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Are People Sensitive to Problems in Communication?

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Abstract

Recent research indicates that interpersonal communication is noisy, and that people exhibit considerable insensitivity to problems in communication. Using a dyadic referential communication task, the goal of which is accurate information transfer, this study examined the extent to which interlocutors are sensitive to problems in communication and use other-initiated repairs (OIRs) to address them. Participants were randomly assigned to dyads (N = 88 participants, or 44 dyads) and tried to communicate a series of recurring abstract geometric shapes to a partner across a text–chat interface. Participants alternated between directing (describing shapes) and matching (interpreting shape descriptions) roles across 72 trials of the task. Replicating prior research, over repeated social interactions communication success improved and the shape descriptions became increasingly efficient. In addition, confidence in having successfully communicated the different shapes increased over trials. Importantly, matchers were less confident on trials in which communication was unsuccessful, communication success was lower on trials that contained an OIR compared to those that did not contain an OIR, and OIR trials were associated with lower Director Confidence. This pattern of results demonstrates that (a) interlocutors exhibit (a degree of) sensitivity to problems in communication, (b) they appropriately use OIRs to address problems in communication, and (c) OIRs signal problems in communication.

Keywords: Other-initiated repair; Dialogue; Pragmatics; Reference; Communication; Miscommunication; Interaction; Referential communication

1. Introduction

It is widely believed that interlocutors are sensitive to problems in communication and use an interactive repair mechanism to address them (Jefferson, 1987; Sacks, Schegloff, & Jefferson, 1974; Schegloff, Jefferson, & Sacks, 1977; Sidnell, 2011). Conversational

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repair encompasses a set of sequentially organized practices that interlocutors engage in to address problems of speaking, hearing, or understanding (Sidnell, 2011). Repairs may be self- or other-initiated (Kitzinger, 2013; Schegloff et al., 1977). Self-initiated repairs are performed by the current speaker, who anticipates a problem in communication. Other-initiated repairs (OIR)—from a generic “huh,” to a specific information request—are side-sequences performed by a “listener” to signal trouble and address breakdowns in communication (Dingemanse et al., 2015; Schegloff, 2000; Schegloff et al., 1977). OIR is a frequent feature of conversation—occurring every 84 s (Dingemanse et al., 2015)—and similar repair mechanisms are seen across a range of different languages (Dingemanse & Enfield, 2015; Dingemanse et al., 2015; Sicoli, 2016).

For instance, in the current task, a participant described an abstract geometric shape as “nun.” Their partner queried this label, by offering the alternative description, “is that pray?” This type of OIR seeks a confirmation of the offer, which in this case received a disconfirming “no.” This is the most common type of OIR in conversation, as it is the most specific in pin-pointing the trouble source. Other types of OIR, like the open request “huh?”, are less explicit in identifying the source of the miscommunication. Despite the ubiquity of OIRs during conversation, it is unclear if OIRs actually resolve problems in communication, or if people are even sensitive to problems in communication in the first place. This study experimentally tests if interlocutors are sensitive to problems in communication and if they use OIRs to signal and address those problems.

1.1. Are interlocutors sensitive to communication problems?

Anecdotal evidence suggests that other-initiated repairs may not affect communication behavior. In Garrod and Anderson (1987), pairs of participants created spatial description schemes to collaboratively navigate through a computerized maze. Participants sometimes tried to repair communication breakdowns by explicitly negotiating alternative spatial description schemes. However, the new description schemes that were agreed on during interactive repair rarely survived, indicating that the repairs did not affect subsequent communication behavior. Similarly, explicitly negotiating a communication strategy did not improve performance in an experimental-semiotic task (Galantucci, 2009).

More fundamentally, experimental research suggests that interlocutors may not be sensitive to problems in communication in the first place. This was examined in a series of studies in which communicative incoherence was introduced into dyadic conversations. Communicating remotely via a text–chat interface, interacting pairs of participants’ text–chat entries were surreptitiously swapped with those produced by another participant engaged in a separate and unrelated conversation (Galantucci & Roberts, 2014), or they were replaced with a pre-determined message that introduced conversational incoherence (Roberts, Langstein, & Galantucci, 2016). In each case, most participants failed to notice the incoherent topic change. This insensitivity also held for face-to-face interactions in which an experimental confederate uttered a nonsensical phrase during the task (Galantucci, Roberts, & Langstein, 2018). These findings suggest that communication is noisy and error prone, and that people can be insensitive to problems. This insensitivity to problems in communication is consistent with "change blindness" studies, which demonstrate that people can be insensitive to major changes in their immediate environment (Simons & Rensink, 2005). For example, in a classic study, only half of the participants detected the surreptitious replacement of their conversation partner during a face-to-face interaction (Simons & Levin, 1998).

