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Social verbs: a force-dynamic analysis

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SOCIAL VERBS:
A FORCE-DYNAMIC ANALYSIS

by

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DISSERTATION

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DEDICATION

To my parents, Marcela and Luděk. Without their love, support, and encouragement this dissertation would not have been possible.

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ABSTRACT

This dissertation provides a semantic analysis of verbs that describe social events, i.e., events in which participants interact with each other on a social level. The following broad semantic categories of verbs are discussed: verbs of communication (e.g., *tell, say, advise*), transfer of possession verbs (e.g., *own, give, buy*), social role verbs (e.g., *work, hire, imprison*), verbs of interpersonal interactions (e.g., *fight, meet, bully*), and verbs that denote conceptual relations between entities (e.g., *differ, symbolize, indicate*). Despite their prominent status in the lexicon and frequent use in everyday situations, linguistic accounts of social verbs are quite limited, and a comprehensive survey of social verbs within a unified theoretical framework has not been proposed.

The primary objectives of the semantic analysis are to identify event structures associated with different social verbs (or VERB TYPES) and to formalize a representation for verbal and constructional semantics in the social domain. The analysis is anchored in Talmy's (1988) theory of "force-dynamics" and is guided by Croft's (1991, 2012) application of this theory in his event structure representation. This study reveals that in many social events, entities are conceptualized as undergoing the same types of changes as entities in physical events. Metaphorical extensions of

argument structure constructions used with physical verbs reveal that our conceptualization of social events is to a large extent motivated by our understanding of how events unfold in the physical world. Event structures associated with social verbs follow the same force-dynamic principles characteristic of physical events.

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Chapter 1: Introduction

1.1 Social verbs as a semantic category

The category of verbs that describe social events, here referred to as "social verbs," encompasses a vast amount of the verbal lexicon. In the broadest sense, social verbs describe various events in which people interact with each other on a social level or engage in activities or events that are socially sanctioned. Social verbs include verbs of communication (e.g., *tell, say, advise*), possession and transfer of possession verbs (e.g., *own, give, buy*), verbs in which people assume social roles or assign them to each other (e.g., *work, hire, imprison*), or conduct other interpersonal interactions with each other (e.g., *fight, meet, bully*).

Despite their prominent status in the lexicon and frequent use in everyday situations, linguistic accounts of social verbs are quite limited and a comprehensive survey of social verbs within a unified theoretical framework has not been proposed. Most studies of social verbs focus on a specific group of social verbs. For example, Fillmore (1969) focuses on verbs of judging such as *accuse, blame, criticize*, or *forgive*. Givón (1975) discusses the semantics of events of interpersonal manipulation, which includes verbs such as *force, forbid*, or *prevent*. Cuyckens and Parret (1982) discuss the semantics of communication verbs, such as *speak, talk, say* and *tell*. The semantics and syntax of transfer of possession verbs has received much attention (e.g., Oehrle 1976, Viberg 2010, Beavers 2011, Aikhenvald 2013, Goddard and Wierzbicka 2019). Rappaport Hovav and Levin (2008) include verbs of transfer of possession in their discussion of the dative alternation. A collection of typological studies on

verbs of giving can be found in Newman (1996, 1998). In other cases, various social verbs are incorporated into more general semantic and syntactic analyses (e.g., Levin 1993, Goldberg 1995, Van Valin 2004, Croft 2012).

Providing a unified account of social verbs raises diverse challenges that require special attention. One such challenge lies in the definition of the category itself. What should a category of social verbs be comprised of? Should social verbs be understood to denote only events in which a social interaction between people takes place? One approach to defining the category of social verbs is that they denote only events in which human entities interact with each other. In this account, possession verbs such as *borrow* or *give* would be included but verbs such as *owe* or *belong to* would be excluded since these verbs evoke only one agentive participant. Similarly, this definition would include communication verbs such as *tell* or *advise* but exclude verbs such as *say* or *whisper* which don't evoke interpersonal interactions. The other approach, which is adopted here, takes a broader perspective and defines the category of social verbs by including all events that cannot be said to describe physical or experiential events. By physical events, we mean events in which entities are either in a spatial or physical force relation with each other. In this account, the category of social verbs therefore excludes verbs of motion (and location), e.g., *run, leave, slide* (Talmy 1975, Tenny 1995), application and removal verbs, e.g., *place, spray, remove* (Iwata 2005, Beavers 2017), change of state verbs, e.g., *dry, break, cut* (Rappaport Hovav and Levin 1998), physical creation and emission verbs, e.g., *build, sing, gush*, or verbs of mental states and processes, e.g., *fear, amuse, judge* (Levin and Grafmiller 2013, Verhoeven 2007). The semantic classes that are included in the category of social verbs are enumerated in Chapter 2 (section 2.2).

