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Chapter 2 The p-model of data and evidence in linguistics

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Abstract

The p-model is a metatheoretical approach to linguistic theorising that has been designed to capture the nature of linguistic data and evidence in an unorthodox and novel, but well-motivated and effective way. Its starting point is the insight that the latest literature on linguistic data and evidence acknowledged the *uncertainty* of the latter as their key feature. Since the main characteristic of *plausible inferences* is that they facilitate drawing conclusions from uncertain premises, and since chains of plausible inferences constitute the main body of the process of *plausible argumentation*, the basic idea of the p-model is that the structure of linguistic theories is based on various techniques of plausible argumentation. This chapter summarises the main hypotheses of the p-model, which the case studies in the volume are expected to apply to various linguistic theories.

1. The problem

In the *Introduction* to the present volume, we put forward a brief analysis of the current debate on linguistic data and evidence. Against this background, the problem to be solved is as follows:

- (P) (a) What kind of metascientific framework is capable of providing a novel and comprehensive model of linguistic theorising?
(b) How can the concepts of ‘linguistic data’ and ‘linguistic evidence’ be defined in such a way that the shortcomings of the current literature can be avoided?

Our hypothesis is that an argumentation theoretic model of linguistic theorising can be expected to yield the solution to (P)(a) and (b) by transforming the rather vague assumptions of the progressive insights put forward in the current debate into a workable account of linguistic data and evidence.

Our line of reasoning will be as follows:

In Section 2, we will give an overview of a model of plausible argumentation meeting this expectation. We will call it the *p-model* and consider it as a possible solution to (P)(a). In Section 3, we will show how the p-model yields our solution to (P)(b). Finally, in Section 4, we will summarise our findings.

In Sections 2 and 3 we will illustrate the concepts which we introduce and the claims which we make predominantly (but not exclusively) by examples taken from the case studies in the present volume. Accordingly, this chapter prepares the application of the p-model in the subsequent case studies.

2. A possible solution to (P)(a): the p-model

2.1. Introductory remarks

Before introducing the p-model, let us make the following preliminary remarks.

The current state of the art in the philosophy of science clearly shows that the standard view of the analytical philosophy of science has lost its former acceptance and dominance. As a consequence, it has been replaced by a variety of new approaches. This *pluralism* legitimises the elaboration of a metascientific model which intends to solve (P)(a) in an unorthodox and novel, but well-motivated and effective way.

Second, the basic idea of the p-model is that the structure of linguistic theories is based on various techniques of *plausible argumentation*. Such an approach has been put forward in Kertész & Rákosi (2012) and is called *the p-model of plausible argumentation*.¹

Third, we emphasised that the latest literature on linguistic data and evidence acknowledged the *uncertainty* of the latter as their key feature. Since the main characteristic of *plausible inferences* is that they facilitate drawing conclusions from uncertain premises, they seem to provide an appropriate tool for modelling this feature of the relationship between linguistic data/evidence and the hypotheses of linguistic theories. Therefore, one of the p-model's central notions will be the concept of 'plausible inference'.

Finally, we want to emphasise that plausible inferences do not constitute a calculus. Their theory is no 'logic', since plausible inferences take non-formalisable characteristics of statements into consideration, too.

Thus, in the present chapter we will confine the discussion of the basic notions on which the p-model rests to the elucidation of the ideas motivating them without striving for formalisation. For the more complete and more precise – but, for the substantial reason mentioned, still informal – presentation of the p-model see Kertész & Rákosi (2012).

2.2. The uncertainty of information: plausible statements

In most cases our hypotheses are not statements the truth of which is guaranteed by experience, supporting evidence, a proof or whatever. Rather, they are *plausible*: we are ready to accept them to some extent on the basis of suitable *sources* that support them. Such – more or less *reliable* – sources are, for example, corpora, theories, conjectures, the intuition of native speakers, experiments, fieldwork, historical documents, dictionaries, videotapes, or even inferences (cf. Rescher 1976: 6f.; Rescher 1973: 63ff., Kertész & Rákosi 2012).

In order to capture this inherent uncertainty and the limited reliability of information, the p-model – following Rescher (1976) – interprets scientific hypotheses not as propositions but assigns them a structure consisting of an *information content* and a *plausibility value*. This plausibility value does not belong to the logical structure of the statements. It shows to what extent the given statement is supported by a source; that is, how reliable the source makes it, and to what extent one is willing to accept the hypothesis on the basis of the source at issue.

Plausibility is *source-dependent*. A statement may be very plausible according to one source, and less plausible with respect to others. It may also happen that some sources support the negation of the given statement and make it *implausible*. Further, if several sources

¹ Our approach has been motivated by the ideas of George Polya and Nicholas Rescher (cf. e.g. Polya 1948, 1954; Rescher 1976, 1987), and prepared e.g. in Kertész (1993, 2004a, 2004b) and Kertész & Rákosi (2006, 2009).

support a statement, then its plausibility value is higher on the basis of all sources together than its plausibility value on the basis of any of the sources alone.

Example 1. The statement

The lexical-semantic representation of weather verbs contains an internal argument which cannot be expressed syntactically

is a plausible statement on the basis of a linguistic paper (Komlósy 1994) as a source, because it is expressly supported by it. Nevertheless, this paper cannot be regarded as a perfectly reliable source guaranteeing the truth of this statement. The uncertainties of such a source can be formulated from different points of view:

- The hypothesis at issue is an inductive generalisation covering several cases (i.e., it makes a claim about all Hungarian weather verbs). Therefore, it has to be checked whether there are weather verbs in Hungarian which may occur with semantic arguments that can be explicitly realised.
- The linguistic intuition of the linguist (in this case, that of Komlósy) may be influenced and rendered unreliable by the theory he relies on. Thus, he may be mistaken about the analysis of the sentences at issue and state incorrectly that they are subjectless in this sense.
- It might happen that other native speakers judge the sentences containing the given construction differently.

Németh T. (this volume) shows that after involving further sources (arguments relying on introspective data) this hypothesis has to be regarded as implausible.

Example 2. The hypothesis

The reinterpretation of the construction “*anar* + infinitive” as a construction with a present tense auxiliary in Old Catalan is based on the high frequency of the 1Pl form *anam* ‘we go/we are going/we went’, which is ambiguous between past and present tense and allows an association to the present tense paradigm of the verb *anar*.

can be deemed plausible, among others, on the basis of the frequency analysis provided in Juge (2006) as a source. Nevertheless, Nagy C. (this volume) refers to two factors which may diminish the reliability of this source: “First, in other cases of analogical change the basicness of third persons is emphasised. Second, it is questionable whether the frequency will remain the same, when investigating it in a larger corpus.”

Plausibility can be represented numerically (cf. Rescher 1976). These values, however, do not have any exact meaning which could be applied in every context but solely indicate different *relative strengths* of plausibility (reliability, supportedness, acceptance) within one argumentation process (theory). The minimum value of plausibility is indicated by 0, which means that the given statement is of neutral plausibility on the basis of the source at issue. The maximal value is indicated by 1 meaning that the statement in question is true with certainty on the basis of the given source.

To sum up, the plausibility value of the statement *p* on the basis of the source *S* is such that

- a. $|p|_S = 1$, if p is true with certainty on the basis of S ;
- b. $0 < |p|_S < 1$, if p is plausible on the basis of S ;
- c. $0 < |\neg p|_S < 1$, if p is implausible on the basis of S ;
- d. $|p|_S = 0$, if p is of neutral plausibility on the basis of S , i.e., if it is neither plausible nor implausible on the basis of this source.

Example 3. In a theory on discontinuous constituents, for example, the following plausibility values may be assigned to the statements in question:

- a. |The sentence *Elements moving rightward cannot be moved out of the clause in which they originate* contains the cognitive metaphor CLAUSES ARE CONTAINERS. $|_S = 0$

where S is the Theory of Government and Binding (GB Theory). This statement has neutral plausibility according to the source S , because neither it nor its negation is supported by the source S . The reason for this is that GB Theory cannot say anything about the acceptability of this hypothesis because it does not make use of concepts such as ‘cognitive metaphor’.

- b. |Degree word complements form deep- and surface structure discontinuous constituents with degree words. $|_S = 0.2$

If this statement has not been tested yet but is only a conjecture raised at this moment, then it has to be assigned a low plausibility value on the basis of S which is an intellectual source.

- c. |Degree word complements form deep- and surface structure discontinuous constituents with degree words. $|_S = 0.4$

It may be the case that the hypothesis in b) has undergone some testing with the help of a thought experiment conducted by the linguist. That is, if he/she has tried to think over its consequences and examined its tenability on the basis of a few acceptability judgements as evidence, then this hypothesis can receive a somewhat higher plausibility value on the basis of a thought experiment as source S than in the former case. Nevertheless, this plausibility value cannot be high, since the testing was unsystematic and relied solely on the linguistic intuition of the given linguist.

- d. |In sentences containing both a degree word complement clause and a relative clause extraposed from subject position, the relative clause has to precede the degree word complement clause. $|_S = 0.6$

Suppose that this hypothesis has been checked by a linguist with the help of several pairs of sentences such as *People were so angry who knew John that they refused to participate* vs. **People were so angry that they refused to participate who knew John*. In this case, the above hypothesis can be judged to have a rather high plausibility value on the basis of the linguist’s linguistic intuition as well as his/her linguistic analyses as a source S . Nevertheless, we should not forget that the judgements which are rooted in this source may be controversial.