Before accepting that people tend to be insensitive to problems in communication, it is important to highlight several factors that may undermine this conclusion. First, it is well-established that social interaction improves communication success (Fay et al., 2018; Garrod, Fay, Lee, Oberlander, & MacLeod, 2007; Schober & Clark, 1989). Under the collaborative view of interpersonal communication, interlocutors use an interactive grounding process to negotiate shared reference that improves communication success (Clark, 1996). This account assumes that people are sensitive to problems in communication, although it is not directly tested. (Note that the interactive alignment theory of dialogue does not assume that people are sensitive to communication problems [Pickering & Garrod, 2004]). Second, if temporary incoherence does not negatively impact the overall gist of the conversation, then it may not be necessary to treat or even recall. Third, if the primary goal of conversation is social, then other-initiated repairs might be unnecessary, or may even be face-threatening (Schegloff et al., 1977). Fourth, self-reports of noticing communication problems can be inaccurate (due to insufficient recall, saliency, etc.), and we should instead focus on behavioral evidence—what people actually do in interaction during communication breakdown. A stronger test of people's sensitivity to problems in communication would include a task-oriented conversation, where the primary goal is accurate information transfer, and an analysis of what participants do in situ when facing a perceived problem in communication.

Using a referential communication paradigm, we test interlocutors' sensitivity to problems in communication. Participants' goal was to accurately communicate a series of confusable abstract geometric shapes to a partner. If participants are sensitive to problems in communication, they will be less confident on trials in which communication is unsuccessful, and will be more likely to produce an other-initiated repair on these trials compared to successful communication trials. By contrast, if participants are insensitive to problems in communication, there will be no difference in interlocutor confidence, or repair frequency, in trials that are successful or unsuccessful.

2. Method

The study received approval from the University of Western Australia Ethics Committee. Participants viewed an information sheet before giving written consent to take part in the study. The information sheet and consent form were both approved by the Ethics Committee. All methods were performed in accordance with the guidelines from the NHMRC/ARC/University Australia's National Statement on Ethical Conduct in Human Research.

2.1. Participants

A convenience sample of 88 undergraduate students from the University of Western Australia (M_{age} = 23.82 years, *SD* = 8.49; 59 female), organized into 44 dyads, participated in exchange for partial course credit.

2.2. Task and procedure

The goal for each participant was to successfully communicate a series of confusable abstract geometric shapes to a partner using a text–chat interface. The shapes, known as tangrams, have been widely used to study referential human communication (Clark & Wilkes-Gibbs, 1986; Rogers, Fay, & Maybery, 2013; Tolins, Zeamer, & Fox Tree, 2017). The Director typed a message to communicate a shape displayed on their screen (sampled from a pool of six target shapes that were repeated over the task) and their partner, the Matcher, guessed which shape was being communicated from a randomly ordered list of eight shapes (the six target shapes plus two distractor shapes). The shapes were randomly sampled from a set of 18 (see Fig. 1).

The task was administered using a text–chat interface that recorded all typed communication activity. All communication was done across networked desktop computers. Shape descriptions were typed using a standard keyboard. For each participant, a text–chat box filled the left half of their screen, where they could exchange messages with their partner. Each dyad member was allocated a different font color (light blue or yellow, displayed against a black background), to easily identify the author of each message. For the Director, a to-be-communicated shape was displayed to the right of the text–chat box, below a

