FORUM

Communication and miscommunication: The role of egocentric processes

BOAZ KEYSAR

Abstract

Communication is typically considered to be guided by principles of cooperation, requiring the consideration of the communication partner's mental states for its success. Miscommunication, in turn, is considered a product of noise and random error. I argue that communication proceeds in a relatively egocentric manner, with addressees routinely interpreting what speakers say from their own perspective, and speakers disambiguating their utterances with little consideration to the mental states of their addressees. Speakers also tend to overestimate how effective they are, believing that their message is understood more often than it really is. Together, these findings suggest a systematic cause for miscommunication.

1. Communication and miscommunication

Most people, most of the time, think that what they say is pretty clear. Ambiguity is not routinely noted when people normally communicate. In contrast, linguists and psychologists who study the use of language notice potential ambiguity everywhere. The newspaper is a goldmine for unintended meanings, as in this recent classified ad: "Bedroom furniture—Triple dresser with mirror, armoire, one night stand." Students of language know that even if you write "one nightstand," the text will not be devoid of ambiguity because every text can have more than one meaning. Even a simple statement such as "This chocolate is wonderful" is ambiguous because it could be a statement of fact, an offer, a request for more, and so on. Despite such ubiquitous ambiguity, there are two reasons why people may not be confused. They use context for disambiguation, and they assume that the writer or speaker is a cooperative agent (Grice 1975). With both powerful tools, language users take a linguistic system that has a huge potential to fail, and use it successfully.

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The cooperative principle explains why communication succeeds. Language users presume that their communication partner is cooperative, and use this to extract a specific meaning that preserves this assumption. What the partner believes, thinks, and knows is central to this process. For instance, cooperativeness requires a certain level of informativeness. A speaker is expected to be informative in the sense that she is not providing too little information or too much information. When a colleague asks where I live, and I do not wish to offend him, I do not say "in Chicago" even though it is perfectly true. We work together; he obviously knows I live in Chicago. In this sense, what I know about what my colleague knows, and what I assume about what he doesn't know, should be central to what I say. Not only must others' mental states be central to communication, but also there is a good reason to believe that people have a unique ability to make inferences about these mental states quickly and accurately. Sperber and Wilson (2002) argued precisely that. Because conversation is so quick, with rapid turn taking and facile inferences, they conclude that the human mind is designed to take into account the beliefs of the other effortlessly and automatically. This would suggest the existence of a mental module that is dedicated to the consideration of beliefs during language processing (Fodor 1985).

In this paper, I challenge these assumptions. I argue that when people communicate they do not routinely take into account the mental states of others, as the standard theory assumes. People don't rely on the beliefs and knowledge of their addressees to design what they say, and addressees do not routinely consider what the speaker knows to interpret what they hear. Of course, sometimes they might. However, such consideration of the mental state of the other is not done systematically. I will argue that when people succeed in avoiding ambiguity, it is not necessarily because they are following the principle of cooperation.

Why would language users behave in such a strange way that defies "common sense"? Why would they not do as they "should" and systematically take into account the mental state of their communication partner? The reason is that our own perspective, knowledge, and beliefs have priority over anything we know about others' perspective, knowledge, and beliefs (Decety & Summerville 2003; Epley, Keysar, VanBoven, & Gilovich 2004). Our own perspective, then, does not allow us to follow the cooperative principle's assumption. This, in turn, can explain miscommunication. Misunderstanding, then, is not what occasionally happens when random elements interfere with communication; it is not only a product of noise in the system. It can be explained systematically as a product of how our mind works.

