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Doubling up on double meanings: Pragmatic alignment

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Garrod and Pickering (2004) maintain that conversation is easy because automatic alignment occurs at various levels during conversation. Other related theories of alignment have also been proposed for emotional/mood alignment (Hatfield, Cacioppo, & Rapson, 1994). Though there is a large literature on pragmatics in discourse, there is as of yet no experimental demonstration that this level also undergoes alignment. Two experiments test the impact of the use of indirect language by a pseudo-confederate on participant contributions to interaction. Overall, individuals coordinate during interaction at the level of pragmatics (Experiment 1), and this is not explained merely by mood inducement through content of a double meaning (Experiment 2). We discuss findings in terms of psycholinguistic alignment and emotional contagion.

Keywords: Dialogue; Alignment; Pragmatics; Priming.

“When you have nothing to do and lots of time to do it, come on up”, is a classic use of indirect language (IL) by Mae West (Cowan & Cline, 1940). Mae West was infamous for her use of IL to counteract censorship of a sexual nature during the early 1940’s film industry. For example, Mae West made no secret of her intentions to promote herself sexually. She even publicly stated, “It isn’t what I do, but how I do it. It isn’t what I say, but how I say it, and how I look when I do it and say it” (Chandler, 2009). She capitalised on her audience’s ability to successfully interpret her intent from the use of paralinguistic and nonverbal cues to spoken sexual innuendo to

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counteract reprisal from censorship laws (Failler, 2001). The use of IL was central to Mae West's triumph over 1940's cinematic industry. As language users, it is not only entertaining, but also common and useful for interlocutors to integrate IL during colloquial communication. The purpose of the study presented here is to determine whether, when we hear IL from a conversation partner, we may also come to use IL and align pragmatically during dialogue. In short, we test whether conversation partners could be primed to be as conversationally "cheeky" as Mae West.

Currently, there has been a growing research agenda to identify this sort of joint action between interlocutors during dialogue. However, much of our understanding of language and dialogue has often been based on studies of single language processors (e.g., single word/sentence production and comprehension in text/monologue; Bock, 1986; Potter & Lombardi, 1990). While this is a powerful simplifying assumption, natural language is learned and most often occurs in the context of social interactions (Clark, 1992). This has been a longstanding concern (e.g., Clark, 1975), and recent growth in this research seeks to find a mechanistic account for the great ease with which humans process dialogue.

In one prominent example, Garrod and Pickering (2004) have proposed a model of interactive alignment to explain the possible mechanisms behind the effortless nature of conversation. Interactive alignment theory characterises the emergence of shared or "aligned" representations between interlocutors when information is coordinated at various linguistic levels (e.g., phonological, syntactic, and semantic) to promote coordination with his/her conversation partner. One mechanism of alignment in this theory is that the speaker will routinely prime his/her listener across these levels during interaction. Once alignment occurs, it may help the speaker form predictions about how to respond during future spoken utterances (Pickering & Garrod, 2009). These predictions provide ways to more efficiently produce and comprehend speech without overloading the cognitive system. In short, alignment permits strengthened comprehension through growing "implicit common ground" (Pickering & Garrod, 2004, p. 10), in which undergirding active prediction may facilitate future comprehension and potential recovery from any interactive misalignment.

Though the present literature on alignment in dialogue has revealed shared representations and processes at various linguistic and paralinguistic levels during interaction, (e.g., such as words or syntax and speech rates, utterance durations, response latencies, pause durations, and vocalisations: Branigan, Pickering, & Cleland, 2000; Brennan & Clark, 1996; Cappella & Planalp, 1981; Chapple, 1982; Loehr, 2007) there still remains relatively less research on the alignment of pragmatics during spoken language (e.g., interpretation and implementation of nonliteral intent). The integration of linguistic and paralinguistic information naturally promotes a deeper

understanding when a spoken statement is not syntactically clear (Snedeker & Yuan, 2008). For example, Bavelas, Black, Lemery, and Mullett (1986) note that a key component in communication is that “[w]e don’t always say what we mean, and often don’t mean what we say” (p. 6). It should be considered that much of spoken language is characterised not only by the words we use, but also the way in which words are spoken (Nygaard & Lunders, 2002; Snedeker & Yuan, 2008). Paralinguistic contributions to communication are necessary to understand how conversation partners process spoken language, especially when the linguistic message is unclear. It is possible that priming, one core mechanism of interactive alignment, with low/mid-level linguistic representations (words, phrase options, etc.) and paralinguistic cues to the intent of spoken language should lead to alignment at the pragmatic level during dialogue (Garrod & Pickering, 2004). During alignment, interlocutors form predictions to prevent miscommunication, which in turn may promote cohesion and decrease social distance between speakers (Giles & Ogay, 2007). If linguistic and paralinguistic information are actively integrated to promote high-level linguistic processes like pragmatic intent, a crucial component of daily language, then one should expect that pragmatic intent may align in similar ways.

In this paper, our goal is to demonstrate alignment of IL. IL here refers to any form of pragmatic discourse that broadly represents any type of statement that has at least one literal meaning and one nonliteral meaning. For example, if a speaker were to produce the statement “Oh, what a gloomy day”, on a sunny day, a listener could interpret the speaker’s intent in at least one of two ways. The literal interpretation would be that the speaker thinks it is a gloomy day. The nonliteral interpretation would be that it is actually a nice day, but the speaker intends to be playfully ironic. Verbal irony is a typical form of pragmatics that often relies on the contribution of paralinguistic information (e.g., joyful intonation with negative language) in spoken language. It has often been defined as meaning something other than what is literally stated or in complete opposition to what was explicitly stated (e.g., Brown & Levinson, 1987; Grice, 1975). It has also been compared to sarcasm, and some claim that irony and sarcasm may be difficult to separate, and therefore should be discussed as similar processes (Eisterhold, Attardo, & Boxer, 2006; Gibbs, 2000). However, some researchers have suggested that the use of such a definition fails to characterise the true nature of verbal irony (Bryant & Foxtree, 2002; Wilson & Sperber, 1992). Though verbal irony has been defined in various ways, this form of pragmatics often relies heavily on the contribution of paralinguistic cues to intent of the speaker (e.g., tone of voice or prosody, Clark & Gerrig, 1984; Rockwell, 2000). We will use the term IL to refer to many types of indirect speech acts that may have a double meaning (i.e., literal and nonliteral meanings). This term was chosen because the issue at hand explores the

alignment of indirect contextual statements in general rather than a specific type of indirect speech act (e.g., simile, sarcasm, or irony).

