Introduction

Dina El Zarka & Steffen Heidinger
Karl-Franzens-Universität Graz

Much linguistic data can be better understood once we take into account the information structural properties of linguistic expressions. It is therefore not surprising that information structure has received considerable attention in recent linguistic research (cf. overviews in Breul & Göbbel 2010; Zimmermann & Féry 2010; Krifka & Musan 2012; amongst others). An important advance in the study of information structure lies in the refinement of the descriptive inventory; thus, different levels of information structural partitions have been distinguished: topic vs. comment, focus vs. background, given vs. new (cf. Krifka 2007 for a recent survey). It has been shown that these partitions tend to be relevant for different types of linguistic phenomena. For example, one domain where information status, i.e., the distinction between given and new information, has proven particularly useful is the domain of nominal constituents (pronouns, definite NPs, indefinite NPs, etc.). It has been shown that information status is a good predictor for the occurrence of the various formal types of noun phrases (cf. Prince 1981; Gundel et al. 1993; Ariel 2001, Ariel 2014; Roberts 2003).[1]

The study of information structure, like every other linguistic domain, involves the identification of form-function correlations, such as *(movement to the) preverbal position* and *focus*, or *left dislocation* and *topic* (cf. Skopeteas 2012). In order to find a suitable method to investigate the relation between forms and functions, we have to consider at least the following three variables:

- the IS-notions that are involved (e.g., *focus*, *topic*, *givenness*),
- the forms that are involved (e.g., *dislocation*, *clefting*, *prosodic prominence*),
- the type of hypothesis that we want to verify in our research.

The challenge is to identify and apply research methods that are suitable with respect to these three components. In the past decades, a great number of methods and tests have been devised to investigate information structure. Skopeteas (2012) provides a comprehensive overview of empirical research of information structure to date. Our brief outline of different methods is structured according to the type of data used (following Skopeteas 2012), focusing on their merits and problems.

The investigation of *naturalistic data* (mainly corpus data) usually starts from a linguistic form and interprets potential information structural functions that correlate with these forms. Given that determining and annotating information status is, comparatively, easier than identifying pragmatic relations such as *topic* and *focus*, it comes as no surprise that corpus studies have most frequently been used for the investigation of the information status of referents. Theoretical accounts of how the status of discourse referents is expressed in a language are mostly based on empirical

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[1] Other domains where information status is relevant are the linear ordering (cf. Arnold et al. 2000) and the prosodic realization of constituents (cf. Baumann 2006).

studies of naturalistic data (Chafe 1976, 1994; Prince 1981; Gundel et al. 1993; Ariel 2001, 2014).

However, corpus data have also been used for the investigation of linguistic forms related to topic or focus (e.g., syntactic by Herring & Paolillo 1995 for Sinhala and Tamil; prosodic by Hedberg & Sosa 2008 for English; Frascarelli & Hinterhölzl 2007 for German and Italian; Simard 2010 for Jaminjung; El Zarka 2013 for Egyptian Arabic), narrow focus or contrast (Brunetti 2009), and exhaustivity (Wedgwood et al. 2006). Other focus-related phenomena such as the behavior of focus-sensitive particles or theticity have also been investigated in corpus data (Matić 2003). Pešková (this volume) investigates the form of subject NPs in Porteño Spanish in relation to topic and focus.

Naturalistic data is particularly well suited for the falsification of a hypothesis (cf. Skopeteas 2012). If a structure S can be observed to occur frequently in a context C_i with a specific interpretation I_j, we may formulate the hypothesis that structure S is triggered by the context C_i and is always associated with the interpretation I_j. We may even believe that the interpretation I_j is actually the meaning M_k of a certain structure S. Naturalistic data may provide evidence against such hypotheses if it contains instances of the structure S in a context C_i that gives rise to an interpretation I_l, i.e., crucially, it cannot be interpreted as I_j, let alone denote a meaning M_k. In principle, a single counterexample to the suggested property is enough to falsify a hypothesis; furthermore, natural language corpora, especially if they are large, have the additional virtue of allowing frequency counts that help establish statistical tendencies of form-function relations. Statistical methods, such as multivariate and mixed-effect linear regression analyses, seem to be particularly promising in determining the effect of certain contextual and other functional factors on the occurrence of a specific linguistic form (cf. Owens et al. 2010).