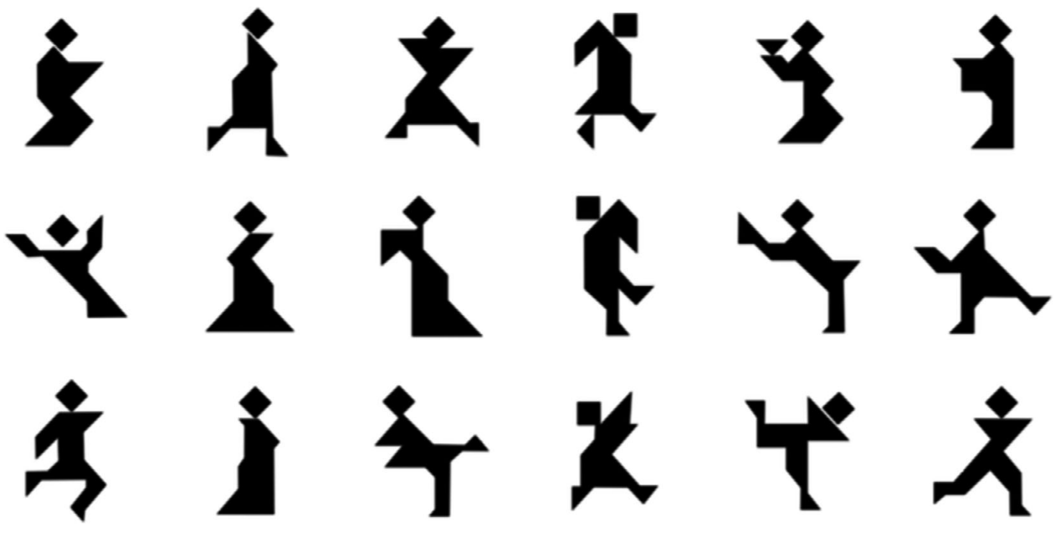

Fig. 1. The set of 18 geometric shapes, or tangrams. Eight shapes were randomly sampled from the pool of 18 for each dyad, and six of the sampled shapes were communicated 12 times each over 72 trials. The remaining two shapes served as distractors, and they were never communicated by the dyad.

prompt asking them to describe the shape to their partner. For the Matcher, eight shapes were displayed in a 2 × 4 grid to the right of the text–chat box, below a prompt asking them to select the shape being described by the Director. When the Matcher believed they had identified the Director's intended shape, they selected the relevant shape from the interface by a mouse click (see Fig. 2).

Following Matcher shape selection, the Director and Matcher each indicated how confident they were that the Matcher had selected the Director's intended shape. Confidence was rated on a Likert scale of 0–6, where 0 = Not at all confident and 6 = Extremely confident. When both confidence estimates had been entered, the current trial ended and the next trial was initiated. The text–chat box was cleared at the start of each trial. Each trial had a 30-s time limit, after which the trial ended without the Matcher selecting a shape, and both participants were notified that time had run out. Confidence estimates were not requested in this situation. Pilot testing indicated that 30 s was enough time to produce an other-initiated repair, but it was not always enough time to complete the repair. This time limit was essential to ensure we had a sufficient sample of unresolved communication problems. Participants were given no explicit feedback with regard to their communication success. Having participants communicate remotely across networked computers meant they were unaware of their partner's identity.

Participants completed the task in dyads (randomly allocated). Participants in each dyad (N = 44 dyads) played 72 trials with the same partner. Each of six shapes was communicated 12 times across the 72 trials. For each dyad, the same six target shapes and two distractor shapes were used across the task. The distractor shapes were never communicated. So, each target shape recurred 12 times over the course of the experiment. Each participant acted as the Director on half of the trials and the Matcher on the other half, with role allocation randomized across trials. Matchers could provide text feedback within a trial, allowing them to initiate repairs.

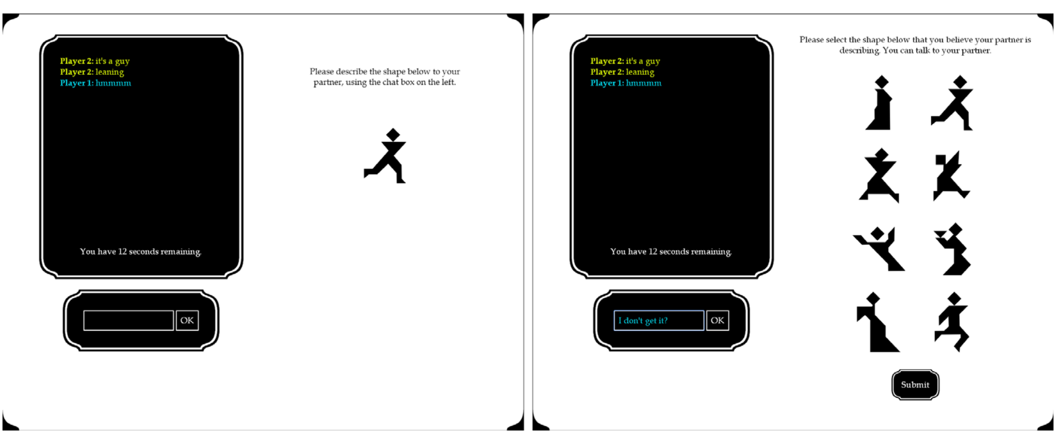

Fig. 2. The text–chat interface. The left panel shows the Director's interface, and the right panel shows the Matcher's interface.

2.3. Repair coding

Each trial was coded as including a repair(s) or not including a repair(s) (by author AM). Repair trials were those that included a Matcher response to a Director's description that indicated miscommunication or uncertainty, and which was intended to elicit a Director response. Also included in the initial repair coding were self-repairs in which a Director revised a previous description, as with correcting a typo. A random sample of trials (20%) was then coded as repair or not repair (by author BW). The two sets of ratings showed strong inter-coder agreement (Kappa = 0.94, $k = 2$, $N = 595$). Repairs were then coded as self-initiated ($N = 149$) or other-initiated ($N = 266$), and instances of other-initiated repair were coded following Dingemanse and Enfield's (2015) classification: open requests (no specification of a precise trouble source; $N = 35$), restricted requests (queries for specific information with Wh- or option questions; $N = 59$), and restricted offers (a candidate understanding or suggested alternate description; $N = 172$; by authors AM and BW). The two sets of ratings again showed strong inter-coder agreement (Kappa = 0.94, $k = 2$, $N = 410$). The ratings from author AM were used in the analyses.