Also, interlocutors are not likely to use only one type of IL; rather they may use an array during dialogue (Gibbs, 2006). The individuals involved in the conversation must interpret intent during indirect contexts because they are aware of their partner's discourse goals, rather than applying a "rhetorical label" to their partner's statements (Kreuz, 2000). When the IL fails, the listener may ignore the speech act because the pragmatic goal was never realised. Yet, when talkers use IL, they may provide a number of cues related to pragmatic intent that prevent their pragmatic goal from failing.

To date, there has been a large body of research evaluating pragmatics in discourse (e.g., for background see: Attardo, 2001; Austin, 1962; Bryant & Foxtree, 2002; Clark, 1996; Clark & Gerrig, 1984; Eisterhold, Attardo, & Boxer, 2006; Grice, 1989; Kreuz & Glucksburg, 1989; Sperber & Wilson, 2005; Stalnaker, 1970). In spite of this, perhaps surprisingly, the *alignment* of a dialogue's pragmatics has been scarcely examined. While the processing of pragmatic information likely encompasses the encoding/decoding of word choice, syntax, and prosody, the interpretation of intent may change given the context in which it is expressed. For instance, take the "gloomy day" example from above, the listener that hears "It's a gloomy day" with no contextual grounding may interpret the statement as literal, when in fact it was meant to be nonliteral. Consequently, the listener must decode all levels of production in order to interpret information that was not explicitly stated (i.e., pragmatics is not necessarily just the sum of its lower-level parts). The purpose of this study is to add to the current literature evaluating pragmatics by examining its usage during dynamic interactions. If interlocutors have the ability to align their prosody, words, and syntax, they should also understand the pragmatics of a speaker's statements, which leads to alignment at the pragmatic level. The current study assesses the alignment of pragmatics by priming interlocutors with IL in hopes to induce reciprocal exchanges. It should be noted, the purpose of this study is not to determine how any specific paralinguistic cue or form of IL could be used in conversation settings, rather the study attempts to find reciprocal behaviours at this pragmatic level.

EXPERIMENT 1

The purpose of the first experiment is to determine the effect of priming IL on participant contributions during a pseudo-interaction. A pseudo-interaction represents a scenario in which participants believe they are exchanging verbal information with another person, though they in fact do not interact with a real person, but respond to pre-recorded scripted statements as if it were a real

person. When participants are primed with IL from the pseudo-confederate, participants should then produce more statements with a double meaning (e.g., literal and nonliteral).

Method

Participants

Participants included 27 University of Memphis undergraduate students (mean age = 19.48 years; 23 females). Twenty-six were native speakers of American English, but one participant was a native speaker of African Swahili. S/he was not an outlier and was retained for analysis. All participants reported normal to corrected vision and no hearing/speech impairments. All methods were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 1983.

Materials

The experiment took place in a private laboratory room. Participants were seated at a comfortable distance from a 20-inch iMac Computer screen. A Razor Barracuda noise-reducing headset/microphone was used to present and record acoustic data. MATLAB PsychToolbox-3 programmes (Brainard, 1997) controlled stimulus presentation and recorded participant responses for the conversation and rating tasks.

Stimuli

The experimental stimuli consisted of 15 celebrity pictures collected from the 2005–2007 worst-dressed celebrity lists, from TMZ.com (see Figure 1a for the celebrity names). All celebrity pictures were presented individually on a black background in the middle of the 20-inch computer screen (see Figure 1b for an example of the experimental display). Ten pseudo-confederate statements were scripted for each of the worst-dressed celebrity pictures. The pseudo-confederate, a Caucasian female speaker, was instructed to produce the pre-scripted expressions that coincided with the specific celebrity picture, based on her own understanding of neutral, exaggerated (slightly humorous with oscillating amplitude and F_0 throughout the signal) and/or understated (relatively flat intonational pattern) IL prosody. The designation of the talker's expressions were intentionally expressed humorously or flatly in order to provide variability in the productions, because participants in a pilot study perceived the productions much more unfavourably when they only heard one type of double meaning marked by a specific acoustic intonation.

