HUMAN

COGNITIVE

PROCESSING

Methods in Cognitive Linguistics

Edited by
Monica Gonzalez-Marquez,
Irene Mittelberg,
Seana Coulson and
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John Benjamins Publishing Company

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Amsterdam / Philadelphia

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences – Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Library of Congress Cataloging-in-Publication Data

Methods in cognitive linguistics / edited by Monica Gonzalez-Marquez, Irene Mittelberg, Seana Coulson and Michael J. Spivey.
p. cm. (Human Cognitive Processing, ISSN 1387–6724 ; v. 18)
Includes bibliographical references and indexes.
1. Cognitive grammar--Research--Methodology. I. Gonzalez-Marquez, Monica.
P165.M47 2006
415--dc22 2006050840
ISBN 90 272 2371 8 (Hb; alk. paper)
ISBN 90 272 2372 6 (Pb; alk. paper)

John Benjamins Publishing Co. · P.O. Box 36224 · 1020 ME Amsterdam · The Netherlands
John Benjamins North America · P.O. Box 27519 · Philadelphia PA 19118-0519 · USA

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Acknowledgements

Putting together a book like this requires inspiration, patience and lots of help! First of all, we want to thank all of the contributors to this volume. Writing pedagogical material is, without a doubt, one of the most challenging tasks in our profession. How does one explain clearly to a neonate in the field what has become common sense to us as researchers? Not an easy question to answer, yet one to which all of our authors have responded admirably.

The foundation for this volume came from the energy of all of the participants of the first Empirical Methods in Cognitive Linguistics (EMCL) workshop, held at Cornell University, NY, 2003. A warm thank you to you all. The faculty presenters were: Leonard Talmy, Tatiana Chernigovskaya, Seana Coulson, Shimon Edelman, Raymond Gibbs, Kira Gor, Barbara Lewandowska-Tomaszczyk, Scott Liddell, Teenie Matlock, Wolfgang Settekorn, Lera Boroditsky, Chris Sinha, Michael Spivey, and Eve Sweetser. The faculty participants were: Ben Bergen, Claire Cardie, Marianella Casasola, Roberta Golinkoff, Jeff Hancock, Naomi Khoda, Ed Kako, Suzanne Kemmer, Andrej Kibrik, Ken McRae, Rafael Nuñez, Yasuhiro Shirai, Guy Van Orden, Morten Christiansen, Herb Colston, James Cutting, and Joerg Zinken. The student participants were: Carey Benon, Michele Bishop, Sean Flanagan, Uri Hasson, Daniel Richardson, David Havas, Michael Klieman, Chris Koops, Sarah Kriz, Kristin Mulrooney, Andriy M'yachykov, Shweta Narayan, Florencia Reali, Fey Parril, Rachel Pulverman, Sebastian Ross-Hagebaum, Monica Sanaphre, Nathaniel Smith, Bob Williams, Ying Choon Wu, Reka Beneczes, Vito Evola, Maurizio Gagliano, Olga Khomitsevich, Daniel Kislyuk, Sarah Lee, Vera Malioushenkova, Bo Pederson, Sophia Skoufaki, Cristina Soriano, Tatiana Svistounova, Sylvia Tufvesson, Eric Breck and Stanka Fitneva.

For financial support we want to thank the Cognitive Studies Program at Cornell University and the National Science Foundation, in particular Guy Van Orden.

A heart-felt thank you from mgm to her advisors, Michael Spivey, Seana Coulson and James Cutting for allowing her to undertake such an ambitious venture.

A huge thank you to James Cutting, editor of Psychological Science, for allowing mgm to plague him with endless editorial concerns. (Famous last words: this will only take a minute!)

Shimon Edelman's (past chair of the Cognitive Studies Program at Cornell University) adventurous spirit demonstrated by encouraging a second year graduate student in word and deed to begin what have become the international Empirical Methods in Cognitive Linguistics workshops, deserves a generous round of applause. If he hadn't said yes, it is unlikely we would have come this far.

We also want to thank Johannes Wagner and Anders Hougaard for organizing the inspiring Language and Communication workshop, where mgm met her dear friend Uri Hasson, and after much discussion realized that EMCL needed to happen.

The support staff at Cornell was absolutely invaluable in getting so many things done, both with the workshops as with this volume. A tremendous thank you to Linda LeVan, Elizabeth Chandler, Pam Cunningham, Mary Lou DeBoer, Keith Daniels, and Fred Horan.