2. Understanding egocentrically

Young children know how to speak before they know how to reason well about other's beliefs. Only at around four to five years of age can children distinguish between what they know and what others know (Wellman 1990; Wellman, Cross, & Watson 2001). Before age four, they behave as if their own beliefs are shared by others. Their reasoning about mental states is relatively egocentric. Their private knowledge overwhelms their thinking. The most compelling demonstration of this is the false belief task (Perner 1991; Perner, Leekam, & Wimmer 1987). The child hides a candy together with Sally and then Sally leaves the room. The child then moves the candy to a different hiding location. When Sally returns to the room, the child is asked where Sally will look for the candy. Young children think that Sally will look for the candy where it really is: in the new hiding place. Because they know where it is, this private knowledge overwhelms their reasoning. Around age four, children start to distinguish what they know from what others know, and they are more likely to think that Sally will look for the candy in the old hiding place where she believes it is. This developmental trajectory seems universal, as it is typical not only of Western children but also in places with a very different culture such as China (Sabbagh, Xu, Carlson, Moses, & Lee 2006), and even in isolated, pre-literate cultures (Avis & Harris 1991).

Though it seems that children's thinking is transformed from egocentric to allocentric, we have shown that the basic egocentric tendency persists through adulthood. In an experiment where subjects followed instructions, we investigated whether their interpretations of the instructions were egocentric (Epley, Morewedge, & Keysar 2004). The subject sat across the table from a "director," and the director told the subject what objects to move around on the table. For instance, there were two trucks, a large one and a smaller one, both visible to the subject and the director. The director said, "Move the small truck." As with the hidden candy task there was a third even smaller truck, visible only to the subject but not to the director. We made it painfully clear to the subjects that the director could not see the smallest truck, and that he would not ask them to move it. If they were not egocentric, then they should not have believed that the director intended them to move the smallest truck.

We found that children tended to interpret "the small truck" quite egocentrically. Young children reached for the truck that only they could see almost half of the time. We also discovered an interesting similarity between children and adults, as well as an interesting difference. We found that the initial process of interpretation is identical for children and adults. By tracking subjects' gaze, we could tell which object they are

considering as the intended one. Adult subjects were just as quick as young children to initially look at the hidden truck. This initial process, then, forces subjects to consider what they can see as opposed to what the director can see. To interpret the instructions as intended, the subjects must then recover from their egocentric interpretation and find an object that can be seen by both themselves and the director. Children were much less effective in this recovery than adults. Once they found an egocentric referent, they took much longer than adults did to find the intended one. In fact, children were less able to recover from it altogether. Once they looked at the hidden object, they were more likely to make an error and reach for it (51%) than adults (21%).

What we discovered, then, is that even though children are eventually able to comprehend the beliefs of others, this ability does not guide their interpretation of others' actions. Even adults initially behave as if they confuse the knowledge of the other with their own, but can eventually use their understanding of beliefs to correct their interpretation. In this sense, adults are not allocentric in how they understand others; they are just more practiced in overcoming an inherent egocentric tendency. The same is true for the very ability to think about beliefs (Birch and Bloom in press). Adults fail the false belief task if it is a bit more complex. Five-year-olds are able to predict that Sally would look for the candy where she believes it is. However, when asked to determine the probability that Sally will look in any one of several locations, even adults think that she is more likely to look in the place that the candy really is, because they know it is there. Therefore, people have an egocentric tendency in both thinking about other's beliefs and in interpreting what they say. They have experience recovering from this tendency, but do not always succeed.

The egocentric tendency that we discovered is no small matter. Though adults perform better than children, they still show a surprising disregard for the perspective of the other. Why would adults move the smallest truck, when they clearly know that the director could not have been aware of that particular truck? Whenever adults did this in our experiments, they were unabmiguously committing an egocentric error. In fact, the great majority of adult subjects in our experiments (around 80%) committed such errors at least once during the session (Keysar, Lin, & Barr 2003). This was not because their private knowledge was more compelling than the knowledge shared with the director. When the hidden truck is smaller than the intended truck, the hidden truck is a better, more compelling referent than the intended one. However, this difference was not crucial. Even with two trucks of the same size, adults were just as likely to commit the egocentric error (Lin & Keysar 2005). In this case, they tended to ask, "Which truck?" neglecting to use their knowledge

that the director could only have meant the one he could see. If asymmetry between the intended and private object cannot explain the egocentric behavior, what can?

