Dessalles, J.-L. (2016).
In A. Rocci & L. de Saussure (Eds.), *Handbook of Communication Science*, 205-223.
Berlin: De Gruyter Mouton.

Narration and reasoning, from structure to biological function

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Abstract: Human conversation has a particular structure that bears no resemblance with any other known communication system. People's spontaneous talking comes in two forms: narratives and collective argumentative reasoning. This characteristic conversational *structure* cannot be fortuitous. Conversation is a costly behaviour, if only by the time and energy it demands. Surprisingly, there have been few attempts to relate conversational structure to any biological function it may have. This chapter illustrates conversational structure with examples and explores the issue of its biological purpose.

Verbal communication is what makes the most obvious difference between *homo sapiens* and other animals. The time we devote to it is disproportionate. Spending about six hours a day (Mehl & Pennebaker, 2003) in verbal activities, speaking some 16 000 words on average per individual (Mehl et al. 2007) seems ridiculous. What is so essential about talking that we devote so much time and energy to it? Strangely enough, this issue about the *function* of verbal communication has rarely been addressed. What is even more surprising is that there have been very few attempts to relate the *structure* of verbal communication to any supposed biological function it may have. This chapter proposes precisely to do this. I will consider the two main conversational modes, narration and argumentative reasoning, and illustrate them with examples. I will then observe that these two components of verbal behavior can be linked to proximal functions, which include the maximization of unexpectedness. Lastly, I will consider the issue of determining the possible ultimate (*i.e.* biological) function of narration and of argumentative reasoning.

The human conversational behaviour

Human conversation is characteristic. It has no equivalent in nature (Hauser *et al.*, 2014). Animal communication is most often manipulative (Krebs & Dawkins, 1984) or consists in specialized costly displays (Zahavi & Zahavi, 1997). There are well-known exceptions, such as communication among social insects such as bees and ants (von Frisch, 1967; Ryabko & Reznikova 2009), but these exceptions are all specialized communicative devices designed to achieve material goals, such as locating food sources. In most cases, the repertoire of signs is limited to less than a few dozens. We cannot exclude the possibility that some cetacean species make use of extremely rich communication systems, but for now there is no evidence of any elaborate analogy in form and function with our own. Some primate species spontaneously combine two meaningful signs to produce new meanings (Arnold & Zuberbühler, 2006; Ouattara *et al.*, 2009). However, there is no strong evidence that this ability, which mainly concerns innate signals, may be considered as a precursor of human verbal communication, even in an embryonic form (Hauser *et al.*, 2014).

Human conversation has no equivalent in the technical world either. Our machines do communicate large amounts of data. They use definite protocols designed to achieve efficiency, *i.e.* to maximize the rate of error-free data transmission. These protocols bear no similarity with human conversation. In comparison, our way of communicating appears incredibly inefficient. Not at the level of speech: we can recognize more than 15 phonemes

per second in a noisy acoustic environment, a feat that machines have not yet achieved in a reliable way. But what people do with this complex machinery seems desperately disappointing. People use many words, often in a repetitive manner, to make a point that can be summarized in one or two sentences. It seems that the conversational bandwidth is used in a way that any engineer would consider absurd. Verbal communication would be indeed very different if it were designed to maximize information transfer.

We will not conclude that conversation is inefficient, nor that it is a pointless activity, that we talk just because it is pleasurable, just to fill up the time. On the contrary, each spontaneous conversation should be regarded as a marvel. As will be suggested here, none of the elements mentioned in a conversational move are there by chance. They all contribute to making the move locally optimal, even if what is optimized is definitely not the information transfer rate.

Since the aim of this chapter is to associate possible biological functions to verbal behaviour, we only consider *spontaneous* verbal interactions. In particular, the word 'conversation' will be used in a restricted way, meaning chatter. We will therefore exclude from our scope the various institutionalized language games, such as formal argumentative debating, task-oriented dialogues (e.g. hotel booking dialogue), formal negotiations or written texts, that have attracted much attention in several fields of study on language and discourse (Walton & Macagno, 2007). Spontaneous chatter makes up by far the major part of our six hour daily interaction time (Mehl & Pennebaker, 2003). It could be thought to have a more complex structure than formal dialogues, due to the absence of institutionalized rules that limit the participants' freedom. From a cognitive perspective, things turn out however to be simpler.

A cognitive approach to spontaneous conversation considers the evolution of beliefs and desires throughout the interaction, whereas the participants' intentions are pushed into the background. From this perspective, the way utterances are linked one to each other is almost independent from who uttered them. For instance, self-answers make soliloquies sometimes hard to distinguish from dialogues. The main concern is to know what makes the *content* of an utterance acceptable. It is to predict the conditions in which saying that the carpet is red is appropriate or, on the contrary, would lead to an expression of incomprehension like "So what?" (Labov, 1997).

This cognitive perspective offers a simplified description of conversation. Spontaneous verbal interaction seem to come in two distinct modes: narration and argumentative reasoning (Bruner, 1986; Dessalles, 2000). This partition echoes a classical distinction observed in written texts, where narration is marked by specific features such as the preterit in French (Feuillet, 1985). Even if the narrative and the argumentative modes are sometimes intertwined in actual conversations, they can often be observed in pure form during several minutes of spontaneous verbal interaction. But the main reason to distinguish these two modes is that they correspond to different cognitive mechanisms. Together, these two conversational modes fill up more than 90% of spontaneous verbal communication (Dessalles, 2008a). We will consider them in turn.

