

Perishing Probabilities of Publication *

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Abstract

The effects of the rate of disclosure on the evolution of a cognitive process are investigated. A high rate of disclosure increases the risk of erroneous interpretations and promotes conceptual diversification at the expense of conceptual abstraction. The diversification increases exponentially with frequency of disclosure. Premature disclosure of a cognitive process may also lead to a distortion of the knowledge base. In contrast, a slow rate of disclosure increases the general validity and accurateness of the conclusions drawn and allows for flexibility to abandon obsolete interpretations.

I RESULTS

An abstract interpretation of a phenomenon in Nature may link affirmatively to n observed or known contextual phenomena listed in a database. One particular interpretation, C_n , out of many, C_m , has a probability of P_n . The contextual cognitive elements may stabilize an interpretation so that its likelihood fades less rapidly: There is a set of probabilities

$$\begin{aligned} P_a &= \frac{C_a}{C_m} \exp(-K \log(\frac{a_a! b_a! c_a! \dots}{n_a!})\tau) \\ P_b &= \frac{C_b}{C_m} \exp(-K \log(\frac{a_b! b_b! c_b! \dots}{n_b!})\tau) \end{aligned} \tag{1}$$

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describing these various interpretations. The letters $a, b, c \dots$ denote each multiplicity of various identical contextual elements with $n = a + b + c + \dots$ since the contextual elements interact with the abstraction randomly and within themselves according to their weight less their redundancy. $K > 0$ is a constant and τ is the real time passing before a choice

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between the various P is made. Obviously, the most correct (good) interpretation, I_g , has the property that $P_g > P_{x \neq g}$. If one of the available interpretations must be chosen sooner or later then

$$P_{n,t} = \frac{P_{n,\tau>0}}{\sum P_{\tau>0}} \quad . \quad (2)$$

The topic of the title is to analyze the mechanisms by which the unknown I_g and its associate elements can be identified with particular attention paid to the length of the time interval by which any of the interpretations are chosen.

The awareness of the knowledge base pertinent to the task of choosing the correct interpretation is not collective. Rather, Eq. (1) describes individual judgement relative to the same individual's database of facts and available interpretations. The process takes place in a background of distinct judgements described by similar sets of probabilities. Channels of publication and knowledge dissemination serve the purpose of widening the database upon which the individual judgements are made. Thus, each cognitive process, N_I , has access to a database, db_n , relevant to the interpretations I_n , some local forum of information exchange, and an open forum of disclosure connecting with other cognitive processes in similar settings.

In the process of the investigation that results in determining I_g more and more data can be evaluated as to its relevance. This leads to a slower decay of the probability of the increasingly correct interpretation because an increasing number of contextual elements can be added in its exponential factor. A long time interval between each choice of an interpretation amplifies the probability that the most correct interpretation is selected while the probabilities of the other, less likely alternatives begin to fade comparatively rapidly to negligible values (Eq. (2)). Thus, not only is the pertinent knowledge base strengthened but also are the irrelevant interpretations sorted out while this happens. Furthermore, in the event that the interpretations, C_n , are weighted themselves with a higher multiplicity ascribed to the commonest and most fashionable interpretations, a prolonged decision period may restore the impact of the objective database. Clearly, an undisturbed cognitive process interacting solely with its database and not being forced to take premature decisions has a good chance of making progress towards finding the most correct interpretation.

What are then the effects of putting the cognitive process in the context of some vehicle of disclosure in the presence of parallel cognitive processes centered around it? An immediate beneficial effect is, of course, to widen the knowledge base from where the pertinent database may be selected. As long as no premature decision between the interpretations the database is provoked no harm will be done. However, a speeded-up rate of decisions between interpretations will increase the likelihood of an erroneous choice because 1) the relevant database has not been consolidated and 2) the irrelevant interpretations are still reminiscent (Eq. (2)).

Besides identifying the correct interpretation of the database (the correct abstraction) any cognitive process must also choose between several databases pertinent to different abstractions and between hierarchies of abstraction within the same database. These subtler venues may steer the focus of the attention astray within the nuances of the most correct interpretation (the most general abstraction), particularly if the database has not matured. Namely, the factorials in the exponential factor of eq. (1) express that any abstraction links

to its constituent cognitive elements in a weighted manner conveying the focus of the attention. In other words, each cluster of contextual cognitive elements forms itself a basis for conceptual differentiation with

$$\begin{aligned}
 P_{x,a} &= \frac{a_x}{n} \exp(-K \log(\frac{a_{x,a}! b_{x,a}! c_{x,a}! \dots}{n_{x,a}!})\tau) \\
 P_{x,b} &= \frac{b_x}{n} \exp(-K \log(\frac{a_{x,b}! b_{x,b}! c_{x,b}! \dots}{n_{x,b}!})\tau)
 \end{aligned} \tag{3}$$

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etc., where the factorials refer to some extended database invoked by each particular sub-element of the original abstraction. Since $n > a, b, c \dots$, a more consolidated abstraction is more stable towards differentiation into details. Thus, a cognitive process forced to make premature decisions tends to automatically be channeled into distraction from what is important. This is even more conspicuous if the premature abstractions are disclosed on an open forum because the audience is less knowledgeable about the pertinent database (which was assumed to be the reason for publishing) and would be distracted even more. With few exceptions, the cognitive processes taking place in an audience of reviewers-receivers, r , have $a_r < a_s$, $b_r < b_s, \dots$ and $\bar{n}_r \approx \bar{n}_s$ where n_r refers to a different database deriving from a different background than that of the speaker-sender, s .

In a collective setting with fiscal periods and the like, a decision rate (disclosure rate), $\nu = 1/\tau$, may be defined with $\nu > \nu_g$ and $\tau < \tau_g$. For any $\tau < \tau_g$ with reference to τ_g , the number of conceivable choices of detail increases exponentially within a database of constant size and the shorter τ is the more increases the likelihood of attention to minute detail. In a scenario where the audience must choose between the alternatives, such conditions consolidate the diversification into detail, even more so in the presence of means of publication and funding. A fashionable research area may thus absorb attention as well as funding solely ascribable to a high rate of disclosure.

This attention to detail must not be confused with freedom of interpretation and freedom to set a focus of interest. An interpretation, I_{db_1} , may be overturned by reference to the extended database $db_{1e} \ni db_1$ whereas the choice of focus of interest among various good interpretations, $I_{g_1}, I_{g_2} \dots$, of different databases, db_1, db_2, \dots does not necessarily depend on an evaluation of their respective databases. For the part $db_{r_2} \notin db_{s_1}$ the interpretation I_{g_2} is consolidated if more of the contextual elements db_{s_1} can be linked to I_{g_2} instead. Therefore, any disclosure of a cognitive process inherently tends to make the various existent interpretations mutually exclusive even without consideration of social and human factors in a competitive environment. The diversity and appropriateness of the various databases may thus have to be protected if exposed to an open forum, particularly in the case of premature disclosure.