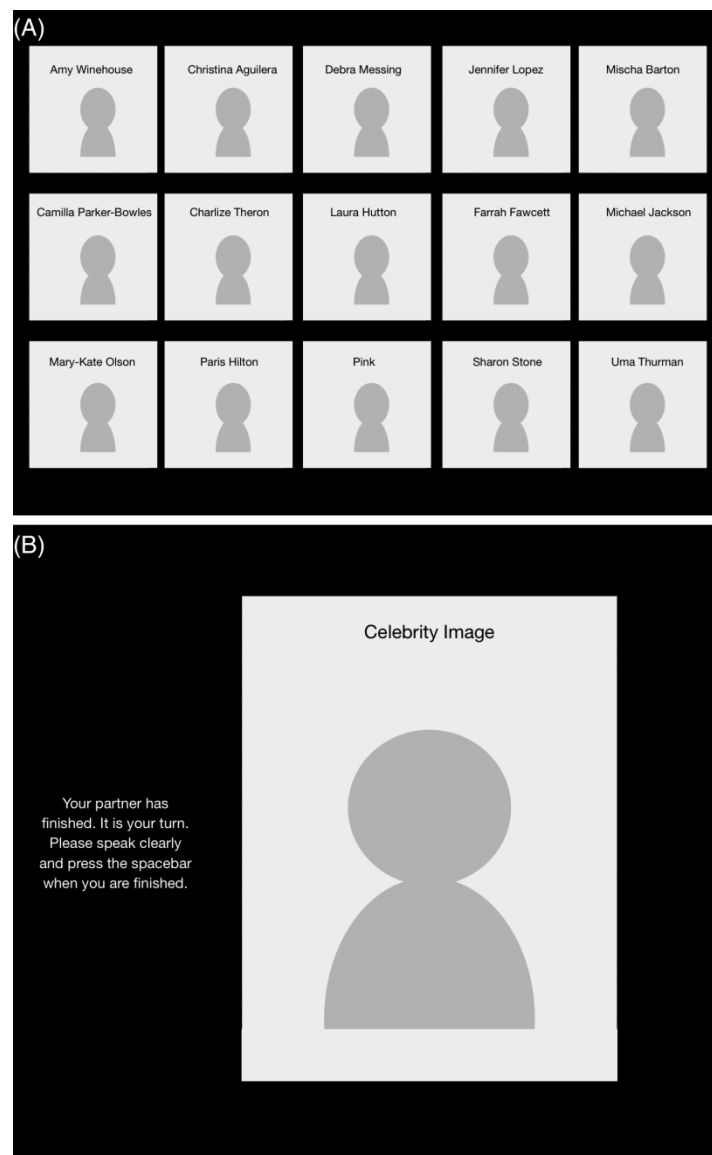


Figure 1. (A) Names of the worst dressed celebrities. (B) An example of the screen participants viewed when responding to a celebrity picture.

For example, one statement a participant could have heard from the pre-recorded female talker was “Her head looks like an olive on a toothpick” (e.g., an image of Amy Winehouse with a beehive hair style). The literal interpreta-

tion is that her head is an olive and her body is a toothpick. In reality, this is not possible, so the other possible interpretation would be that she has a relatively large head for such a small body. Therefore, the double meaning here refers to the literal interpretation based on the semantic production or the nonliteral interpretation that is used to provide an extra piece of information to express a criticism in a humorous way without being overly negative.

One script was created for the IL statements, which required the female talker to produce a total of 75 statements with double meaning in an exaggerated and understated tone of voice (i.e., resulting in 150 total possible ILs). The female talker was also required to produce 75 scripted neutral statements (general descriptions). This resulted in a total of 225 utterances (i.e., 3 prosodic variations \times 5 statements per picture \times 15 pictures; Hancock, 2004; see Table 1 for a sample of the statements). Since only one script existed for the each of the 75 IL statements, the prosodic variations of exaggerated and understated statements were never repeated for a single picture during an experimental condition. Also, in a pilot experiment, the researchers found that overly persistent presence of IL prosody disrupted participants' performance in a similar task because they found it unpleasant or "annoying". Therefore, blocks of trials were created to include a mixture of the IL (both exaggerated and understated) and neutral statements, with the amount of neutral statements in different proportions (see Table 2 for proportion distributions).

Each pseudo-confederate utterance was sampled at 44.1 kHz, 16-bit sampling rate. The pre-scripted statements were recorded by statement type (i.e., either exaggerated, understated, or neutral), which produced amplitude differences between sound files. Consistent with many speech production/perception studies, the sound stimuli were equated for RMS amplitude to control for subjective perceived loudness. This allowed the researchers to set the listening volume to a comfortable listening level. Additionally, presenting stimuli with unequal loudness could provide unwanted perceptual cuing to the purpose of the task. Varying loudness could indicate the statements were pre-recorded or perceived as coming from a different source if the overall amplitude was not the same.

Of the 225 pre-recorded scripted statements, 75 IL and/or neutral comments were pseudo-randomly selected and retained for the experimental

TABLE 1
Sample of pseudo-confederate statements

<i>Statement</i>		
Connotation	Indirect language	"Her head looks like an olive on a toothpick".
	Literal	"She is wearing a black jacket".

sessions. The selected utterances were then distributed within three blocks consisting of 25 utterances each, and differed by the proportion of IL (e.g., 2/3, 2/3, and 0, see Table 2 for condition distribution). The distributions of IL created three experimental conditions in which participants were randomly assigned before the experimental session. These conditions were expressed in terms of the block with the higher proportion, 2/3 being in the beginning, middle, or end blocks. These distributions were chosen to provide a natural exchange of IL and to never inundate participants with IL for any given picture.

Procedure

To begin, the participant was seated next to a Caucasian female confederate while completing the informed consent, but separated during the experimental sessions. A Caucasian female confederate was chosen, because the pseudo-confederate was a Caucasian female. This is an important distinction to make, because much of talker variability is related to the perception of race and gender (Ryalls, Zipprer, & Bauldauff, 1997; Walton & Orlikoff, 1994), and because the student population at the University of Memphis is quite diverse, making such cues readily recognizable. Therefore, it was important to have the live confederate match the race and gender of the pseudo-confederate to promote the believability of having a real interaction. Participants were instructed that they will discuss celebrity pictures with another participant, but would be separated during the experiment. This instruction was further explained as a measure to obtain uncontaminated auditory recordings, because when having a conversation, people often speak over each other. The participant was then told that they would be viewing the same pictures as their partner, and his/her partner would begin the experiment because she had been viewing the first picture longer. The participant was then informed that they were not limited in what they could say and there were no correct or incorrect answers.

