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CHAPTER 1

Introduction

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The linguistic expression of causation has been a topic of interest to philosophers since antiquity. With the burgeoning of the science of linguistics in more recent times, linguists have also begun to be interested in causation, recognizing the important role it plays in diverse linguistic phenomena. Causation is most obviously referred to directly through lexical causatives such as *cause,* but it is relevant to the meanings of many other elements in language. For example, a causal relation has been proposed as a part of the meaning of accomplishments such as *build a house* or *bake a cake* (Pustejovsky 1995, Higginbotham 2009, Ramchand 2008). The notion of intentional causation in the domain of agency is crucial to the understanding of verbal syntax and semantics (DeLancey 1984, Levin & Rappaport 1995, Reinhart 2002, Folli & Harley 2005, Alexiadou et al. 2006). As Talmy's (1988, 2000, a.o.) force-dynamic view of meanings suggests, the meanings of modals such as *can* and *must,* and the meanings of verbs such as *help* and *prevent*—or indeed all verbs, a view furthered by Croft (1991, e.g.) and Gärdenfors (2000, e.g.)—are plausibly related to our understanding of causation. And in less-studied languages, the issues of unintentional causation, unachieved goals, and other interesting causatives have come to the forefront (Zepeda 1987, Travis 1991, 2000, Davis & Demirdache 2000, Pylkkänen 2002, Jacobs 2011, Fauconnier 2012, e.g.).

Discussion of such causally-related phenomena has been lively within cognitive linguistic approaches, typological studies (e.g., Song 1996; Shibatani 2002), as well as more structurally-oriented work in the generative tradition. It is, however, becoming increasingly clear that if we

are to further our understanding of how causal meanings are represented in language, it will be important to take advantage of all the resources at our disposal.

For example, we see already in this volume that causal phenomena in less-studied languages are important to theories of causation in language. The idea that cross-linguistic data is important will be uncontroversial to linguists, but it is worth underlining, as typological and cross-linguistic research is methodologically very different from the philosophical tradition of relying on the philosopher's own intuitions. Any theory of language must come to terms with the wide, but relatively constrained, variation in form and meaning seen amongst the world's languages, some of which may contradict received philosophical consensus (see Copley & Wolff, this volume, for discussion). To the extent that philosophers and cognitive scientists make claims about language, they must also come to terms with cross-linguistic variation, especially the variation seen in less-studied languages.[1] Among the languages discussed in this volume are several less-familiar languages such as Tohono O'odham, Finnish, Yu'pik, Hindi/Urdu, Vietnamese, Karachay-Balkar and Tagalog.

In addition to taking advantage of the wealth of causal expressions and phenomena in the languages of the world, the nature of semantics itself demands that in order to further our understanding of causal meanings, a wide range of theories must be considered. As Chomsky (1995) famously reminds us, semantics has two interfaces: the conceptual system and the computational system (i.e., syntax). If theories of the semantics of causation are to continue to advance, research on causal concepts—both philosophical and psychological—must be combined with syntactic theory of the structures they are embedded in. In other words, theories of causal meaning, or indeed any meaning, must be both conceptually plausible and syntactically honest. It is interesting to note that in this position there is no basic conflict with cognitive

linguistics, which has always taken the interface between cognition and language seriously, and which can be seen as a good starting point for the bringing together of conceptual and syntactic theory. In a way, the promise of the cognitive linguistic approach is fulfilled in an approach that sees semantics as the bridge between purely conceptual and purely structural evidence.

The question arises as to how far along we are in the quest to understand the semantics of causation via its two interfaces: the cognition-semantics interface and the syntax-semantics interface.