3. Results

The data were analyzed using logistic and linear mixed effects modeling, with crossed random effects for dyads and for shapes. All analyses were performed and all figures were created in R (R Core Team, 2013). Statistical models were estimated using the glmer() and lmer() functions of lme4 (Bates, Maechler, Bolker, & Walker, 2013). The maximal random effects structure justified by the experiment design was specified where possible (Barr, Levy, Scheepers, & Tily, 2013). The data, R Script, and text–chat dialogues are available on the Open Science Framework: https://osf.io/53948/

Section 3.1. provides a descriptive analysis of the types of other-initiated repairs observed, as well as how the OIRs were addressed. Section 3.2. examines the change in Director and Matcher confidence, communication efficiency, and communication success when participants repeatedly played the referential communication game. Section 3.3. tests if Matchers were sensitive to problems in communication, and if Matchers' use of OIRs signaled a communication problem to their conversational partner (i.e., the Director).

3.1. Descriptive analysis of other-initiated repairs

Participants performed 266 OIRs; 8.6% of trials involved an OIR (10 trials had more than one OIR). Restricted offers were the most frequent, and open requests the least frequent (see Table 1). Text–chat repairs reflect a similar distribution to that found in spoken conversation (Kendrick, 2015, on English OIRs). The frequency of restricted offers suggests that participants in our text-based task adhered to the preference for specificity seen in spoken repairs, by which an interlocutor should be specific with respect to the problem (Dingemanse & Enfield, 2015).

Table 1
Other-initiated repair types from the present text–chat experiment and spoken conversation in English (from Kendrick, 2015). Percentages are followed by counts of total other-initiated repair use (in brackets)

	Open Request	Restricted Request	Restricted Offer
Text-chat	13.2% (35)	22.2% (59)	64.6% (172)
Spoken (English)	23.4% (41)	34.3% (60)	42.3% (74)

Open requests, the least specific type of OIR, were infrequent despite being relatively quick to produce. This type of OIR often includes “Huh?” or “What?” in spoken English (Dingemanse, Torreira, & Enfield, 2013; Kendrick, 2015). The text–chat communication included modality-specific open requests such as (repeated) question marks or variations on “What?” (e.g., “wut”). Examples of open requests below (marked by the arrow) represent common uses and solutions to this repair initiation. In examples 1 and 2, open requests were followed by clarifications—albeit potentially ambiguous ones—that elaborated on prior descriptions, while the request in example 3 was not resolved (due to task time limitations). Open requests were addressed with clarifications in 55% of cases, while the remainder went unaddressed.

(1) Open Request: Dyad 21, Iteration 4, Trial 22
Player 1: Diamond head
Player 1: Trunk is lopsided
-> Player 2: ?
Player 1: Cant see his legs

(2) Open Request: Dyad 15, Iteration 9, Trial 50
Player 2: Lean
-> Player 1: what???
Player 1: lean hahah
Player 2: gravity

(3) Open Request: Dyad 8, Iteration 11, Trial 61
Player 2: leaning preacher looking folk
-> Player 1: wut

Restricted requests, where a Matcher asked a specific question about the Director’s description, were used in just less than a quarter of OIRs. Restricted requests specify the trouble source more explicitly than open requests, and as such appeared more frequently (satisfying the preference for specificity in OIR). Below are representative examples of how restricted requests were performed (marked by arrows), and the solutions given. Restricted requests asked about specific information, by providing an “or” option about a specific feature as in (4), or by querying information about a specific feature as in (5) and (6). The former strategy was used in 56% of restricted requests, while specific queries made up the remainder of occurrences. The time limitations of the task appeared to impact the strategies for making restricted requests in that they tended to be short queries about particular features using "or" or "any" constructions. Sixty-one percent of responses to restricted requests were clarifications in direct response to the restricted request, while nearly 30% went unattended.