There are at least two reasons for this phenomenon. First, one's own perspective is dominant and provides a compelling interpretation of what others say. Second, the consideration of other's beliefs is not automatic. Instead, it is an effortful process, which requires cognitive resources and is easily disrupted. If this is true, then people's interpretations should depend on the resources available to their working memory. People differ in the capacity of their working memory, and this difference affects performance on a variety of cognitive tasks (Baddley 1986; Just & Carpenter 1992). Typically, performance on tasks that depend on working memory capacity deteriorates as this capacity decreases. In contrast, automatic processes are unaffected by working memory variations. We compared the performance of people with a high capacity working memory to those with low capacity in our perspective-taking task. Indeed, people with relatively low working memory capacity showed a much stronger egocentric tendency than those with high capacity: They were much more likely to be distracted by the hidden truck, and slightly more likely to move it (Lin & Keysar 2005).

Variation in capacity determines how much working memory is available to different individuals, but memory resources can also vary as a function of external demands. For instance, a phone conversation while driving could deplete attentional resources, thus leaving the driver less able to respond to unexpected problems (Strayer & Johnson 2001). We manipulated the external "cognitive load" by asking subjects to keep in mind either two (low load) or five (high load) sets of numbers while following instructions. Indeed, with a high external load subjects were much more egocentric than with low external load, and behaved like subjects who have a low working memory capacity. Our ability to consider other's beliefs, then, is very fragile. It is the first thing that is affected by the lack of mental resources. In contrast, egocentric interpretations are robust and less vulnerable to fluctuations in working memory and resources.

The assumption of cooperativeness in comprehension depends on assessing the mental state of the speaker. Nevertheless, understanding does not seem to be guided by what the speaker knows. Instead, listeners interpret what speakers say from their own perspective. They only consider the mental state of the speaker if they need to correct an error.

Perhaps cooperativeness would be more likely to play a role when people converse over time, accumulating shared experiences and establishing common ground (Clark, Schreuder, & Buttrick 1983; Clark and Carlson

1981). People tend to converge on similar terminology over time (Krauss & Glucksberg 1977). So we may start calling something "the worst bush," and continue to call it that, even when context changes and there is no longer a need to distinguish it from other bushes. When we persist in using the same term, it is as if there is a tacit agreement on the meaning. It seems cooperative because if we change what we call it, it might signal a change in referent (Clark 1987). Brennan and Clark (1996) argued that such cooperativeness is at the heart of people's tendency to use terminology consistently over time. If you call a bush a bush, and then suddenly switch and call it a shrub, people are surprised (Metzing & Brennan 2003). It seems that people establish mutual terminology and expect each other to cooperate and adhere to it.

However, listeners' expectations are actually independent of cooperativeness. When people establish a particular way of describing an object with a partner, they expect even a new conversation partner to adhere to that terminology. They know that the new partner is not privy to the tacit agreement established with someone else to call the object a bush, but they expect this terminology to be used nonetheless (Barr & Keysar 2002). The expectation to call it a bush, then, could not be based on cooperativeness. The same happens when a partner suddenly switches to "shrub," violating a tacit agreement to call it a bush. Listeners are indeed surprised when that happens. But they are just as surprised if the speaker establishes the agreement with a different person, and then switches terms when talking to the new listeners (Shintel & Keysar in press). Listeners do have expectations that speakers keep using the same term for the same thing, but not because they assume the speakers are cooperative; instead, it is because they assume the speakers are consistent.

People's tendency to converge on the same terminology, then, is not governed by considerations of cooperativeness. People do that regardless of what they believe about the other's knowledge and belief. Most strikingly, people behave the same way even when they cannot remember past events at all. Hippocampal amnesiacs, who repeatedly converse on a set of objects, showed typical convergence over time on a consistent set of terms, just like non-amnesiac controls (Duff, Hengst, Tranel, & Cohen 2005). Keeping track of other's beliefs is not necessary in order to explain what looks like a cooperative behavior.

The research I reviewed strongly suggests that listeners understand language from their own perspective, without much consideration for the mental state of the speaker except when they need to correct an error. Such an egocentric process could be a systematic cause of misunderstanding and miscommunication. Nevertheless, if speakers assume most of the responsibility for disambiguation and make sure they tailor what they say

to the beliefs, knowledge, and expectations of their addressees, then communication would not suffer from the listener's egocentric tendency. Next, I will evaluate if speakers attempt to do that.