Of course, corpus studies alone can never be sufficient to produce an exhaustive description of information structural phenomena in a specific language. Especially in understudied languages, i.e., in the overwhelming majority of the world's languages, corpora are simply not large enough to contain all types of structures relevant for the investigation of information structure (cf. Matić, this volume). Consisting of entirely uncontrolled data full of multiply conditioned variation, corpus data alone can also never produce sufficiently reliable analyses that allow us to gain deeper insights into cross-linguistic and possibly universal aspects of the interaction between information structural notions and linguistic forms. As Skopeteas (2012) observes, to prove that a certain linguistic phenomenon is dependent on context, it is not only necessary to know in which contexts the investigated linguistic phenomenon occurs, but also in which contexts it does not occur.

A corpus study may be apt for establishing the context-relatedness of a linguistic form. However, the reverse hypothesis that a certain speaker intention, i.e., a certain context, will regularly trigger the occurrence of a specific linguistic form cannot be proven on the basis of a corpus study (if it can be proven at all: cf. Matić, this volume, on the fallacy of "context-to-intention assumptions" and "intention-to-grammar assumptions"). Thus, analyses based on naturalistic data have to be backed by experimental evidence and speaker intuitions about the grammaticality of a linguistic expression and its appropriateness in a certain context.

A clear advantage *experimental methods* have over observation in naturalistic discourse is the possibility of controlling for different linguistic and extra-linguistic factors. A common type of experiment in information structure research is the production experiment, in which linguistic utterances are elicited in a given context. This can be done either using a linguistic context such as questions eliciting an appropriate answer on the assumption of question-answer-congruence, forced-choice experiments and sentence-completion tasks, or, alternatively, using non-linguistic context provided by visual stimuli (cf. van der Wal, this volume; Uth, this volume). Many experimental studies today utilize such visual stimuli, whether pictures or films, to elicit linguistic data given a specific context. *The Questionnaire on Information Structure* (QUIS) (Skopeteas et al. 2006) is a comprehensive collection of experimental tasks based on visual stimuli. It was designed within the Collaborative Research Center (SFB 632) *Information Structure* and has since then been applied for the investigation of information structure in a large number of languages, both within and outside the project.

Within QUIS, different types of visual stimuli are used for different types of tasks, and different tasks have different virtues and drawbacks with respect to the investigation of information structure. For example, films and picture books can be used to elicit longer coherent narratives that have the advantage of exhibiting somewhat more natural speech. In fact, many corpora of spoken language in language documentation contain this type of data, which may thus be characterized as an intermediate type between naturalistic and experimental data (cf. Lee, this volume). Elicited narratives also share with the former the drawback of including multiply conditioned variation. However, the fact that the same story is usually elicited from several speakers at least provides a better basis for detecting form-context correspondences than completely heterogeneous spontaneous speech.

A well-known example of a video stimulus is Chafe's *pear story* (Chafe 1980), while another frequently used method to elicit narratives makes use of the picture books of the Frog stories series (e.g., Mayer 1969). Narratives have been widely used to study referential expressions (cf. Lee, this volume, for an overview). Map-tasks are successfully used to elicit dialogic data, providing a rich source for the study of givenness, focus and contrast, and especially corrections.

More effective control of different factors can be gained by a constrained experimental design using only single pictures combined with a question or a sequence of a small number of pictures that provide similar or almost identical data across speakers (cf. Gabriel 2007, 2010; Uth, this volume). As in question-answer pairs, the utterances are usually very short and are supposed to encode a specific information structural category such as information status, contrastive topic, or contrastive focus. They are also used to test the influence of other factors on information structure such as animacy, semantic role, or transitivity.

Like naturalistic data, experimental production data has also been very frequently used for the investigation of information status. Numerous linguistic and psycholinguistic studies have investigated the effect of givenness on deaccenting (cf. Cruttenden 2006 for a recent comparative study on deaccenting of given items in a number of languages). Experiments by Swerts et al. (2002) and Hellmuth (2005) provide evidence for the hypothesis that deaccentuation is especially common in West-Germanic

languages (Ladd 1996), while in Italian (Swerts et al. 2002) and Egyptian Arabic (Hellmuth 2005) given referents are usually accented.

There are, however, certain caveats with experimental designs. One is that you might not always get what you are looking for. For example, it is very difficult to elicit event-reporting (thetic) sentences using visual stimuli. There is, in fact, no guarantee that a speaker will not treat the "new" referent as a topic and hence will not interpret the depicted scene in the expected way (cf. Van der Wal, this volume). Similarly, Uth (this volume) discusses whether the experimental setup used in Gabriel (2007, 2010; and also in Heidinger 2014) elicits "pure" information focus and not epistemic-evidential marking.