Thanks are also due to the co-organizers of the two subsequent EMCL workshops. In Portsmouth, England, a thank you to Chris Sinha for inviting the workshop to come to his Language, Culture and Mind Conference (2004), and to Stephanie Pourcel, Stanka Fitneva and Joerg Zinken, co-organizers with mgm, whose dedication led to a workshop where questions key to the further development of the discipline were brought to the fore. Currently, Javier Valenzuela and mgm are co-organizing EMCL 3 in Murcia, Spain. A thank you to Javier and to the Spanish Cognitive Linguistics Association (AELCO) for inviting us to come!

Thank you to Kees Vaes and the editorial team at John Benjamins for their tremendous patience with this volume, and to the head editors of Human Cognitive Processing, the book series this volume will be a part of, Jan Van Nuyts, Ray Gibbs, and Marcelo Dascal.

A special thank you to Raymond Becker for loving, supporting, and generally taking care of mgm.

Finally, many thanks to our two anonymous reviewers at John Benjamin's and to our student/faculty reviewers, Monica Sanaphre, Raymond B. Becker, Javier Valenzuela, Joseph Hilferty, Uri Hasson, Christina Soriano, James Cutting, Rick Dale, Shweta Narayan, Sebastian Ross-Hagemon, Rick Dale, Nathaniel Smith, Bo Pederson, Fey Parrill, Stanka Fitneva, Erin Hannon, Joel Snyder, Florencia Reali, Benjamin Hiles, Daniel Graham, Vito Evola, Reka Benczes, Daniel Kislyuk, Thomas Farmer, Sophia Skoufaki, and Christian Koops.

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Foreword

Leonard Talmy

1. Introduction

The new insights into the system of conceptual structuring in language that have been coming from the relatively recent tradition of cognitive linguistics have rested mainly on the methodologies already standard in the field of linguistics overall: introspection in conjunction with theoretical analysis. The aim of the workshop that the present volume arises from was to help foster the application of additional methodologies to this emerging body of understanding. The spirit of the workshop and the papers here has been to value all of the applicable methodologies for their distinctive contribution to the total picture. Each methodology can be seen as having certain capacities and limitations that accord it a particular perspective on the nature of conceptual organization in language. In this respect, no single methodology is privileged over others or considered the gold standard of investigation.

Though not all of them were represented at the workshop or are in this volume, the range of methodologies that apply to conceptual structure in language includes the following: introspection into the meanings and structures of linguistic forms and expressions, whether in isolation or in context, as well as the comparison of one's own introspections with those reported by others (the more recent notion of "meta cognition" largely overlaps with that of introspection); the comparison of linguistic characteristics across typologically distinct languages and modalities (e.g., spoken and signed language); the examination of how speech events interact with context, such as with the physical surroundings, the participants' background knowledge, or the cultural pattern; the analysis of audiovisual recordings of naturally occurring communication events, including their text, vocal dynamics, gesture, and body language; the (computer-aided) examination of collated corpora, often annotated; the examination of cumulatively recorded observations of linguistic behavior, as by children acquiring language; the experimental techniques of psycholinguistics; the instrumental probes of the brain's linguistic functioning in neuroscience; and the simulations of human linguistic behavior in artificial intelligence. Used in conjunction with all of these is the methodology of analytic thought, which includes the systematic manipulation of ideas, abstraction, comparison, and reasoning, and which is itself introspective in character, though with its object of attention not limited to language, as in the case of the linguistic introspection otherwise treated here. A selection of

these methodologies is considered next for their respective capacities and limitations, so as to demonstrate their complementary character.

2. Introspection

In addition, introspection exhibits a particular profile of both capacities and limitations in accessing different aspects of language, as described below, and it is its pattern of limitations that has in part spurred the use of certain other methodologies to fill in for them. The methodology of introspection begins this account and occupies some space because it has been central in the development of cognitive linguistics and continues as its main methodology, and because its particular profile of limitations has in part led to the pattern in the use of other methodologies. Linguistic introspection is conscious attention directed by a language user to particular aspects of language as manifest in her own cognition. More specifically, certain aspects of language spontaneously or through evocation can appear in a language user's consciousness – what can here be termed "first-level consciousness". In the same language user, a second level of consciousness can also occur that has as its object the contents of the first level of consciousness. This second-level consciousness – or attention – can be volitionally evoked and directed at a chosen linguistic target. Aspects of language differ in their readiness to appear in first-level consciousness. And, if present there, they differ in their amenability to second-level attention. An aspect of language is more amenable if it has greater strength and clarity and can remain more stably present in first-level consciousness while attention is directed at it, whereas it is less amenable if it is fainter, vaguer, or more elusive under such attempted scrutiny. As a cover term spanning such first-level readiness and second-level amenability, aspects of language will here be said to differ in their "accessibility" to consciousness, attention, or introspection (see Talmy forthcoming).