- e. |The sentence *People were so angry who knew John that they refused to participate* is grammatically correct, while the sentence *People were so angry that they refused to participate who knew John* is ungrammatical. $|_S = 0.8$

This statement concerns only the grammaticality of two sentences. Nevertheless, even if *S* is the linguistic intuition of the linguist and he/she is convinced that his/her judgement is doubtlessly correct, the above statement cannot be regarded to be true with certainty. It may obtain a high plausibility value which may be increased by involving further persons in the judgement of the two sentences' grammaticality.

Of course, the highest plausibility value provides a well-designed experiment with an appropriate statistical evaluation of the results.

It has to be stressed that low plausibility values do not mean improbability but rather, a relatively small, limited amount of plausibility (reliability, acceptance). In such cases, the source votes expressly *for* the given hypothesis. If a source is against a hypothesis then it makes its negation plausible and the given hypothesis *implausible*.

We distinguish between direct and indirect sources. In the case of *direct sources*, the plausibility of the statement at issue is evaluated with respect to the reliability of the source. With *indirect sources*, however, the plausibility value of the given statement is determined with reference to the plausibility of other statements – that is, with the help of an inference.

Example 4. Nagy C. (this volume) judges the following hypothesis plausible:

The reinterpretation of “*anar* + infinitive” as a periphrasis with a present tense auxiliary is realised due to the high frequency of the 1PI form *anam*.

If she simply referred to Juge (2006) without presenting his argumentation, then the plausibility value would be assigned to this statement on the basis of this paper as a direct source. Nagy C., however, presents Juge's argumentation in detail. Therefore, the above hypothesis is supported by a series of plausible inferences as an indirect source.

2.3. *Obtaining new information from uncertain information: plausible inferences*

Deductive inferences the premises of which are true with certainty are capable of guaranteeing the truth of the conclusion. That is, if the premises of an inference are true with certainty, and there is a logical consequence relation between them and the conclusion, then we are totally justified in accepting the conclusion. However, very often either there is no logical consequence relation between the premises and the conclusion or at least one of the premises, instead of being certainly true, is only plausible in the light of the given sources. Moreover, the combination of these two cases may also occur. Although such inferences are not capable of securing the certainty of the conclusion (assured hypothetically or actually by the premises), they may – under appropriate circumstances – make the conclusion *plausible*.

Plausible inferences are mappings associating a set of plausible and/or true statements (premises) with a plausible statement (conclusion). In such inferences the connection between the premises and the conclusion cannot be reduced to the relationship between their logical structures, as is the case with deductive inferences. Plausible inferences take into consideration not only the logical structure of the premises and the conclusion but their plausibility values and semantic structure as well. They rest on *a semantic relation*: for example, causality, analogy, similarity, sign, necessary or sufficient condition, part-whole relation etc.

The first type of plausible inferences consists of cases in which there is a logical consequence relation between the premises and the conclusion but at least one of the premises is only plausible and not true with certainty.

Example 5. Let us illustrate this by an example taken from Bibok (this volume):

$0 < |$ If there is a verb with the semantic representation ‘X causes Y to move into/onto Z’, then it can be converted into a verb with the semantic representation ‘X causes Z to change state by means of moving Y into/onto it’. $|_B < 1$

$0 < |$ The verb *ken* (*X Y-t Z-re*) ‘smear (X, Y on Z)’ is a verb with the semantic representation ‘X causes Y to move onto Z’. $|_B < 1$

$0 < |$ The verb *ken* (*X Z-t Y-nal*) ‘smear (X, Z with Y)’ can be converted into a corresponding verb with the semantic representation ‘X causes Z to change state by means of moving Y onto it’. $|_I < 1$

The first premise is a conditional sentence. It captures a lexical rule proposed for the locative alternation of the verb *ken* ‘smear’ (cf. Pinker 1989: 79). This hypothesis results from an inductive generalisation about the syntactic behaviour and the semantic structure of a certain verb class. Although we cannot state that the first premise is true with certainty, it is legitimate to deem it plausible on the basis of the two sources mentioned. The second premise is plausible on the basis of theoretical considerations. That is, it can be hypothesised but one cannot claim with certainty that it is true. Due to the logical structure of the premises and the conclusion there is a logical consequence relation between the two premises of this inference.

It is clear that these premises are not sufficient to support the conclusion perfectly. If the premises were true with certainty, then the conclusion could also be considered as certainly true. If the plausibility value of one of the premises were 0, then the conclusion would be of neutral plausibility, too. It is also clear that if the plausibility of the premises increases (decreases), then the plausibility of the conclusion will also move in the same direction. From this it follows that if both premises are plausible statements, then one is allowed to suppose that the plausibility of the conclusion lies between the two cases mentioned – that is, it is a plausible statement, too.

The result of Example 5 can be easily generalised: If a logical consequence relation and some semantic relation hold between the premises and the conclusion, the premises make up a consistent set of statements, all premises have a positive plausibility value (that is, they are either plausible or true with certainty) on the basis of some set of sources *S*, while at least one of them is not true with certainty, then the conclusion is plausible on the basis of this inference as a source. This means that inferences belonging to the first type of plausible inferences can be regarded as *indirect sources* that partially support their conclusion.

It may happen that the statements playing the role of the premises are consistent, they are true with certainty according to a set of sources, and a semantic relation can be reconstructed that connects them with the conclusion – but there is no logical consequence relation between them and the conclusion. Such instances form *the second type of plausible inferences*. What matters in all these cases is that the connection between the premises and the conclusion cannot be reduced to the relationship between their logical structure, as with deductive inferences. If there is no logical consequence relation between the premises and the conclusion, then *latent background assumptions* are also needed (Rescher 1976: 60 ff., Polya 1948: 223). These background assumptions have to fulfil certain logical and semantic criteria

(see Kertész & Rákosi 2012), and they have to be true, plausible, or at least not known to be implausible or false according to some source.

Example 6. With inductive inferences, the set of the premises has to be supplemented by the background assumption that the cases not examined also possess the characteristics that could be found in the investigated ones; the conclusion states the presence of these characteristics as a general rule. Let us examine the following example from Rákosi (this volume):

|In Axininca Campa, it is the output-form [noŋkomati] that belongs to the input /no-N-koma-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋkomataati] that belongs to the input /no-N-koma-aa-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋkomatakoti] that belongs to the input /no-N-koma-ako-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋkomatakotaatiro] that belongs to the input /no-N-koma-ako-aa-i-ro/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋč^hiki] that belongs to the input /no-N-č^hik-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋč^hikaati] that belongs to the input /no-N-č^hik-aa-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋč^hikakoti] that belongs to the input /no-N-č^hik-ako-i/. $|_{K_1} = 1$

|In Axininca Campa, it is the output-form [noŋč^hikakotaatiro] that belongs to the input /no-N-č^hik-ako-aa-i-ro/. $|_{K_1} = 1$

[|For every other input form which contains a syllable without an onset in Axininca Campa, the corresponding output form has a consonant inserted into the onset position. $|_{K_1} = 0$]

$0 < |$ Syllables must have an onset Axininca Campa. $|_{I_1} < 1$

Since Kager never indicates that statements of this type could turn out to be false and be in need of revision, he seems to assign a very high or even maximal plausibility value to the premises; in this reconstruction, we will choose the latter interpretation. At this point of his argumentation, he does not mention further arguments which could support or refute the latent background assumption which covers all cases not mentioned in the premises. Therefore, it has neutral plausibility on the basis of K_1 , that is, the relevant passages of Kager (1999) as a direct source. At a later stage of his argumentation (abbreviated as source K_2), however, Kager presents data which indicate that the latent background assumption is implausible:

|In Axininca Campa, it is the output-form [osampi] that belongs to the input /osampi/ and not the form *[tosampi]. $|_{K_2} = 1$

|In Axininca Campa, it is the output-form [iŋkomati] that belongs to the input /i-N-koma-i/ and not the form *[tiŋkomati]. $|_{K_2} = 1$

[|For every other input form which contains a syllable without an onset in Axininca Campa in word-initial position, the corresponding output form has no onset word-initially. $|_{K_2} = 0$]

$0 < |$ Word-initial syllables do not have an onset in Axininca Campa. $|_{I_2} < 1$

Thus, if we take into consideration the information provided by this source too, and evaluate the plausibility value of the premises on the basis of the sources K_1 and K_2 together, then the first inference is no longer capable of supporting the plausibility of the conclusion. This is due to the circumstance that it relies on a latent background assumption which is implausible instead of being at least of neutral plausibility.