A second problem is that in an experiment, the presence of the experimenter has an enormous influence on what is assumed to be in the common ground between speaker and hearer. Thus, the experimenter, being a possible addressee of a participant's utterance, may be assumed to be aware of a newly introduced referent on a picture, and thus the referent may be treated as given (cf. Lee, this volume).

Another issue related to experimental design is the socio-cultural appropriateness of visual stimuli, if one and the same set is used across languages. Thus, it will often be necessary to adapt visual stimuli to the target culture.

Furthermore, it is not easy to control for all different factors in an experiment. In the above mentioned study, Hellmuth (2005) comes to the conclusion that speakers of Egyptian Arabic deaccent neither given elements within a phrase nor given phrases in a sentence. However, El Zarka (2013) shows that in Egyptian Arabic given information is clearly downgraded (pronounced in an "attenuated manner," Chafe 1976) or even deaccented, if it is part of the presupposition of a sentence. She argues that the given referents in the game used by Hellmuth (2005) are always part of the focus and are presumably regularly accented for this reason. Thus, we are well-advised not to take the results of a particular experiment at face value without considering the possibility that other factors may have influenced the results of our experiment (in the present case the [+/-focus]).

A general drawback of experiments is that the language produced in experimental settings is mostly less "natural" than in recordings of spontaneous speech and can at best be called semi-spontaneous. More often than not, elicited utterances are not what can be heard in natural discourse. To test certain hypotheses, speakers have to obey certain instructions, as e.g., "Please answer using a whole sentence," when the most natural reply to a question would be a one-word statement. Again, the presence of the experimenter as well as the whole setting may influence the spontaneity of the utterances and the naturalness of speech. This is especially problematic in the study of prosody. In the QUIS corpus elicited for Egyptian Arabic, for example, there is an overly high proportion of high rising contours for declarative sentences. Taken at face value without resorting to natural discourse it might be assumed that Egyptian Arabic usually has high rising declarative intonation as has been attested for a number of Urban Northern dialects in the British Isles (Jarman & Cruttenden 1976; Cruttenden 1981). As it seems, this over-proportionate use of this specific intonation contour, which may be interpreted as cautious and unconfident, can be ascribed to the fact that young Egyptians were interviewed by a white European female academic who was not only more advanced in

age, but probably also perceived as superior in social status. Thus, it would be misguided to conclude that new information or focus is encoded by a high rise in Egyptian Arabic.

Evidence from naturalistic discourse or production experiments has to be complemented by another type of evidence that is not provided by inductive reasoning. Such evidence is based on the intuition of native speakers concerning the grammaticality, acceptability, and appropriateness of a certain linguistic structure in a given context. *Speaker intuition* provides the only possibility of gaining negative evidence, which obviously cannot be encountered in naturalistic and experimental production data (Himmelmann 2006). Although a negative judgment about context felicity is apt for verifying a negative hypothesis, there is again a problem involved with this method. A speaker's intuition is not necessarily reliable, even in grammaticality judgments, and even more so in the case of context felicity, which is more difficult to assess. Thus, it is also a question of how "good" the intuitions of a certain speaker are and how many congruent judgments of different speakers we can get (cf. Adli 2004, 2011 on how to collect reliable judgments in an experimental setting). In linguistic research, there are basically two ways of collecting data on speaker intuitions: to work with individual speakers or language assistants, which is common practice in fieldwork, or to collect a large number of judgments on the researched phenomena. This can be done using questionnaires containing the structures that have to be evaluated or by perception experiments. Given that speaker intuitions are not necessarily reliable, fieldwork data of understudied languages, especially with a very small number of speakers, are particularly problematic (cf. Matić, this volume). If a large number of speakers is available in a language community, it is possible to collect speaker judgments on a large scale in an experimental format or with questionnaires.

The six contributions to this special issue of *Grazer Linguistische Studien* discuss relevant issues, open questions, and the advantages and drawbacks of the various methodological options in the study of information structure. The volume is the outcome of a workshop which took place in Graz, Austria, on the 24th and 25th of May 2013.[2]

Choonkyu Lee's article ("Using picture sequences to study referential accessibility") is concerned with the use of visual stimuli in the investigation of various accessibility factors influencing referential choices. After reviewing some of the well-studied factors that influence the accessibility of referents depending on the preceding text, conceptual knowledge, or perceptual availability, the author turns to the less extensively studied domain of situational dimensions of the discourse content (topic time, space, and overall theme). The paper presents a review of previous studies of content dimensions and their influence on a reader's perception of story continuity and referential choice. He also discusses some widely used narrative elicitation methods such as films and picture books and comments on their virtues and drawbacks. He specifically points out the influence of the experimental setting and the presence of an experimenter on the naturalness of production data.