3. Speaking egocentrically

It is unrealistic to expect people to speak unambiguously. Sources of ambiguity are so numerous that some ambiguity is virtually guaranteed. However, as with any performance, speaking need not be devoid of pitfalls in order to function well. A good enough performance is sufficient (Ferreira, Ferraro, & Bailey 2002). Indeed, speakers have many tools to constrain ambiguity and reduce it to an acceptable level. For example, "He broke the glass under the table" has at least two syntactic structures. In one case "under the table" is the location of the broken pieces, although he may have broken the glass somewhere else. In the other case, "under the table" is where he broke it. To convey only the first meaning, one could explicitly use a relative clause "He broke the glass that was under the table." Tools such as this syntactic one are readily available to speakers. The question is, do speakers use these tools to communicate cooperatively?

Several studies suggest that though speakers use such tools to disambiguate meaning, they do not do so in the service of cooperation. They do not disambiguate their speech for the benefit of their addressee. Ferrira and Dell (2000) investigated speakers' tendency to disambiguate expressions such as "The woman knew you ..." by distinguishing between "The woman knew you when you were a baby" and "The woman knew that you were cute." The only thing that determined their use of the disambiguating cue was its availability in memory. So while speakers were sensitive to how ambiguous what they said sounded to them, they were not sensitive to how ambiguous it was for a particular addressee (See similar findings in Arnold, Wasow, Asudeh, & Alrenga 2004).

Speakers can use different words to communicate more clearly, but they can also say the same thing with a different intonation. Saying "I should apologize" with a stress on "I" means that I should, but with a questioning intonation on the "I" suggests that perhaps someone else should apologize. How things are said is a powerful tool that affects what meaning is conveyed, but there is little evidence that it is used for the benefit of addressees. For instance, Kraljic and Brennan (2005) showed that while speakers use prosody for disambiguation, they do this whether their addressee needs it or not. They use intonation even when the addressee has sufficient knowledge to understand that it could only be I who should

apologize. So speakers disambiguate because it seems better to them, not in an attempt to be cooperative. Speakers also pronounce words with varying degrees of clarity. When they talk about something for the first time, they pronounce their words more clearly than when they continue to refer to it (Fowler & Housum 1987). This makes sense for communication and is indeed functional for the addressee. When your friend starts gossiping about a new colleague, it is useful that he pronounces her name, Tzimisce, very clearly. When he mentions it repeatedly, his pronunciation is not as clear any more. Vowels are reduced and he says it faster. This is useful for you, because the first time you hear it is when you need help, when you need it to be very clear. After that, your memory fills in the missing information and you have no difficulty understanding the reduced form. Though this helps the addressee, there is no evidence that speakers do it to be cooperative. They pronounce words clearly initially and less clear subsequently independently of the needs of their addressee (Bard, Anderson, Sotillo, Aylett, Doherty-Sneddon, & Newlands 2000).

Being informative is a central part of being cooperative. Therefore, when my colleague asks me where I live, I do not tell him "in Chicago" because this would clearly be under-informative. Indeed, Engelhardt, Bailey and Ferreira (2006) found that speakers avoid being under-informative. However, they also found that speakers systematically err in the other direction, tending to be over-informative. This is analogous to answering the question "where do you live" by providing my exact address when my colleague was just trying to make conversation.

There are cases when people seem to be perfectly informative. Indeed, when people tell stories they seem to provide information at the "right" level. They are more likely to spell things out precisely when things are not obvious. For instance, when they tell a story about stabbing, they are more likely to mention the instrument when it is an ice pick than when it is a knife. In general, they are more likely to provide information when it is atypical than typical. An ice pick is a relatively rare tool for stabbing, a knife more common. In storytelling, it seems that speakers are behaving in line with cooperativeness. They are taking the knowledge and beliefs of their addressees into account, and using information accordingly. As it turns out, speakers are not really doing this because they are sensitive to the knowledge of their addressees. They are just as likely to provide atypical information when their addressees are uninformed as when their addressees already know that information (Brown and Dell 1987; Dell and Brown 1991). Speakers are less likely to mention typical information not because it is obvious to their addressees, but because it is obvious to them.