As for the cognition-semantics interface is concerned, the integration of theories of the cognition of causation with theories of language is nearly non-existent. While there has never been universal consensus in the field as to the nature of causation, we will see in this volume— especially in Copley & Wolff's chapter and the other chapters of the first section— that this debate should be of interest to linguists. Moreover, the time is ripe for the traditional positions in the debate have recently been pursued intensively to a much more advanced level than has ever been seen before. A burst of philosophical interest in causation over the last ten years has led to highly sophisticated accounts of causal phenomena, with the hypothesis space dramatically reduced. Likewise, a trend toward formalization makes these theories at once more falsifiable and, potentially, more accessible to linguists.

We can extend this thought to the fields of psychology and computer science, too, in which there have been a number of recent advances in the analysis of causation. In particular, cognitive scientists have shown how causal relationships can be used to make forward and backward inferences about the probability of events, including events embedded in complex networks of causation (Pearl 2000, among many others). Further, there has been real progress in

investigating the cognitive plausibility of proposed models of causation (e.g., Sloman 2005, Gopnik & Schulz 2007, Marcus & Davis 2013).

All of this is to indicate that access to the conceptual interface with semantics in the discussion of linguistic expression of causation is not only desirable, but possible. An additional reason is that generative linguistics has matured as a field. Over the last thirty years, as generative work at the syntax-semantics interface has become more and more refined in mapping meanings to syntactic components, linguists are finding themselves in the position of asking ever more detailed questions about the meanings of these components. At the same time, the complexity that was characteristic of early transformational grammar has been winnowed down, in the Minimalist Program (Chomsky, 1995), to a single compositional operation MERGE. Likewise, there is a concerted drive to simplify the inventory of semantic combinatorial operations (see, e.g., Heim & Kratzer 1998). Such simplification makes linguistic theory more cognitively realistic, and thus more open to interaction with theorists in related disciplines.

This brings us to the second interface, that of semantics with syntax. The last twenty years have seen a veritable explosion of work at this interface, a good deal of it concerning causation. On the generative approach to language, theories of meaning are understood to be constrained by syntactic considerations, so there arises in the generative approach a possibility of better understanding how language represents causation by coming to see how causal meanings are syntactically structured.

Despite the fruitfulness of this approach, there is still a need to bring structural approaches to causation more closely together, and this constitutes another reason why we have been interested in bringing the two sections of this volume together into one conversation. It seems to us that linguists interested in lexical semantics study causation in lexical semantics;

those interested in causation and agency study these topics in argument and event structure; and causation as it pertains to modality, aspect, and other phenomena has been addressed only in passing.

At each interface, then, there are particular points that need addressing with respect to causal meaning: the cognition-semantics interface should be informed by the philosophical and psychological perspectives on causation, and the syntax-semantics interface should see greater integration across linguistic phenomena related to causation. Finally, both interfaces must ultimately relate to each other through the semantics, in a theory of meanings of causal (cross-)linguistic phenomena. The papers in this volume are offered in this context.

1.1 From causal concepts to causal meanings

The first section of the volume deals with causation at the cognition-semantics interface, i.e., the mapping from conceptual representations of causation to the representations of causal meaning in language.

In Chapter 2 ('Causal theory should inform linguistic theory and vice versa'), **Bridget Copley** and **Phillip Wolff** offer a basic introduction to the different approaches philosophers take to causation. These approaches may be divided into two categories: dependency theories, in which a cause C causes an effect E just in case E depends on C in some way (familiar to linguists through David Dowty's 1979 adaptation of David Lewis's 1973 theory of causation), and production theories, in which C causes E just in case a certain configuration of influences holds of C and E, or some conserved quantity is transmitted from C to E. Copley & Wolff argue that a familiarity with these theories would be fruitful for linguists working on causation in language, and give examples (defeasible causation, volitionality, and causal chain mappings) where the

choice of causal theory has ramifications for the linguistic theory, but also that linguistic theory has the potential to inform philosophers and cognitive scientists working on causation as well.

