were scored as unsuccessful. In the cooperative condition, 26 dyads solved the task (13 in the symmetric condition, 13 in the asymmetric condition). In the competitive condition, 29 dyads solved the task (17 in the asymmetric condition and 12 in the symmetric condition).

Results

Manipulation check. To ensure that the power manipulation was effective, participants completed a post-session questionnaire that asked them to rate on a Likert scale, ranging from 'not at all' (1) to 'very much' (7), "*How much power they felt that they had in the task*" and "*How much control they felt they had over the outcome of the task*." The data were normally distributed. Participants in the high power condition rated themselves as feeling both more powerful (M = 3.50, SD = .86) than those in the low power condition (*M* = 2.40, *SD* =.93), $t(78) = 3.86$, $p < .001$, $\eta^2 = .06$, and as perceiving themselves to have more control over the task (*M* = 3.90, *SD* = .71) compared to those in the low power condition (*M* = 2.22, *SD* = .89), $t(78) = -2.86$, $p = .005$, $\eta^2 = .03$.

To test whether our task manipulation was effective, the number of joint points gained was used to examine whether dyads were using an integrative (cooperative) or a distributive (competitive) strategy in the negotiation. When all potential integrative trade-offs are realized, it is possible for negotiators to earn a maximum of 28,800 joint points. When negotiators resort to distributive agreements on each issue, it is possible for negotiators to earn a maximum joint outcome of 19,200. Thus, we coded negotiations that ended with 19,200 or fewer points as distributive in nature and negotiations ending with over 19,200 points as integrative in nature. This coding revealed that 34 of the competitive dyads were using a distributive strategy and that all 40 of the cooperative dyads were using an integrative strategy. This suggests the task manipulation was highly effective. This was confirmed by a significant one-way ANOVA with total points as the dependent variable and task (cooperative vs. competitive) as the independent variable. Cooperative dyads scored more points overall (*M* = 24,295, *SD* = 1963.38) than compared to competitive dyads (*M*= 18,348, *SD* = 1954.12), $F(1,78) = 184.36$, $p < .001$, $\eta^2 = .70$, 95%CI [.587, .772].

Analysis of negotiation outcome. Figure 3 shows the mean LSM for each interaction as a function of power, task type and outcome. A 2 (Power: asymmetric vs. symmetric) x 2 (Task Type: cooperative vs. competitive) x 2 (Outcome: successful vs. unsuccessful) between-subjects ANOVA with LSM as the dependent variable revealed a significant three-way interaction after controlling for baseline LSM, *F*(1,

72) = 48.26, $p < .001$, $\eta^2 = .43$. In line with our hypotheses, cooperative dyads with symmetric power and competitive dyads with asymmetric power that succeeded on the task showed higher levels of LSM, compared with dyads that were classed as unsuccessful. Specifically, an analysis of simple effects revealed: (1) a main effect of power for successful dyads, $F(1,51) = 3.97$, $p = .020$, $\eta^2 = .072$, 95%CI [.001, .230], with dyads displaying higher LSM in the asymmetric ($M = .87$, $SD = .06$) compared to symmetric power condition ($M = .84$, $SD = .03$), and a main effect of power for unsuccessful dyads, $F(1,21) = 16.47$, $p = .001$, $\eta^2 = .440$, 95%CI [.001, .230], with dyads displaying higher LSM in the symmetric ($M = .89$, $SD = .07$) compared to asymmetric power condition ($M = .85$, $SD = .03$); (2) a main effect of task for unsuccessful dyads, $F(1, 21) = 11.59$, $p =.003$, $\eta^2 = .356$, 95%CI [.055, 576], with unsuccessful cooperative dyads displaying higher levels of LSM ($M = .88$, $SD = .04$) than unsuccessful competitive dyads ($M = .86$, $SD = .06$); (3) a significant Power x Task interaction for successful dyads, $F(1, 51) = 4.88$, $p =.032$, $\eta^2 = .087$; symmetric cooperative dyads had higher LSM ($M =.86$, $SD = .03$) compared to symmetric competitive dyads ($M =.83$, $SD = .05$), with the reverse pattern for asymmetric dyads ($M = .89$, $SD = .07$ for asymmetric competitive, and $M = .86$, $SD = .04$ for asymmetric cooperative dyads. The opposite interaction was found for unsuccessful dyads, $F(1, 21) = 63.44$, $p =<.001$, $\eta^2 = .75$; symmetric cooperative dyads had lower LSM ($M =.84$, $SD = .07$) compared to symmetric competitive dyads ($M =.92$, $SD= .02$), and asymmetric cooperative dyads has higher LSM ($M = .91$, $SD= .02$) compared with asymmetric competitive dyads ($M =.71$, $SD = .03$).