TABLE 2
The proportion of indirect language for each condition (beginning, middle, and end) by block (images 1–5, 6–10, and 11–15)

		<i>Block</i>		
		<i>Beginning</i>	<i>Middle</i>	<i>End</i>
Connotation	Beginning	0.67	0.33	0
	Middle	0	0.67	0.33
	End	0	0.33	0.67

During the first task, the participant and pseudo-confederate took turns describing each of the 15 celebrity images (i.e., 10 statements per picture; 5 participants and 5 pseudo-confederates). After each pseudo-confederate response, the participant received a visual and auditory prompt to indicate his/her turn (see Figure 1b for an example of the visual prompt). The visual prompt was presented in text form, to instruct the participants how to maneuver through the experiment: “Your partner has finished. It is your turn. Please speak clearly and press the spacebar when you are finished”. Participants also received an auditory cue, in the form of a beep at the beginning of each trial to indicate when they could start speaking. Each pseudo-confederate statement had a 2-s delay before its presentation to imply she was thinking about the picture and how to respond. Once the first task was completed, the participant was asked a number of questions (see Section “Measures”).

During the second task, participants were asked to code their own comments as having another meaning other than what was explicitly stated (i.e., irony was used as an example to aid in self-coding), or as a literal statement. IL consisted of, but was not limited to, sarcasm, rhetorical questions, and/or a simile, while statements with only one meaning included descriptions, nonsarcastic insults, and/or agreement statements (Roberts & Kreuz, 1994). Crucially, at the time of coding, the participant utterances with the paired celebrity image were randomly presented to prevent order effects.

Measures

At the end of the first task, participants were asked if s/he: (1) perceived statements with double meanings? (88.9% perceived), (2) produced statements with double meaning? (92.5% produced), and (3) produced statements with double meaning when their partner did? (74% aligned). Upon completion of Tasks 1 (pseudo-interaction) and 2 (self-coding), the confederate and participant were re-seated together for debriefing and asked: “Did you feel you were having a conversation with this person?” (59.3% deceived). Though this shows a low deception rate, it may have been due to demand characteristics related to the way the experimenter asked about the deception. Since the scenario was somewhat unnatural, less fluid, and interactive as a real conversation, participants may have felt the *conversation* was not “real” or natural, but did believe they were speaking to a real person. More recently, the researchers have found that asking participants, “Would you be surprised if I told you that you were not really talking to the person (confederate) sitting next to you?” is a better indicator of deception, and has revealed deception rates higher than 90% (Roche, Caucci, Dale, & Kreuz, 2010).

The participant codes were subsequently evaluated, and revealed that the rating task was rather difficult for some participants. Therefore, an expert coder re-coded each participant response based on the definitions above (see Table 3 for κ scores). The codes that differed between participant/expert rater were retained and randomly presented to a blind rater. As a note, κ was somewhat low, but well within the range of κ_{\max} . When the distributions of codes are not equal, the amount of possible agreement will be low. Bakeman and Deckner (2007) demonstrated that evaluating the maximum possible κ may be useful when the coding distributions are not equal because it is not limited by the constraints of the imposed marginals. Since κ values were low, measures were taken to improve the coding scheme in Experiment 2 for participants to increase agreement with the expert and blind coders (see changes under Experiment 2). Thus, the raters were retrained on 10% of the existing disagreed upon statements. The expert and blind coder recoded the remaining statements separately. The raters together (for 100% agreement) determined the last 2% of the responses that did not induce agreement. We thus had two sources of coding to identify the presence of ILs (participant self-coders and expert/blind coders). We conducted analyses on these sources separately to ensure that any patterns obtained are consistent across both and not unique to one.

Results

The probability of IL from participants and expert/blind coder ratings was placed in a 3 (Condition: beginning, middle, *or* end) \times 3 (Block: beginning, middle, *and* end) mixed repeated measures fixed effects model with a compound symmetry heterogeneous (CSH) covariance structure. Participant data from both deceived and not deceived individuals are reported because there were no significant differences in response distributions between these groups (see General Discussion). This variance/covariance structure was chosen because it best represented the data. Post hoc adjusted Bonferroni paired comparisons were used to evaluate any significant main effects and interactions.

TABLE 3
 κ , κ_{\max} , and $\% \kappa_{\max}$ between Participant (P) \times Expert (E) and Expert \times Blind (B) coders

		κ	κ_{\max}	$\kappa_{\max} (\%)$
Coder	P \times E	0.65	0.95	68
	E \times B _{time1}	0.39	0.46	84.5
	E \times B _{time2}	0.74	0.88	83.5

Participant ratings

The Type (3) test of fixed effects revealed a significant main effect for Block, $F(2, 27.72) = 16.29$, $p < .001$, and a Condition \times Block interaction, $F(4, 27.72) = 4.67$, $p < .005$; see Figure 2a. The paired comparisons for the main effect of Block revealed that the highest probability of IL occurred in the middle block relative to the beginning ($p < .001$) and end blocks ($p < .05$). There was a higher probability of IL in the end block compared to the beginning ($p < .005$). The Condition \times Block interaction revealed that the middle condition had a significantly higher probability of IL in the middle block relative to the beginning ($p < .001$) and end blocks ($p < .05$). Similarly, the end condition received a higher probability of IL in the end block than the beginning block ($p < .001$).

