



CONTEXT DYNAMICS 1: IS RELEVANCE SUBSCRIPTED ?

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It is generally assumed that a pragmatic proposition is formed by an utterance as relevant to some context. However, such assumptions may not yet be treated as scientific because operational definitions of the main concept "relevance" hardly exist, thus prone to circular definitions as "relevance of an utterance to a context exists whenever the utterance is relevant to the context", or "relevance exists whenever a relevance-theoretician says it exists" (to arrive at such inferences, please see [1], the book that marks the birth of the literary hypothesis of relevance). This theoretical vulnerability is probably due to the treatment of a context as invariant, and/or the belief that short-term memory can hold an infinite amount of propositions (some of which become inferences as a result of undefined procedures while some others remain as presuppositions), and/or the conception of an utterance as unitary and static following its onset in the hearer's mind, which is scientifically tolerable, because after listening to or reading out an utterance thoroughly and thinking about it for a period which an ordinary hearer/reader would unfortunately lack, the utterance could have a consolidated unitary episodic structure and the number of pertaining propositions could be easier to count, without the well-known limitations of short-term memory. Leaving such speculative and non-empirical deductions out of the discussion here, the utterance itself maybe considered as a token for context analysis by the hearer(s), as previously proposed [2, 3]; please also see [4]. The model resulting from such an approach may be called the Dynamic Context Processing Model, which permits the argument that a storage pattern representing the elements of an initial context preceding the utterance may not exactly match the resultant pattern following an utterance as input, and thus if the perceived relevance of an item of some utterance u to an initial context c_1 may be assessed using an independent criterion such as success/failure in recognition and/or the reaction time of the recognition response, as different from the perceived relevance of the same item to a next context c_2 in which u is still an argument, then it may be proposed that relevance is not a determinant in the domain of an implicature/explicature using u , but a variable whose value depends on the subscript range of a function C . Since the model focusses on an utterance-as-input for context manipulation, previous formulations with some critical conceptions can be adopted:

* A context may be re-conceived of as a **recurrent competitive network** that operates by (a) contrast-enhancing its input, normalising its activity and storing it in STM if proper feedback is present, and (b) shunting off the input as noise in the absence of such feedback", following [5]. Re-defining "proper feedback" as an input segment bound on associates of items already active in STM (previous context elements), it is possible to argue that relevance will not control, but depend on this feedback during the formation of a "next" context (for a philosophical discussion, please see [6, 7];

* Relevance can be considered as controlled by **antagonistic rebound** relations among previous context and immediate utterance elements, a kind of activity whereby "a group of cells detect and respond to the offset of another cell group's responses" [5], preventing the STM-inclusion of a previous context's elements that are not associated to the incoming items from the immediate utterance;

* STM control is achieved through (1) **chaotic** and (2) **entropic** processes involving **activation** and **inhibition** (please consult [8] for details of inhibition, and [9a, b] for general applications of this concept), respectively; both of these functions employ waves such as (a) the **P300** in response to unexpected inputs, and (b) the **Contingent Negative Variation** in response to expected inputs, which in turn control the reaction time and STM field size allocated to the input (for P300 and CNV functions, see [5, 10]; relevance may be argued to depend on the P300 or CNV activity induced by the input utterance pattern, since the expectedness or unexpectedness decision regarding an input in a hearer's system cannot be hypothesised to result from the decisions of an imaginary overhearer (such as a relevance-theorist making up conversation examples);

* Adopting again from Grossberg, it can be argued that "... individual neural events ... are behaviorally irrelevant unless they are bound together by **resonant feedback**", that "the resonant state provides a context-dependent code", and that "... rather mysterious rubrics of 'paying attention' and 'expectancy' could be attached to the more substantial theme of **code stability** and **consistency**' and the establishment of dynamically maintained critical periods." [5];

* It can moreover be argued that the relevance hypothesis lacks the flexibility to handle the often-observed phenomenon of *jumping to conclusions*, termed **circumscription** by McCarthy, which "...conjectures that the 'known' entities are all there are" (1987). Replacing the difficult task of an exhaustive LTM search the relevance hypothesis requires (in case it is seriously considered) by McCarthy's following formulation somehow seems scientifically more plausible: "Circumscription ... will allow us to conjecture that no relevant objects exist in certain categories except those whose existence follows from the statement of the problem [considering all kinds of input as problems] and common sense knowledge" [10]; please also see [11, 12, 13]. Could this be the key to a higher-order 'economy' that the self-celebrated relevance-theorists are so fond of?