Example 7. In other cases the transformation of an inference of Type 2 into a deductively valid inference is not confined to the addition of further statements, but some premise-candidates have to be deleted or modified. This is the case with inferences which are called ‘reduction’. Let us see the following instance of this inference type:²

If Axininca Campa is characterised by the constraint hierarchy ONSET >> DEP-IO, then the output-candidate [noŋkomati] is more optimal than the output-candidate [noŋkomai]. _{K} = 1
The output-candidate [noŋkomati] is more optimal than the output-candidate [noŋkomai]. _{K} = 1
0 < Axininca Campa is characterised by the constraint hierarchy ONSET >> DEP-IO. _{I} < 1

There is no logical consequence relation between the premises and the conclusion. This inference can be transformed into the following inference which is deductively valid:

[[If to every input form belongs the output form on the surface which is optimal according to an evaluation based on the constraint ranking ONSET >> DEP-IO, then Axininca Campa is characterised by the constraint hierarchy ONSET >> DEP-IO. _{S} = 1]
[[The output form [noŋkomati] is optimal according to an evaluation based on the constraint ranking ONSET >> DEP-IO. _{S} = 0]
0 < It is the form [noŋkomati] that belongs to the input /no-N-koma-i/ at the surface representation. _{S} ≤ 1
[[In every other case too, to the input form belongs the output form on the surface which is optimal according to an evaluation based on the constraint ranking ONSET >> DEP-IO. _{S} = 0]
0 < Axininca Campa is characterised by the constraint hierarchy ONSET >> DEP-IO. _{I} < 1

The transformation of the premises maintains the semantic relations between the statements which occur in this inference. Thus, while the first premise of the original inference presents a *testable consequence* (necessary condition) of the application of the proposed constraint hierarchy (namely, the evaluation of two output-candidates on the basis of this ranking), the first latent background assumption of the transformed inference reverses this relationship and formulates a *sufficient condition* of the correctness of this constraint hierarchy. Since at this point of the argumentation we do not possess further information about the evaluation procedure (that is, about the evaluation of all possible output-candidates), the second and third latent background assumptions have to be judged to be of neutral plausibility. From this it follows that the conclusion can be assigned a low plausibility value on the basis of this inference as an indirect source. As is shown in Rákosi (this volume), the next step of Kager’s argumentation revises the plausibility value of the second latent background assumption, since it turns out to be implausible.

² See also inference (29) in Rákosi (this volume).

Our considerations in connection with Example 6 and 7 can be generalised as follows. If there is no consequence relation between the premises and the conclusion, then the semantic relation between the premises and the conclusion has to be extendable to further statements which make the resulting inference deductive. That is, the set of premises has to be transformed into another set of statements which contains, besides one or more premises, some *latent background assumptions* as well. If the premises of the inference resulting from the transformation are true, plausible, or at least of neutral plausibility, then an inference can be obtained from the statements and sources that assigns a plausibility value to the conclusion as an indirect source.

The combination of these two cases may also occur: with inferences belonging to *the third type of plausible inferences*, there is no logical consequence relation between the premises and the conclusion, and there is at least one premise which is not certainly true but only plausible.

Example 8. Most inferences capturing the (positive) result of hypothesis testing belong to this group, since usually not all premises can be regarded to be true with certainty but are only plausible according to some source. For example, in Baltin (1987) the following hypothesis is tested, among others (see Kertész & Rákosi 2013):

- (H) Sentential complements are generated in the deep structure between the degree word and the adjective in the case of *too*, *so* and after the degree word in the case of *enough* as sisters of the degree word. Then they get moved rightward and adjoined to S' in the surface structure (i.e., they are 'extraposed').

From (H) it follows that in sentences containing a relative clause extraposed from subject position and a degree word complement clause (sentential complement), the relative clause precedes the degree word complement clause – supposing that relative clauses are adjoined to S' . (H) was tested with the help of the following data:

- (D) The sentence *People were so angry who knew John that they refused to participate* is grammatically correct, while the sentence *People were so angry that they refused to participate who knew John* is ungrammatical.

(D) can be regarded to be plausible – but not certainly true – on the basis of Baltin (1987) as a source, since this source is basically nothing else but Baltin's linguistic intuition. From this we obtain the following plausible inference:

$0 < |$ If (H), and relative clauses are adjoined to S' , then the sentence *People were so angry who knew John that they refused to participate* is grammatically correct, while the sentence *People were so angry that they refused to participate who knew John* is ungrammatical. $|_B < 1$

$0 < |$ The sentence *People were so angry who knew John that they refused to participate* is grammatically correct, while the sentence *People were so angry that they refused to participate who knew John* is ungrammatical. $|_B < 1$

$0 < |(H), \text{ and relative clauses are adjoined to } S'.|_I < 1$

There is no logical consequence relation between the premises and the conclusion. Despite this, we may claim that the conclusion is plausible, because there is a semantic relation between them, and both premises are plausible on the basis of the same source. Relying on

this inference as an indirect source one may assign only a relatively low plausibility value to (H). This plausibility value can be increased, for example, if one checks (H) with the help of further “linguistic data” like (D).

The three cases also witness that plausible inferences are *fallible*. First, at the outset their conclusion is not true with certainty but only plausible to some extent; that is, the conclusion gets only partial support from the premises. Second, plausible inferences with latent background assumptions are especially liable to mislead because if one of the latent background assumptions turns out to be implausible or false, then the inference will be insufficient to establish the plausibility of the conclusion even if the premises are true or plausible. Moreover, taking into consideration a wider scope of sources, one may come into possession of information that makes the premises, the latent background assumptions or the conclusion implausible or false. Therefore, it is always the case that the conclusion is plausible only *relative to* the premises, the latent background assumptions and the sources supporting them.

2.4. *The p-context and the p-context-dependency of plausible inferences*

From the above characterisation of plausible inferences it is clear that the relation between the premises and the conclusion cannot be reduced to their *formal* properties. Beyond their logical structure, we have to take into consideration all information that may be relevant for judging the plausibility value of the premises and latent background assumptions as well as the semantic relation between them and the conclusion. This motivates the introduction of the notion of *p-context*, which will serve as the background against which plausible inferences can be put forward, used and evaluated. The p-context includes, first, a set of sources in terms of which the plausibility value of statements can be judged. Second, it covers a set of statements together with their relevant characteristics (in particular, their plausibility values with respect to the sources in the p-context, and their logical and semantic structure). Third, the accepted methodological norms related to the components of the p-context (for instance, the permissible type(s) of inference, the criteria of the acceptability of the statements, the methods of the treatment of inconsistencies, the criteria for judging the reliability of the sources etc.) also belong to the p-context.

Plausible inferences are in several respects *p-context-dependent*. First, the p-context facilitates plausible inferences only in cases in which the premises are plausible or true according to some sources in the context. In addition, plausible inferences have to be legitimate inference types in the given p-context. Second, if the context changes so that new sources become available which may influence the plausibility value of the premises (by making them more plausible or less plausible or even implausible), then the plausibility of the conclusion will change as well. Third, if there is no logical consequence relation between the premises and the conclusion, then the plausibility of the conclusion does not only depend on the plausibility of the premises, but is also influenced by every piece of information related to the latent background assumptions. From this it follows that any new information which strengthens or weakens the plausibility of the premises and that of the latent background assumptions influences the plausibility of the conclusion as well. This also means that plausible inferences are *dynamic*. They are indirect sources which are sensitive to changes in the p-context. Fourth, there are often many (direct or indirect) sources that allow a plausibility value to be assigned to a statement. In such cases, the plausibility of this statement is higher than its plausibility on the basis of the individual sources.

Example 9. To illustrate the p-context-dependency of plausible inferences, let us examine an example. Vecsey (this volume) presents and analyses arguments for and against Kaplan’s Fixity Thesis:

(FT) The denotation or propositional contribution of an indexical expression a is fixed solely by the relevant parameters of its actual context of occurrence c , and cannot be influenced by any sentential operators.

According to Kaplan’s (1989) argumentation, in English there is no context-shift. As Vecsey (this volume) emphasises, the same holds, for example, for Hungarian or German. Therefore, the following plausible inference (inductive generalisation) presents itself:

Inference 1:

$$\begin{array}{l}
 0 < |\text{In English, there is no context-shift.}|_{S_1} < 1 \\
 0 < |\text{In Hungarian, there is no context-shift.}|_{S_1} < 1 \\
 0 < |\text{In German, there is no context-shift.}|_{S_1} < 1 \\
 \hline
 [|\text{In all other languages, too, there is no context-shift.}|_{S_1} = 0] \\
 \hline
 0 < |\text{There are no context-shifting languages.}|_{I_1} < 1
 \end{array}$$

The latent background assumption has neutral plausibility on the basis of the sources within this p-context (S_1), since they do not contain more relevant information.

Thus, if we test (FT) on the languages mentioned, we obtain the following plausible inference:

Inference 2:

$$\begin{array}{l}
 |\text{If (FT) is crosslinguistically applicable, then there are no context-shifting languages.}|_{S_1} \\
 = 1 \\
 0 < |\text{There are no context-shifting languages.}|_{I_1} < 1 \\
 \hline
 0 < |(\text{FT) is crosslinguistically applicable.}|_{I_2} < 1
 \end{array}$$

On the basis of acceptability judgements gained from native speakers of Amharic and Zazaki presented in Schlenker (2003) and Anand & Nevins (2004), however, plausible inferences 3 and 4 can be put forward:

Inference 3:

$$\begin{array}{l}
 0 < |\text{In Amharic, there is context-shift.}|_{S_2} < 1 \\
 0 < |\text{In Zazaki, there is context-shift.}|_{S_2} < 1 \\
 \hline
 0 < |\text{There are context-shifting languages.}|_{I_3} < 1
 \end{array}$$

Inference 4:

$$\begin{array}{l}
 |\text{If (FT) is crosslinguistically applicable, then there are no context-shifting languages.}|_{S_1} \\
 = 1 \\
 0 < |\text{There are context-shifting languages.}|_{I_3} < 1 \\
 \hline
 \end{array}$$

$0 < |(FT) \text{ is not crosslinguistically applicable.}|_{I_4} < 1$

If one extends the p-context by further data which indicate the presence of context-shift in further languages, then the plausibility value of the second premise increases, and, as a consequence, that of the conclusion increases, too. In contrast, in this extended p-context the first inference is no longer capable of supporting its conclusion. The reason for this is the circumstance that its latent background assumption is not plausible on the basis of all available sources (S_1 and S_2). As a consequence, the second inference loses its capability to support its conclusion, because its second premise is not plausible on the basis of all available sources in this extended p-context.