This pattern of results suggests that the interaction is driven by the difference between symmetric and asymmetric dyads, with higher LSM overall for symmetric dyads. In addition, unsuccessful symmetric dyads display overall higher LSM than unsuccessful asymmetric dyads, and cooperative dyads have higher LSM overall compared to competitive dyads when unsuccessful. These patterns, in particular, the two-way interaction between power and task type are consistent with our hypothesis that matching is higher only when the task is cooperative and the power dynamic is symmetric, and when the task is competitive and the power dynamic is asymmetric. Both situations represent an interaction type that is schema consistent.

Consistent with Experiment 1, the baseline LSM fell midway between the observed scores (M = .84; SD = .05). By condition the baseline scores were: Asymmetric Competitive Successful (M = .85, SD = .06); Asymmetric Competitive Unsuccessful (M = .83, SD = .08); Asymmetric Cooperative Successful (M = .84, SD = .06), Asymmetric Cooperative Unsuccessful (M = .85, SD = .06); Symmetric Cooperative Unsuccessful (M = .85, SD= .07); Symmetric Cooperative Successful (M = .85, SD= .03); Symmetric Competitive Unsuccessful (M = .83, SD = .02); Symmetric Competitive Successful (M = .83, SD = .02). [3]

LSM as a predictor of success. First, a logistic regression analysis was conducted to predict outcome (successful vs. unsuccessful) from power (symmetric vs. asymmetric), task type (cooperative vs. competitive) and baselineLSM. Comparison of a constant only model to a model containing each predictor was not significant, $X^2(3) = 1.20$, p = .369, Nagelkerke's R = .035. A second model containing each predictor, and all two-way interaction terms (BaselineLSM*Power; BaselineLSM*Task; and Power*Task) was not significant, $X^2(5) = 1.75$, p = .186, Nagelkerke's R = .064, nor was a third model containing all predictors, all 2-way

[3] Re-running the ANOVA with difference score in the model did not significantly alter the pattern of results.

interaction terms and the 3-way interaction (BaselineLSM*Power*Task), $X^2(1) = 3.75$, $p = .290$, Nagelkerke's $R = .064$. This indicates that baselineLSM, in combination with other variables, did not reliably distinguish between outcomes.

Next, a logistic regression analysis was conducted to predict outcome (successful vs. unsuccessful) from power (symmetric vs. asymmetric), task type (cooperative vs. competitive) and LSM. Model 1 against a constant only model was not statistically significant, indicating that individually the predictors did not reliably distinguish between outcome, $X^2(3) = 2.65$, $p = .448$, Nagelkerke's $R = .046$. Model 2 with all interaction terms (LMS*Power; LSM*Task; and Power*Task) was statistically significant, indicating that the interaction between predictors did reliably distinguish between outcome, $X^2(3) = 9.42$, $p = .024$, Nagelkerke's $R = .197$. Significant predictors were LSM ($p = .014$, $b = 3.27$), power ($p =.011$, $b = 4.47$), and the interaction between power and outcome ($p =.013$, $b = .02$). The third model with the 3-way interaction (LMS*Power*Task) was statistically significant, indicating that the interaction did reliably distinguish between outcome, $X^2(1) = 41,07$, $p < .001$. Nagelkerke's $R = .638$ indicated a moderate to strong relationship between predictors and outcome. The interaction between power, task and LSM made a significant contribution to task outcome (p=.040, $b = .01$).

Experiment 3: LSM x Power x Interaction Context

In two experiments, we have shown that task type interacts with power symmetry to determine the link between LSM and interaction outcome. We show first, that levels of LSM differ depending on power dynamics and task type and, second, that power, task type and LSM all contribute to predict task outcome. However, we demonstrated this by manipulating the cooperative vs. competitive orientation of the task within the same context. As such, we do not know whether the effect is specific to the type of exchange-related context that negotiations typify. In Experiment 3, we sought to disentangle the effect of task type and the interaction context by examining whether different interaction contexts produce the same patterns.

Interaction Context

In Experiments 1 and 2, participants worked on tasks within a single context (e.g., a competitive vs. cooperative negotiation). In Experiment 3, we disentangle the task (cooperation vs. competition) from the interaction context (negotiation vs. social) while assessing similar outcomes (i.e., the success of the interaction). To equate for success in the social interaction context, we took a measure of whether participants would want to interact with their partner in the future, with '*Yes*' being our measure of interaction success. In line with our previous findings, we predicted that LSM would be associated with task success in a social interaction context compared to a negotiation context within a symmetric power dynamic. We predicted the reverse pattern for the negotiation context, with more LSM associated with task success when there is an asymmetric power dynamic compared to a symmetric power dynamic.