Availability of information is a powerful determinant of how the mind works (Tversky and Kahnemen 1973). It also seems to play an important role in what information speakers rely on. What determines speakers' behavior is not what they believe to be available to their addressee, but what is available to them. When doctors answer patient's questions they could infer how well informed the patient is about medical issues from the way the patient asks the questions. It makes sense that they would then use technical language if the patient used technical language, but use more everyday language if the question did not include technical terms. This is what Jucks, Bromme, and Becker (2005) found. However, they also found that the tendency to use technical language was just as high when the patient's question was non-technical, but the medical expert consulted a source that used technical terms. The source made the technical terms available, and so the expert was more likely to use them even though the patient had no access to that source. Availability of information may make speakers look like they are being cooperative when they are not.

A few studies show that speakers do attempt to take their addressee's mental state into account. When we asked people to identify pictures for addressees, they tended to use shared context more than their own private context. Under pressure to communicate quickly, they were just as likely to rely on private context as on context shared with the addressee (Horton & Keysar 1996). Robnagel (2000, 2004) found a similar pattern with a different methodology; speakers were less able to tailor their speech to their addressees when they were under cognitive load than when their attentional resources were undisturbed. This suggests that when speakers plan what to say, they are fundamentally egocentric, but they monitor and correct errors to tailor their speech to their addressees. When the monitoring process is interrupted with time pressure or cognitive load, they fall back on purely egocentric speech.

Speakers do not seem to be able to monitor for ambiguity very effectively. A purely linguistic ambiguity is particularly hard to detect. When speakers attempt to identify a picture of a baseball bat for addressees, they often call it a bat, even if this may lead the addressees to select an animal bat. In contrast, it is easier for speakers to avoid referential ambiguity; when two animal bats are present, they often distinguish them by adding an adjective, like "the large bat" (Ferreira, Slevc, & Rogers 2005). Speakers show a similar difficulty with linguistic ambiguity when trying to use intonation to disambiguate syntactically ambiguous sentences. Acoustic analysis shows that though speakers attempt to, they do not include the necessary acoustic cues (Allbritton, McKoon, & Ratcliff 1996).

Speakers' difficulty in disambiguating what they say could lead to misunderstanding, but it does not have to. If speakers can gauge their effectiveness, they may be able to anticipate that their addressee would have difficulty understanding them. Speakers need not necessarily be always clear, but the question is, are they attuned to their possible miscommunication? Can they tell when they conveyed their intention successfully and when they did not?

We found that speakers are not attuned to this. They are systematically biased to think that they are understood when they are not (Keysar & Henly 2002). We asked subjects to say syntactically ambiguous sentences so that another subject will understand them as unambiguous. For instance, they said, ''Angela killed the man with the gun,'' trying to convey the idea that Angela used the gun to kill the man, not that he had the gun. Then we asked them which of the two meanings the listener understood, and compared it to the meaning the listener actually understood. Only about 10% were calibrated, and a few underestimated. The great majority of speakers tended to overestimate their ability to convey the message. The overestimation was quite dramatic. When speakers thought they were understood, 50% of the time they were wrong. One might suspect that such overestimation is exaggerated because of the experimental situation, but it is probably the other way around. In the experiment, speakers were provided with both meanings and actively attempted to disambiguate the sentence. This should have helped them contrast the meaning and exaggerate the one they intended to convey. In a typical conversation, speakers do not normally consider alternative meanings to what they say. In ''real life,'' they may not even realize that there is a need to disambiguate it. This surely would result in an even more dramatic overestimation. When and why do speakers overestimate their effectiveness? The answer is, under many circumstances, and for many reasons. Communication affords a variety of situations that lend themselves to such overestimation. When speakers attempt to use intonation to disambiguate syntactic ambiguity, they use cues. Therefore, they would exaggerate the stress on *Angela* to convey that she was the one who killed the man with the gun. They know what they attempt to convey, and they know how they are doing it. This private knowledge makes the stress on *Angela* sound objectively clear. Nevertheless, it only sounds like that to them because they already know what they are trying to convey. Such ''construal'' is fundamental to our interpretive system (Griffin & Ross 1991; Ross 1990) and it introduces a paradox to communication: because we know what our intention is, our communication seems to convey it uniquely, and it seems to have only the intended meaning. This illusion was demonstrated with non-linguistic communication by having people