The accessibility of an aspect of language to directed conscious attention depends at least on the following five factors: cognitive organization in general, particulars of an individual's cognition, the current situation, conditions of attending, and the categorial object of attention. For the first factor, cognition across individuals appears to be structured in such a way – whether innately or from common developmental conditions – as to privilege certain aspects of language over others along the accessibility gradient. As a second factor, though, due to individual differences in cognition – whether these result from innate differences or from training or practice – particular aspects of language can be above or below average in their accessibility to consciousness in a language user, thus able to diverge within limits from their usual ranking. As the third factor, the accessibility that various aspects of language afford to consciousness can vary over time within a single individual in accord with changes in the situation or his concerns. An individual might, for example, attend more strongly to the exact wording of a lawyer and more to the tonality of an intimate. Fourth, the accessibility of various aspects of language to consciousness differs in accordance with what can be called the "conditions of attending", three of which can be suggested.

In the first condition, an individual uses second-level consciousness to attend in isolation to some aspect of language within some small excerpted portion of discourse such as a word or sentence. In the second condition, an individual endeavors to attend with second-level consciousness to aspects of language that appear in first-level consciousness in the course of an ongoing communication event that she participates in as speaker or listener. The third condition rests on the assumption that some trace of first-level consciousness of some aspect of language can continue to be present for a short time, gradually fading away, directly following its evocation in some communication event. In some cases and to some degree, an individual can use second-level consciousness to attend to this brief perseveration of first-level consciousness to examine what its contents had been during their immediately preceding activation. The fifth factor, the category of the object of attention, can range from the meaning of a word, through the grammaticality of a sentence, to the intonation of one's speech. This factor is best considered in conjunction with the properties of the prior factors, as in what now follows.

2.1 First condition of attending

To begin with the first condition of attending, human cognition seems organized in such a way that categories of language aspects differ in their accessibility to introspection in isolation. Of the most accessible categories – ones that are strong, clear, and stable as objects of attention in isolation – the foremost is meaning: the conceptual content associated with linguistic representations. Not only is meaning the aspect of language that linguistic introspection is best at, but, in addition, introspection has the advantage over other methodologies in seemingly being the only one able to access it directly. Meaning is a consciousness phenomenon and, if it is to be taken on as a target of research, introspection – itself a process occurring in consciousness – is the relevant instrumentality able to reach its venue. Introspection accesses meaning of several types. One type is the meaning of an individual word. Access tends to be greater for an open-class word than for a closed-class word, and greater for a concrete meaning than for an abstract one. Thus, one can readily attend to the meaning of the open-class concrete word *bucket*, less so to the meaning of the open-class abstract word *relation*, and perhaps still less so to the meaning of the closed-class and abstract words *not* and *with*. Also stable under scrutiny in isolation is the overall meaning of a phrase or sentence. Likewise accessible is the derived meaning of an idiom or figure of speech, such as a metaphor, as distinguished from any literal reading such a form might represent. Comparably, as is often apparent to someone pausing to choose his phrasing carefully in writing, one can attend directly to the appropriateness or good fit of a word with respect to its meaning in a given context (or to its register in a given context as mentioned next).

Somewhat less directly involved with meaning but still highly accessible to attention in isolation is the register of a linguistic form – that is, apart from its actual referent, its character as relatively more colloquial, learned, child-oriented, etc. and, hence, its appropriateness for use in an informal, formal, or child-oriented situation, etc. Finally, now apart from meaning or its context, linguistic cognition seems structured in a way to permit relatively easy conscious access to the grammaticality of a phrase or sentence – that is,

its degree of conformity to the standard patterns of syntax and morphology in one's language – though this can vary substantially across individuals, especially as a consequence of training. Most of generative linguistics rests on an assumption of the reliability of such grammaticality judgments.