According to Vecsey (present volume), however, the situation changes again, if we add the results of Stechow's (2003) considerations to the p-context. He claims that the argumentation presented by Schlenker (2003) and Anand & Nevins (2004) is faulty and they cannot be regarded as reliable sources. In this p-context, the source S_2 loses its reliability and is no longer capable of supporting the premises of Inference 3. Therefore, Inference 4 cannot be regarded as a reliable indirect source either, which could make its conclusion plausible.

2.5. Problems, their solution and their resolution

In a p-context the sources may yield too much information in the sense that there is a statement which is made plausible by some source while its negation is made plausible by another. In such cases, the p-context is informationally *overdetermined* (Rescher 1976: 2, Rescher & Brandom 1980: 3ff.) and the set of the plausible statements in the p-context is *p-inconsistent*. Nevertheless, the p-context may be informationally *underdetermined* as well (Rescher & Brandom 1980: 3ff.). A typical case of the informational underdetermination of the p-context is its *p-incompleteness*, insofar as there are statements which are neither plausible (in the extreme case: true with certainty) nor implausible (in the extreme case: false with certainty) with respect to any source given. A p-context may be simultaneously informationally under- and overdetermined.

Example 10. As Németh T. (this volume) shows, the p-context of Komlósy's (1994) lexical-functional approach becomes p-inconsistent by adding further data to it. Namely, in the p-context of Komlósy (1994) the following statement receives a high plausibility value, since it is supported by several arguments (plausible inferences):

(H) Hungarian verbs of natural phenomena cannot occur with an explicit subject and do not license a formal subject either.

Németh T., however, presents corpus data which support the opposite standpoint:

(~H) There are verbs of natural phenomena in Hungarian that can occur with explicit subjects.

Both (H) and (~H) are assigned a high plausibility value by their sources. Thus, the extended p-context is p-inconsistent.

Example 11. As Nagy C. (this volume) points out, Detges (2004) cannot be regarded as a useable source on the basis of which it would be possible to assign a plausibility value to the statement

The Old French form (*il*) *va dire* is a present form [meaning ‘all of a sudden, he says’].

or to its negation

The Old French form (*il*) *va dire* is not a present form [but it is in the preterit, meaning ‘suddenly, he said’].

The reason for this lies in the circumstance that Detges refers in both cases to the same source, namely to Gougenheim (1971 [1929]: 96f.). From this it follows that in the p-context of Detges (2004), the above statement is of neutral plausibility; thus, this p-context is informationally underdetermined, because it is p-incomplete.

We call instances of p-inconsistency and p-incompleteness *p-problems*. If a p-context is characterised by over- and/or underdetermination in this sense, then it is called *p-problematic*.³ In order to solve a p-problem, we have to re-evaluate the p-context by revising its elements (see Section 2.6 on this). A *solution of a problem* is achieved if a p-context has been arrived at in which either

- (a) the statement in question is unanimously supported or opposed by the sources, that is, it is either plausible or implausible on the basis of *all* sources in the given p-context,⁴ or
- (b) the statements generating p-inconsistency can be represented in such a way that they become separated systematically and this separation is well-motivated.⁵

It is possible, however, that *a p-problem has several solutions*. This necessitates the introduction of the notion of the *resolution of a p-problem*. We resolve a p-problem if we find a solution of the given p-problem which is, when compared with other solutions, the best according to a particular set of accepted criteria and according to the information available. It may be the case, however, that in an informational state one can only show that for the time being there is no resolution achievable.

Example 12. Nagy C. (this volume) presents the p-context consisting of investigations into the morphological aspects of the history of the Catalan “*anar* ‘go’ + infinitive” construction. This p-context is p-inconsistent, because the statement

- (H) The Catalan GO-past comes from the construction “GO-verb conjugated in present tense + infinitive”

³ These definitions can be generalised. Thus, cases of informational over-/underdetermination not necessarily related to plausibility are called *problems*.

⁴ Such cases will be called *consistent solutions*.

⁵ In such cases, we speak of a *paraconsistent solution* resulting from the superposition of two solutions which contain only one member of the rival hypotheses. Cf. Subsection 2.6.2 and Rescher & Brandom (1980).

as well as its negation are plausible according to some source. Nagy C. analyses three solutions proposed in the literature:

- (S₁) Colon (1979a,b) presents arguments which unanimously support (H). He states that the current meaning of “*anar* + infinitive” can be derived from the present auxiliary variant. The reason for the loss of preterit forms in the auxiliary was a historical present use which pushed the preterit forms of the auxiliary into the background. In this p-context version, it is the periphrasis with present auxiliary which undergoes the semantic change. The spread of the present auxiliary forms is interpreted as being the result of an extension of historical present usage.
- (S₂) Detges (2004) deems (H) plausible and (~H) implausible and agrees with Colon on the hypothesis that the current meaning of “*anar* + infinitive” can be derived from the present auxiliary variant. He claims that the tense of the auxiliary is optional, although the present-tense variant was used more frequently at all times. He also maintains that the present auxiliary periphrasis conventionalised as a foreground-marker due to its high frequency.
- (S₃) Juge (2006) rejects (H) and supports (~H). According to this p-context version, it is not the periphrasis with present auxiliary which undergoes the semantic change, but the periphrasis with preterit auxiliary. Further, the spread of the present auxiliary forms is the result of a reinterpretation, triggered by syncretism in one of the most frequent forms of the paradigm.

To sum up, while in the solutions provided by Colon and Detges a high plausibility value is assigned to (H), and (~H) is rejected, Juge proposes the opposite: giving up (H) and keeping (~H). Thus, all three proposals are consistent solutions of the starting p-problem along the lines of point (a) mentioned above (which says that the statement at issue is unanimously supported by the sources); that is, according to these authors, one of the rival hypotheses has to be given up and only the other one can be deemed to be plausible. With the help of the extension of the p-context by further sources and data, however, Nagy C. argues that the first two solutions are untenable (because the plausibility of their hypotheses is lost or at least decreases considerably and the p-inconsistency of these p-contexts increases). In addition, the solution proposed by Juge (2006) can be regarded as the resolution of this p-problem because it does not contain p-inconsistencies and its hypotheses have a high plausibility value on the basis of the sources presented by Nagy C.

Example 13. Nagy C. (this volume) mentions a solution of a p-problem that is based on the method described in point (b) above, that is, on the systematic separation of the conflicting statements. As she points out, in Colon’s account both the hypothesis that the GO-periphrasis has a past tense value in Old Catalan and its rival, according to which the periphrasis manifests a historical present use, are plausible. This, however, leads to p-inconsistency. Namely, from the first hypothesis it follows that the GO-verb does not refer to real motion but is grammaticalised to some degree. If the second hypothesis holds, then the GO-verb should refer to real motion. Nevertheless, we can maintain both hypotheses if we separate their field of application and suppose that they refer to different periods in the development of Old Catalan.

2.6. The problem solving process

2.6.1. Plausible argumentation

To achieve the solutions or the resolution of a given p-problem, a process is conducted which elaborates and compares as many solutions as possible. It is this heuristic process that we will call *plausible argumentation*. In simple terms, plausible argumentation is the gradual transformation of a p-problematic context into one which is no longer (or at least, less) p-problematic. This involves the successive re-evaluation of a p-problematic p-context by the elaboration of possible solutions to its problems and the evaluation and comparison of the alternative solutions. Its aim is to detect all available solutions and decide which of them is to be accepted as the resolution of the given p-problem.

The above characterisation of plausible argumentation indicates that the argumentation process is basically *not linear*, because the re-evaluation of a p-problematic p-context usually does not lead immediately to an unproblematic one but may raise new problems. This may require the revision of previous decisions, the assessment of other alternatives etc. Therefore, throughout the argumentation process one returns to the problems at issue again and again, and re-evaluates the earlier decisions about the acceptance or rejection of statements, the reliability of the sources, the plausibility values of the statements, the workability of methodological norms, the conclusions previously reached by inferences etc. In sum: one *retrospectively re-evaluates* the information at issue (cf. Rescher 1976, 1987). Retrospective re-evaluation is *cyclic* in nature. However, it is not only cyclic, it is also *prismatic*. This means that the cycles continuously change the *perspective* from which the pieces of information constituting the p-context are evaluated (cf. Rescher 1987).

Argumentation cycles involve the following phases:

- a. the *extension* of the p-context by new sources, new statements, new methods etc.;
- b. the *coordination* of the extended p-context (for example, comparing the plausibility values of the statements stemming from the old and the new sources, collecting and summarising information about the reliability of the sources, checking the consistency of the set of the plausible statements etc.);
- c. the *modification* of the extended and coordinated p-context. This means that one has to elaborate the p-context that can be regarded as a re-evaluated version of the starting p-context. For instance, one has to determine the plausibility value of the statements in the p-context on the basis of the totality of the sources in the p-context, one has to decide which sources have to be rejected as unreliable or accepted as new, which methodological norms have to be abandoned, modified or accepted, etc.; and
- d. the *comparison* of the rival solutions.