(4) Restricted Request: Dyad 22, Iteration 7, Trial 41
Player 2: praying
Player 2: kneeling down
Player 2: diamond head
-> Player 1: facing left or right
Player 2: looking right

(5) Restricted Request: Dyad 15, Iteration 5, Trial 30
Player 2: dog
-> Player 1: what is the dog?
Player 2: faces left
Player 2: has a tail
Player 2: and a square head
Player 2: odd dog

(6) Restricted Request: Dyad 25, Iteration 2, Trial 10
Player 1: this legit looks like a chess piece
Player 1: like a diagonal square on top
-> Player 2: any arms?
Player 1: and one leg
Player 1: one arm left

The most frequent OIR strategy was the restricted offer, which gives an interpretation of the Director's description in a suggestive manner. Offers typically ended with a question mark (82% of all occurrences), indicating they were no other corrections (Jefferson, 1987), but an attempt to understand a potentially problematic description. Offers are candidate understandings, which may take the prototypical "you mean X?" form, as in (9) below. As such, offers were usually followed by the Director's confirmation of the offer or a correction of the offer (7–9, offers marked by arrows). Offers were met with either correction if the interpretation did not match the Director's intended meaning, as in (7), or confirmation if the offer was an accurate interpretation (49%), as in (8) and (9). Corrections could be as simple (and potentially uninformative) as "no," although these occurred infrequently (6%), as negative responses typically included corrected versions (14%). The remaining offers went unaddressed, either due to time limitations or simultaneously fulfilled requests. Text-based interaction does not allow for immediate public production of descriptions or repairs—that is, it takes time to type responses, and we do not know what the other is typing in the moment. Therefore, it was not uncommon that while the Matcher was typing a repair initiation, the Director was typing the to-be-queried description simultaneously. While this modality difference is interesting, it falls beyond the scope of this study, but it does at least provide an explanation for some of the unattended repair initiations.

(7) Restricted Offer: Dyad 1, Iteration 5, Trial 27
Player 1: dancing left kick right
-> Player 2: no head guy?
Player 1: head

(8) Restricted Offer: Dyad 2, Iteration 11, Trial 63
Player 2: diamond head
-> Player 1: looks like they're kneeling?
-> Player 1: like Z shape?
Player 2: no
Player 2: yea

(9) Restricted Offer: Dyad 18, Iteration 7, Trial 37
Player 2: person running to the right, arms raised, looking up
-> Player 1: you mean Kevin?
Player 2: wait Kevin?
Player 2: yep
Player 1: YES

The presence and rate of other-initiated repairs in this study suggest that participants noticed and attended to problems in communication by (1) initiating a repair and (2) responding to the repair initiation. We consider the effect of OIRs as a whole, that is, collapsed across the different OIR types. The reasons for this are twofold: first, not all OIR strategies provided sufficient data for separate analyses; second, all OIR strategies demonstrated the recognition of a problem in communication, even if they treated the problem differently.

3.2. Change in communication efficiency, interlocutor confidence, and dyad accuracy over repeated social interactions

This section examines the change in Director and Matcher confidence (rated on a Likert scale ranging from 0 to 6), communication efficiency (the number of words used to communicate each shape), and communication success (shapes correctly identified by the Matchers) over repeated interactions (Iterations 1–12, i.e., from the first time the shape was communicated to the twelfth and final time it was communicated in each dyad). Each analysis excluded trials in which the participants ran out of time.

First, we present a typical dyadic interaction that involves OIRs over multiple trials for the same shape (Table 2). In Trial 5, the Director (Player 2) initially described the Tangram with a directional description. The Matcher (Player 1) initiated a repair via the restricted offer "Standing?" The Director responded with the clarification "bowing man," adding "with triangle bum." Later, in Trial 23, the Matcher—now Player 2—used the previously repaired description to offer, “begging with butt?” and received a confirmation preceded by an alternate offer, “triangle bum.” Later again, in Trial 56, the prior descriptions that arose from the repair sequences were used effectively, without the need for repair. Over repeated interactions and repair sequences, the shape description was dramatically abbreviated, to “TB,” making communication more efficient.

The confidence data were analyzed using a linear mixed effects model. Iteration (1–12, centered) was entered as a fixed effect. The random effects structure included by-Dyad and by-Shape random intercepts, as well as by-Dyad and by-Shape random slopes for Iteration. Over iterations, Director confidence increased ($\beta = 0.18$, $SE = 0.02$, $t = 10.86$, $p < .001$; see Fig. 3A) and Matcher confidence increased ($\beta = 0.16$, $SE = 0.02$, $t = 10.27$, $p < .001$; see Fig. 3B). Next, we analyzed the change in communication efficiency (same model). Over iterations, fewer words were used to communicate each shape, making communication increasingly efficient ($\beta = -0.60$, $SE = 0.06$, $t = -10.34$, $p < .001$; see Fig. 3C). The communication success data were analyzed using a logistic mixed effects model (same model structure). Over iterations communication success improved ($\beta = 0.26$, $SE = 0.04$, $z = 6.21$, $p < .001$; see Fig. 3D).