Conversational narratives

The importance of narration in spontaneous conversation, despite a few precursor studies (Labov, 1997; Sacks, 1992; Polanyi, 1979; Tannen, 1984), has not been properly acknowledged until recently (Norrick, 2000). One possible reason is that people do not tell stories in unnatural conditions, when they are observed by scientists and asked to behave spontaneously. People almost systematically tell stories to friends or family, but less often to strangers. Narratives may occupy from 25% (Dessalles, 2008a) up to 40% (Eggins & Slade,

1997) of conversational time. Conversational narratives most often come in clusters, in what Tannen called *story rounds* (Tannen, 1984).

Before the turn of the century, few studies had attempted to describe spontaneous conversational narratives from a cognitive perspective. Most studies concentrated on learned or written narratives, which result from a long elaboration process. We are dealing here with spontaneous narratives, in which the speaker holds the ground for seconds or minutes, telling a past event with the hope that listeners will find it *interesting*. Quite often, the story is told for the first time and its structure is designed in an on-going process. How? Some studies in the Conversational Analysis domain offered detailed descriptions of spontaneous narratives. However, the ones cited above are among the few that attempted to address the issue of interest. Knowing what makes a narrative interesting to interlocutors cannot be properly solved by limiting oneself to studying their 'surface' (structural schemas, style, …). Interest is a cognitive phenomenon that requires a description in terms of knowledge, desires, expectations. Let's illustrate this with a few examples.

The nude model

A conversational narrative is about an event that, supposedly, has really happened. It is easy to recognize a narrative by the fact that the four W's (When, Where, What, Who) get generally instantiated as the story develops. Moreover, as we will see, a narrative has a point, which becomes clear when the story reaches its climax (Tannen, 1989). Consider the following conversation (adapted from Norrick 2000, p. 55-56; transcription details omitted; emphasis added).

Brianne: It was just about *two weeks* ago. And then we did some figure drawing. Everyone was kind of like, "oh my God, we can't believe it." We- y'know, *Midwest College*, y'know,
[. . .]
Brianne: like a … *nude models* and stuff. And it was really weird, because then, like, just *last week*, we went downtown one night to see a movie, and we were sitting in [a restaurant], like downtown, waiting for our movie, and *we saw her* in the [restaurant], and it was like, "that's our model" (laughing) *in clothes*
Addie: (laughs) Oh my God.
Brianne: we were like "oh wow." It was really weird. *But it was her*. (laughs)
Addie: Oh no. Weird.
Brianne: I mean, that's weird when you run into somebody *in Chicago*.
Addie: yeah.

This conversation is about a coincidence. The person that Brianne encountered by chance has certain unique characteristics: she is that very person that posed in the nude for a figure drawing lesson Brianne had attended a week before. Our intuition tells us many things about what makes this story interesting. Let us comment on the elements that Brianne included in her narrative.

Just last week: This temporal mention is by no means fortuitous. Interest would drop down if the same story was told in the same conditions months after the fact. Conversely, the excitement due to such an event is maximal at the moment of its occurrence or when it is reported shortly after. This does not preclude the possibility of telling old stories, but to be mentioned, old facts require some strong thematic connection which is dispensable in the case of recent events.

Just about two weeks ago: The time interval between the two encounters with the model is an important parameter. Interest would be weaker if the interval had been of one month or one year instead of only one week. The impact of the story would have been greater, conversely, if the second encounter had occurred just two hours after the class.

Nude model: The model's nudity is essential to the story. With a dressed model, the story would be much poorer indeed, as it would lose its exceptional character.

In clothes: Brianne needs to underline the obvious contrast between the two encounters.

Midwest College: Brianne makes it explicit that figure drawing with a nude model is a truly exceptional situation in such an institution. Interest would lessen if Brianne was attending an art school with regular life drawing.

It was her: The actual presence of the model in the restaurant is crucial. The story would be much poorer if the person seen in the restaurant had just been looking like the nude one, but was not her.

Chicago: The size of the city matters here, as the second encounter would have been more likely in a small town.

We saw her: Brianne reports the event as a first-hand story. The same anecdote would appear much less interesting to Addie if it had happened to one of Brianne's neighbors rather than to herself.

Among these story elements, two are obvious to the addressee: the fact that the model is dressed in the restaurant, and the fact that the scene happens in Chicago. Brianne nevertheless bothers to mention them explicitly. She had to choose among hundreds of details those which she considered relevant to the interest of the story. She did not mention how she was dressed herself, nor how the weather was on that day or whether the model was blond or brunette. According to the claim of the present paper, her choices are by no means fortuitous. She mentioned exactly those elements that have a definite impact on interest.

Most individuals, in a situation of telling the same story, would not miss any of these elements. What does this narrative skill consist of, and where does it come from? Are we told, as children, that a good story preferentially refers to recent facts? That when two similar situations are reported in a story, they should be close to each other in time? That the size of the city where fortuitous encounters occur is relevant, whereas the size of the building or the size of the country is not? Are we explicitly told by our caretakers that first-hand stories are better than second-hand stories? Is narrative know-how just a list of carefully learned recipes of that kind? Or do individuals possess a general knowledge of what makes an episode reportable. What sort of intuition tells them how to present the episode so that it appears more exciting to listeners?