An *argumentation cycle* is a phase of the plausible argumentation process which develops a new solution to the p-problems included in the starting p-context and examines whether with this solution their resolution has been achieved. It may have *subcycles* which revise certain decisions made within the given argumentation cycle, and continue the argumentation process by turning back to an earlier stage of the argumentation cycle. It consists of three main stages.

First, one *sets up* a new p-context version. One presents hypotheses, sources, and methodological norms which one accepts and which are regarded as the starting points of the next stage (cycle) of the argumentation process. The new p-context version may try, for example, to examine whether a solution can be achieved if one keeps only one member of the p-inconsistent hypotheses and gives up the other one, or it may attempt to retain both rival hypotheses and find out how they can be separated from each other in a well-motivated way.

Second, the new p-context version is *elaborated*. This involves the extension of the p-context by new pieces of information. To this end, one makes use of the new direct and indirect

sources (plausible inferences), methods, criteria, etc. in the p-context. Then, the extended p-context is *coordinated*: the old and new information related to the plausibility values of statements, the reliability of the sources, the applicability of methods, or the fulfilment of the criteria are summarised. As a next step, the coordinated p-context is *modified*. This means that one makes decisions on the basis of the coordination of the old and new pieces of information in order to elaborate a revised, re-evaluated version of the starting p-context which is a solution of the starting p-problem.

Third, one *compares* the elaborated p-context version to its rivals obtained in the earlier cycles. The question is whether it is a solution of the starting p-problem(s). If not, then the argumentation process turns back and a new subcycle is started in order to elaborate on the given p-context. If a solution has already been arrived at, then it has to be examined to see whether it is a better solution according to the accepted criteria than the ones elaborated earlier, and whether further rival solutions are conceivable. The argumentation process can only terminate if one is in possession of the best solution available within the practical limits given – that is, the resolution of the starting p-problem; otherwise, a new argumentation cycle has to be initiated.

Figure 1 illustrates the main stages of the argumentation process.

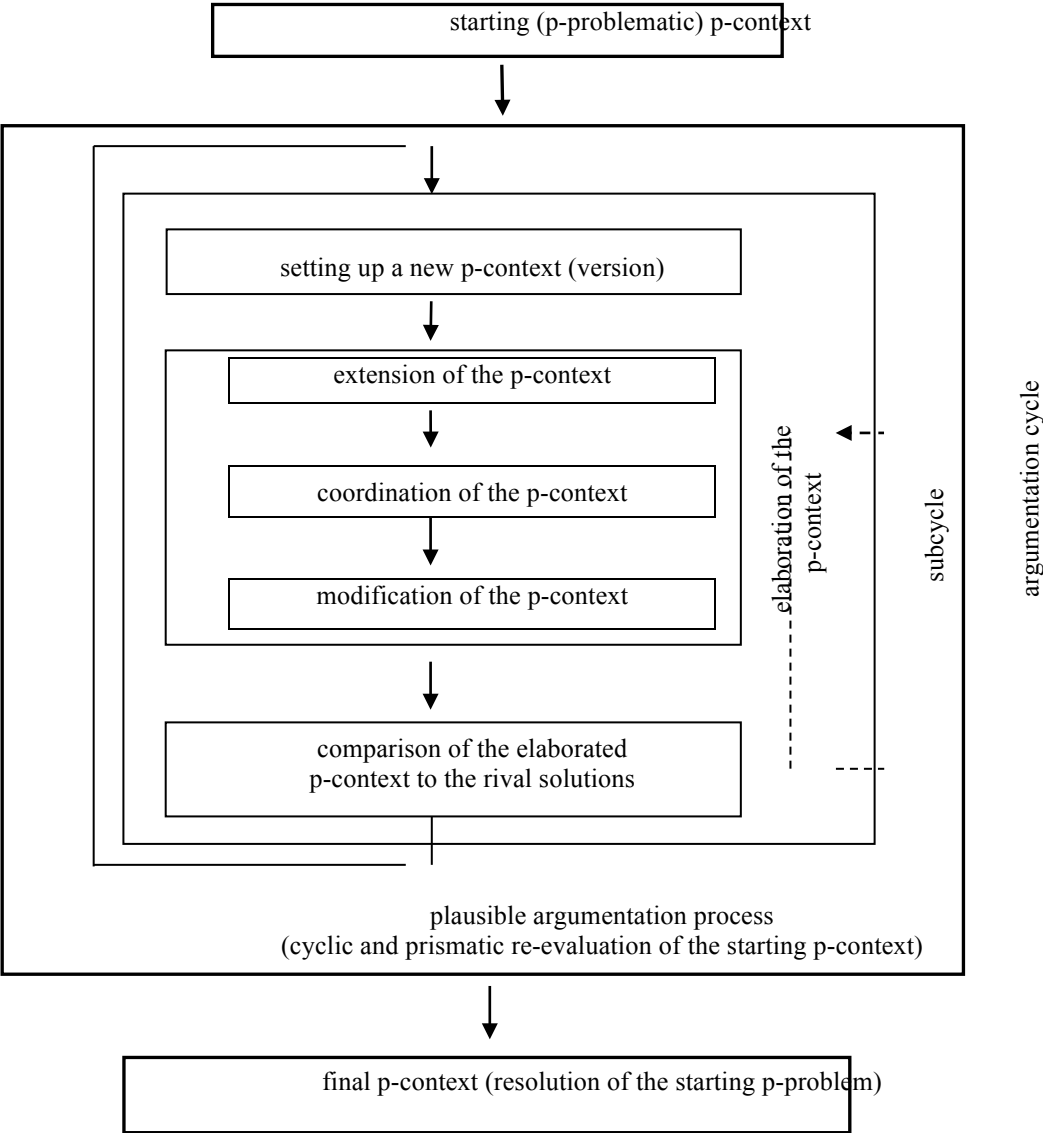


Figure 1: The process of plausible argumentation

Example 14. Kertész & Rákosi (this volume) and Rákosi (this volume) reconstruct the argumentation cycles of the given author. Bibok (this volume), Németh T. (this volume), Nagy C. (this volume), Koczogh (this volume), Rákosi (this volume) and Vecsey (this volume) present and analyse rival solutions to a given p-problem. Since in the first cycle it can only be shown that they are all problematic and do not provide the resolution of the p-problem investigated, the authors start a new argumentation cycle in order to find a resolution with the help of the extension of the p-context with new sources.

2.6.2. *Problem-solving strategies*

As already mentioned in the preceding section, the decision as to whether the argumentation process may terminate and the resolution of the starting p-problem is achieved is not absolute and not incontrovertible. The reason for this is, first, that because of *practical limits*, the cyclic re-evaluation cannot be complete, cannot take into consideration every piece of information and cannot examine every possibility but has to remain partial. The second reason is that in most cases, attempts at the solution of the initial problems lead to the emergence of new problems which should be solved – and so on ad infinitum. Third, the rival solutions obtained as results of the argumentation cycles conducted are partial, too, since they have been elaborated with the help of diverse heuristics. Moreover, the comparison of the rival solutions cannot be reduced to the mechanical comparison of the plausibility of their hypotheses but has to rely on a series of criteria. One must examine which solution is, *as a whole*, the least p-problematic p-context, which solution contains the highest number of hypotheses with a high plausibility value, which solution is the most comprehensive etc. However, this is usually a difficult and complex task because there may be conflicts among the evaluations obtained: one solution can be optimal in respect to one criterion but not as satisfactory with others.

Therefore, it is of vital importance to find *problem-solving strategies* which may lead to effective and reliable decisions. Such heuristics make it possible to elaborate and compare a fair amount of p-context versions and arrive at a well-founded resolution of the starting p-problem even though the fulfilment of these tasks can be only partial.

An important subgroup of heuristics consists of *strategies of the treatment of p-inconsistency*. Basically, one can follow three strategies:

- a. *The Contrastive Strategy.* The essence of this strategy is that it treats the p-context versions containing the contradictory statements as *rival alternatives*, compares them and strives for a decision between them.
- b. *The Exclusive Strategy.* This strategy is the continuation of the Contrastive Strategy in cases in which a decision has been reached between the rival p-context versions elaborated. It fulfils a kind of control function insofar as it examines whether the p-context version chosen can provide an explanation for all phenomena that could be explained by the rejected p-context version. This is important because the explanatory power of the resolution should be as high as possible; therefore, information loss resulting from the rejection of p-context versions should be avoided or at least minimised.
- c. *The Combinative Strategy.* It may be the case that one wants to keep both rival p-context versions because they illuminate some phenomenon from different points of view which are equally important and cannot be given up. Therefore, the two p-context versions are no longer deemed to be rivals but are rather co-existing alternatives which have to be maintained *simultaneously*. The task is to elaborate both p-context versions, make them as comprehensive and as free from p-problems as possible. Nevertheless, the separation of the two p-context versions has to be *systematic* and *well-motivated*.

Example 15. Nagy C. (this volume) first applies the Contrastive Strategy and strives for a comparison of the plausibility of the hypotheses and latent background assumptions and via this, of the tenability of the rival solutions investigated. As a result, she comes to the decision that one of the three solutions is considerably better than the other two. At this point, she changes to the Exclusive Strategy and examines whether the solution of Juge (2006) can solve all problems which have arisen within the two rejected solutions.

