An Evolutionary View on Problems with Communication Patterns for Knowledge Workers

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Aim and Assumptions

This position paper addresses common communication problems for knowledge workers in a networked, multi-project environment from an evolutionary standpoint. Evolution in the context of this paper is not specifically about human evolution, but about the evolution of language as a form of communication between humans (see e.g. Terrence Deacon). Common communication patterns of knowledge workers are put into this perspective, and, more specifically, we address several problems with these communication patterns that negatively influence human performance and feeling of well-being at work. We ask ourselves and the reader the question how it is possible that communication (and the technology that makes communication possible) has grown into something that puts a huge load on our brain's capacity to function. How is it possible that something as useful as symbolic language seems to have 'kidnapped' our brains into doing things that are obviously counterproductive. We argue that when explaining language as a thing that evolved using humans and their brains as host (medium) this question becomes easily answerable.

Several assumptions underlie our approach, apart from the evolutionary view on language. These assumptions have to do with knowledge work. First, we assume the knowledge worker has multiple tasks, either within one project or in multiple projects. Second, individual projects are large, and as a consequence every project has a network of people (other workers) involved. Third, the tasks are diverse, i.e., mental context switching is needed between them.

Problems

In this position paper we try to keep it as close to the knowledge worker as possible. We start with a short overview of the problems related to communication in networks of knowledge workers.

1. The size of the network composed of all project members in all projects an individual worker participates in can easily negatively influence the productivity and wellbeing of the worker. Project teams are optimized in terms of size and performance, but as a worker is involved in multiple projects and therefore has multiple tasks, the project-relevant communication overhead for one person can easily exceed the productivity gain of collaboration.
    a. Symptoms:
    Constant context switching due to email/phone/sms/msn interruptions; the feeling of not having done anything; an agenda full of meetings; having to read up on documents at home; a shallow level of involvement, or the feeling of having a shallow level of involvement.
2. A second way in which the size of the worker's network (this time including his/her social network, i.e., not limited to the network of combined-project members) can negatively impact working performance and wellbeing is by constant 'FYI spam'. Digital communication is low-cost, perceptually powerful and high bandwidth: video, images, documents, sound, short ideas, etc. can be send around to an unlimited number of friends without them having asked for it. Sometimes something is crucial for someone to know, but often this type of FYI messages are plain overhead and produce strong mental context switches (exactly *because* they are somewhat interesting and originating from a friend).
    a. Symptoms:
    An inbox filled with company announcements; filled with periodical information messages; filled with 'have you seen this', 'this is very cool', 'should we do something with this?', etc. type of emails; constant loss of focus; finding yourself browsing the net and asking yourself how the f*ck you got there; having a corporate spam folder;
3. Email (and comparable forms of communication) has grown from a simple communication medium to a work-distribution medium. Within project teams individual workers typically send emails that contain both the request for input from another worker as well as the data

needed to generate that input. As a result, it is implicitly assumed that once the "job" has been sent, the answer to the request will be 'yes'. A related problem is that it is also assumed that the receiver is supposed to reply to the request. This easily creates information overload.

   a. Symptoms:
      An always-filled to-do list; the feeling of never having finished something.; irritated emails about not having responded to a request; not knowing in what direction ones work goes; a full inbox when coming back from vacation (why should you do all these things while you were on vacation); symptoms of stress;

4. Intermediate deliverables are, in large projects, a management's tool to see if the project is still in sync with the planning. The sore truth is that many intermediate deliverables are in paper form and become a symbol of "work". The deliverable becomes the goal, while it should actually be a measurement of where the project is. As a result, the actual content of the deliverable becomes trivial, as the project management will not look at it, and the other project members don't really care about it. Planning on deliverables thus has the effect of introducing additional overhead, and creating a false certainty that the project is on track.
   a. Symptoms:
      An explosion of communication between the project members just before the deliverable deadline; project management 'spam' about the deliverable, while during the rest of the project the management is quiet; meetings that are about dates and deliverables and not about what should be *in* those deliverables.
5. The worker is involved in different projects, but so are the other project members. As a result, difficult planning issues emerge to get everyone together when work has to be discussed face-to-face. A direct consequence is that individual workers get their agenda planned full by other project members, and, just as in email requests, no reply means you agree.
   a. Symptoms:
      Always on the move; not getting any work done at work (but having to do it at home); long-term appointment planning (e.g., multiple weeks in advance); almost no scheduling flexibility; the feeling of being guided by your agenda/i.e. your colleagues.