Unexpectedness

Despite its apparent intricacy, the human spontaneous narrative skill seems widely shared (Scalise Sugiyama, 1996), probably as much as the Cartesian "Good Sense". This is only possible if this intricacy is only apparent. As it turns out, many components of the human narrative skill can be reduced to a single instruction:

Make the event appear maximally unexpected to the audience

Before defining it properly, we must mention a few caveats about the notion of unexpectedness. First, 'unexpected' does not merely mean 'improbable'. The occurrence of a lottery draw like 1–2–3–4–5–6 is hugely unexpected and is worth announcing to anyone, despite the fact that it is as probable as any other draw. Second, 'unexpected' does not necessarily mean 'new'. Two of my colleagues were born on February 29th. This fact, once known, should not surprise any more. Yet, whenever the topic comes to anniversaries, especially by the end of February, colleagues like to mention the coincidence again and enjoy being amazed at it. This difference between unexpectedness and newness allows people to retell old known stories and still enjoy them (Norrick, 2000). Lastly, unexpectedness does not need to be experienced firsthand. Many stories rely on the fact that unexpectedness is supposed to be experienced, not by participants, but by characters. The following excerpt is translated from French[1]. 'Burro' is not a French word, but it sounds like 'beurre' (butter).

[1] Original:

D: […] she was with her cousin in Spain. And so… they wanted to buy butter. And then [laugh] Her cousin said to her, she didn't speak one word of Spanish, but she said to her: "I can speak Italian; Italian and Spanish, that's the same", and then

O: Oh là là ! Oh là là !

D: So she enters the store, and she says 'Burro'. And then [laugh] then everyone was staring at her, and so 'burro' means 'donkey'.

O: Oh ! [laugh]. It means 'donkey'! She wanted to say 'Butter' ! Burro. [laugh] It plays tricks, isn't it?

Even someone who is perfectly fluent in Spanish can get the point and find the story interesting. To do so, one must imagine the surprise of the cheese seller and of the other customers, who were aware of only one side of the story. Unexpectedness, even in others' minds, makes good stories.

What is unexpectedness, if it is neither low probability, nor newness, nor firsthand surprise? A cognitive approach to this problem leads to define unexpectedness as *complexity drop* (Dessalles, 2008b) or, in other terms:

Unexpectedness = abnormal simplicity

Simplicity is known to play a major role in cognitive science (Chater & Vitányi, 2003). For instance, the human brain reconstructs the hidden parts of a visual scene by following a principle of maximal simplicity. Technically, simplicity is measured by the size of the shortest available description (see www.simplicitytheory.org). When the outcome of a lottery is 1–2–3–4–5–6, people see a structure that is much simpler that anticipated. It is a mere sequence, starting from the lowest bound 1. By contrast, a boring draw like 12–17–29–33–34–40 cannot be summarized. One can predict that the interest of various draws depends on their descriptive simplicity. For instance, draws like 20–22–24–26–28–30 or 7–14–21–28–35–42 would make events worth telling, but they would be less thrilling than 1–2–3–4–5–6.

The careful examination of Brianne's narrative suggests that every bit of information she provides concurs to increasing the complexity drop between some standard, expected, world and the actual situation she witnessed. Some elements of the narrative increase complexity on the *expected* side.

Midwest College: Art lessons in a Midwest college are not expected to involve nude models. We must imagine that special (*i.e.* complex) circumstances led to the event.

In clothes: If one forgets about the context, then the naked/clothes contrast highlights the difficulty (*i.e.* complexity) of imagining circumstances that allowed Brianne to see that normally dressed person sitting over there, naked.

Chicago: In a large city, more complex circumstances are required to bring the woman to the restaurant where Brianne recognizes her.

On the other hand, Brianne provides crucial elements that diminish complexity on the *observation* side, by making the event simpler to describe. As a consequence, the event appears abnormally simple by contrast with the complexity of the circumstances that allowed it to happen.

D- […] elle était avec sa cousine en Espagne. Et alors, elle dit, ils voulaient acheter du beurre. Alors [rire] y a sa cousine qui lui dit, elle parlait pas un mot d'espagnol, mais elle lui dit « moi je parle italien, italien et espagnol c'est pareil », alors

O- Oh là là ! Oh là là !

D- Alors elle entre dans le magasin, puis elle dit 'burro'. Et alors, [rire] alors tout le monde regardait, et alors burro, ça veut dire l'âne.

O- Oh ! [rire]. Ça veut dire l'âne. Elle voulait du beurre ! Burro. [rire] Ça joue des tours, hein ?

Just last week: The second encounter is much simpler to locate in time (for a given precision) than if it had occurred one year ago or 'some day'.

Just about two weeks ago: The drawing lesson is simple to locate as well, and the two encounters are simple to locate in reference to each other.

Nude model: Knowing the feature 'nude in public', the woman is easy to disambiguate among all people that Brianne encountered.

It was her: If the encountered woman had not been the model herself, but merely been looking like her, she would have been more complex to disambiguate.

We saw her: If the story had been second-hand, the description of the witness would add up to the description of the event, making it less simple.

Each element of a story can be evaluated in relation to its effect on unexpectedness. If the model had spoken to Brianne in the restaurant, without recognizing her, e.g. asking for salt, the story would have been still better. The reason is that the minimal actual description of the encountered individual requires discriminating among the customers in the restaurant. With the mention that she spontaneously spoke to Brianne, this discrimination is unnecessary; the description complexity diminishes and interest goes up.

Any conversational narrative aims at making the 'complexity drop' between expectations and description maximal. To appreciate the story, listeners must be able to measure the drop. A listener who could believe that nude models are commonplace in college art lessons, or who wouldn't know that nudity in public is rare, would not totally get the point in the nude model story. In the 'burro' story, listeners must understand that the word 'burro' evokes neither 'butter' in Spanish nor 'donkey' in French. If so, they know that the cheese seller must have imagined *complex* reasons why the two women were asking for a donkey in her shop; but listeners also know a much *simpler* reason, the lexical confusion. If any of the two sides is not understood, the complexity drop, and therefore the punch line, vanishes.