Example 16. Bibok (this volume) adopts first the Contrastive Strategy, too. But after the comparison of the rival solutions to problems related to the Hungarian locative alternation verbs presented by the lexical and the constructional approaches, he changes to the Combinative Strategy. The reason for this decision lies in the need to keep both perspectives, because lexical and constructional factors seem to play a role in syntactic alternations. Therefore, neither of the two proposals can be given up because relevant phenomena would remain without an explanation. Thus, by the exact specification of the role of the lexical and the constructional factors in the model, Bibok proposes a lexical-constructional explanation that is capable of unifying the explanatory power of the two approaches without leading to proliferation of p-inconsistencies in his approach.

The p-model allows us to describe the different strategies for the treatment of contradictions, considering the latter to be an integral part of linguistic theorising, that is, of a cyclic and prismatic argumentation process. These strategies make it possible to deem inconsistency *not a fatal failure*. They do not compel us to treat all contradictions in a unique way but license several possible methods for their handling:

- With the help of cyclic argumentation based on plausible inferences, one may try to resolve contradictions by giving up one of their members in that the Contrastive and the Exclusive Strategy are made use of.
- One may tolerate a contradiction with the help of their paraconsistent representation based on the application of the Combinative Strategy. In this case, they may be regarded not as temporary phenomena but as constitutive elements of the given theory.
- In the absence of an acceptable solution, when both kinds of strategies seem to fail, the inconsistency may be temporarily tolerated until one is in possession of new information on the basis of which new argumentation cycles can be initiated.

Consequently, the process of the emergence (and the resolution) of inconsistencies is a *constitutive* characteristic of linguistic theorising. One of the most substantial results of the p-model is that it systematically accounts for this characteristic.

2.7. *The solution to (P)(a)*

On the basis of the above considerations we may summarise our hypothetical solution to (P)(a) as follows:

(SP) (a) The p-model provides a novel and comprehensive model of linguistic theorising.

Naturally, the next step is to show how the p-model defines the notions of linguistic data and evidence.

3. A possible solution to (P)(b): The p-model's concepts of 'data' and 'evidence'

3.1. Data

The p-model suggests that data are not identical to “examples” such as the following Hungarian sentences:

Az anya vizet önt a virágra.
**Az anya vízzel önti a virágot.*

Rather, their structure consists of two components: a statement with an information content and a plausibility value supported by a direct source (see also Rescher 1979: 69):

(D1) A datum is a statement with a positive plausibility value originating from some direct source.

The above “examples” can be transformed into data as follows:

$0 < |$ The sentence *Az anya vizet önt a virágra* is grammatical in Hungarian while the sentence **Az anya vízzel önti a virágot* is not. $|_S < 1$

where S is the linguistic intuition of the linguist as a direct source. A second possibility is the transformation to a datum with a more complex structure whose plausibility value originates from a compound of the linguist's linguistic intuition and linguistic knowledge:

$0 < |$ The sentence *Az anya vizet önt a virágra* is grammatical in Hungarian while the sentence **Az anya vízzel önti a virágot* is not, and the meanings and grammatical properties of the words and parts of words in these two sentences can be characterised as follows:

Az anya-Ø viz-et önt-Ø a virág-ra.
the mother-NOM water-ACC pour-PRS.INDF.3SG the flower-SUB
'The mother is pouring water onto the flower.'

**Az anya-Ø víz-zel önt-i a virág-ot.*
the mother-NOM water-INS pour-PRS.DEF.3SG the flower-ACC
'The mother is pouring the flower with water.' $|_S < 1$

Accordingly, data are in most cases not claimed to be true with certainty, but they are usually more or less plausible “truth candidates”. Their plausibility is usually supported by the sources to some extent but the sources are not able to make them certainly true (see also Rescher 1976: 8, 1977: 213, 1987: 307). Nevertheless, a datum must possess a certain degree of initial plausibility, that is, it has to receive a plausibility value from some reliable source. Statements which are of neutral plausibility or implausible according to any sources in the p-context, are not data in this sense.

Example 17. Grammaticality/acceptability judgements are data since they are plausible statements. Their source is the linguistic intuition of some native speaker(s) and their

information content consists of the evaluation of the correctness (grammaticality or acceptability) of sentences. Accordingly, the statement

The sentence *Hajnalodván, elindultunk hazafelé* is correct in Hungarian, while the sentence *Hajnalodva, elindultunk hazafelé* is not.⁶

is a datum in Németh T. (this volume: Section 2.4) because it receives its initial plausibility value on the basis of the linguistic intuition of the author of Tóth (2001). This plausibility value is not maximal, because linguistic intuition cannot be regarded as a totally reliable source. As Németh T. (this volume) remarks, the evaluation of the correctness of these sentences is not unanimous, because another native speaker, for example, Sárík (1998) judges the acceptability of *-ván*-participle forms differently. That is, on the basis of this source, the following statement counts as a datum:

Neither the sentence *Hajnalodván, elindultunk hazafelé*, nor the sentence *Hajnalodva, elindultunk hazafelé* is grammatically correct in Hungarian.

From this it follows that the p-context is p-inconsistent because it contains two incompatible data. Despite this, the initial plausibility value of the first datum can be increased by collecting judgements from other native speakers, too.

The statement

The *va*-participle **hajnalodva* formed from the weather verb *hajnalodik* ‘to dawn’ is ill-formed, but the *ván*-participle form of it *hajnalodván* is well-formed in Hungarian.

looks similar to the above datum but it is not a datum according to the terminology of the p-model in the argumentation conducted by Németh T. (this volume). The reason for this is that its plausibility value does not originate from a direct source (a linguistic paper or the linguistic intuition of native speakers) but from an indirect one (that is, from a plausible inference):

$0 < |$ The sentence *Hajnalodván, elindultunk hazafelé* is correct, while the sentence *Hajnalodva, elindultunk hazafelé* is not. $|_S < 1$

$0 < |$ If the sentence *Hajnalodván, elindultunk hazafelé* is correct, then the *ván*-participle form of the verb *hajnalodik* ‘dawn’ is well-formed. $|_S < 1$

$0 < |$ If the sentence *Hajnalodva, elindultunk hazafelé* is not correct, then the *va*-participle **hajnalodva* formed from the weather verb *hajnalodik* ‘dawn’ is ill-formed. $|_S < 1$

$0 < |$ The *va*-participle **hajnalodva* formed from the weather verb *hajnalodik* ‘to dawn’ is ill-formed, but the *ván*-participle form of it, *hajnalodván* is well-formed. $|_I < 1$

If, however, this statement obtained its plausibility value from a linguistic paper simply referred to by Németh T., then it would count as a datum.

⁶ For a better understanding, we repeat the author’s glosses here. It is important to remark, however, that they do not belong to the datum at issue (although it is possible to construct a datum that involves this information, too):

<i>Hajnal-od-ván/*va,</i>	<i>pro</i>	<i>el-indul-t-unk</i>	<i>haza-felé.</i>
dawn-SFX-VÁN/-VA		PVB-start-SFX-PST-INDF.1PL	home-towards
‘Dawn coming, we started for home.’			

Example 18. Corpora are often used and reliable – but not completely reliable – sources, too, which make it possible to assign a plausibility value to statements such as

The phrase *esteledik a nap* is grammatical in Hungarian.

The phrase *sötétedik a látóhatár* is grammatical in Hungarian.

The phrase *hajnalodik az idő* is grammatical in Hungarian.

The phrase *zuhog az eső* is grammatical in Hungarian.⁷

It may be the case that there are native speakers who judge these phrases to be ungrammatical. Therefore, the presence of the phrases at issue in the Hungarian National Corpus cannot guarantee that all speakers of Hungarian, or at least the majority of them, accept them.

Example 19. Data used in linguistic theories often have a complex structure in the sense that the source on the basis of which their plausibility can be judged has to be interpreted as a compound of several sub-sources. For example, the plausibility value of the following statements is not just based on the linguist’s linguistic intuition, native speakers’ judgements or corpus presence, but also on linguistic analyses with the help of a semantic/syntactic/pragmatic theory:

- a. In the sentence *Mas con foren prop d’Agda, noves los van venir con havia pres, lo dia passat, a aquells* from Muntaner’s *Crònica*, *van venir* ‘arrived’ is a grammaticalised form, conveying a past tense meaning.
- b. In Axininca Campa, to the input /no-N-č^hik-i/ belongs the output-form [noŋč^hiki].
- c. *Villámlik az ég* ‘the sky is lightning’ and *sötétedik az ég* ‘the sky is getting dark’ are well-formed expressions in which *villámlik* as well as *sötétedik* are weather verbs and *ég* is an explicit subject.
- d. In the Amharic sentence *jon jəgna nə-ññ y yɪ-all*, the attitude operator modifies the content of the character of the pronoun.

The structure of the datum in (a), for example, is “The unit *S* can be identified in corpus *C* and it had the characteristics *X*.” From this it is clear that the source of its plausibility value is not the corpus (Muntaner’s *Crònica*) alone. Rather, it is a compound of the historical document itself, the linguist’s linguistic intuition and his/her skills in the application of linguistic analysis. The reliability of each of these (sub-)sources influences the plausibility of the datum. Therefore, it is not only factors which are decisive for the originality of the historical document that are relevant; difficulties or uncertainties in the identification and interpretation of the given linguistic phenomenon must be taken into account as well.

From what we have said about plausible statements in Section 2.2, the following characterisation of data can be highlighted:

- Data are “given” in a specific sense: their initial plausibility is not determined with the help of plausible inferences conducted within the given argumentation process, but directly on the basis of the reliability of their source. Thus, they function as starting points: plausibility values enter the argumentation process through them – and, of course, they can spread towards other hypotheses of the theory by plausible inferences.