Method

Participants. Eighty undergraduate participants (self-reported sex: 48 females, 32 males; age range 17-32 yrs) were recruited via the University's online participation system and paid £3.50 for a 30-minute study. All participants gave written and verbal consent. Ethical approval was granted from Lancaster University Research Ethics committee. Restrictions were put in place so that participants from Experiment 2 could not take part. Based on the results of Experiment 2, we estimated a total sample size of 76 participants (total dyads = 80) to detect a medium effect ($\eta^2 = .30$) with 80% power using an F test with alpha at .05.

Materials and Procedure. On arrival at the lab, participants were randomly assigned to a high power, low power or control (no power prime) manipulation. They then received a power prime, following Magee and Galinsky (2008), that consisted of giving participants 5-minutes to write an essay either about a time they experienced power over someone else (high power prime) or a time someone else experienced power over them (low power prime). Participants in the control condition did not complete an essay.

On completion of the writing task, participants were separated into either a high-power—low-power dyad or a control—control dyad. This pairing strategy ensured that dyads formed either asymmetric (high power prime—low power prime) or symmetric (no power prime—no power prime) pairings. They were asked to confirm that they did not know their interaction partner. Dyads comprised a mix of same and mixed sex pairings. Participants were instructed that they would take part in a negotiation task lasting 10-minutes. Half of the dyads completed the negotiation task followed by the social interaction, whereas the other half completed the social interaction followed by the negotiation. Participants interacted in each context with a different partner, while still maintaining the symmetric or asymmetric pairing.

The negotiation context was a competitive employment negotiation, equivalent to that used in Experiment 2. Eight issues were reduced to 6 issues (*salary, vacation, start date, location, contract and assignment*) due to the reduced time limit of 10-minutes. Three of these issues were integrative, 2 were distributive and 1 was compatible. The social interaction context was operationalized as an informal conversation with another participant. Participants were told that they had 10-minutes to chat, with the aim of getting to know each other, while they waited for the next part of the experiment. In both tasks, participants were seated in full view, with payoff schedules blocked from view during the negotiation as per Experiment 2.

Outcome measures. LSM scores were calculated using the same method as Experiments 1 and 2. Negotiation outcome was calculated in line with Experiment 2 (n = 19 *successful* vs. n = 21 *unsuccessful)*, yielding dyad success as a measure of cooperation. As a measure of success in the social interaction context, participants were given a post session questionnaire that asked '*Please indicate whether you would be willing to meet and interact with your partner again on a future task*?' (Lakin & Chartrand, 2003). This was scored as successful (*Yes*) or unsuccessful (*No*). To be successful, each partner had to indicate '*Yes*' to a future meeting (n = 18). Participants had no reason to expect that they would interact with their partner again in the future. These measures were completed alongside various other post-experiment measures including perceptions of power, liking, and task enjoyment.

Results

Power manipulation check. A post-session questionnaire was used to ensure that the power manipulation was effective. Participants were asked to rate how much power and influence they felt that they had during the interactions. A 3 level (Power: High vs. Low vs. Control) univariate ANOVA with rating of control (1 = *not at all* to 7 = *very much*) as the dependent variable revealed a significant main effect of power, $F(2,57) = 62.34$, $p < .001$, $\eta^2 = .686$, 95%CI [.532, .764]. Tukey post-hoc tests revealed a significant difference between high power and low power conditions, with low power participants rating themselves as having less control ($M = 2.60$, $SD = .87$) than high power participants ($M = 5.35$, $SD = .92$, $p < .001$). Low power participants also rated themselves as having less control than control participants ($M = 3.25$, $SD = .87$, $p < .001$). Finally, control participants rated themselves as having less control than high-power participants ($p < .001$). This suggests that our power manipulation was effective.

Valence manipulation check. To increase confidence that any observed differences across condition were attributable to the change in interaction context rather than the potential affective valence associated with that context (i.e., a competitive task based activity versus a friendly chat), we ran two checks. First, a post-session questionnaire was used to check for a difference in task enjoyment across context (competitive negotiation vs. social interaction). A comparison of participant ratings of task enjoyment (*1 = not at all, 7 = very much*) across conditions revealed no significant effect of task enjoyment for power (symmetric vs. asymmetric), $F(1, 76) = 2.34$, $p = .130$, context (negotiation vs. social interaction), $F(1, 76) = .800$, $p = .385$, or Context*Power, $F(1, 76) = .450$, $p = .514$.

Second, we compared the amount of affective language shown by our dyads across conditions, as measured by relevant categories in the LIWC output. Participants did not differ in their use of affective language (i.e., affect category) across power, $F(1,76) = .54$, $p = .465$, context, $F(1,76) = 2.33$, $p = .131$, or the interaction, $F(1,76) = .15$, $p = .696$. There were no significant differences when affect was split by positive affect (power, $F(1,76) = .92$, $p = .339$, context, $F(1,76) = 1.59$, $p = .198$, or the interaction, $F(1,76) = 1.84$, $p = .179$) or negative affect (power, $F(1,76) = .01$, $p = .928$, context, $F(1,76) = 3.47$, $p = .066$, or the interaction, $F(1,76) = 1.63$, $p = .205$).