The complexity-drop rule controls many aspects of narrative interest. We mentioned its role in coincidences, in exceptionality (a nude model in a Midwest college, a donkey in a cheese store) and in the importance of first-hand experience. Complexity drop also explains why recent events, or events occurring in the vicinity, make better stories, as locations close in time or space are simpler to describe (Dessalles, 2008b). Various aspects that contribute to the narrative experience, like metaphors in which two independent domains turn out to share the same structure, can also be characterized by a drop in complexity. But one of the most notable effects of the complexity-drop rule is its role in controlling emotional intensity.

Emotion

Generating complexity drop in listeners' minds is a requirement for a conversational story. Besides this essential component of the human narrative competence, a few optional features enhance interest. One is humour, another one is emotion. When exposed to emotional situations, individuals have a systematic tendency to share them (Rimé 2005). Though emotional stories are preferentially recounted to close acquaintances, they may spread around, as they are retold as second-hand narratives in a majority of the cases, especially when the generated emotion was high (Rimé 2005:162). As a result, emotional events tend to invade our conversations with close friends.

The following example occurred in a series of stories about different facets of a recent earthquake experience. Albert and Ned are two brothers. All are college students (adapted from Ervin-Tripp and Küntay 1997; transcription details omitted).

Albert: you know that that nice glass china display case in our dining room?
Ned: in the dining room

Cynthia: oooh
Albert: trashed
Cynthia: forget it!
[. . .]
Cynthia: oh my god!
Albert: oh a er antiques genuine antiques
Ned: and the amount of money we have lost is going to be astronomical

Interest in this excerpt is controlled by the amplitude of the loss. This parameter controls the intensity of emotion. Cynthia's "oh my god!" indicates that the emotion is shared. But the same parameter also controls the *simplicity* of the situation. We can imagine situations in which the two effects are disconnected. The fact that a person wins huge gains in the national lottery makes the news. Being exceptional, the event is by definition simple to isolate from all other lottery winning situations. Simplicity generates a complexity drop, and therefore unexpectedness. One does not need to share the winner's happiness to enjoy the news. In the china display case story also, the amplitude of the loss makes the situation exceptional, and therefore simple. But it has an additional effect, which to create an intense shared emotion. Emphasis (*e.g.* by the use of the word 'astronomical') has two coupled effects: it increases the scale of the event, and it simplifies it by making it exceptional. In other situations, emotion and unexpectedness depend on separate parameters. For instance, the death of a common friend is a highly emotional event in itself, but the intensity of the sorrow is controlled to a large extent by the unexpectedness of the event (*e.g.* whether she was badly ill or had a car accident).

Humour is another essential component of many conversational narratives. The 'burro' story, for instance, generated laughter. As for emotion, unexpectedness and humour are intimately connected on many occasions. Humorous effects in conversation are often due to the existence of an automatic behavioural sequence that proves inappropriate (Bergson, 1940). In a normal world, people behave appropriately; any inappropriate outcome requires complex circumstances to occur. The existence of an automatic (and therefore simple) behavioural sequence that produces the inappropriate outcome creates a complexity drop. The difference of complexity generates both unexpectedness and comic effects.

Argumentative reasoning

Spontaneous argumentation is the other major conversational mode. The word 'argumentation' is taken in its basic acceptation, as a rational exchange of statements. This basic meaning does not require any intention of convincing or any antagonist attitude toward an 'opponent'. In its extended sense, argumentation has been widely studied as a language game involving conflicting agendas between participants. The distinction between the basic and the extended notions matches the opposition between "argumentative reasonableness" and "strategic maneuvering" (van Eemeren *et al.*, 2007; van Eemeren *et al.*, 2012). From the cognitive perspective adopted here, we just consider how the successive predicates that are expressed by participants are logically linked to each other. As we will observe, the participants' freedom is quite limited in this domain.

The following conversation has been recorded in a Japanese family (original in Japanese, names changed). The conversation starts in the narrative mode, as an event is announced: Masako's cousin Keiko gets married.

Father: Masako, you remember my young brother, Yasuyuki…
[Yasuyuki is Masako's uncle; they have not seen each other for several years.]
[. . .]
Father: Yasuyuki's daughter, her name is Keiko.
Masako: Yes, will she get married?

Father: Yesterday, we've got a phone call. Well, they already registered at the office,
Masako: Oh dear.
Father: And in February next year,
Masako: Oh dear.
Father: On the 21st, I think. He asked whether we could attend, so...
Masako: Oh my.
Father: The two of us [Father and Mother].
Masako: I'd like to go as well.
Father: But they said they wouldn't invite the cousins.
Masako: No?
Father: No.
Masako: Well, we didn't see each other [with Keiko] a great deal.
Mother: Not that much.
Father: We didn't either [Masako has two brothers, and Keiko wasn't invited when they got married].
Masako: Yes.
Father: If they invite all the cousins, such as Yukio [cousin from another family], Takashi and Hiroshi [Mother's brothers],
Masako: Yes, I understand,
Father: That would be too much, and so, I didn't ask up to what point they invite, since yesterday, on the phone,
Mother: Keiko did come to the grandmother funeral [Father's mother, some ten years ago],
Father: She came.
Mother: We did not see her again since.
Father: Yes.
Masako: Yes, I only saw [her] a couple of times since my childhood.

The conversation shifts when Masako asks: "I'd like to go as well". Then the participants are involved in a discussion about the fact that Masako is not invited to her cousin's wedding. Then the three participants, including Masako, enumerate various good reasons to explain why she will not take part in the wedding.

The argumentative part of this excerpt relies on a *logical conflict*. A logical conflict occurs when participants consider a proposition with two opposite attitudes. In the present case, the conflicting proposition can be phrased as "Masako is invited to Keiko's wedding".

Invited: Masako wants to be invited.

Not invited: Yasuyuki said that cousins (this includes Masako) are not invited.