tap a song so that an audience would be able to identify it. Just like our speakers, tappers greatly overestimated their effectiveness (Newton, 1990). Instead of a mental orchestra that accompanies the tapping, our speakers had in mind their intended meaning. This caused them to hear that what they communicated was effective.

This construal problem in communication is very pervasive, making people less aware of their effectiveness. For instance, it is easier to communicate on the phone than via email. It is easier to communicate face to face than on the phone. These differences are particularly clear when intonation is important. For instance, people were asked to convey either a sarcastic message or a sincere one, and to estimate which message their addressee understood. Given that a sarcastic tone is much easier to convey in speech, people managed to convey it much more effectively by speaking than via email. Nevertheless, they thought that they were just as effective in both media (Kruger, Epley, Parker & Ng 2006). People are not sensitive to difficulties that different media introduce, they do not appreciate the handicap of lack of intonation in email messages, and even when they can use intonation, they overestimate the effectiveness of those cues (Keysar & Henly 2002). Given that media variations abound, and cues to meaning are of many sorts, speakers have many opportunities to conclude incorrectly that their addressee understood them.

One way that speakers may be cooperative is to consider the mental states of their addressees in order to tailor their communication to their conversation partners. They would evaluate what they say in light of what they know about what their address knows. This might be too daunting a task for the human mind. Instead, speakers may use a rougher heuristic of who knows what. They may not consider if each piece of information is known by the other, but instead keep track of how much information they share with the other. Under some circumstances, this may lead people to miscommunicate more often with people who share a lot with them than with people who share little information with them. This is precisely what we found (Wu & Keysar in press). The more information people share, the more they tend to confuse their addressee when they discuss new information. This is particularly pertinent to the possibility of miscommunication because people typically expect the opposite. They expect to communicate better when they share more with others than when they share less.

4. Conclusion

Listeners rely on their own perspective when they understand language; they do not routinely use knowledge of the speaker's mental state when

they understand what the speaker says. They show a fundamental egocentric tendency, coupled with an attempt to understand the speaker from his or her own perspective. Assumptions of cooperativeness, then, come into play only as part of a corrective mechanism, if at all. Speakers do not seem to be guided by cooperativeness either. They disambiguate what they say, but mainly because it seems ambiguous to them, independently of how ambiguous it is for their addressee.

Egocentric speech and egocentric understanding could introduce a systematic reason for miscommunication. Private knowledge affects processing in two ways. Sometimes it seems to be shared when it is not. With much effort, one could undo this. The more insidious impact comes from its "construal" effect. Private knowledge can make an ambiguous utterance seem unambiguous by "construing" it. Once it seems unambiguous, it seems objectively unambiguous; independent of the private knowledge that disambiguated it. This is particularly relevant for speakers, trying to convey an intention, which is always private knowledge, via an utterance which is usually ambiguous. Consequently, speakers have difficulty gauging their ability to convey their message and systematically overestimate their effectiveness. Therefore, they are less likely to be able to design their utterances for the benefit of their addressee, and less likely to notice when their addressee misunderstands them.

If this is true, then why is communication so successful? Why are people so effective in conveying and understanding intentions? One answer is that successful communication is overdetermined. Even when people are not acting as cooperative agents, they may communicate successfully because the context is powerful. The other answer may be that we do not know how successful communication really is. It seems that miscommunication is relatively rare, but much of it may go unnoticed. You may tell a friend you really liked that movie about the journalist from Kazakhstan who is touring the United States, and the friend may think you were being sarcastic. You proceed to talk about other movies, without ever knowing that he misunderstood you. By definition, we do not know how often miscommunication goes unnoticed. This cluelessness distorts our performance feedback, making it very difficult to make adjustments and know when we are communicating well, and when we are not.

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