Expert/Blind coder

The Type (3) test of fixed effects revealed a significant main effect for Condition, $F(2, 10.81) = 4.89$, $p < .05$, and Block, $F(2, 30.99) = 12.30$,

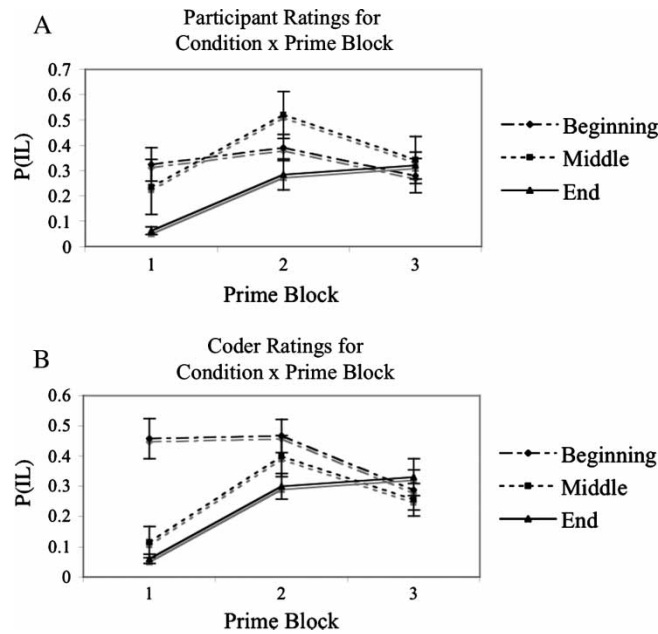


Figure 2. (A) Participant codes: For the middle and end blocks, there is a substantially higher probability of indirect language as the proportion of indirect language increases. (B) Coder ratings: For the beginning block, with 2/3 indirect language right away, there are substantially higher double meaning judgments. However, the middle and end blocks, there is a substantially higher probability of indirect language as the proportion of indirect language increases.

$p < .001$, with a Condition \times Block interaction, $F(4, 30.99) = 7.04$, $p < .001$, see Figure 2b. Post hoc paired comparisons of IL between conditions revealed a significantly higher probability of IL in the beginning condition relative to the end condition ($p < .05$). Comparisons for block across all conditions revealed a higher probability of ILs in the middle blocks relative to the beginning ($p < .01$) and end blocks ($p < .05$). The Condition \times Block interaction revealed that the beginning condition had a significantly higher probability of ILs in the beginning and middle blocks relative to the end block ($p < .05$). The middle condition received a higher probability of IL in the middle block relative to the beginning ($p < .001$). Finally, the end condition received a higher probability of ILs in the end block than the beginning and middle blocks ($p < .005$; $p < .001$, respectively).

Discussion

Experiment 1 examined the contribution of a pragmatic prime, indirect spoken language, during a pseudo-interaction. This type of language makes use of nonliteral dialogue with intentions that go beyond a literal semantic interpretation. The results of this study suggest that a participant's dialogue is highly affected by the perception of IL during a pseudo-interaction. "Implicit common ground" was established between the participant and pseudo-confederate via shared visual context. Providing this shared visual context allowed participants to be more readily able to exchange IL during the interaction because precedence was set through a pattern of pre-existing/shared social knowledge.

As seen in Figure 2, coders had a higher proportion of IL judgments than participants. This may have been due to difficulty some participants had in categorising their own statements. It should be noted that only the rating task was challenging for participants, because it was difficult for them to apply the generalised definitions that were provided before the coding session. All participants said the production of the descriptions during the pseudo-interaction was rather easy. Also, during the experimental task, they did not seem to be cognitively aware that their behaviour mimicked the behaviour of the pseudo-confederate, until they were queried about the behaviour at the end of the first task. Instead, as consistent with many emotion research categorisation paradigms, participants had a difficult time rating their own statements, mainly because the definitions initially provided to them were rather general and abstract, and unusual for them to consider meta-linguistically (Graesser et al., 2006). This problem was addressed in Experiment 2, by providing more explicit descriptions of the categories.

Regardless of the difference between the participants and coders, the overall trends in the data provided the same interpretation: Experiment 1 provides evidence of pragmatic alignment in both the participant and coder

ratings. The main effect of Condition (coder) reveals that alignment may have been stronger at the beginning of the conversation because participants were primed early on in the conversation. This demonstrates that residual effects of the prime persisted longer for the beginning condition relative to the end condition. The main effect of Block simply represents the overall higher percentage of ILs participants received during the middle of each conversation. This resulted in unaffected means in the lower IL proportion blocks, as seen in the tails of the beginning and end conversation conditions. The effect of alignment is most evident in the Condition \times Block interaction, where an increased probability of ILs occurred given a higher concentration of double meaning primes from the pseudo-confederate. Even though participants received some form of IL throughout the entirety of the experiment, the distribution of IL provided by the participants reflects the patterns produced by the pseudo-confederate, in general showing that the prime had a systematic impact on how participants responded during the pseudo-interaction.

EXPERIMENT 2

A theory similar to interactive alignment has been proposed in the emotion literature. Emotional contagion involves shared affect-related representations or states. Affective cues to another person's emotions could promote the convergence of similar state representations that may similarly simplify or facilitate dialogue (Bono & Ilies, 2006; Hatfield, Cacioppo, & Rapson, 1993; Hsee, Hatfield, Carlson, & Chemtob, 1990; Neumann & Strack, 2000). An individual's affect may change depending on cues related to the valence of their conversation partner's actions and language. Research in this domain has argued that emotional contagion occurs if the individual automatically mimics and synchronises with another person's affective cues, thus converging on each other emotionally.

This theory is similar to Garrod and Pickering's (2004) position, in that we not only use linguistic information to make conversation easier, but may also allow speakers to decode pragmatic intent from the emotional cues interlocutors produce. Indeed, the results from Experiment 1 may have simply been due to the alignment of an affect-related cue: The valence (almost always humorous in this context) of the ILs themselves. As a control experiment, the purpose of Experiment 2 is to examine the influence of any such mood contagion on pragmatic alignment, and partly replicate the findings of Experiment 1.