The above literature research was re-assessed in view of the present study as follows:

* It can be argued that the non-monotonic formulation $(b : f)/f$ is a model for relevance as a variable in a general model of communication, reasoning that if in the formula "infer f from b if it is consistent that b is true and it is consistent to believe that f is true" f has been permitted by b to enter STM processing then in case of a new input variant of f it will be consistent to infer f with no need for a given — or inferred — dictum in the form " f follows b " or "from all bs f can be inferred"; in other words, it may not be necessary to state that an inference must be based on explicit — and processed — relevant premises because the relevance of f to b seems to depend on the *consistency* parameter in the relation. Consistency in turn may be defined as a vector product of the resonant feedback that is localised by resultant activation through f , a variant in STM, and b which is an invariant LTM code. Thus, the model would assume that there is no need for a speaker/hearer to assess a relevance parameter in each sub-event of communication because relevance would already be expressed in attentional and temporal parameter values in retrieval and storage of STM and LTM items, respectively;

* If inhibition results from — or is at least contingent on — activation, then it can be said that P300 and CNV are functions of activation. Assuming activation as chaotic, the relevance of an input to a pre-existing (already established) context cannot be an argument in the communication process at the time of input because a chaotic set of conceptual codes by default rejects contingency on relevance. On the other hand, relevance is acceptable in an entropic set, formed by inhibition following activation; however, the onset of inhibition, by definition, cannot be contingent on the relevance of the input to the items inhibited.

Within the framework of the above discussion, the following assumptions were adopted:

- * A context is neither given nor chosen, but dynamically created and maintained/modified by the pattern of elements in an utterance [2];
- * Utterance and context elements share a limited STM space due to backward and forward activational propagation patterns resulting in resonant feedback patterns, creating transience of contextual elements via inhibitory patterns caused by utterance elements operating through attentional and temporal parameters [3];
- * Decisional localisation is enabled by resonant feedback patterns formed by resultant activational vectors in STM [10], within unit real time [3];
- * Relevance in empirical terms can be considered as manifest in the degree of resonant feedback in STM, operational in terms of decisional localisation in STM controlled by the resultant vector of activational and inhibitory waves depending on the integral sum of associations among utterance (real input) and contextual (virtual input) elements (see [9a, b] for theoretical setup and [3] for experimental results).

Following the above literature research and parametric assumptions, it was hypothesised that

- * The perceived relevance R_0 of an utterance U_0 to an initial context C_0 does not predict the perceived relevance R_1 of a next utterance U_1 to (a) the initial context C_0 and (b) a next context C_1 which is modified but employs elements of C_0 as arguments. It was reasoned that if relevance is a controlling factor in verifying a pragmatic proposition, then (1) R_1 can be regressed on R_0 and (2) there should exist a main effect of R_0 on R_1 ;
- * The integral sum P_0 of R_0 and its contingent RT_0 can predict the integral sum P_1 of R_1 and its contingent RT_1 . The reasoning here was that if perceived relevance is dependent on the argument(s) of a context, then the relevance decision and the time (which is also a dependent) taken to produce that decision can be conceived of as elements of an integral sum;
- * Reaction time RT_0 for the relevance decision for U_0 is lower than RT_1 for U_1 . It was argued that depending on the dipole gradient of relevance ranging from 'relevant' to 'non-relevant', U_0 should be subject to CNV or P300 feedback propagation, respectively, where the size of the wave would vary directly with the STM space used by U_0 . If U_1 causes a wave of greater magnitude due to larger STM space used, then RT_1 reflected by a decision for U_1 should be greater than RT_0 for U_0 .