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[2] The workshop was organized with the support of the *Vice Rectorate for Research and Junior Researchers' Promotion*, University of Graz and was part of the Habilitationsforum *Diskurse und Episteme*.

Dejan Matić ("Textual clues for information structure categories") discusses the problem of identifying information structure categories in the corpora of lesser known languages. He is predominantly concerned with two methodological choices that can be applied in fieldwork on endangered languages, naturalistic corpus data and elicitation with individual speakers of the language. In line with Matić & Wedgwood (2013), he specifically argues against the assumption of universal grammatical categories of information structure whose correlates have to be found in every language. He argues that the two types of methods in information structure research, distributional and contextual methods, i.e., tests and interpretation of utterances in context, are not sufficient to establish information structure categories in any language. This general problem is aggravated in the study of lesser known languages with a small number of speakers. To support his argumentation, Matić discusses two case studies from his own fieldwork.

Andrea Pešková's article ("Information structure and the use of pronominal subjects in Spanish") deals with the use of overt pronominal subjects (PS) in Porteño Spanish (a variety of Spanish spoken in the Buenos Aires area). Based on spoken language data, she analyzes the impact that different discourse functions have on the overt realization of pronominal subjects in this variety of Spanish. She proposes an inventory of five different discourse functions of pronominal subjects in Porteño Spanish. In line with the general topic of this special issue, the author puts special emphasis on the methodological challenges in determining these discourse functions in spoken language data. Hence, the author not only presents an analysis of pronominal subjects (in spoken language data) in terms of discourse functions, but also depicts in detail the methodological challenges and choices that underlie the analysis.

The starting point of Maja Stegenwallner-Schütz and Flavia Adani's article ("How can the study of developmental disorders inform linguistic theory about information structure?") is the assumption that *special language impairment* (SLI) and *autism spectrum disorder* (ASD) manifest themselves in different linguistic components: while SLI affects grammatical abilities, ASD affects pragmatic abilities. In the study of IS-related phenomena, the question often arises as to whether they are grammatical or pragmatic. According to the above assumption, the linguistic behavior of speakers with SLI or ASD might be instructive in this respect: phenomena which cause problems for speakers with SLI are part of grammar proper, while phenomena which cause problems for speakers with ASD are part of pragmatics. The goal of Stegenwallner-Schütz and Adani's paper is to verify (based on a detailed survey of the relevant literature) how the two disorders manifest themselves with respect to context effects on sentence interpretation and referential choices, and to determine how instructive the two disorders are with respect to the grammar-pragmatics divide.

Melanie Uth ("Spanish preverbal subjects in contexts of narrow information focus: Non-contrastive focalization or epistemic-evidential marking?") provides a detailed examination of one specific method for the elicitation of narrow information focus used in Gabriel (2007, 2010): a semi-spontaneous elicitation experiment in which participants have to answer *wh*-questions related to a visual stimulus. The author is concerned with the question of whether the experimental set up used by Gabriel (2007, 2010) guarantees a setting in which information focus and not epistemic-evidential marking is elicited. The

author first discusses those aspects of Gabriel's original experimental design that she assumes to be problematic with respect to the elicitation of "pure" information focus. In a second step she presents a modified version of Gabriel's experimental design and the results of her own experiments in which she applied this modified design.

Jenneke van der Wal ("Tests for focus") presents an overview of different tests that are used to identify the focus of a sentence, its scope, and its semantic/pragmatic interpretation. Van der Wal gives examples from a wide variety of languages for formal strategies of focus encoding. Besides the well-known strategy of posing questions to control for the focus in the congruent answer, the paper reviews a fair number of tests using co-text for focus identification, mostly additions to the sentence containing the focus that are assumed to refer back to the focus part, such as "(and) not Y," contradictions to an incorrect statement, or conjunctions with "and/but also...." These strategies are well-suited to identify the scope of a contrastive focus in the sense of Dik (1981). The paper is also concerned with quantifiers and particles, irrespective of whether they are dedicated focus markers or only typically associated with a focus, such as 'only' and 'even'. The final section is devoted to stimuli used for the elicitation of utterances expressing different types of focus.

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