Still under the condition of attending to them in isolation, some aspects of language offer only moderate rather than strong accessibility to introspection. Returning to meaning as the object of attention, the strong access to the meaning of a word, noted earlier, holds whether the word is composed of one or more morphemes. But in the latter case, the meaning of a bound closed-class morpheme – that is, of an affix or clitic – seems only moderately accessible. Thus, while the meaning of the whole word *unresettable*, as in *This kind of trap is unresettable*, is quite available to direct examination, the meanings of the affixes *un-*, *re-*, and *-able* seem less fully and immediately available without the aid of analytic manipulations. However, this aspect of language may be quite sensitive to differences across individual speakers. Such a difference may have existed between my two main consultants for Atsugewi – a polysynthetic Hokan language of northern California – both with little Western schooling and with their native language unwritten. One consultant could provide the single multi-affixal verb best expressing a situation I had depicted, but could not identify any of the affixes within the verb, such as the particular "Cause prefix" representing the specific cause of the main event. The other consultant could not only provide the best verb for the depicted situation, but could proceed to volunteer systematic variations of cause within the situation and provide the corresponding series of verbs, each one with a different Cause prefix. The second consultant would seem to have had greater conscious access to the morphological structure of words in her language.

A further moderate case is that of access to the different meanings associated with a particular morphemic shape. For example, a person asked to think of the various senses of the noun *stock* might come up with several, but scarcely all, of the following: 'soup base', 'stored supply', 'line of descendants', 'farm animals', 'financial instrument', 'rifle part', 'fragrant flowered plant species'. One could then ask, though, what happened to the remaining senses in the respondent's cognition. On hearing the word *stock* in contexts that evoked them, the respondent would no doubt have come up with those very senses. Apparently, our cognition is organized in a way that allows particular senses of a word to come into consciousness in the relevant contexts, but not as a full connected set under introspection – though introspection does yield a few. The full set can again typically be achieved only with the aid of analytic procedures, like those giving rise to dictionaries through a kind of corpus research. A similar accessibility pattern seems to hold for a comparable aspect of language: approximate synonyms in a lexicon. If asked to think of other words with roughly the same meaning as, say, *tendency*, a respondent might come up with a couple, but probably not all, of the following: *inclination, leaning, disposition, proneness, propensity, proclivity*. If we think of a certain concept, our cognition is apparently so organized as to present in consciousness one or two of the lexical forms that express it and, with introspection, to present several more such forms, but not to present the extended set. As before, the extended set can be achieved only with the aid of analytic procedures through another kind of corpus research, the kind that leads to a thesaurus.

Finally, now somewhat less directly involved with meaning, the lexical category of a word – noun, verb, adjective, etc. – also seems moderately accessible to introspection. Our cognition seems structured to allow us some sense of lexical category, although individuals surely vary on this and, even the most natively gifted individual would need training or practice to be able to articulate this sense.

As the last circumstance under the condition of attending to a linguistic entity in isolation, some aspects of language appear to remain poorly or not at all accessible to introspection, that is, are elusive or absent under direct attention. Often, the means for getting at such aspects is to combine introspection – employing it where its capacities work well – with analytic manipulation. In the area of linguistic meaning, while the overall meaning of a word is one of the aspects of language most accessible to direct attention, the specific semantic components that structurally comprise that meaning largely are poorly accessible. For example, one can reasonably well attend in isolation to the overall meaning of the preposition *across* in its locative sense, as in *The board lay across the road.* And, if asked to, one could probably come up with a vague sense of what seemed like one of its components of meaning, say, 'perpendicularity of two axes'. But the combination of semantic introspection with analytic manipulation can tease out no fewer than nine criterial components of meaning (see Talmy 2003, 2006). The method here is to systematically alter individual elements (especially spatial relations) within the referent situation and use one's semantic introspection to see if the original sentence with *across* still applies to it, or if now a sentence with a different preposition would apply instead. The situational elements needed for *across* to apply must then correspond to components of its meaning. Thus, one can little directly discern the semantic components of a word's meaning through introspection, but one *can* use introspection – in fact, perhaps one must use it – where it functions appropriately, in the experiencing of the overall meaning of a word, as part of a procedure for ferreting out its semantic components.