Equivalent findings were also found for LIWC's emotional tone category for power $F(1,76) = 3.74$, $p = .057$, context, $F(1,76) = 1.01$, $p = .317$, and the power x context interaction, $F(1, 76) = 2.70$, $p = .105$, and for LIWC's negations category across power, $F(1,76) = 1.65$, $p = .216$, context, $F(1,76) = .09$, $p = .770$, and the power x context interaction, $F(1,76) = 1.08$, $p = .302$. This absence of differences in measures of affective valence across our conditions is supported by Paxton and Dale (2013) who studied differences between arguments and friendly interactions and found that affective changes do not significantly predict changes in levels of interpersonal synchrony. They suggest that differences in affective valence between affiliation and argument cannot fully explain patterns of mimicry; thus, other factors, such as the interaction context, are likely impacting observed patterns.

Hypothesis tests. Figure 4 shows the mean LSM scores as a function of power, context and outcome. After controlling for baseline LSM, higher levels of matching were found in the social interaction condition compared to the negotiation condition, $F(1, 72) = 7.46$, $p = .008$, $\eta^2 = .08$. This main effect was subsumed by a significant three-way interaction between power, context and outcome, $F(1,72) = 14.88$, $p < .001$, $\eta^2 = .22$. Consistent with the prior experiments, the baseline LSM fell midway between the observed scores ($M = .82$; $SD = .10$). Condition specific baselines were as follows: Asymmetric Negotiation Successful ($M = .83$, $SD = .12$); Asymmetric Social Successful ($M = .84$, $SD = .12$); Symmetric Negotiation Successful ($M = .83$, $SD = .10$); Symmetric Social Successful ($M = .83$, $SD = .16$); Asymmetric Negotiation Unsuccessful ($M = .84$, $SD = .12$); Asymmetric Social Unsuccessful ($M = .84$, $SD = .08$); Symmetric Negotiation Unsuccessful ($M = .82$, $SD = .13$).

A planned analysis of the simple main effects confirmed a main effect of context for successful dyads, $F(1, 37) = 5.34$, $p = .027$, $\eta^2 = .014$, 95%CI [.780, .850], with dyads displaying higher LSM in the social interaction context ($M = .87$, $SD = .02$) compared to the negotiation context ($M = .81$, $SD = .02$). There was a significant 2-way interaction between power and interaction context for unsuccessful dyads, $F(1, 39) = 12.66$, $p = .001$, $\eta^2 = .25$. Symmetric dyads in the social interaction context had lower LSM (*M* = .80*, SD* = .04) compared to symmetric dyads in the negotiation context (*M* = .86*, SD* = .04). In contrast, asymmetric dyads in the social interaction context had higher LSM (*M* = .92*, SD* = .03) than asymmetric dyads in the negotiation context (*M* = .86*, SD* = .04).

In order to test our prediction that LSM levels will depend on power and interaction type, an analysis of the simple main effects by power revealed a main effect of interaction context for asymmetric dyads, $F(1, 36) = 41.60$, $p < .001$, $\eta^2 = .98$. Asymmetric dyads displayed higher levels of language matching in the social interaction context (*M* = .90*, SD* =.07) compared to negotiation context (*M* =.79*, SD* = .03). For asymmetric dyads, there was also a main effect of outcome, $F(1, 36) = 6.77$, $p = .013$, $\eta^2 = .19$. Asymmetric dyads who solved the task had higher levels of language matching overall (*M* = .87*, SD* = .03) compared with asymmetric dyads who did not solve the task (*M* = .83*, SD* = .06). There was a significant interaction between context and outcome, $F(1, 36) = 32.68$, $p < .001$, $\eta^2 = .91$. Asymmetric dyads in the social interaction context, who were unsuccessful had higher levels of LSM (*M*= .92, *SD* = .01) than when successful (*M* = .87, *SD* = .03). There was no interaction for symmetric dyads ($F < 1$).

Random Effects

Due to counterbalancing of task order and the fact that participants were members of more than one dyad, a linear random intercept multilevel model with task order, participant (i.e., dyad structure), and baseline LSM as random effects was used to explore the relationship between LSM, power, context and outcome. This model confirmed the relationship between LSM, power, context and outcome. In model 1, the three random effects (task order, participant and baseline LSM) contributed 10.7% to the total variance. Model 2 with random effects plus power revealed that including power as a fixed effect explained 12.35%, of which .78% was explained by power. Adding interaction context alongside power and the random effects in Model 3, explained 17.14% of the model (9% for context as a fixed factor). The final model, model 4 (random effects, power, context, outcome and the interaction terms), explained 36.59% of total variance, of which 29.88% was explained by fixed factors (power, context, and outcome) and 6.71% is explained by random factors (participant, task order, and baseline LSM) (see Table 1 for beta weights and significance).