An evolutionary view on language

Before being able to address the above described issues from an evolutionary point of view, we first need to understand how language (but *not* necessarily communication) could have evolved into a specific form around us humans (see Dawkins; Deacon). This idea needs some explanation.

Given the fact that languages all over the world seem to share a common structure, that languages are typically learned at very young age, that it is difficult to learn a second language at a later age, and that people generally like to communicate and that language strongly facilitates communication, it is plausible to also assume that any natural language is a thing that evolved into a certain form. Why? Because these aspects of language are very well explained by this assumption. This is what we will show in this section.

For something to evolve, we need (1) a copy mechanism, (2) small errors in copying, and (3) selective pressure. Speech is the copy mechanism, together with the hearing of the speech signal and the interpretation of the signal in the receiver's brain. Further, humans have a natural need to communicate, we are social animals. This need, together with our strong vocalization and understanding potential makes us great 'copy mechanisms'.

Small errors are made while copying. Speech, hearing and interpretation are not perfect, resulting in slight variations in sayings, words, sentence structure, etc. These small variations enable a selection mechanism to favor some words and languages structures above others.

We can identify two selective pressures quite easily. First, there is selective pressure for any language as it should serve humans in their quest for survival. A language that seriously decreases a human's survival potential (by, e.g., interfering with behavior that is useful for survival) does a bad job for

itself as it needs its 'host' for copying purposes. When it does serve its host well, it has a larger chance at copying itself to other humans than those languages that are not helpful to their hosts. A second form of selective pressure is inter-language competition. A language competes with other languages in a very real sense. If two languages are used to communicate, then it is the language that can be learned the earliest (and thus the most adapted to the host's brain, in our case an infants brain) that will win the competition, provided that it is still rich enough to have all communication benefits the other competing languages provide. This means there are two forms of pressure: communication complexity (pushing languages up to being more complex) and ease of learning (pushing languages down to being learnable).

These combined aspects of language evolution explain a series of different phenomenon related to language (see e.g. Deacon). All natural languages humans speak are learned at around the same age: this is the current stable point between what young brains can handle and what language can handle in terms of communication complexity. It also explains why all languages share common structures. Human infant brains are the same everywhere, and humans have the same need for communication everywhere, therefore languages had the same up and down selective pressure. Further, it explains why languages close to each other share many features: they are close and either 'steal' from each other or are natural variations of each other. It explains why languages are easy to learn at a young age but *not* at a later age. Languages had to compete with regard to their ease of learning (selective pressure downwards), and as such all languages had to gradually adapt their structure so that they are being learned by humans at a younger and younger age. This means languages gradually got adapted to infant brains. An infant's brain is different in terms of how it processes information than an adult brain. As a result, the process of learning a natural language is badly adapted to adult brains, and therefore learning a second language at a later age is difficult.

So, what should we do with all this? First, realize, that language is not the same as communication. Language is something that could only evolve *because* humans have an intrinsic need to communicate. This means there are different forms that can serve communication, natural language being a very effective one. However, producing text is not communication per se. Another important observation is a language also serves itself, not just its host, i.e., humans. Why? Because a language evolved by the power of its potential to survive, and survival for language is multifaceted: it has to serve the host, but it also has to win the competition with other languages by (1) manipulating the host to copy the language, (2) trying to outsmart other languages by being easy to learn at a young age and by blocking the capacity to learn a new language once the host is 'infected', and (3) manage the amount of variation hosts can introduce (to much variation will kill the language).