The purpose of priming mood was to check the humorous nature of the IL statements as the primary influence on participant responses, rather than IL itself. This was accomplished by inducing a humorous mood prior to the

experimental session (see Section “Materials” for a description). This was done to test for possible influences from pre-existing mood prior to the task. The idea was to induce humour in all participants to see if responses in Experiment 1 were simply due to the inducement of a positive mood rather than the inducement of IL. If the effect of pragmatic alignment found in Experiment 1 was merely due to mood, then the induced positive mood should have an effect on the levels of pragmatic alignment during Experiment 2. That is, there should be a change in the probability of responding with IL at the beginning of the conversation relative to Experiment 1.

Method

Participants

Participants included 16 undergraduate students (mean age = 20.25 years; 11 females). All participants reported having normal to corrected vision, and no reports of hearing or speech impairments. All methods were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 1983.

Materials and stimuli

Experiment 2 was identical to Experiment 1, with two exceptions. Participants were presented with a 2.37 min clip¹ of a comedic satire before the experimental session to induce a humorous mood. The comedic satire mainly controlled for and allowed for the assessment of whether participant responses were merely due to their own internal mood states. The clip was rated 6.8 on a 10-point Likert scale (1 = not funny, 10 = extremely funny). The conditions evaluated during this experiment were limited to the beginning and end conditions. The strength of Experiment 1's effects shows that these two extremes should be sufficient to reproduce the basic findings, thus requiring fewer participants.

Procedure

The instructions to the participants were identical to Experiment 1, with the exception of the presentation of the video clip. Therefore, before the experimental interaction task began, the participant was asked to view

¹ A scene from a popular British comedy show (“Lauren in French Class” from The Catherine Tate Show) found on youtube.com. (<http://www.youtube.com/watch?v=zV1zK8zRCPo>).

the humorous video clip while the confederate was being instructed about the task in a different room.

During the second task, participants were again asked to code their own comments as having a double meaning. Since the rating task was rather difficult for some participants in Experiment 1, definitions and examples of possible subcategories were provided for IL and literal statements. This was done to increase the understanding of what each category meant (see Table 4 for the descriptions).

Measures

At the end of the first task, participants were asked if s/he: (1) perceived statements with double meaning? (100% perceived), (2) produced statements with double meaning? (93.75% produced), and (3) produced double meaning when their partner did? (81.25% aligned). Upon completion of both tasks, the confederate and participant were seated together for debriefing and asked: “Did you feel like you were speaking with this person?” (56.2% deceived).

Identical to Experiment 1, expert and blind coders re-coded each participant response based on the definitions above (see Table 5 for κ , κ_{\max} , and $\% \kappa_{\max}$).

Results

The 2 (Condition; beginning *or* end) \times 3 (Block; beginning, middle, *and* end) analysis for Experiment 2 was identical to Experiment 1. Participant data from both deceived and not deceived individuals are reported because there were no significant differences in response distributions between these individuals (see Section “General Discussion”).

TABLE 4
Subcategory examples of indirect language [sarcasm, simile, and rhetorical question (R?)] and literal [description, nonsarcastic insult (Insult (NS), agreement)] statements

	Type	Statement
Indirect language	Sarcasm	“Nice dress”, if the dress was ugly.
	Simile	“She looks like a peacock”.
	R?	“What was she thinking?”
Literal	Description	“She is wearing a dress”.
	Insult (NS)	“She is ugly”.
	Agreement	“Yeah, I agree”.

TABLE 5
Obtained values of κ , κ_{\max} , and $\% \kappa_{\max}$ between Participant (P) \times Expert (E) and Expert \times Blind (B) coders

		κ	κ_{\max}	$\kappa_{\max} (\%)$
Coder	P \times E	0.71	0.92	77.4
	E \times B _{time1}	0.22	0.32	68
	E \times B _{time2}	0.68	0.89	76

Participant ratings

The Type (3) test of fixed effects revealed a significant main effect for Block, $F(2, 24.30) = 4.80$, $p < .02$, and a Condition \times Block interaction, $F(4, 24.30) = 15.99$, $p < .001$, see Figure 3a. Post hoc paired comparisons of Block revealed a higher probability of IL in middle block than the beginning ($p < .05$). The Condition \times Block interaction revealed that the beginning condition had a significantly higher probability of IL for beginning and middle blocks relative to end block (both, $p < .05$). Similarly, the end condition received a higher probability of IL for middle and end blocks than beginning block ($p < .005$; $p < .001$, respectively).

Expert/Blind coder

The Type (3) test of fixed effects revealed a significant main effect for Block, $F(2, 24.96) = 8.35$, $p < .005$, and a Condition \times Block interaction, $F(4, 24.96) = 10.37$, $p < .001$, see Figure 3b. Post hoc paired comparisons of Block revealed a higher probability of IL in middle block than the beginning ($p < .001$) and end blocks ($p = .05$). The Condition \times Block interaction revealed that the beginning condition had a significantly higher probability of IL for the middle blocks relative to end block ($p < .005$). Similarly, the end condition received a higher probability of IL for middle and end blocks than beginning block ($p < .005$; $p < .001$, respectively).

The final analysis conducted was used to evaluate the probability of IL responding between Experiments 1 and 2. A 2 (Experiment: no Video *or* Video) \times 2 (Condition: beginning *or* end) \times 3 (Block: beginning, middle, *and* end) mixed fixed/random effects model with an first-order auto-regressive (AR1) variance/covariance structure, with experiment, condition, and participant held as random factors was used to evaluate the proportion of IL use between Experiments 1 and 2. This model revealed that there was no significant Experiment main effect, $F(1, 18.859) = 0.136$, $p = .717$, and no significant Experiment \times Condition, $F(1, 20.243) = 0.253$, $p = .633$, Experiment \times Block, $F(2, 59.663) = 0.460$, $p = .633$, and Experiment \times Condition \times Block interactions, $F(2, 59.663) = 0.598$, $p = .553$. The results from