Note that the first attitude is a desire, whereas the second one is a piece of knowledge. When only knowledge or beliefs are involved, the logical conflict is said to be *epistemic*; when desires are involved, we call it *epithymic* (Dessalles, 2008b). Argumentative reasoning results from attempts to solve the logical conflict. The way human beings do this is characteristic. It can be captured by a simple recursive procedure. Interestingly, the procedure is the same, regardless of the nature of the logical conflict, epistemic or epithymic. A minimal model of this procedure, named C–A–N, consists in three phases: Conflict, Abduction and Negation (Dessalles, 2008b). According to the CAN model, individuals involved in argumentative reasoning perform a very limited set of cognitive operations.

- *Conflict*: detect any conflicting proposition, *i.e.* a proposition that receives two opposite epistemic or epithymic attitudes.

- *Abduction*: infer a likely cause of the conflicting proposition; possibly propagate the conflict to that cause.

- *Negation*: consider the opposite of the conflicting proposition.

The logical conflict is solved either when actions can be performed to change the state of the 'world', or when a hidden piece of knowledge is revealed or retrieved from memory, or

when the intensity of the weaker attitude is considered tolerable. This latter possibility is made possible by an operation of revision:

- *Revision*: Attitudes may be revised through re-evaluation.

The first conflicting proposition is 'Masako goes to the wedding'. It is wished by Masako, but presented by her father as false. At this point, the participants face an epithymic conflict that triggers the argumentative discussion. The father's next move, "they wouldn't invite the cousins", propagates the conflict to one of its causes: the statement 'cousins not invited' is both believed and not wished. Masako's next utterance "we didn't see each other a great deal" makes sense if the following knowledge is shared:

- Close family is invited to the wedding

- Masako belongs to close family

This knowledge leads to an epistemic conflict about the proposition 'Masako is invited': she should be, but she is not. Masako propagates the conflict on one of its causes: 'Masako belongs to close family', and then revises one of the conflicting attitudes by observing that she is not so close to Keiko's family after all.

With his next move "We didn't [invite the cousins] either", the father continues with the conflict located on 'cousins not invited'. Its negation: 'cousins are invited' is equally conflicting (whished and not believed). But the corresponding wish generates a new conflict: 'cousins were invited at the brothers' weddings' (wished and not true).

Then, the father continues with the negated version of the conflict, considering the possibility that 'cousins are invited', and he detects a new epithymic conflict: 'That would be too much'. The mother's utterance: 'Keiko did come to the grandmother funeral' can be seen as an attempt to restore the fact that Keiko is close family, but it turns out to do the opposite ('We did not see her again since').

This example is typical of collective argumentative reasoning. Though the C–A–N procedure aims at capturing a basic human ability, it leaves room to choices, preferences and cultural or personal style. For instance, in the above excerpt, Masako chooses to solve the logical conflict herself, instead of insisting on its intensity. With a similar context, the conversation could have taken another course in another culture or in another family. Despite these variations, we are bound to use the few operations listed in the C–A–N procedure, or face the risk of appearing irrational.

From structure to function

Why structure implies function

Spontaneous conversations do have structure. We just saw that they consist in two forms of behaviour: narratives and argumentative reasoning. The two modes are often intertwined. In the wedding example, the argumentative part interrupts the "news section" of the conversation. Conversely, whole narratives may sometimes play the role of a single argument. But the two modes obey different laws. Narratives aim at maximizing unexpectedness and emotion sharing, whereas argumentative discussions are designed to deal with logical consistency.

Narratives and argumentative reasoning are emergent processes. In a narrative, the storyteller thinks of an unexpected point to make. To make the point unexpected to the eyes of her audience, she must bring in some context, such as the figure drawing class in the nude model story. We all have the skill to build up a good conversational narrative. Even if some seem to excel in the exercise, all individuals have the competence to tell stories in which all

elements are relevant. And all healthy individuals possess the competence to appreciate others' narratives. Similarly, all healthy individuals know how to make a relevant point during an argumentative discussion, either by pointing to a logical conflict or by mentioning a possible solution to some underlying logical conflict. Discussions emerge from the collective attempt to deal with inconsistencies between beliefs and desires. Even if we are not equal in making the best sensible points at the right moment in a discussion, people who produce utterance that have no bearing on the current logical conflict are rapidly considered bizarre or mentally ill.

These systematic mechanisms provide *structure* to conversation. Each utterance must play a definite role: either contribute to unexpectedness or to emotion sharing (narratives), or highlight or solve logical conflicts (argumentative reasoning). Conversational structure emerges from these elementary moves. From this observation, we must ask why conversation does exist. Why do people behave in such a mechanistic way? They could do many other things with words. They indeed do many other things with words, but marginally so. Most of the 16 000 words that we daily pronounce on average are used, neither for poetry nor to give orders, but for purely conversational purposes. So what is the function of spontaneous conversation? What is the function of telling narratives about real-life events? What is the function of publicly dealing with logical conflicts?

For long, the question of why people talk has remained not only unanswered, but also largely unasked. The mystery deepens as one realizes that most human conversation is about futile matters that have no real material impact on the participants' lives, as illustrated by the 'nude model' or the 'burro" examples. One may be tempted to consider that verbal communication is precisely no more than a pointless activity. We would talk, just because it is pleasurable. This attitude towards the purpose of conversation is wrong, for two reasons. First, language behavior involves a huge cost, not only by the daily hours it demands of each of us, but also because of the cognitive resources that exist only for it. For instance, a good deal of our huge cortex is devoted to episodic memory (Cabeza *et al.*, 2008), a uniquely human feature that is involved in retelling events in conversation (Suddendorf & Corballis, 2007). It would be absurd to think that all this time and cognitive resources are wasted in a pointless activity. The second reason is that conversational competence, like other aspects of language such as phonology or syntax, has a definite structure, as if it had been "designed"; and in the natural world, only natural selection can produce designed features (Pinker & Bloom, 1990). If we follow this logic, conversational behaviour must have a definite biological function. Which one?