Chapter 3 ('Formal semantics for causal constructions'), continues the effort to bring together philosophers and linguists. In this chapter, **Richmond Thomason** addresses Dowty's extension of Montague's Intensional Logic to the problem of causation. He identifies some difficulties that arise in Dowty's approach, and suggests an alternative event-based theory that, while it does not provide a global interpretation of causality, seems to work well with a wide range of the causal constructions that are important in word formation. He further relates these ideas to some themes in contemporary philosophy and in the formalization of commonsense defeasible reasoning.

Max Kistler, in Chapter 4 ('Analyzing causation in light of intuitions, causal statements, and science'), suggests that the existence of two equally plausible but incompatible approaches to causation has its source in the conflict between two types of intuitions. Some causal judgments are justified by the intuition of nomic dependency, i.e. dependency of one state of affairs on another by virtue of laws of nature. Other causal judgments are made on the basis of a material influence or transmission between events. These two types of intuition lie behind the tension between an explanatory concept and a mechanistic conception of causation. Kistler first argues that causal statements relating facts express the explanatory aspect of causation, and causal statements relating events express the mechanistic aspect. Relying in part on nominalization data, he goes on to propose a framework that reconciles the two aspects and shows the logical relations between statements of the two sorts. Finally, he analyzes some types of causal statements that do not seem to fit in the proposed scheme: statements expressing interruption, triggering, and omission, where counterfactual information about what would have happened

'normally' must be taken into account, where normality may be understood in terms of statistical average, biological fitness, or morality.

Chapter 5 ('Causal pluralism and force dynamics') represents another take on the distinction between the two different kinds of theories of causation, rejecting the idea that both kinds of theory are necessary. **Phillip Wolff** argues that dependency models represent causation in terms of kinematics, that is, with respect to the observable properties of events. In contrast, his dynamics model, (a kind of production theory which is based on Talmy's 1988 theory of force dynamics), specifies causation in terms of dynamics: the invisible quantities that produce kinematic patterns. In the dynamics model, causation is characterized as a pattern of forces and a position vector. This model is supported by studies in which participants watched 3D animations generated from a physics simulator. In these experiments, the very same forces used to generate physical scenes were used as inputs into a computer model to predict how those scenes would be described. In a second line of experiments, the model is extended to sequences of events in which configurations of forces are linked together by their resultant vectors. As predicted by the model, people's overall descriptions of causal chains depended on the types of force configurations (e.g., CAUSE, PREVENT, NOT-ALLOW) from which the chains were composed. The model was able to predict when a causal chain could be described in more than one way, and to what degree. Thus, unlike any other model to date, the dynamics model offers an explanation of the relationship between deterministic and probabilistic causation, as well as of the semantics of several complex predicates.

One obstacle to applying production theories of causation to formal semantic theory is that forces are typically not represented in formal semantics. **Bridget Copley** and **Heidi Harley** point out in Chapter 6 ('Eliminating causative entailments with the force-theoretic framework:

The case of the Tohono O'odham frustrative *cem*') that in many cases in natural language, causation must be treated as 'defeasible'—that is, one event is asserted or presupposed to normally cause a second event, but there is no entailment that the second event actually occurs. To account for such cases, they propose that the arguments discovered by Davidson refer to forces instead of to events. A force, conceptually, is energy input into a situation. Formally, Copley and Harley treat forces as functions from an initial situation to the situation that results *ceteris paribus* (all else being equal). This allows for the possibility that all else may not be equal, leading to the lack of a causative entailment. Copley and Harley illustrate the framework with an analysis of the frustrative morpheme *cem* in Tohono O'odham, a Uto-Aztecan language spoken in southern Arizona and northern Mexico. The resulting analysis sheds light on statives, plans, prospective, imperfective, and perfective aspect.

Chapter 7 ('Modality and causation: Two sides of the same coin') also relates production theory to language, this time from a cognitive/typological perspective. On the basis of cross-linguistic data from languages such as Yu'pik, Italian, Serbian, and Finnish, **Tatjana Ilic** argues that modal and causative meanings are fundamentally related. Causative meanings arise in causal chains with agentive verb bases whose subject is devoid of control over the event. Typically, such a chain also involves an initiator—not the subject—who initiates the event and controls its outcome. In this type of chain, modal presuppositions of obligation on the causee can arise. In contrast, when a causal chain with an agentive verb base and the agent argument does not involve an initiator who can initiate the event and control its outcome, the chain fails to obtain causative interpretation. In this type of chain, modality surfaces as the asserted meaning, replacing the meaning of causation.