In line with Experiment 2, we found a significant interaction in the negotiation context. Dyads with asymmetric power showed more LSM when successful than unsuccessful, whereas dyads with symmetric power showed higher levels of LSM when unsuccessful. This suggests that the effects of power on LSM are dependent on interaction context (negotiation) when there is a clear directive (task outcome).

General Discussion

Across three experiments, we manipulated the power dynamic (symmetric vs. asymmetric), task (cooperative vs. competitive), and interaction context (social vs. negotiation) experienced by a conversing dyad, to demonstrate how these factors affect LSM when matching is in line with schema-led expectations (Dalton et al., 2010). In Experiment 1, we found high levels of matching between symmetric but not asymmetric dyads when successfully completing a problem-solving task. Experiment 2 went on to test the hypothesis that both power and task type interact with LSM and task success. We found that LSM was associated with a task benefit for symmetric dyads engaged in a cooperative task and for asymmetric dyads engaged in a competitive task. Finally, Experiment 3 tested an alternative explanation for the interaction between LSM, context, and power. Specifically, we tested whether it was the cooperative or competitive nature of the task, or the specific interaction context in which that task took place, that was responsible for the differences we observed.

Results show that high LSM is associated with task success in conditions of symmetry and cooperation, and asymmetry and competition, but not symmetry and competition or asymmetric and cooperation. We suggest that these patterns of LSM in Experiment 2 are different due to a violation of schema such that LSM, which often signals affiliation and liking, can interfere with peer-to-peer competition (i.e., symmetric competitive dyads) but is associated with success in cases of peer-to-peer cooperation (i.e., symmetric cooperative dyads). The comparatively high LSM associated with asymmetric cooperative dyads across both conditions of success is likely due to the presence of LSM as a cooperative, affiliate signal used to overcome the struggle for competition in these dyads. These dyads seek to cooperate more, as signalled by higher levels of LSM, but this focus on affiliation is detrimental to the overall asymmetric nature of their relationship. In Experiment 3, we found that LSM and power interact when participants are placed in a negotiation context, but not in a social interaction context. This is likely due to dyads in the social interaction context focusing on rapport creation and affiliation (Babcock et al., 2014), rather than outcome, where affiliation is typically associated overall higher levels of verbal matching (Babcock et al., 2014; Giles & Coupland, 1991; Ireland et al., 2011).

Our three experiments suggest that LSM varies with task type (problem solving vs. competition) and with the wider social context (affiliation vs. task focused). The results also provide support for a change in patterns of LSM across contexts, particularly in competitive situations where communication is likely more challenging (Fusaroli et al. 2012). The common conception in the literature is that verbal mimicry enhances cooperation (e.g., Taylor & Thomas, 2008) and can facilitate task completion (e.g., Garrod & Doherty, 2004; Valdesolo, Ouyang, & DeSteno, 2010); crucially, we find that this is only the case in situations where the behaviour is in line with social schemas.

Our research suggests that linking cooperation to the presence or absence of verbal mimicry is too simplistic an account, and that an individual's schematic expectation should be considered. Theoretically, the data we present here provides a strong account of why verbal mimicry has sometimes been associated with negative outcomes. For example, Ireland and Henderson's (2014) finding that LSM negatively correlates with task success can, in part, by explained by these schematic differences. LSM may interfere with, rather than facilitate, problem solving when the task is of a competitive nature and peers (i.e., symmetric dyads) who have an innate tendency towards affiliation and relational identity (Taylor & Donohue, 2007) interact. Our pattern or results also supports research by Babcock et al., (2014) showing that LSM fluctuates depending on the interaction content (social or task driven), rather than being consistently associated with positive outcomes.

However, the schema-dependent account is not the only possible account. For example, other alternatives are that verbal mimicry may serve as a signal of a disposition (e.g., pro-social orientation), or, as outlined in IAM, mimicry may be functional in the sense that it serves to facilitate the task at hand (Garrod & Pickering, 2004). Looking at our results through the lens of communication accommodation theory may conceive of verbal mimicry as serving to create affiliation (Giles & Coupland, 1991). This explanation avoids the need to pre-suppose schemas and fits many of the conditions where we find patterns of mimicry lead to better interaction outcomes. This account would also arguably view verbal mimicry as task orientated in a symmetric negotiation condition, since each party has good reasons to build rapport and exchange information about mutual interests (Olekalns & Smith, 2005). An absence of mimicry in this situation would be associated with a failure to recognize the opportunities afforded by seeking integrative solutions, but this is the opposite of what our data show.