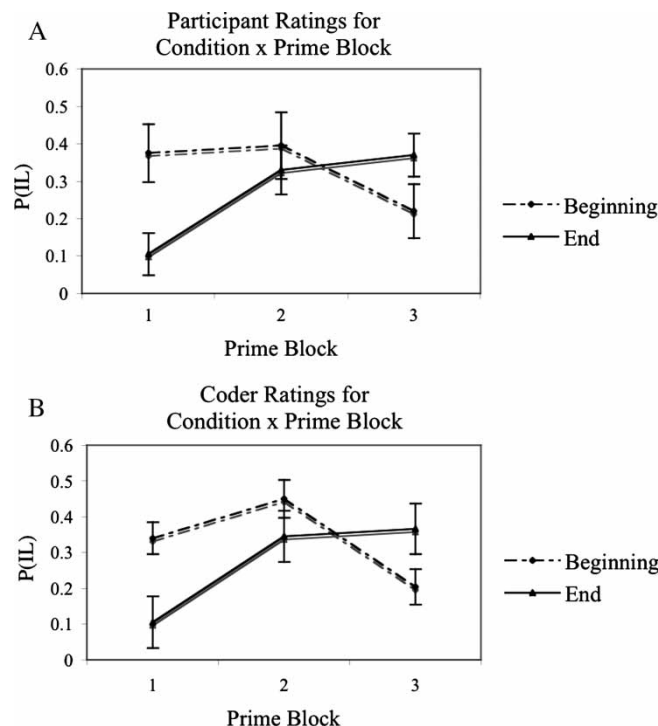


Figure 3. (A) Participant codes: For the beginning block, with 2/3 indirect language right away, there is substantially higher probability of indirect language. However, the end block, there is substantially higher probability of indirect language as the proportion of irony increases. (B) Coder ratings: For beginning block, with 2/3 indirect language right away, there is substantially higher probability of indirect language. However, the end block there is a substantially higher probability of indirect language as the proportion of indirect language increases.

this study show that there were no significant differences in participant responding between the two experiments. This suggests that the effect of IL use was not merely due to a humorous mood inducement.

Additional analysis: Temporal lag of primes

We combined data from both experiments to investigate the time course of the priming of IL. The 75 utterances of the pseudo-confederate, and those generated by participants in the task, may be treated as a time series of utterances, having the property of IL or not. We used categorical cross-recurrence analysis (Dale & Spivey, 2006; Richardson & Dale, 2005), a technique that permits quantifying the leading/following patterns during sequences of behavioural events. For example, Richardson and Dale (2005)

used this method to quantify the temporal lag required for listener eye-movements to “catch up” to a speaker’s own eye-movements.

In the same analysis here, we found that participants’ IL indeed lagged behind the primes across participants in both experiments. Using a window of lags between -10 (primes lead) and 10 (participant leads), cross-recurrence showed that maximum “match” between participants and pseudo-confederate occurred at a lag of approximately -2 statements—one-sample $t(42) = -2.3, p < .05$. This suggests that if the stimulus sequence contained 2 prime statements of IL, the participant coupled to this pragmatic intent. This analysis provides further evidence that participants are aligning through priming, as priming predicts this temporal lag relation between recordings and participant utterances. It also suggests that the “optimal” time to align pragmatically is not immediately after one’s interlocutor offers IL, but instead after an intervening utterance (lag 2).

Discussion

Emotional contagion refers to the alignment or synchronisation of emotional cues with another person. The current experiment attempted to induce a humorous mood before the experimental session, in order to determine if this would affect the participant’s behaviour during the session. However, the moderate humour ratings for the video clip may have contributed to the nonsignificant effect of emotional contagion. Yet Experiment 2 did replicate the basic findings of Experiment 1, with the exception of finding a main effect of Condition. This shows that the initiation of IL in the beginning condition of Experiment 2 did not have as strong of an effect as it did in Experiment 1. Since there were no significant differences between Experiments 1 and 2, the direct replication of Experiment 1 does imply that regardless of the attempts to induce a mood, there was clear evidence of alignment at the pragmatic level. Participant and coder ratings were relatively similar (see Figures 4 and 5), suggesting a more detailed description of the subcategories was helpful. Participant responses reflected similar patterns as the pseudo-confederate in both conditions. This reveals that the pragmatic prime had a significant impact on how participants responded during the pseudo-conversation. Overall, participants coordinated their pragmatics with the pseudo-confederate, and not simply in response to the humorous mood induced by the video.

GENERAL DISCUSSION

Experiments 1 and 2 revealed that members of an interaction align pragmatically with their discourse partner. These findings are consistent with previous research exploring interactive alignment at other linguistic

levels (see Garrod & Pickering, 2004 for a review). However, this effect is somewhat inconsistent with some current pragmatics literature. For example, Dress, Kreuz, Link, and Caucci (2008) obtain results suggesting many individuals from the southern USA often refrain from using IL, specifically sarcasm, in novel social situations because it has a strong negative connotation in the regional dialect. One may be tempted to attribute this to the oft-cited theory that there is a higher propensity for umbrage within the southern USA (Nisbett & Cohen, 1996). Therefore, “southerners” may intend to prevent conflict or even violence by adhering to social politeness and hospitality (Cohen, Vandello, Puente, & Rantilla, 1999). Yet, if a speaker successfully implements a pragmatic goal (e.g., to be humorous in a sarcastic manner) during conversation, the listener is obligated to decode the speaker’s intent resulting in, for example, a now-accepted use of the double meaning (Attardo, 2001; Sperber & Wilson, 2004). Also, if the listener wishes to continue the conversation or prevent offending their conversation partner, they are likely to accommodate their communication to the speaker (Giles & Ogay, 2007).