Paul Egré, in Chapter 8 ('Intentional action and the semantics of gradable expressions (On the Knobe effect)'), examines an hypothesis put forward by Pettit & Knobe (2009) to account for the Knobe effect: the fact that speakers are more or less likely to judge actions as intentional depending on certain circumstances of the action. According to Pettit & Knobe, one should look at the semantics of the adjective *intentional* on a par with that of other gradable adjectives such as *warm*, *rich,* or *expensive*. What Pettit & Knobe's analogy suggests is that the Knobe effect might be an instance of a much broader phenomenon which concerns the context-dependence of normative standards relevant for the application of gradable expressions. Egré adduces further evidence in favor of this view, and goes on to examine the predictions one obtains when assuming that *intentional* involves a two-dimensional scale, which implies evaluating how much an action or outcome is desired on the one hand, and how much it can be foreseen as a consequence of one's actions on the other.

1.2 From causal meanings to causal structures

The chapters in the second section of the book investigate causation at the syntax-semantics interface—the mapping between causal meanings and the syntactic structures by which these meanings are structured.

Fabienne Martin and **Florian Schäfer** present chapter 9 ('Causation at the syntax-semantics interface') as an overview of the themes that arise in the study of causation at the syntax-semantics interface. They firstly present and discuss recent proposals about the argument structure and the event decomposition of (anti-)causative verbs, and illustrate the deep interconnection between these two layers through several generalizations that have been put forth in the recent literature: (i) causer (i.e. inanimate) subjects require a resultative event structure; (ii) non-culminating readings of accomplishments require the predicate's external argument to be

associated with agentive properties; (iii) the difference between agent vs. causer subjects affect transitivity. Most of the phenomena addressed through this section illustrate the crucial role played by the thematic properties of external arguments in the syntax-semantics of causative verbs, as well as the importance of a more fine-grained typology of agents (intentional or not, endowed of control over the action or not) for the syntax. The last section addresses some of the differences between mono-clausal vs. bi-clausal causatives, focusing on the distinction between indirect and direct causation. Again, the thematic properties of external arguments are shown to play a crucial role in this distinction too (and more particularly in the possibility to use a lexical causative to express indirect causation).

In the case of Hindi/Urdu causative constructions, the instrumental *se*-marked adjunct is licensed with an 'intermediate agent/causee' interpretation in the indirect morphological causative using the suffix *-vaa* (Masica 1991, Saksena 1982b, Kachru 1980, Hook 1979), inviting comparisons with the demoted agent analysis of English by-phrases (Jaeggli 1986, Grimshaw 1990, Baker et al. 1989, Embick 2004). In Chapter 10 ('Causal chains and instrumental case in Hindi/Urdu'), **Gillian Ramchand** revisits the licensing and interpretation of instrumental case-marked nominals in Hindi/Urdu causative constructions to argue against the hypothesis that the *se*-marked phrase corresponds to a demoted agent. Rather, Ramchand argues that a more unified analysis of *se*- phrases can be achieved through an event-structural analysis, in line with the standard interpretation of other adverbials in the syntax (cf. Ernst 2002). Since the 'intermediate agent' interpretation is only possible with indirect causatives in Hindi/Urdu, the event structural analysis proposed here also has implications for the direct vs. indirect causation distinction in the syntax.