LSM did not disappear or decrease when communication was challenging, but we observed patterns of adaptation and change across contexts. This suggests that LSM fluctuates in a context specific fashion. In the future, it would be useful to consider whether matching of certain function words categories are associated with change in context. Looking at task-relevant words, Fusaroli and Tylén (2016) suggest that, whereas general linguistic alignment does not have a positive effect on task performance, alignment of certain task relevant vocabularies does correlate with performance: the more dyads selectively align on task related words, the better they perform. Future work in this area could further tease apart the relationship between LSM and context in order to explore whether this matching is indiscriminate, or specific to the type of task based language, as predicted by the interpersonal synergies model (Fusaroli, Rączaszek-Leonardi, & Tylén, 2014; Riley, Richardson, Shockley, & Ramenzoni, 2011).

Another possible explanation for our findings concerns the differences in affective valence across experimental conditions. This is most pronounced in Experiment 3 where we have a competitive negotiation context (an interaction with potentially negative valence), and a social interaction context (an interaction with potentially positive valence). The null effects that we report for task enjoyment and affective language lead us to conclude that the differences we report are likely attributable to the interaction context manipulated in our experiment, rather than differences in affective valence. However, this does not represent a direct test. Future research could run similar experiments with the inclusion of four experimental conditions (collaborative social, divisive social, collaborative task, and divisive task).

Overall, our results point to the importance of interaction context on verbal mimicry, yet how these patterns might interact with other forms of mimicry remains to be explored. Work on behavioural mimicry is increasingly exploring the effects of contexts, and is beginning to suggest that behavioural mimicry is affected by variables such as affective engagement and task constraints (e.g., Bernieri, Davis, Rosenthal, & Knee, 1994; Duran & Fusaroli, 2017; Miles, Griffiths, Richardson, & Macrae, 2010; Tschacher, Rees, & Ramseyer, 2014).

Given these similar patterns of results in the non-conscious behavioural mimicry literature, namely the relationship between behavioural mimicry and affiliation (Chatrand & Lakin, 2013), as well its findings on the adaptive nature of mimicry to changes in social dynamics (Lakin & Chartrand, 2008; Muir et al., 2016), it is likely that we may see a similar pattern of context specific behavioural mimicry (Paxton & Dale, 2013). Given that our dyads were seated in full view of each other, it is possible that the patterns of LSM observed in our data could have been contaminated, or even facilitated, by similarities in behavioural mimicry between dyads. Considering these processes at both the unimodal, as we have done here, and multimodal level would allow us to further tease apart the relationship between mimicry and interaction context. This could include non-verbal behaviours such as mimicry of posture and mannerisms, but also speech factors such as pitch, tone and speech rate (Giles & Coupland, 1991) that were not captured in our study.

Practically, our results elucidate the situations in which speakers should be confident, or wary, about using mimicry strategically. For example, as suggested by our results, LSM may be unlikely to associate with success amongst peers competing for a shared resource. Having provided an understanding of the way power and interaction context affect mimicry, research can begin to move towards considering its use in applied contexts where communication has consequences. Developing cooperation quickly and effectively is critical to hostage negotiations where rapport is viewed as the first step toward conflict de-escalation and a peaceful resolution (Taylor & Donald, 2004). Our findings coupled with follow-on work could be used to identify the appropriate pattern of matching to adopt given the power dynamic and task focus held by the perpetrator.

Conclusion

The specific structures of our communication-how we say what we say- play a critical role in determining the outcomes of those communications. Whereas the traditional view is that verbal mimicry elicits positive behaviors that lead to more successful interactions, recent contradictory findings lead us to believe that this picture is incomplete (Ireland & Henderson, 2014; Taylor & Thomas, 2008). To complete the picture, LSM must be considered as an automatic, schema-driven process. To wholly understand the potential application of language matching in our social lives, we need to co-opt this naturally occurring process, and examine how the interaction context influences it and understand the schematic expectations associated with that context. Our findings point to the types of conditions under which language matching may potentially be used to benefit interaction and when it is best controlled in order to avoid harming the interaction.