⁷ For the analysis of these data, see Németh T. (this volume).

- Since data are defined as statements possessing a positive plausibility value, and the plausibility value of statements depends on the p-context (see Section 2.4), data are p-context-dependent, which means that they are theory-dependent as well.

3.2. Evidence

The p-model defines three types of evidence in order to *grasp the relationship between data and other hypotheses of the theory*.

Weak evidence for a hypothesis h simply means that we can build inference(s) on the given datum that make(s) h plausible (in the extreme case true with certainty). *Weak evidence against a hypothesis h* means a datum on which we can build inference(s) that make(s) h implausible (in the extreme case false with certainty):

- (D2) (a) A datum e is **weak evidence for hypothesis h** , if the p-context contains statements that extend e into an indirect source on the basis of which a positive plausibility value can be assigned to h .
- (b) A datum e is **weak evidence against hypothesis h** , if the p-context contains statements that extend e into an indirect source on the basis of which a positive plausibility value can be assigned to $\sim h$.

From this definition it follows that a datum can be weak evidence for a statement and its rival simultaneously, although it may support them to different extents.

Example 21. As Bibok (this volume) shows, the lexical rule approach proposes the following hypothesis for the description of the locative alternation of verbs:

- (H) If there is a verb with the semantic representation ‘ X causes Y to move into/onto Z ’, then it can be converted into a verb with the semantic representation ‘ X causes Z to change state by means of moving Y into/onto it’.

(D₁) is weak evidence for (H):

- (D₁) The sentence *Az anya zsírral keni a kenyeret* is grammatical in Hungarian.

First, (D₁) is a plausible statement and its plausibility value originates from a direct source (Bibok’s linguistic intuition). Second, we can construct a chain of plausible inferences that make (H) plausible and one of them uses (D₁) as a premise:

$$\begin{array}{l} 0 < |\text{If (D}_1\text{), then there is a verb } ken \text{ with the semantic representation ‘} X \text{ causes } Z \text{ to} \\ \text{change state by means of moving } Y \text{ into/onto it’}|_B < 1 \\ 0 < |(\text{D}_1)|_B < 1 \\ \hline 0 < |\text{There is a verb } ken \text{ with the semantic representation ‘} X \text{ causes } Z \text{ to change state by} \\ \text{means of moving } Y \text{ into/onto it’}|_{I_j} < 1 \end{array}$$

|If (H), and there is a verb *ken* with the semantic representation ‘ X causes Y to move into/onto Z ’, then there is also a verb *ken* with the semantic representation ‘ X causes Z to change state by means of moving Y into/onto it’ $._B = 1$

$0 < |\text{There is a verb } ken \text{ with the semantic representation 'X causes Z to change state by means of moving Y into/onto it'}|.I_1 < 1$

$0 < |\text{There is a verb } ken \text{ with the semantic representation 'X causes Y to move into/onto Z'}|.B < 1$

$0 < |(H)|.I_2 < 1$

while (D₂) is weak evidence against (H):

(D₂) The sentence *Az anya vízzel önti a virágot* is ungrammatical in Hungarian.

because the following chain of plausible inferences presents itself:

$0 < |\text{If (D}_2\text{), then there is no verb } \ddot{o}nt \text{ with the semantic representation 'X causes Z to change state by means of moving Y into/onto it'}|.B < 1$

$0 < |(D_2)|.B < 1$

$0 < |\text{There is no verb } \ddot{o}nt \text{ with the semantic representation 'X causes Z to change state by means of moving Y into/onto it'}|.I_3 < 1$

|\text{If (H), and there is a verb } \ddot{o}nt \text{ with the semantic representation 'X causes Y to move into/onto Z', then there is also a verb } \ddot{o}nt \text{ with the semantic representation 'X causes Z to change state by means of moving Y into/onto it'}|.B = 1

$0 < |\text{There is a verb } \ddot{o}nt \text{ with the semantic representation 'X causes Y to move into/onto Z'}|.B < 1$

$0 < |\text{There is no verb } \ddot{o}nt \text{ with the semantic representation 'X causes Z to change state by means of moving Y into/onto it'}|.I_3 < 1$

$0 < |(\sim H)|.I_4 < 1$

Relative evidence for a hypothesis *h* also requires that the datum provides stronger support to *h* than to its rivals:

- (D3) (a) A datum *e* is **relative evidence for hypothesis *h***, if
- (i) *e* is weak evidence for hypothesis *h*;
 - (ii) the inference(s) connecting the premises and *h* provide(s) *h* with a higher plausibility value than the plausibility values of *h*'s rivals assigned to them by the inferences also using *e* as a premise.
- (b) A datum *e* is **relative evidence against hypothesis *h***, if
- (i) *e* is weak evidence against hypothesis *h*;
 - (ii) the plausible inference(s) connecting the premises and $\sim h$ provide(s) $\sim h$ with a higher plausibility value than the plausibility value of *h* assigned to it by the inferences also using *e* as a premise.

Example 22. The datum

(D) The sentence *Az apa kávéval lötyyenti az asztalterítőt* is ungrammatical in Hungarian.

is relative evidence for the hypothesis of the lexical-constructional approach according to which

- (H) The locative alternation is relevant for only those verbs whose meaning representations are underspecified (in a relevant way).

The reason for this is that (D) can be treated with the help of (H)'s rivals – as Bibok (this volume) shows – only as an exception. From this it follows that in this case, the plausibility of the rival hypotheses can only be relatively low, because they can receive only very weak support from inferences making use of (D). In contrast, the plausibility of (H) can be high on the basis of plausible inferences involving (D) as a premise.

The third type is *strong evidence* which means that the datum makes only hypothesis *h* plausible and does not provide any support to its rivals:

- (D4) (a) A datum *e* is **strong evidence for hypothesis *h***, if
 (i) *e* is weak evidence for hypothesis *h*;
 (ii) *e* is not weak evidence for any of *h*'s rivals.
 (b) A datum *e* is **strong evidence against hypothesis *h***, if
 (i) *e* is weak evidence against hypothesis *h*;
 (ii) *e* is not weak evidence against any of *h*'s rivals.

Example 23. The datum referred to in Németh T. (this volume)

- (D) *Sötétedik az ég* 'the sky is getting dark' is a well-formed expression.

is strong evidence *against* the hypothesis that

- (H₁) Verbs of natural phenomena in Hungarian cannot occur with explicit subjects, and they do not allow even expletive, formal subjects.

The following plausible inference making use of (D) as a premise indicates that (H₁) has to be regarded as implausible:

$$\begin{array}{l} \text{If (H}_1\text{), and the verb } \textit{sötétedik} \text{ is a verb of natural phenomena and } \textit{ég} \text{ is an explicit} \\ \text{subject, then } (\sim\text{D})|_N = 1 \\ \text{The verb } \textit{sötétedik} \text{ is a verb of natural phenomena and } \textit{ég} \text{ is an explicit subject.}|_N = 1 \\ 0 < |(\text{D})|_N < 1 \\ \hline 0 < |(\sim\text{H}_1)|_{I_1} < 1 \end{array}$$

(D) provides also weak evidence *for* all of (H₁)'s rivals mentioned in Németh. T. (this volume), that is, for (H₂) and (H₃):

- (H₂) The verb *sötétedik* belongs to the group of verbs of natural phenomena that have a subject argument position which can be filled optionally.

$$\begin{array}{l} \text{If (H}_2\text{), then (D)}|_N = 1 \\ 0 < |D|_N < 1 \\ \hline 0 < |H_2|_{I_2} < 1 \end{array}$$

- (H₃) Verbs of natural phenomena take a quasi-argumental subject.

$$\begin{array}{l}
| \text{If } (H_3) \text{ and the verb } \textit{sötétedik} \text{ is a verb of natural phenomena, then } (D). |_N = 1 \\
| \text{The verb } \textit{sötétedik} \text{ is a verb of natural phenomena.} |_N = 1 \\
0 < |(D)|_N < 1 \\
\hline
0 < |(H_3)|_{I_3} < 1
\end{array}$$

In contrast, the datum

(D') *Villámlik az ég* 'the sky is getting dark' is a well-formed expression.

does not provide strong evidence against (H₁), because it is also weak evidence against one of its rivals, namely (H₂'), which is regarded as plausible by Keszler (2000):

(H₂') The verb *villámlik* belongs to the group of verbs of natural phenomena which do not have a subject argument position, while there are verbs of natural phenomena which have a subject position that can be filled optionally.

It is easy to see that the concepts of weak, relative and strong evidence do not meet the requirements laid down by the standard view. First, evidence is interpreted by the p-model not as a special subset of data but as a datum with a special function *relative to some hypothesis of the theory*. From this it follows that evidence is not objective, immediately given, theory-independent and completely reliable but source- and theory-dependent and reliable only to a certain extent. Second, data which meet the criteria laid down in (D2)-(D4) in most cases do not perfectly support or refute the given hypothesis. The connection between the datum and the hypothesis is established by plausible inferences relying on plausible premises. Third, the function of evidence is not restricted by the p-model to the testing of hypotheses, that is, to the justification of theories, but data and evidence play a role in every stage of the process of linguistic theorising.