Over repeated interactions communication became increasingly efficient and accurate. This replicates a well-established pattern in the literature (e.g., Clark & Wilkes-Gibbs, 1986; Garrod et al., 2007; Krauss & Weinheimer, 1964). In addition, Director and Matcher confidence increased over repeated social interactions.

3.3. Are interlocutors sensitive to problems in communication?

Matcher sensitivity to problems in communication was assessed in two ways: at the perceptual level (using confidence estimates) and at the behavioral level (using other-initiated repairs). If Matchers are sensitive to problems in communication, they will be less confident on trials in which communication is unsuccessful compared to trials in which communication is successful (Hypothesis 1), and trials that contain an OIR will be less successful compared to trials that do not contain an OIR (Hypothesis 2). If OIRs signal communication problems to the Director, Directors will be less confident on trials that contain an OIR compared to trials that did not contain an OIR (Hypothesis 3).

Table 2
Descriptions and repair sequences for a tangram by Dyad 30. See also Clark and Wilkes-Gibbs (1986) for similar examples

Tangram	Iteration 1, Trial 5	Iteration 4, Trial 23	Iteration 10, Trial 56
	Player 2: LF = left facing Player 2: So LF Player 1: yeah Player 1: standing? Player 2: bowing man with a triangle bum	Player 1: tray man Player 1: LF Player 2: Begging with butt? Player 1: triangle bum Player 1: yeah	Player 1: triangle Butt Player 1: TB Player 2: TB

To test Hypothesis 1, we identified all unsuccessful trials (excluding trials where participants ran out of time) and then selected a comparison group of matched successful trials. For each unsuccessful trial, we randomly selected a successful trial from another dyad from the same trial number (i.e., 1–72). Because matcher confidence and communication success changed over trials (see Fig. 3), it was crucial to match unsuccessful and successful trials by trial number. The Matcher confidence data were analyzed using a linear mixed effects model. Trial Type (Successful, Unsuccessful) was entered as a fixed effect (centered). The random effects structure included by-Matcher and by-Shape random intercepts, as well as by-Matcher and by-Shape random slopes for Trial Type. Matchers were sensitive to problems in communication; their confidence was lower on trials in which communication was unsuccessful compared to trials in which communication was successful, supporting Hypothesis 1 ($\beta = -0.96$, $SE = 0.16$, $t = -6.00$, $p < .001$; see Fig. 4A).