METHOD

Subjects

The subject pool comprised 33 male and 33 female students, aged 19 thru 23, of the Hacettepe University Departments of English Linguistics, English Language and Literature, Food Engineering and Computer Engineering, and the Middle East Technical University Departments of City Planning, Physical Engineering and Environmental Design. In addition, 15 voluntary judges from external premises, aged 23 thru 72, participated in the study.

Materials & Equipment

A HIGH-TECH 2000 cassette player, SONY V502 stereo headphones, and a CHRONOS VT-1 timer/chronometer were used.

Design

A 3-group simple design was employed.

Procedure

In the first phase, 15 judges listened to a computer-edited tape recording involving a single-turn conversation at an airport terminal, 14 seconds in length [10 secs. for the announcement "Passengers of flight number 207 of SABENA airlines to Brussels please be ready at exit number two for passport control" to represent C_0 , 2 secs. for the conditioning utterance "Are you going to Brussels?", and 2 secs. for U_0 (a) "Yes. I am going to Brussels", (b) "I have friends in Brussels", or (c) "I am going to buy a Cola"]. The judges were independently asked to rate the relevance of U_0 to C_0 on a Thurstone scale with subdivisions of 0.1 points. After computing the average score per U_0 alternative, scores were recoded to read (a) **1** for the range 1.0-2.9 as "relevant", (b) **2** for the range 3.0-4.9 as "remotely relevant", and (c) **3** for the range 5.0-6.9 as "non-relevant". 94 % of the judges rated (a) as "relevant", 80 % rated (b) as "remotely relevant", and 87 % rated (c) as "non-relevant" [Runs Test: $Z=1680$, $p=0.8666$; $Z=0.0179$, $p=0.9857$; $Z=-0.5205$, $p=0.6027$; Kolmogorov-Smirnov Goodness of Fit: $Z=0.7607$, $p=0.6092$; $Z=0.5519$, $p=0.9209$; $Z=0.3991$, $p=0.9973$ respectively; Cochran's $Q=26.3639$, $p=0.0001$; Chi-Square (strictly parallel) = 54.6363, $p=0.0001$]. In the main phase, the subjects were individually tested; after the presentation of the first sequence (the same sequence as the one received by the judges), where the first experimental group heard U_0 in the form (a), the second group received it as (b), and the third group heard the (c) version. The subjects were pre-instructed to rate U_0 as "relevant" or "non-relevant" to C_0 as fast as possible by pressing one of the two response keys in front of them. By the end of the sequence period, the timer de-activated itself and started the chronometer and a subject's response stopped the chronometer and re-started the timer so that a 12-sec. sequence followed [9 secs. for the announcement "Flight number 207 of SABENA airlines to Brussels is ready to take off at gate number two" representing C_1 and 3 secs. for the utterance U_1 "I'm sorry, but I have to go" by the "second" speaker of the first sequence]; pre-instruction now required the subjects to rate U_1 as "relevant" or "non-relevant" to C_1 as fast as possible, again by pressing one of the two response keys in front of them, and once more, by the end of the sequence period, the timer started the chronometer and a subject's response stopped it. RT_0 and RT_1 values were recorded per subject.

RESULTS & DISCUSSION

The results of the study were as follows:

Table 1. Regressing R_1 on R_0

Multiple R		0.17992			
R square		0.03237			
Adj. R square		0.01725			
Std. Error		0.48457			
Variable	B	Std.Err. of B	Beta	T	p <
R_0	0.174632	0.119347	0.179919	1.463	0.1483
(constant)	1.356618	0.190412		7.125	0.0001

Table 2. Regressing P_1 on P_0

Multiple R		0.79919			
R square		0.63870			
Adj. R square		0.63305			
Std. Error		0.11531			
Variable	B	Std.Err. of B	Beta	T	p <
P_0	0.770112	0.072402	0.799187	10.637	0.0001
(constant)	1.418951	0.435597		3.257	0.0018

Table 3. ANOVA for the effect of R_0 on R_I

Source of Variation	Sum of Squares	df	Mean Square	F	p <
Main Effects					
R_0	0.503	1	0.503	2.141	0.148
Explained	0.503	1	0.503	2.141	0.148
Residual	15.028	64	0.235		
Total	15.530	65	0.239		