The inconsequential character of most conversational topics casts doubt on traditional attempts to explain away language behaviour in terms of 'information transmission' or 'knowledge sharing'. Conversational behaviour would look radically different if it were optimized for information or knowledge transfer rate. No engineer would recognize a data transmission protocol in our daily narratives. If conversation served the purpose of useful information transmission, speech would be used most of the time advisedly, didactically and efficiently to increase others' knowledge. Moreover, inconsequential topics should not only be avoided, but also reproved, which is obviously not the case. Besides, accounting for language behaviour by merely invoking its benefits for the collective is a type of explanation that has been abandoned half a century ago (Williams, 1966): Biological explanations require that costly behaviour benefit *those who pay the cost* for it. Something must be at stake during our daily conversations that matters significantly more than the transfer of futile facts.

The social meaning of conversation

If asked why people talk, a lay person would probably answer that it is obviously for social purposes. The social impact of language has been emphasized in several scientific domains, including sociolinguistics. Surprisingly, the idea surfaced only by the end of the twentieth century in scientific studies about the evolution of language, thanks to the work of the primatologist Robin Dunbar. In a famous book (Dunbar, 1996), he compared conversation with grooming behaviour in primates. Observations showed that the function of grooming in chimpanzees and other primates goes far beyond mere cleaning purposes. There is a strong correlation between who-grooms-who and who-helps-who (Silk *et al.*, 2006). Language, according to Dunbar, would have replaced grooming in the social bonding process. Indeed, it is considered an obvious fact that, in our species, close friends must have frequent (verbal) interactions (Friedkin, 1980; Gilbert & Karahalios, 2009).

Why are we so different from our sister species in this respect? Why are we talking in the hope of making friends, instead of merely tickling each other's skin? Why do our conversations show so much structure, with their narratives and argumentative discussions, when they could be limited to synchronized grunts? The preceding development allows us to rephrase the problem. We must explain why human beings select their friends among those who make interesting and relevant points during conversation. This means, according to what precedes, that friends are chosen among those who are best able (1) to share unexpectedness and emotions and (2) to deal with logical conflicts.

A biological function of conversation

Human beings devote time and efforts to displaying their ability to deal with *information*. When they tell narratives, they demonstrate their ability to bring unexpected information, especially emotional information. When they signal or solve logical conflicts, they show off their ability to question the quality of information. Why do these two abilities represent personal assets that individuals benefit from advertising? Why only in our species?

Answering these questions amounts to discovering the biological function of language. We are still far from a scientific consensus on this issue. Note that being able to pose the problem in the above terms is already a significant progress. Now, hypotheses about the function of language that are compatible, both with current language use (narration and argumentative reasoning) and with biological laws, do not abound. In particular, we must explain how *speakers* benefit from publicizing their scoop stories and their solutions to logical conflicts. Most traditional accounts of why language exists take the perspective of listeners, who may sometimes benefit from the information they receive. But this listener's perspective is unable to explain why the major part of conversational costs is on the speaker's side. Why are individuals ready to play the speaker's role in conversation? The speaker's role bears the burden of acquiring original information. To do so, one must spend time and energy and sometimes take risks to witness events worth retelling; one has to acquire new knowledge and memorize a huge quantity of facts. And finally, one must spend time to deliver this hard-won information to choosy listeners. Few explanations, if any, among the traditional ones, pass the 'speaker's cost' test.

To go any further, we must take some risks, as daring ideas are better than a lack of hypothesis. Elsewhere (Dessalles, 2008a; 2014), I proposed to correlate two events that are known to have occurred in human phylogeny. One of them is the advent of a signalling behaviour that would be a precursor of language. This new behaviour consisted in using pointing gestures and words to signal unexpected events. It is absent from other primates species (Tomasello, 2006), and it survives nowadays in our current narrative behaviour.

The other event worth mentioning in this context is the advent of weapon use. Hominins discovered how to use sticks and stones to kill conspecifics by surprise (Woodburn, 1982). It is tempting to see a logical relation between this new possibility of risk-free killing and the new signalling behaviour. When the greatest danger comes from your group mates, individuals have no choice but to choose friends that can protect them. Among the qualities that ideal friends must have in a context in which murder is so easy, the ability to spot danger comes first. This is perhaps a reason why we spend so much time and energy in signalling our ability to signal unexpected situations to others. It is a way of advertising our alertness. Our narrative behaviour would be reminiscent of a time when there was no police and no justice to deter potential murderers. To be accepted as friend still nowadays, one must demonstrate one's ability to spot any unexpected situation before others. We do so every time we tell a narrative or bring news to our friends.

If we follow this line of reasoning, emotion sharing in narratives makes sense as well. By sharing emotions, individuals make themselves predictable to their friends and diminish the probability that they could be a danger themselves. Our propensity to deal with logical conflicts during our lengthy argumentative discussions makes sense as well, if it evolved to deter liars (Dessalles, 1998). A similar claim can be found in the notion of 'epistemic vigilance' (Mercier & Sperber, 2011). Note, however, that the evolutionary account is quite different here. The point is not to protect oneself against erroneous information, as supposed with the 'epistemic vigilance' notion, but to publicly denounce any inconsistent stance. Again, what matters is not information *per se*, but its impact on social choice.