Another aspect of language that does not simply pop into awareness on introspection is that of syntactic principles and patterns. For example, if asked to consider the two sentences *Whose dog did our cat bite?* and *Whose dog bit our cat?*, an average English speaker would have little direct sense for what it is about the first sentence that (among other syntactic characteristics) requires the inclusion of the word *did*, the basic form of the verb *bite*, and the positioning of this verb at the sentence's end, while the second sentence requires an absence of *did*, the past-tense form of the verb, and the positioning of the verb within the sentence. Again, though, linguists have been able to tease out syntactic regularities governing facts like these by combining their introspective sense for the grammaticality of sentences with the analytic procedure of systematically altering the elements and arrangements within such sentences to uncover patterns.

Finally, there is little if any direct conscious access to the cognitive processes that underlie any of the strongly viable operations of introspection. For example, although we can readily attend to the fact that we get an immediate sense of the meaning of the word *bucket* when we hear it, we cannot attend to the mental processing that led to that meaning coming to mind.

2.2 Second condition of attending

We turn now to the second condition of attending, that is, directing one's attention to various aspects of language occurring while one is engaged as a speaker or listener in ongoing discourse (which could be extended to fluent writing or reading). The various aspects of language present in discourse again seem to range widely in their accessibility to such meta-attention. Thus, strongly accessible are the overall topic or subject matter of some portion of discourse and – though this may well vary across individuals – a sense for the degree of thematic and logical coherence present in the discourse. Also highly accessible is the specific conceptual content expressed by a speaker one is listening to, even down to a relatively fine-grained level if one listens attentively. Perhaps a bit lower in accessibility to meta-attention, though still high, is the conceptual content that one has in mind to express as one speaks, as well as the conceptual content one cues up for one's next turn at speaking while still listening to one's interlocutor.

But certain other aspects of language seem to afford only moderate, little, or no accessibility to direct attention during communication. Thus, during speech, the recombinant core system of language (see Talmy 2004) is accompanied by expressive subsystems that the speaker generally seems able to attend to only sporadically and moderately. Perhaps in order of decreasing accessibility, these include "vocal dynamics", my term for the gradient subsystem in language that includes pitch, loudness, rate, precision, etc.; the speaker's gestures, including not only their unfolding forms but also their timing relative to the ongoing spoken track; and the speaker's facial expressions and body language.

Deviations from well-formedness in speech can attract speaker or hearer attention and can even appear in attention with full salience if they exceed a certain "grace allowance", but those occurring within the grace allowance scarcely attract attention and are only moderately accessible to any attention directed at them. Such deviations include contextually inappropriate forms, misplaced forms, non-optimal choice of words or constructions, grammatical or referential conflict across different sentence portions, self-corrections, incomplete constructions, pauses, inclusion of "uh" and "oh", restarts, interruptions by other speakers, and overlaps with other speakers. Also attracting little attention and perhaps highly affected by any attention directed at it is what a speaker's or hearer's gaze successively lights on, in the former case perhaps influencing what she next says and in the latter case often influenced by what the speaker has just said.

Finally, seemingly inaccessible to conscious attention are the cognitive operations and processes going on that yield the production or the comprehension of speech.

2.3 Third condition of attending

Without examining it in detail, the third condition of attending – directing attention to the memory trace of various aspects of language that have just been manifested – also exhibits different degrees of accessibility. Thus, at the relatively high end of accessibility might be the ability to attend to the thematic topic and conceptual content, still in memory, of some immediately prior discourse. By contrast, the memory of, and hence one's ability to attend

to, the exact wording and phrasing that had just been used to represent such conceptual content might be elusive.

2.4 Profile of introspection

A profile has just been sketched of the capacities and limitations that introspection has in accessing aspects of language. Where this profile has peaks and elevations, introspection may be the methodology of necessity or choice. But as its profile dips, other methodologies become increasingly necessary to corroborate or fill in for the introspective findings. And where introspection lacks access altogether, any information about those aspects of language must come from other methodologies.

In addition, researchers can feel a call to other methodologies to the extent that they have either or both of the following two concerns. The first is the concern that observation can affect what is observed. For the present intra-cognitive issue, this is the concern that directing second-level attention at them might disturb the contents of first-level consciousness. The claimed gradient by which first-level contents range from being more stable to being more elusive either can be accepted and cause increasing concern toward the elusive end, or can be questioned even at the proposed stable end. Further, concern is likely to be greater for the second condition of attending than for the first, in part because some of the attention otherwise needed just to maintain adequacy of speaking or listening in a conversation might be diverted to the purpose of self-observation.