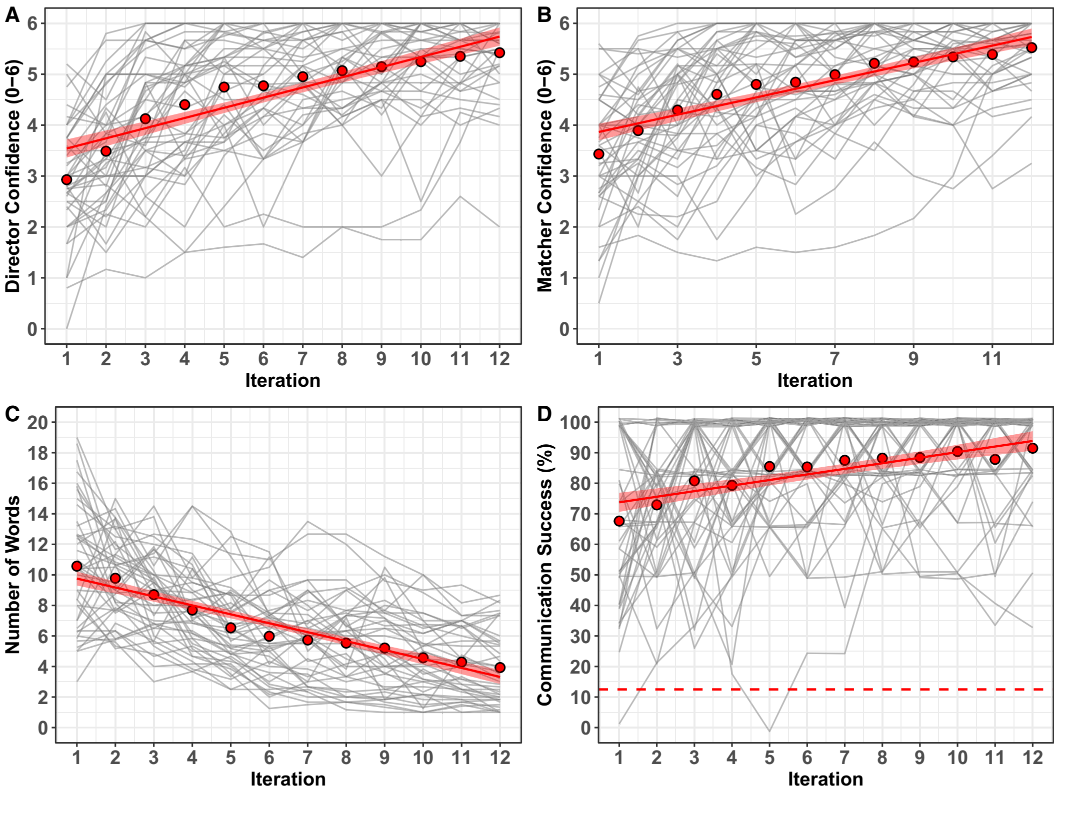

Fig. 3. Change in mean (A) Director and (B) Matcher confidence, (C) communication efficiency (number of words used to describe each shape), and (D) communication success (expressed as a percentage) over Iterations 1–12 and plotted for each dyad. In each panel, the solid red line is the linear model fit and the light red shaded area is the bootstrapped 95% confidence interval. The dot points reflect the overall mean at each Iteration. The dashed horizontal red line (D) indicates chance communication success of 12.5%. Chance performance would increase to 16.67% if participants realized the distractor items were never communicated. A small amount of noise was added to the communication success scores to reduce over plotting (D).

To test Hypothesis 2, we identified all OIR trials (including trials where participants ran out of time) and then selected a comparison group of matched trials that did not contain an OIR. For each OIR trial, we randomly selected a trial that did not contain an OIR from another dyad from the same trial number (i.e., 1–72). The communication success data were analyzed using a logistic mixed effects model (same model structure). Trial Type (No OIR, OIR) was entered as a fixed effect (centered). Communication success was lower on trials that contained an OIR compared to trials that did not contain an OIR, supporting Hypothesis 2 ($\beta = -0.91$, $SE = 0.32$, $z = -2.84$, $p = .004$; see Fig. 4B).

To test Hypothesis 3, we identified all OIR trials (excluding trials where participants ran out of time) and then selected a comparison group of matched trials that did not contain an OIR. The Director confidence data were analyzed using a linear mixed effects model. Trial Type (No OIR, OIR) was entered as a fixed effect (centered). The random effects structure included by-Director and by-Shape random intercepts, as well as by-Director random slopes for Trial Type (including a by-Director random slope for Shape led to model over-fitting). Director confidence was lower on OIR trials compared to no OIR trials, suggesting that OIRs signaled a communication problem to the Director, supporting Hypothesis 3 ($\beta = -0.63$, $SE = 0.18$, $t = -3.57$, $p = .001$; see Fig. 4C).

4. Discussion

Other-initiated repairs are a frequent and universal feature of human communication (Dingemanse & Enfield, 2015; Dingemanse et al., 2015). Other-initiated repairs are

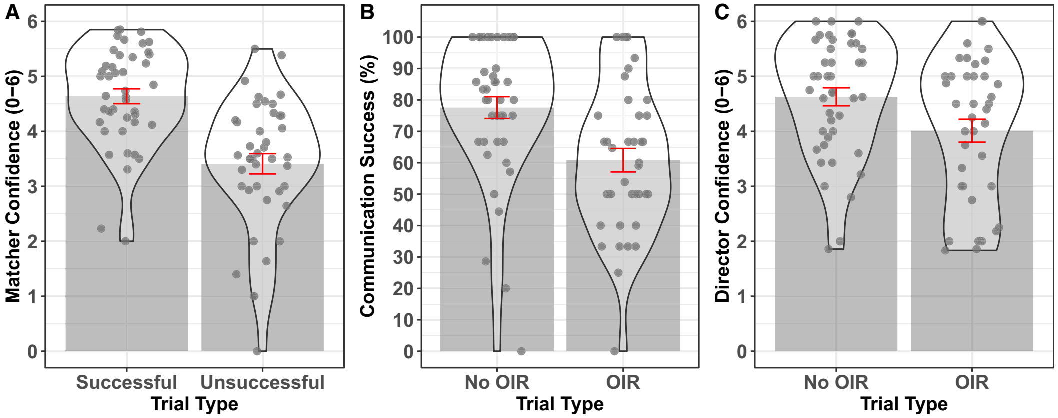

Fig. 4. Mean (A) Matcher confidence (0–6) of communication success in successful and unsuccessful communication trials, (B) communication success in trials without an other-initiated repair (No OIR) and with an OIR (OIR), and (C) Director confidence (0–6) in trials without an OIR and with an OIR. Error bars are the bootstrapped 95% confidence intervals, and the dot points indicate the mean score per participant/dyad.