Conclusion

For long, the human talking behaviour did not get the attention it deserves. Language has been initially studied in its abstract form, far from the conditions of its spontaneous use. When conversation was studied, it was to highlight its ritualized aspects, such as phatic communication, regardless of what the utterances were about. In this chapter, I emphasized the difference between the two spontaneous conversational modes, narratives and argumentative reasoning. The distinction between these two modes becomes obvious as soon as the content of conversations is analyzed from a cognitive perspective. The structures of narratives and of argumentative discussion differ radically. All predicative elements in a narrative must contribute to maximizing unexpectedness or to emphasizing emotion. During argumentative reasoning, on the other hand, all predicative elements must have a logical effect, either by pointing to a logical conflict or by attempting to solve an underlying logical conflict.

This structural approach to conversation shows that *conversational relevance* is much more constrained than 'relevance in general'. A relevant element in a narrative must enhance unexpectedness or emotion. A relevant element in a discussion must introduce or solve a logical contradiction. These phenomena require two conditions to be apparent. First, they must be observed in *spontaneous* conversation, when participants are among friends and feel free to speak. Second, analysts must be fully informed of the contextual elements that were available to the participants. These two requirements: spontaneity and context, are unfortunately lacking in many controlled studies of talking behaviour. It may explain why the basic cognitive structure of spontaneous conversation has been ignored for long.

This chapter is an attempt to go beyond the study of conversation *structure*, by addressing the issue of its *function*. Surprisingly, most studies on language do not consider what it is good for. The huge investment in time and energy that human beings universally devote to conversation excludes any possibility that it be a mere social epiphenomenon or convention. The recent advent of social media such as blogs and micro-blogging services (Kwak *et al.*,

2010), open software communities (Scacchi, 2005) or social network platforms (Gilbert & Karahalios, 2009) illustrates how much individuals are ready to invest in showing off their informational abilities. And the fact that social media correlate social affiliation with communicating performance should no longer be a surprise, once acknowledged that the primary function of language and conversation is to select friends. The recent emergence of social media offers further evidence for the fact that there is much more to conversation than a fortuitous social habit.

Conversation does not fit the traditional picture that is offered of our daily interactions, in which people are supposed to cooperate and gently exchange useful information, like goods on a marketplace. Conversation is more like a stage. It is a stage on which individuals appraises each other's ability to be relevant. Any content, even the most futile topic, is taken as an excuse to show off one's ability to detect unexpectedness or to deal with logically inconsistent attitudes.

Spontaneous conversation has a tight structure. The content of every utterance is optimally designed to contribute to the *point*, by contributing to its unexpectedness, to its emotional value or to some logically conflicting attitudes. This structure serves a proximal function: to advertise the speaker's ability to deal with information. And as we suggested, showing off one's informational competence has an ultimate function: to attract friends. Conversation is the place where social networks are formed, broken and repaired. This is the biological function of conversation. When seen from a broad perspective, conversational behaviour calls for an explanation that relates structure to function, as for any behavioural feature that can be observed in nature. I have mentioned possible reasons why *homo sapiens* behaves in such a strange manner. The point of the present chapter is not to present the issue as solved, but rather to signal that it is an important question that should attract much more attention.

References

Arnold, K. & Zuberbühler, K. (2006). Semantic combinations in primate calls. *Nature*, *441*, 303.

Bergson, H. (1940). *Le rire - Essai sur la signification du comique.* Paris: P.U.F., ed. 1975.

Bruner, J. (1986). *Actual minds, possible worlds.* Cambridge, MA: Harvard University Press.

Cabeza, R., Ciaramelli, E., Olson, I. R. & Moscovitch, M. (2008). Parietal cortex and episodic memory: an attentional account. *Nature Reviews Neuroscience*, *9* (8), 613-625. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2692883/

Chater, N. & Vitányi, P. (2003). Simplicity: a unifying principle in cognitive science?. *Trends in cognitive sciences*, *7* (1), 19-22.

Dessalles, J-L. (1998). Altruism, status, and the origin of relevance. In J. R. Hurford, M. Studdert-Kennedy & C. Knight (Eds.), *Approaches to the evolution of language*, 130-147. Cambridge: Cambridge University Press. http://www.dessalles.fr/papers/Dessalles_96122602.pdf

Dessalles, J-L. (2000). *Aux origines du langage : Une histoire naturelle de la parole.* Paris: Hermès-science. http://www.dessalles.fr/papers/Dessalles_99111703.html

Dessalles, J-L. (2008a). Spontaneous narrative behaviour in homo sapiens: how does it benefit to speakers?. In A. D. M. Smith, K. Smith & R. Ferrer i Cancho (Eds.), *The evolution of language - Proceedings of the 7th International Conference (Evolang7 -*

Barcelona), 91-98. Singapore: World Scientific. http://www.dessalles.fr/papers/Dessalles_07091501.pdf

Dessalles, J-L. (2008b). *La pertinence et ses origines cognitives - Nouvelles théories.* Paris: Hermes-Science Publications. http://pertinence.dessalles.fr

Dessalles, J-L. (2014). Why talk? In D. Dor, C. Knight & J. Lewis (Eds.), *The social origins of language*, 284-296. Oxford, UK: Oxford University Press.

Dunbar, R. I. M. (1996). *Grooming, gossip, and the evolution of language.* Cambridge: Harvard University Press.

Eggins, S. & Slade, D. (1997). *Analysing casual conversation.* London: Equinox.

Ervin-Tripp, S. M. & Küntay, A. (1997). The occasioning and structure of conversational stories. In T. Givón (Ed.), *Conversation - Cognitive, communicative and social perspectives*, 133-166. Amsterdam: John Benjamins Publishing Company.