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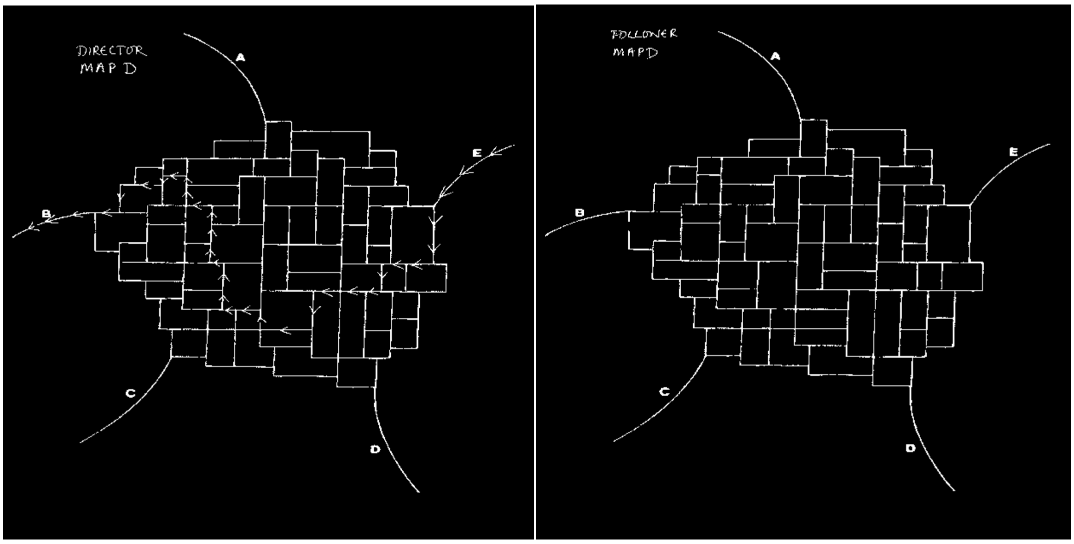

Figure 1: Director and Follow Maps on the Communication Conflict Task Route D: The Conflict Route

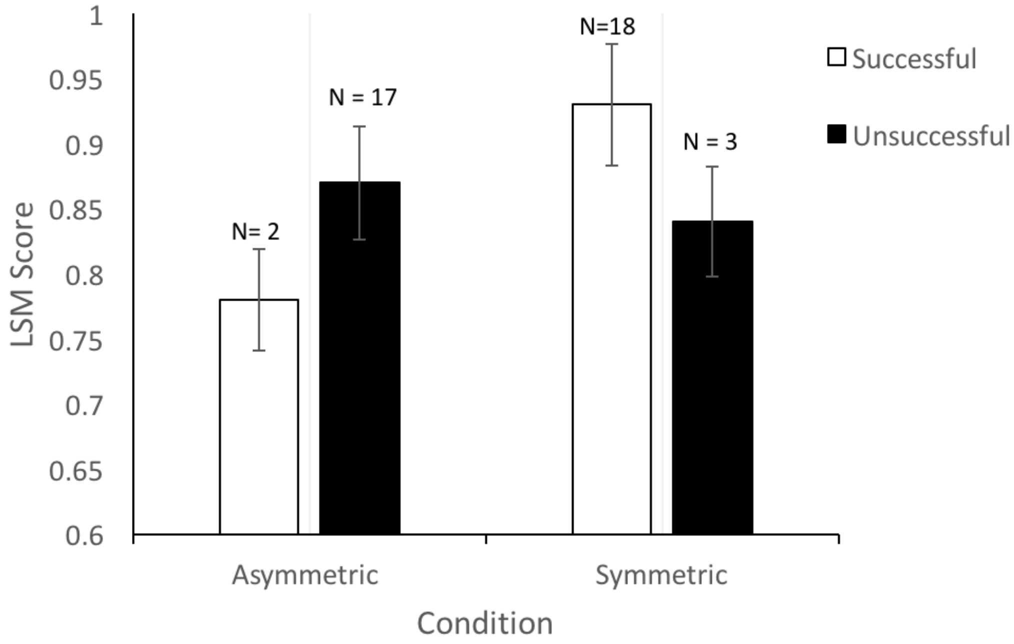

Figure 2: Mean Language Style Matching score as a function of Outcome and Power (*Error Bars represent 95% CIs*).