widely thought to signal trouble and address problems in communication (Schegloff, 2000; Sidnell, 2011). However, recent research casts doubt on this, arguing instead that communication is noisy and error prone, and that interlocutors exhibit considerable insensitivity to problems in communication (Galantucci & Roberts, 2014; Galantucci et al., 2018; Roberts et al., 2016; see also the literature on change blindness; Simons & Rensink, 2005). Using a referential communication task, the goal of which is accurate information transfer, we show that matchers were less confident on trials where communication was unsuccessful, and that communication success was lower on trials that contained an OIR compared to those that did not contain on OIR. This pattern of results demonstrates that interlocutors exhibit (a degree of) sensitivity to problems in communication and use OIRs to address them. In addition, that OIRs were present in unsuccessful trials supports the idea that repair does not necessarily resolve communication problems, but is a signal to them. This is supported by the finding that OIR trials were associated with lower Director confidence compared to trials without an OIR, indicating that Matchers' OIRs signaled problems in communication to their partner.

Because language is ambiguous (Altmann, 1998) and because ambiguity resolution is guided by egocentric processing biases (Keysar, 2007), communication will inevitably be noisy and error prone. For this reason, sensitivity to problems in communication will be imperfect. This has been empirically demonstrated using a task in which speakers try to communicate one of two meanings of ambiguous statements to a listener and then estimate their communication effectiveness (Fay, Page, Serfaty, Tai, & Winkler, 2008; Keysar & Henly, 2002). Consistent with an egocentric processing bias, speakers systematically overestimated their communication effectiveness, predicting the listener would understand their intended meaning more often than they actually did. Signal detection analysis indicated that, in addition to this egocentric response bias, speakers exhibited a degree of sensitivity, being able to discriminate successful trials from unsuccessful communication trials. This pattern of results is consistent with the Matcher sensitivity results returned by this study.

The consequences of miscommunication will vary depending on the context. In this study, the goal of communication was accurate information transfer, whereas in other studies the goal is predominantly social in nature (cf. Galantucci & Roberts, 2014 [though Study 1 here is an exception]; Roberts et al., 2016). Doing reference is a ubiquitous aspect of everyday interpersonal communication (Clark & Bangerter, 2004; Krauss & Fussell, 1996; Sacks & Schegloff, 1979). Indeed, it is one in which we often find repair sequences as we query our references through recipient-designed descriptions or try-marking (Clark & Wilkes-Gibbs, 1986; Sacks & Schegloff, 1979). Problems in referential communication then might be more actionable than temporary incoherence or nonsense phrase insertion in less consequential interactions. We can observe that participants are sensitive to problems in referential communication by the ways in which they react to inadequate signals in situ. Rather than relying on self-reports in post-tests, we can look at the actions participants perform—such as initiating a repair—as evidence of noticing communication problems and acting upon them.

In this study, communication problems appeared to be corrected through a combination of repair and interactive alignment (Pickering & Garrod, 2004). For instance, Tangram 9 was initially described as "left facing" (Dyad 30, Trial 5; see Table 2). The Matcher signaled a potential misunderstanding by adding the restricted offer "standing?" to which the Director added the (corrected) clarification "bowing man." Later, the Matcher (the Director on Trial 5) queried the description for the same shape, "tray man," adding the restricted offer "begging with butt?" to which the current Director responded "triangle bum" (Trial 23). By trial 56, the dyad had aligned on the description "triangle butt," abbreviated to "TB" later in the trial. This process of negotiating conceptualizations/naming has also been documented by Brennan and Clark (1996), who attribute shared history to creating conceptual pacts for references. In addition to shared history, here, OIRs signaled a potential communication problem, which was resolved by incrementally aligning their shape descriptions over trials. This observation, that OIRs signaled miscommunication and triggered a realignment process, is consistent with the results of an experiment showing that interactive alignment may be the primary means through which interlocutors negotiate mutual understanding (Fay, Walker, Swoboda, & Garrod, 2018).

5. Conclusion

It is widely believed that people are sensitive to problems in communication and use OIRs to address them (Jefferson, 1987; Sacks et al., 1974; Schegloff et al., 1977; Sidnell, 2011). This view is challenged by recent studies indicating that interlocutors exhibit considerable insensitivity to incoherency in conversation (Galantucci & Roberts, 2014; Galantucci et al., 2018; Roberts et al., 2016), a finding consistent with change blindness studies (Simons & Rensink, 2005). Following De Ruiter and Albert (2017), we adopted a mixed method approach that combined the experimental method with in-depth qualitative text analysis to examine interlocutor sensitivity to problems in communication. Participants were less confident on trials in which communication was unsuccessful, and they were more likely to use an OIR on these trials compared to trials in which communication was successful. We conclude that interlocutors exhibit (a degree of) sensitivity to problems in communication, and use OIRs to signal and address them.

Open Research badges

This article has earned Open Data and Open Materials badges. Data and materials are available at https://osf.io/53948/.

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