The second concern is over the reliability of and efficacy of introspection in the first place. The reservation can be over the existence of consciousness itself or, if that is granted, over whether the contents of consciousness can accurately reflect the unconscious mental processes felt to constitute the bulk of cognitive functioning.

3. Audio- and videographic analysis

Our look at several other methodologies for their respective capacities and limitations can start with that of examining audiovisual recordings of speech events – that is, audio- and videographic analysis. This methodology has certain advantages in accessing aspects of language where introspection is limited. One such advantage is the ability to examine at leisure the online expressive accompaniments of the core speech track that were earlier cited as only of moderate to low accessibility to second-condition introspection. These include a speaker's vocal dynamics, gestures, facial expressions, body language, and gaze direction. Included as well is the exact timing of all these accompaniments, both alone and in relation to each other. Live recording can capture for study many aspects of the core speech track as well – also not readily attended to during the event – such as its deviations from well-formedness. In addition, what a speaker says at any given moment can be regarded as the result of numerous interacting factors, exerting their various calls on the speaker (see Talmy 2000b: Ch. 6). These factors are sensitive to the immediate idea as well as the larger ideational complex needing expression, to assumptions about what the addressee already knows or should be informed of, to what needs emphasis or de-

emphasis, etc.; and yields selections as to morphemes and constructions. Introspection cannot readily access all these factors online because there are too many of them, because many are elusive, and because some of them may be out of awareness.

Further, these factors appear to be triggered in their full complement in the cognition of the speaker only when he is engaged in what he understands to be an actual interlocutive event of speaking. Hence, audiovisual recordings register what people actually say during naturalistic speech, which cannot be replicated by the kinds of sentences often constructed out of context for first-condition introspection in isolation.

Finally, longer stretches of live recording permit analysis of the kind of discourse functions central to functional linguistics, which, due to their length, are minimally accessible to the isolative introspection that excels at short linguistic forms.

One main limitation to the methodology of working with spontaneous communication – given that such communication is the result of many interacting cognitive factors – is that it does not lead directly to determining the lawful properties of any single factor by itself. For this, the more isolative, probing methods are generally needed. Perhaps a physical analogy might be that, while one kind of study can characterize the complex pattern in which, say, a feather falls, another kind of study is needed to separate out and individually characterize the contributing components, such as gravity, turbulence, friction, and buoyancy.

4. Corpus analysis

Corpora, whose use constitutes another methodology, share with audiovisual recording a focus on naturalistically produced speech. But they typically capture only its segmental text within their usually written format. Live recording thus has the advantage over corpora in capturing the expressive accompaniments of text and the timing of all these components. The consequent advantage of corpora, though, is to make a large quantity of textual discourse available to searches for particular phenomena of interest.

This advantage is especially great for linguistic phenomena whose frequency of occurrence or range of instantiations is the issue. Thus, corpus research can determine the frequency with which a particular expression is used in various contexts. This can be interpreted as a reflection of its unconsciously registered values along various cognitive parameters. These unconscious values are otherwise reflected in consciousness and available to introspection only approximately – as a phenomenological sense of the expression's colloquiality and register. Searches through chronologically sequenced texts, in addition, can uncover gradual changes in the frequency – and therefore changes in the unconscious parametric values – of an expression, whereas such change is largely too slow for any direct introspection. Frequency assessments can also be made of a particular morpheme's co-occurrence with other morphemes. Once again, introspection could yield an approximate sense for the naturalness of such collocations, but not of their specific patterns of occurrance.

Another special asset of corpus work is that it helps one map out the range of alternative realizations of a linguistic entity. Examples of such ranges are the set of constructions

that a particular morpheme can participate in, and the set of polysemous or homonymous senses that a particular morphemic shape can represent. As noted, a dictionary can be regarded as a form of corpus work that addresses this latter example. Direct introspection into such sets of alternatives typically does not come up with the entire range, our cognition apparently not being organized to bring the full set into attention.