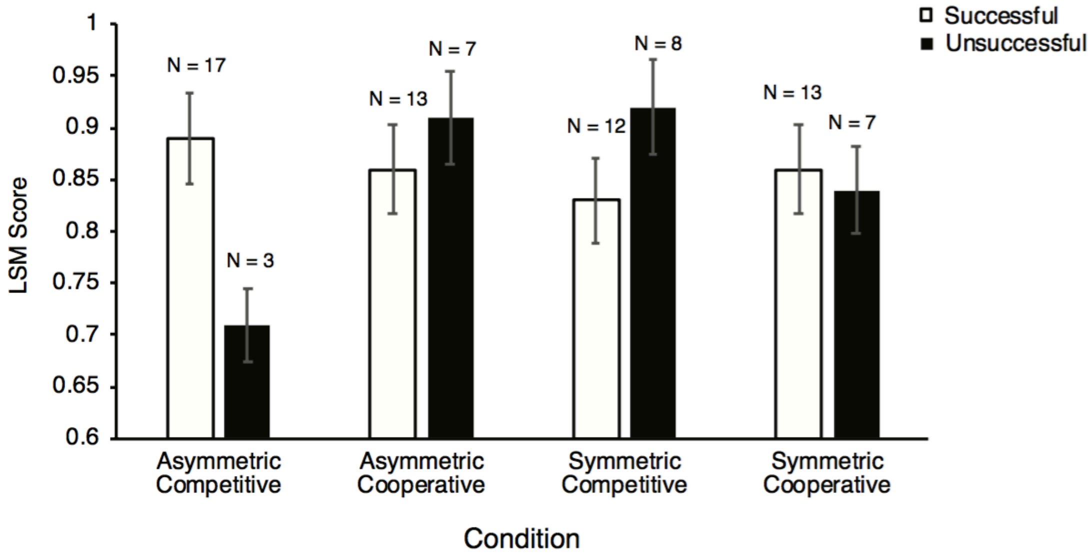

Figure 3: Mean Language Matching Score as a function of Outcome, Power and Task Type (*Error Bars represent SEs*).

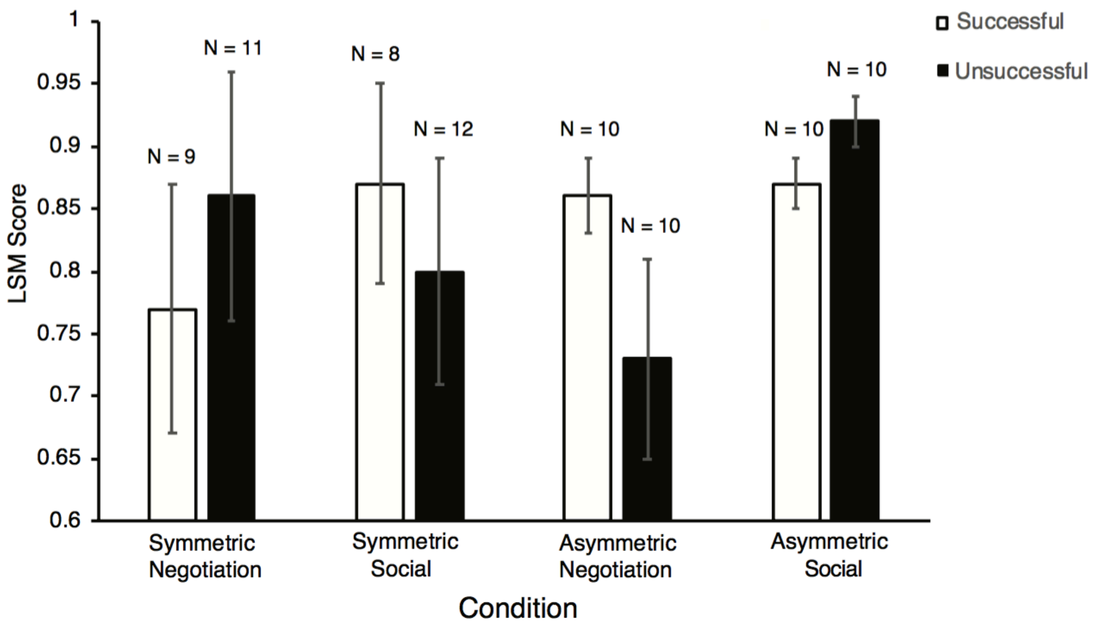

Figure 4: Mean Language Style Matching Score as a function of Outcome, Power and Context (*Error Bars represent SEs*).

Table 1. Multilevel model fixed effect coefficients for LSM[4]

	Model 1		Model 2		Model 3		Model 4	
Fixed Effects	**B**	***SE***	**B**	***SE***	**B**	***SE***	**B**	***SE***
Intercept	0.836	0.01	0.826	0.02	.800	0.02	0.765	0.03
Power			0.020	0.02	0.201	0.02	0.097	0.04
Task					0.065	0.02**	0.110	0.04**
Outcome							0.099	0.04
*Power*Context*							0.100	0.06
*Power*Outcome*							0.227	0.06
*Context*Outcome*							0.175	0.06*
*Power*Context*Outcome*							0.351	0.08**

*** Denotes $p < .05$**

**** Denotes $p < .001$**

[4] Data were analyzed using R, version 3.4: R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/. (package = 'lme4').

Code: Model <- lmer(LSM~ + Power + Goal + Outcome + Power*Goal*Outcome + (1| TaskOrder) +
(1| Participant) +
(1| Baseline),
data = Data,
REML = F).
summary (Model)
LogLik(Model)
R.squaredGLMM(Model).