Ekaterina Lyutikova and **Sergei Tatevosov** argue in Chapter 11 ('Causativization and event structure') that Pylkkänen's (2002) comprehensive theory of the causative at the syntax-semantics interface in a number of languages faces complications. The authors point out that there are languages, one of which is Karachay- Balkar (Altaic, Turkic), for which the theory does not always make correct predictions. The main goal of this chapter is thus to develop an alternative that incorporates the new data and accounts for syntactic and semantic characteristics of causatives in languages like Karachay-Balkar. First, the authors challenge Pylkkänen's suggestion that the causative falls under exactly one of the three structural types, Root-selecting, Verb-selecting and Phase-selecting. Secondly, an account is presented for the semantic distinction between direct and indirect causatives, problematic for Pylkkänen. A novel architecture of the verbal domain is proposed whereby relations between subevents in a syntactically represented event structure are introduced independently from subevent descriptions.

In Chapter 12 ('Inadvertent causes and the unergative-unaccusative split in Vietnamese and English'), **Nigel Duffield** draws together several strands of evidence in support of the claim that two kinds of cause relations are independently represented in phrase-structure. The first of these is the familiar, intentional/volitional cause associated with the thematic relation AGENT, typically represented in the current generative literature as the argument licensed by 'little *v*': in recent years, it has once again become commonplace to assume that this intentional CAUSE is abstractly represented in phrase structure, either as a primitive predicate, or as a relational notion; see Hale & Keyser 1993, Baker 1997; also Pustejovsky 1991, Tenny & Pustejovsky 2000. This chapter, however, focuses on the structural representation of the second type of cause: a less studied relation INADVERTENT CAUSE (IC), and which—in contrast to its more robust

cousin—has escaped detailed scrutiny until quite recently. The analysis presented here develops a proposal originally articulated by Travis 1991, 2000, 2010, which associates the IC thematic relation with the specifier position of a VP-internal functional category, namely, Inner Aspect (IAspP). Travis' proposal is originally motivated by facts from a completely different range of (Western Malayo-Polynesian) languages: to the extent that it extends naturally to the phenomena discussed here, the present work provides confirmation of the profitability of a syntactic approach to inadvertent cause.

In the literature on the causative/inchoative alternation, there are two opposing approaches: one assuming that the alternation is due to causativization in the syntax of an underlying basic unaccusative structure (Embick 1997, Folli 2001, Harley 1995, Ramchand 2008 among many others), and one arguing that a lexical operation of decausativization or reduction of the external causer argument is responsible for the inchoative form (Levin & Rappaport-Hovav 1995, Chierchia 2004, Reinhart & Siloni 2005, Koontz-Garboden 2009, among many others). In Chapter 13, ('Causatives and Inchoatives in the Lexicon and in the Syntax: Evidence from Italian'), **Raffaella Folli** presents data from Italian and argues that this language supports a more flexible approach to the derivation to this kind of alternation. In particular, she argues that in Italian we have to distinguish three classes of verbs that participate in this alternation and that in fact for two classes of change of state verbs, the first type of syntactic operation described above is at work in the formation of causative forms, while for one class the alternation is lexical.

Finally, **Anja Latrouite** investigates Tagalog argument realization patterns in Chapter 14 ('Event-structural prominence and forces in verb meaning'), with a special focus on the construal of events based on subject choice. Tagalog, a Philippine language classified typologically by Drossard (1984) as an "active" language, makes explicit aspects of causal

structure not visible in languages of the European type. The language is known for its complex verbal affixation, as well as the fact that almost every argument in a sentence can be the subject, and get marked on the verb by a voice affix signalling its thematic role. However, it has been observed that there are restrictions on subject selection and that voice choice may lead to shifts in the meaning, and interpretation of verbs. This paper explores these restrictions, and meaning shifts, and argues that voice selection is based on a number of prominence considerations on different levels. On the level of event structure, prominence is shown to be tightly linked to disparate elements associated with the causal construal of the event. Thus, the nature of events, the properties of the participants involved and the relation between them is shown to play a central role in the overall grammatical system.

Notes

[1] We can only speculate on how philosophical theories of causation might have developed differently through the ages if their proponents had been speakers of non-Indo-European languages.