Table 4. ANOVA for the effect of P_0 on P_I

Source of Variation	Sum of Squares	df	Mean Square	F	p <
Main Effects					
P_0	1.743	1	1.743	182.261	0.001
Explained	1.743	1	1.743	182.261	0.001
Residual	0.612	64	0.010		
Total	2.355	65	0.036		

Table 5. Paired T-Test: RT_0 and RT_I

Variables	No. of Pairs	Corr.	2-tail Sig.	Mean	Std.Dev.	Std.Err
RT_0	66	0.803	0.001	415.242	82.825	10.195
RT_I				429.970	81.137	9.987
Paired Differences						
Mean	Std.Dev.	Std.Err.	t-value	df	2-tail Sig.	
-14.7273	51.432	6.331	-2.33	65	0.023	

The results seem to support the hypotheses that R_I can be regressed on R_0 (Table 1), and that there is a main effect of R_0 on R_I (Table 3). Also, the hypothesis that the integral sum P_0 of R_0 and its contingent RT_0 can predict the integral sum P_I of R_I and its contingent RT_I seems to have been supported (Tables 2 and 4). The hypothesis that the reaction time RT_0 for U_0 is lower than the reaction time RT_I for U_I was rejected for safety reasons, although a considerable significance seems to exist.

CONCLUSION

The present study has shown that relevance is not one of the parameters controlling the processing of an utterance within a dynamic context environment. On the contrary, the perceived relevance of an utterance to a context seems to be designated by the utterance itself. It may thus be concluded that within a *dynamic context* framework, relevance is not a determining factor, but is utilised as a conscript of contextual flux. While the results presented seem to confirm related previous formulations and findings, they also seem to suggest once more that research in the field of pragmatics proceed with operational and empirical designs, rather than vague speculations on possibly biased example dialogues, enhancing the image of the relevance hypothesis as "irrefutable", hence non-scientific.

REFERENCES

- [1] Sperber, D., D. Wilson, 1986.. *Relevance: Communication and cognition*. Oxford: Blackwell.
- [2] Aksoy, C. 1995. "Dynamic context processing." *Dilbilim Arastirmalari*, 131-137.
- [3] Aksoy, C. 1996. "Baglam ogelerinin gecisim ozellikleri." Presentation at X. *Turkish Symposium in Linguistics* (in press), Izmir: Ege University.
- [4] Tucker, A. 2004. "Holistic Explanations of Events." *Philosophy.*, 79:573-589.
- [5] Grossberg, S., 1980. "How does a brain build a cognitive code?" *Psychological Review*, 87:1-51.
- [6] Bennett, J., 2004. "Time in Human Experience." *Philosophy*. 2004, 79:165-183
- [7] Harrison, J., 2004. "The Logical Function of 'That', or Truth, Propositions and Sentences." *Philosophy.*, 79:67-96
- [8] Talasli, U., 1984. "Proactive inhibition as a result of activation" *Psychological Reports*, 55: 363-370.
- [9a] Aksoy, C., 1994. *Inhibitory processes in verbal communication*. Unpublished Doctoral Dissertation, Ankara: Hacettepe University.
- [9b] Aksoy, C. , 1994. "The effect of partially relevant information on inferential localisation in decision dichotomies." *Dilbilim Arastirmalari*, 206-218.
- [10] Grossberg, S., Stone, R., 1986. "Neural dynamics of attention switching and temporal order information in working memory" *Memory and Cognition*, 14(6): 451-468.
- [11] McCarthy, J., 1987. "Circumscription: A form of non-monotonic reasoning." In Ginsberg, M.L. (ed.) *Readings in non-monotonic reasoning*. California, Morgan Kaufmann Publishers Inc., 145-152.
- [12] Chomsky, N., 2005. "Simple Truths, Hard Problems: Some thoughts on terror, justice, and self-defence." *Philosophy.*, 80:1:5-28
- [13] Lockie, R., 2004. "Knowledge, Provenance and Psychological Explanation." *Philosophy.*, 79:421-433.