In the rest of this position paper we focus on the first mechanism of a language to serve itself, i.e., manipulating the host into copying the language. In concrete wordings this means that we humans are effectively manipulated (obviously without us being aware of it) by the language we speak into using it as efficient as possible to influence other humans to start using that language. This is the natural mode of functioning of any language, and it makes sense to assume that any language taps our internal need to communicate so that we copy as much of the language as possible. As a result we might run the risk of feeling that we communicate when in fact we are just helping the language to copy itself.

Communication Technology and Language

Communication technology enables us to use many different channels to communicate. Interestingly, many of those channels involve using natural language. Papyrus scrolls, books, newspapers, the phone, email, websites, wikis, blogs, you name it, they all involve language. If we take the paranoid stance, it seems that language kidnaps any media that can be used for copying. The question to what extent, and more importantly to whom language is useful now becomes quite a thorny one. If language lives by copying itself, and it invades any media that enables it to do so, then could it be the case that some acts of 'communication' (quotes on purpose) are actually just acts of copying. In other words, are all our messages useful communications? The problems that current digital communication media give us suggest that we should answer this with a full 'no'.

If we approach language evolutionarily and use this approach to look at the previously described problems, we come to the conclusion that language has 'hijacked' digital communication means. To address this problem, we need to go back to what aspects of language are useful to us. An important aspect is that language enables us to influence the behavior of others to enhance their and our own survival potential. If I can tell you that you should not jump in a fast flowing river, than that manipulates your behavior to your own benefit. If you are family or part of the same tribe, that will also help my survival. So, there actually is a very simple criterion (simple when approached from an abstract point of view) to decide when to communicate: don't communicate unless it is clear that the message *can* change the *behavior* of your receiver and *helps* the receiver in some way to achieve his or her *goals*. Notice that there are two important factors: first, the message should be able to help the other, and the message should be in such a form that it is not only receivable and understandable but also translatable into behavior. FYI messages such as "hey, should we do something with this…<link>?" clearly do not score very high on both criterion. What is the benefit of the message, and how should the message be translated into behavior? A better version of this message is "Hey, I got this and that idea because I read this and that source, and I think we can do this and that with it that will help us to achieve bla bla bla." Note that this form does score high on both criteria. The second type of message is a lot more work to generate. One should not only read the source but also formulate thoughts, intentions and potential behaviors. This is a third criterion that we can use to decide to send a message or not: does it take me some effort to create the message?

The fact that messages are so easy to create and distribute addresses a serious problem resulting from the fact that digital communication means are very low-effort in terms of sending messages. You just move your fingers on the keyboard and then push a button…tada….message send to the whole project team. This aspect of digital communication is a serious benefit for language: copy copy copy. It is however a serious thread to humans: we only need language to adapt our behavior for the benefit of our survival. In essence, there is an important shift in the selective pressure equation due to digital communication. The copying mechanism has just become a lot less costly, and therefore a language can afford to copy much more regardless of whether it is useful for its host.

Conclusion

We have seen that digital communication has changed the way language as an evolutionary entity can function. Languages can afford to copy more of themselves, because the copy mechanism is very low-effort. It does not cost the host a lot to produce the message, and as languages are naturally tied to human needs to communicate, any language will try to abuse this free copy ride. It seems that the only thing we humans can do in order to put some counter pressure against this wild copying behavior of languages is to put more effort in the message and produce less, but more meaningful messages. We have identified three criteria to detect if the message you are about to send to your colleagues is in fact worth sending. First, ask yourself how your message benefits the receiving party and name the benefit. Second, formulate the message in such a way that it involves actions and behavior. Third, if it does not take any effort to create it, don't send it to someone who is already busy (or even better, don't send it at all and keep the topic in mind for the Friday-afternoon drink).