When participants activate their partner’s pragmatic strategy, such as humorous sarcasm, the probability of responding in a similar way should grow. This is evident in the IL distributions provided by the participants (e.g., participant ILs increase/decrease when the pseudo-confederate’s IL increase/decreases). This process may be automatic if the participants were not conscious of why they were mimicking their partner’s behaviour. Interlocutors may not consciously realise that aligning with their conversation partner could naturally reduce social distance during communication. The evidence does not imply that the process of alignment is immediate, because IL accumulated over blocks of exposure (see Figures 2 and 3 and discussion of temporal lag results). If the listener’s behaviour is constrained by social etiquette, then time may be necessary for the recognition of acceptable responses to violations of social rules. Once these violations are assessed, then interlocutors may be more readily able to integrate the existing pragmatic strategy. This notion is most evident in the current participant data, where carry-over effects of the IL were exhibited during the blocks with no ILs presented to the participant. More specifically, under novel conversational scenarios, an individual from the southern USA may never elicit an indirect pragmatic goal, because it is socially unacceptable to do so. However, the pragmatic goal was forcefully implemented in these experiments to allow the participant to adopt and maintain the strategy of the pseudo-confederate, which may have normally been taboo or inappropriate when interacting with an unfamiliar conversation partner. In short, when participants were highly primed for these specific pragmatic goals, s/he was provided with a now socially acceptable strategy of responding.

During interaction, if any of the levels of alignment conflict, then listeners may seek to confirm a speaker's intent—of course, pragmatic goals can and do fail in daily conversation. The alignment model can also potentially explain recovery from possible failures. During conversation, individuals may self-monitor in order to repair mistakes (Horton & Keysar, 1996). If a listener does not comprehend intent, s/he will attempt to seek further information to better align, such as through clarification questions (Pickering & Garrod, 2004). For example, if a statement is not perceived as having two possible meanings, and thus appears anomalous, a repair strategy can be enlisted to remedy the inconsistency (e.g., seeking a possible pragmatic explanation for a literally false or unusual statement).

Such breakdowns relate directly to a limitation of the current study. For example, pragmatic alignment may have been hindered due to the only partially interactive nature of the task. The pseudo-interaction scenario was perceived as non-natural by some of the participants, but as expected, all participants interacted with the pseudo-confederate by using agreement statements or asking questions (e.g., responding “are you serious?” or “yeah, I agree”; cf. Holtgraves, Ross, Waywadt, & Han, 2007). It could be that asking questions and using agreement statements may very well be related to repair strategies. Also, upon further analysis, there were no significant differences in the probability of producing a statement with double meaning between the individuals who were deceived and not. This might suggest that participants who did not report being deceived may have actually been reporting that the task was artificial. The lack of any performance difference between the two groups indicates this may hold true. Future studies we have conducted have corrected this flaw in probing for deception, and found indeed that deception rates using the same confederate setup can approach ceiling if probed properly (Roche et al., 2010).

Interestingly, some participants attributed the artificiality of the conversation to the pseudo-confederate's refusal to acknowledge his/her comments. This may have also prevented the participant from implementing his/her own pragmatic goals, thus forcing the listener to adopt the pragmatic rule of the pseudo-confederate. This irregular way of interacting may have lead to moderate effects of alignment because the participant was prevented from dynamically implementing other conversational strategies. In a natural conversational setting, individuals can enlist other forms of pragmatics and relevant cues to intent (e.g., humour, jokes). For example, Attardo (2001) maintains that humour, irony, and sarcasm are closely related, but the perlocutionary act is different. Also, Bryant and Foxtree (2002) suggest that during spontaneous speech interlocutors are able to decode intent when acoustic cues are presented, especially when context is lacking.

Another limitation of this study was the way in which emotional contagion was evaluated. There was no effect on immediate pragmatic usage when mood was induced. However, there may have been some level of emotional alignment during the course of the pseudo-conversation. If the participants produced similar behavioural (e.g., acoustic) cues related to the emotional intent of the pseudo-confederate, emotional contagion may have in fact occurred. Most notably, mood inducement and emotional contagion should not have been separated, but integrated. The evaluation of emotional alignment should have been probed before, during and after the experimental session to assess if overall mood changes during the course of the study. Further evaluation of mood may reveal interesting relations between emotional and pragmatic contagion. This may serve as a future bridge between the study of language and emotion, as Nygaard and Queen (2008) have stated, emotional cues such as acoustic variation influence the processing of linguistic information.

The evidence presented in this paper advocates that in discourse, individuals might align pragmatically to promote interaction. There is a substantial volume of research on pragmatics, from various types of nonliteral language to contexts of its usage (e.g., Attardo, 2001; Bryant & Foxtree, 2002; Dress, Kreuz, Link, & Caucci, 2008; Eisterhold, Attardo, & Boxer, 2006; Gibbs, 2000, 2006; Hancock, 2004; Kreuz, 2000; Kreuz & Glucksburg, 1989; Roberts & Kreuz, 1994; Rockwell, 2000; Wilson & Sperber, 1992). To our knowledge, the results we present here offer a novel piece of evidence that interlocutors, in real time, may be aligning actively at a very high level of linguistic organisation. Cues to pragmatic intent are likely embedded within the linguistic aspects of conversation (e.g., lexical alignment), but may also include mood-related cues. Researchers should consider the interaction among other such variables (e.g., linguistic, pragmatic, and behavioural cues together) occurring between interlocutors. For example, the perlocutionary nature of the statements evokes emotional cues that may help explain pragmatics-processing mechanisms of dialogue (e.g., humour, innuendo, or arguments). As the current results show, dialogue may be partly underlain by an alignment process not only at the phonological, syntactic, and semantic levels, but also at the level of pragmatic exchange. Future work on dialogue's pragmatics, integrating such levels as linguistic (e.g., words), paralinguistic (e.g., prosody), and emotional behaviour (e.g., laughing or grimacing) will extend our understanding of the ecology of higher-level, real-world interactions.

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