Feuillet, J. (1985). La théorie de Benveniste et l'organisation des systèmes verbaux. *Information grammaticale*, *26* (0), 3-8.

Friedkin, N. (1980). A test of structural features of Granovetter's strength of weak ties theory. *Social networks*, *2*, 411-422.

Gilbert, E. & Karahalios, K. (2009). Predicting tie strength with social media. In , *CHI'09: Proceedings of the 27th international conference on Human factors in computing systems*, 211-220. New York, NY, USA: ACM.
Available at: http://social.cs.uiuc.edu/people/gilbert/pub/chi09-tie-gilbert.pdf

Hauser, M. D., Yang, C., Berwick, R. C., Tattersall, I., Ryan, M. J., Watumull, J., Chomsky, N. & Lewontin, R. C. (2014). The mystery of language evolution. *Frontiers in Psychology*, *5* (401), 1-12.

Krebs, J. R. & Dawkins, R. (1984). Animal signals: mind-reading and manipulation. In J. R. Krebs & N. B. Davies (Eds.), *Behavioural ecology - An evolutionary approach (second ed.)*, 380-405. Blackwell Scientific Publications.
Available at: http://www.psychology.bangor.ac.uk/ward/assets/krebs84.pdf

Kwak, H., Lee, C., Park, H. & Moon, S. (2010). What is Twitter, a social network or a news media ?. In , *Proceedings of the 19th International World Wide Web (WWW) Conference*, 591-600. Raleigh NC: ACM.
Available at: http://an.kaist.ac.kr/~haewoon/papers/2010-www-twitter.pdf

Labov, W. (1997). Some further steps in narrative analysis. *Journal of Narrative and Life History*, *7* (0), 395-415.

Mehl, M. R. & Pennebaker, J. W. (2003). The sounds of social life: A psychometric analysis of students' daily social environments and natural conversations. *Journal of Personality and Social Psychology*, *84* (4), 857-870.

Mehl, M. R., Vazire, S., Ramírez-Esparza, N., Slatcher, R. B. & Pennebaker, J. W. (2007). Are women really more talkative than men?. *Science*, *317*, 82.

Mercier, H. & Sperber, D. (2011). Why do humans reason? Arguments for an argumentative theory. *Behavioral and Brain Sciences*, *34* (2), 57-74.

Norrick, N. R. (2000). *Conversational narrative: storytelling in everyday talk.* Amsterdam: John Benjamins Publishing Company.

Ouattara, K., Lemasson, A. & Zuberbühler, K. (2009). Campbell's monkeys concatenate vocalizations into context-specific call sequences. *Proceedings of the National Academy of Sciences*, *106* (51), 22026-22031.

Pinker, S. & Bloom, P. (1990). Natural language and natural selection. *Behavioral and Brain Sciences*, *13* (4), 707-784.

Polanyi, L. (1979). So What's the point?. *Semiotica*, *25* (3), 207-241.

Rimé, B. (2005). *Le partage social des émotions.* Paris: PUF.

Ryabko, B. & Reznikova, Z. (2009). The use of ideas of information theory for studying "language" and intelligence in ants. *Entropy*, *11* (0), 836-853.

Sacks, H. (1992). *Lectures on conversation vol. 2.* Oxford, UK: Blackwell.

Scacchi, W. (2005). Socio-Technical Interaction Networks in Free/Open Source Software Development Processes. In S. T. Acuña & N. Juristo (Eds.), *Software Process Modeling*, 1-27. New York: Springer Science+Business Media.
Available at: http://www.ics.uci.edu/%7Ewscacchi/Papers/New/STIN-chapter.pdf

Scalise Sugiyama, M. (1996). On the origins of narrative: Storyteller bias as a fitness-enhancing strategy. *Human nature*, *7*, 403-425.

Silk, J. B., Altmann, J. & Alberts, S. C. (2006). Social relationships among adult female baboons (*papio cynocephalus*) I. Variation in the strength of social bonds. *Behavioral Ecology and Sociobiology*, *61*, 183-195.

Suddendorf, T. & Corballis, M. C. (2007). The evolution of foresight: What is mental time travel, and is it unique to humans?. *Behavioral and Brain Sciences*, *30* (3), 299-313.

Tannen, D. (1984). *Conversational style - Analyzing talk among friends.* Norwood: Ablex Publishing Corporation.

Tannen, D. (1989). *Talking voices - Repetition, dialogue, and imagery in conversational discourse.* Cambridge, UK: Cambridge university press.

Tomasello, M. (2006). Why don't apes point?. In N. J. Enfield & S. C. Levinson (Eds.), *Roots of human sociality: Culture, cognition and interaction*, 506-524. Oxford: Berg Publishers.
Available at: http://email.eva.mpg.de/~tomas/pdf/Apes_point.pdf

van Eemeren, F. H., Garssen, B. & Meuffels, B. (2012). Effectiveness through reasonableness preliminary steps to pragma-dialectical effectiveness research. *Argumentation*, *26*, 33-53.

van Eemeren, F. H., Garssen, B. & Meuffels, B. (2007). The extended pragma-dialectical argumentation theory empirically interpreted. In F. H. van Eemeren, B. Garssen, D. Godden & G. Mitchell (Eds.), *Proceedings of the 7th Conference of the International Society for the Study of Argumentation*. Amsterdam: Rozenberg / Sic Sat.

von Frisch, K. (1967). *The dance language and orientation of bees.* Harvard: Harvard University Press.

Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought.* Princeton: Princeton University Press, ed. 1996.

Woodburn, J. (1982). Egalitarian societies. *Man*, *17*, 431-451.

Zahavi, A. & Zahavi, A. (1997). *The handicap principle.* New York: Oxford University Press.