4. Conclusions

The solution to (P)(b) which we have obtained with the help of the p-model provides *a radically new interpretation of linguistic theorising in general and of linguistic data/evidence in particular*. Its essence can be summarised as follows:

- (SP)(b) Linguistic theorising is a cyclic and prismatic plausible argumentation process. The structure and the functions of linguistic data and evidence emerge from, and are bound to, this argumentation process:
- (i) The *structure of linguistic data/evidence* consists of a statement (information content) and a plausibility value (relative strength of acceptability) stemming from a direct source (linguistic intuition, corpus, conjecture, experiment etc.). A datum is *evidence* for a hypothesis if it is a premise of a plausible inference which makes this hypothesis plausible.
 - (ii) The *primary function of data* is to supply the theory with plausibility values. That is, data receive their initial plausibility value directly from reliable sources. All other hypotheses obtain their plausibility value indirectly (with the help of plausible inferences) from the data. The *function of evidence* is

that it contributes to the evaluation and the comparison of the plausibility of rival hypotheses; thus, it is conducive to the resolution of p-problems.

As we have seen, the peculiarities of the argumentation process can account for, among others, the uncertainty, the variety and the combinability of linguistic data/evidence as well as for the emergence and (provisional) existence of inconsistencies triggered by data – that is, for those characteristics of data that could not be explained with the help of other metatheoretical frameworks.

On the way to (SP)(b), our most important insights were as follows:

- a. Data, evidence and the hypotheses supported by the latter are substantially rooted in uncertainty.
- b. Instead of linear progress, linguistic theory formation is built on the cyclic, prismatic and retrospective re-evaluation of previously assumed data and hypotheses.
- c. There are several kinds of inconsistency, and not every kind is disastrous. Among certain circumstances inconsistency may be tolerated, while the process of plausible argumentation also governs the resolution of inconsistencies as well as their temporary or long-term tolerance.
- d. The pluralism of linguistic theories is fruitful because it allows linguists to examine linguistic phenomena from different perspectives and must not give way to the absolutistic defence of particular theories.
- e. There are no final solutions to linguistic problems; any solution can be prismatically and cyclically re-evaluated during later argumentation cycles.⁸
- f. The argumentation structure of linguistic theories largely determines the efficiency of linguistic research.
- g. There is a complex relationship between the argumentation structure of linguistic theories and linguistic data/evidence.
- h. Data are not objective facts but plausible statements whose plausibility may increase or decrease (or even disappear) dynamically during the argumentation process.
- i. The source of linguistic data is not the objective observation of manifestations of linguistic behaviour. Data usually obtain their plausibility value from a complex source which is a combination of the linguist's linguistic intuition, his/her analytic skills, and some other source such as corpora, psycholinguistic experiments, judgements of native speakers, etc.

(SP)(b) does not provide final, all-embracing and infallible answers to questions concerning the nature of linguistic data and evidence. Rather, it should be regarded as a *starting point* which might open a new stage in the debate on linguistic data and evidence by putting forward a novel and systematic metatheoretical model of linguistic theorising.

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⁸ A problem may, of course, have a clear-cut final solution under well-defined conditions, within a given theoretical framework. Despite this, we should not forget that theoretical frameworks may be revised, too and give way to new, better (elaborated) ones.

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References

- Anand, Pranav & Nevins, Andrew. 2004. Shifty operators in changing contexts. In *Proceedings of the 14th Conference on Semantics and Linguistic Theory*, Kazuha Watanabe & Robert B. Young (eds), 20-37. Ithaca: CLC Publications.
- Baltin, Mark R. 1987. Degree Complements. In *Discontinuous Constituency* [Syntax and semantics 20]. Geoffrey J. Huck & Almerindo E. Ojeda, (eds), 11-26. Orlando: Academic Press.
- Bibok, Károly. This volume. The plausibility of approaches to syntactic alternation of Hungarian verbs.
- Colon, Germà. 1978a [1959]. El perfet perifràstic català “va + infinitiu”. [The Catalan periphrastic perfect “va + infinitive”]. In *La llengua catalana en els seus textos* [The Catalan language of texts], Germà Colon (ed), 2nd volume. II. 119-130. Barcelona: Curial.
- Colon, Germà. 1978b [1976]. Sobre el perfet perifràstic ‘vado + infinitiu’, en català, en provençal i en francès [On the periphrastic perfect ‘vado + infinitive’ in Catalan, Provençal and, French]. In *La llengua catalana en els seus textos*. [The Catalan language of texts], Germà Colon (ed), 2nd volume, 131-174. Barcelona: Curial.
- Detges, Ulrich. 2004. How cognitive is grammaticalization? The history of the Catalan *perfet perifràstic*. In *Up and down the cline – The nature of grammaticalization*, Olga Fischer, Muriel Norde & Harry Perridon (eds), 211-227. Amsterdam: John Benjamins.
- Gougenheim, Georges. 1971 [1929]. *Étude sur les périphrases verbales de la langue française* [A study on the verbal periphrases of French]. Paris: Nizet.
- Juge, Matthew L. 2006. Morphological factors in the grammaticalization of the Catalan “go” past. *Diachronica* 23(2): 313-339.
- Kager, René. 1999. *Optimality Theory*. Cambridge: Cambridge University Press.
- Kaplan, David. 1989. Demonstratives. In *Themes from Kaplan*. Joseph Almog, John Perry & Howard Wettstein (eds), 481-563. Oxford: Oxford University Press.
- Kepser, Stephan & Reis, Marga. 2005. Evidence in linguistics. In Kepser & Reis (eds), 1-6.
- Kepser, Stephan & Reis, Marga (eds). 2005. *Linguistic evidence. Empirical, theoretical and computational perspectives*. Berlin & New York: de Gruyter.
- Kertész, András. 1993. *Heuristik der deutschen Phonologie. Eine elementare Einführung in Strategien der Problemlösung*. Budapest: Akadémiai Kiadó.
- Kertész, András. 2004a. *Philosophie der Linguistik. Studien zur naturalisierten Wissenschaftstheorie*. Tübingen: Narr.
- Kertész, András. 2004b. *Cognitive semantics and scientific knowledge. Case studies in the cognitive science of science*. Amsterdam & Philadelphia: John Benjamins.
- Kertész, András & Rákosi, Csilla. 2006. Inconsistency and plausible reasoning in an analysis of German affricates. A case study in the philosophy of linguistics. *Language Sciences* 28: 386-423.
- Kertész, András & Rákosi, Csilla. 2009. Cyclic vs. Circular Argumentation in the Conceptual Metaphor Theory. *Cognitive Linguistics* 20(4): 703-732.
- Kertész, András & Rákosi, Csilla. 2012. *Data and evidence in linguistics. A plausible argumentation model*. Cambridge: Cambridge University Press.

- Kertész, András & Rákosi, Csilla. 2013. Paraconsistency and Plausible Argumentation in Generative Grammar: A Case Study. *Journal of Logic, Language and Information* 22(2): 195-230.
- Kertész, András & Rákosi, Csilla. This volume. Thought experiments and real experiments as converging data sources in pragmatics.
- Keszler, Borbála (ed). 2000. *Magyar grammatika* [Hungarian grammar]. Budapest: Nemzeti Tankönyvkiadó.
- Komlósy, András. 1994. Complements and adjuncts. In *Syntax and Semantics 27*, Ferenc Kiefer & Katalin É. Kiss (eds), 91-178. New York: Academic Press.
- Nagy C., Katalin. This volume. Methods and argumentation in historical linguistics: A case study.
- Németh T., Enikő. This volume. Hungarian verbs of natural phenomena with explicit and implicit subject arguments: their use and occurrence in the light of data.
- Pinker, Steven. 1989. *Learnability and Cognition: The Acquisition of Argument Structure*. Cambridge, MA: MIT Press.
- Polya, George. 1948. *How to solve it*. Princeton: Princeton UP.
- Polya, George. 1954. *Patterns of plausible inference*. London: Oxford UP.
- Rákosi, Csilla. This volume. Data and the resolution of inconsistency in Optimality Theory.
- Rescher, Nicholas. 1973. *The coherence theory of truth*. Oxford: Clarendon Press.
- Rescher, Nicholas. 1976. *Plausible reasoning*. Assen & Amsterdam: Van Gorcum.
- Rescher, Nicholas. 1977. *Methodological pragmatism*. Oxford: Blackwell.
- Rescher, Nicholas. 1979. *Cognitive systematization*. Oxford: Blackwell.
- Rescher, Nicholas. 1987. How serious a fallacy is inconsistency? *Argumentation* 1: 303-316.
- Rescher, Nicholas & Brandom, Robert. 1980. *The logic of inconsistency*. Oxford: Blackwell.
- Sárik, Pál. 1998. A határozói igenevek néhány problémája [Some problems of adverbial participles]. *Magyar Nyelv* 94: 423-435.
- Schlenker, Philippe. 2003. A plea for monsters. *Linguistics and Philosophy* 26: 29-120.
- Stechow, Arnim von. 2003. Feature deletion under semantic binding: tense, person, and mood under verbal quantifiers. In *NELS 33: Proceedings of the Thirty-Third Annual Meeting of the North East Linguistic Society, GLSA*, Makoto Kadowaki & Shigeto Kawahara (eds), 379-404. University of Massachusetts, Amherst.
- Tóth, Ildikó. 2001. Impersonal constructions and null expletives. In *Argument structure in Hungarian*, I. Kenesei (ed), 51-78. Budapest: Akadémiai Kiadó.
- Vecsey, Zoltán. This volume. A plausibility-based model of shifted indexicals.