One main limitation of corpus research, though, is that it in general can not directly yield many abstract linguistic patterns. One reason is that the sentences speakers produce largely are multiply elliptical, omitting constituents that could, in principle, fill in the complete potential structure of some construction or lexical form. The various occurrences of such a construction or lexical form in a corpus will thus typically each lack certain components of their potentially full structure, components whose values might be understood but are implicit (see Talmy 2000a: Ch. 4). For example, in one of its usages, a verb can have one or more optional arguments in its complement structure that are not overtly represented, and will have a particular aspectual signature that can lack some accompanying temporal expression to reveal it. Moreover, a lexical form commonly has several usages, so that a verb, for example, will have several different complement structures and aspects, all of them appearing scattered through a corpus without identification as to the particular usage in play. Unguided attempts to characterize a verb's semantic-syntactic pattern can readily become confounded without sorting out the different levels and scopes in effect. Introspection has the advantage here, since our cognition seems to be organized so as to abstract out the distinct full patterns associated with lexical forms and constructions.

Another limitation of a corpus is that it does not mark those occurrences of a lexical form or construction that are fully felicitous and well-formed, as against those that are less well selected or that deviate in any of the other respects indicated earlier – a recurrent feature of natural speech. This can lead to confounded characterizations of the properties of such forms and constructions. Again, our linguistic cognition is organized so as to have abstracted out the ideal grammatical and semantic properties of particular lexical forms and constructions, ones that can emerge through introspection in a deliberative process like writing, but that are commonly breached in the kind of fluent speech recorded in corpora.

5. Experimental method

As a methodology in the study of language, cognitive psychology is distinguished in its application of the experimental method to linguistic cognition. This method largely consists of presenting a number of individuals with stimuli or instructions, prepared with the aim of addressing a single cognitive factor, and monitoring their responses. Under this aegis, techniques range widely, from the use of instrumentation for special presentations of language-related stimuli or for recordings of physical responses to them; to instructions to generate a specified linguistic output, say, to produce all the words with a given meaning that one can think of in a brief period; to the re-presentation of certain linguistic stimuli after a lengthy period to test for memory. And the time scale of the cognitive processes

such techniques probe ranges from the millisecond level to months, although perhaps the bulk of experiments aims at the shorter end.

One advantage of the experimental method is precisely this access to the millisecond scale of cognitive processes, which is not available to any other methodology. Toward the scale of whole seconds, the experimental method begins to share access with the methodology of audio- and videographic analysis.

Additional advantages of the experimental method can be regarded as complements to advantages found in other methodologies, where the experimental method in turn has limitations. Thus, if an advantage of audiovisual recordings and corpora is that they permit the examination of naturalistic speech, the complementary advantage that experimental psychology shares with first-condition introspection is that the researcher can carefully control the stimuli that evoke linguistic behavior. That is, he can probe the system of linguistic cognition, even perturb it, as a means for detecting aspects of its organization often obscured or sporadic as it functions naturalistically.

Further, if an advantage of introspection and of analytic thought is their direct access to subjectively presented objects of examination, with the researcher attending to the products of her own mind, the complementary advantage that experimental psychology shares with the use of live recordings and corpora is a focus on objectively presented objects of examination, with the researcher attending to the products of the minds of other individuals. The earlier-mentioned concern of some that the act of introspection might affect the object of attention is not resolved by the experimental method, which can be equally at risk in affecting the target of observation. But the concern that introspection might not be reliable due to its very subjectivity is addressed by the experimental method.

Finally, an advantage of audiovisual recording and introspection is that they both permit an in-depth examination of linguistic behavior within the cognition of a single individual, and are thus able to address cognition as an integrated system, one consisting of components in particular interactions. But then the complementary advantage that experimental psychology shares with the use of corpora is that they both base their conclusions on the linguistic behavior exhibited across a set of individuals, and are thus able to abstract away from individual differences and discern even slight characteristics that linguistic cognition tends toward in humans.

One main limitation of the experimental method in psychology might be found in this last contrast. The techniques designed to isolate what is taken as a single factor in linguistic cognition and to keep other factors among which it is embedded from confounding the probe can lead to decontextualization. The result can be an insufficient capacity to track the factor as it weaves through or interacts with its fellows within an integrated system, or to ascertain whether what has been isolated in fact constitutes a functionally discrete factor.

As can be seen, each of the methodologies now being applied to cognitive linguistics has unique capacities that make it necessary for our overall understanding of conceptual structuring in language, as well as having limitations that make the other methodologies additionally necessary for this understanding. It can be further observed that each methodology needs to look at the findings of its fellows for new ideas as to where to

proceed next within its own practices. The chapters in this volume are both early contributions in this collegial spirit, and harbingers of collaborations to come.

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