Another challenge for the description of social verbs as a unified semantic category lies in the diversity of events that social verbs evoke. There are many different social situations that we experience and talk about and the broad semantic categories defined in the first paragraph demonstrate this variation, which is not seen with experiential or physical-domain verbs. In

the definition adopted here, events associated with social verbs range from communicative scenarios to situations in which people assume various social roles within institutions. Given this variation in social events, an analysis of social verbs requires a careful consideration of different semantic distinctions that must be made when defining semantic representations for these verbs.

Additionally, social verbs evoke events in which interactions between participants do not have tangible outcomes, unlike verbs of physical causation. The nature of social events thus lends itself to a less transparent semantic analysis. Furthermore, unlike physical or mental events, the interactions between participants in social events may temporally overlap. For example, many verbs of transfer of possession (e.g., *receive, give, take*) evoke an event in which an agent comes to gain control over a possession while at the same time the semantics of these verbs also implies that the possession is simultaneously being relinquished (willingly or not) by another person. Developing a semantic account of social events necessitates that the analysis clearly define which criteria are relevant for argument realization and the description of event structure.

Given the different types of events that social verbs evoke, it is challenging to come up with a unified definition for this category. The definition that we propose here is disjunctive in that we include events of interpersonal interactions in which two (or more) agents interact with each other as well as events that pertain to socially defined categories, such as ownership in the possession domain, the use of language in communication events, or the assignment of roles within social institutions or groups. Though many verbs of interpersonal interactions involve communication, the use of language is not evoked by all verbs in this domain (e.g., *fight, hug*). As such, the interpersonal interactions domain doesn't neatly fit the definition of social verbs as pertaining to socially defined categories. It is not my goal to come up with a definition that would allow us to easily unify the various social verb categories. I do not argue that social verbs should be defined as a coherent category. Rather, I acknowledge the challenge of having a unified definition for these verbs. As I note in my discussion of

Conceptual Relations, the definition of social verbs is not meant to be inclusive of these verbs. The events denoted by these verbs describe mental relations in which a cognizer establishes a conceptual relation between two (or more) entities.

1.2 Designing a verbal semantic representation

Verbal semantics is an area of great interest in theoretical linguistics, and many different approaches to a verb meaning representation have been put forth (Croft 1991, 2012, Dowty 1991, Davis and Koenig 2000, Van Valin 1993, Van Valin and LaPolla 1997, Rappaport Hovav and Levin 1998). There are different uses for verb meaning representations. A verb meaning representation can be used to infer the meaning of a clause. Verbal semantics supplies information about the structure of an event, i.e., which entities are evoked in the event and how they interact with each other. Knowing which entities a verb evokes allows one to make inferences about the arguments in a sentence and their role within the event. Verbal semantics is also an important determinant of the syntactic realization of participants in events. It has been observed by various scholars that verbs that share similar meanings exhibit similar argument realization patterns (Fillmore 1970, Levin 1993).

As first brought up by Fillmore (1970) in his famous *hit/break* example, hit verbs (*slap, strike*, or *bump*) and break verbs (*bend, fold*, or *shatter*) exhibit different syntactic behavior. Hit verbs do not occur in an argument structure construction in which the theme is realized as a subject (**The window hit*) while break verbs do (*The window broke*). This syntactic difference can be attributed to the event structure evoked by these verbs and holds for other verbs that are semantically similar. Fillmore explains that the reason for the grammaticality of the example with *break* is that the entity being acted upon undergoes a change of state and the event is construed as a change of state event. Change of state events do not require that an external causer initiates the event. Hit verbs, on the other hand, describe events of forceful contact and always occur in the causative alternation in which the subject is either an agent or a non-agentive causer, such as an instrument (Fillmore 1970:125).

Fillmore's (1970) idea that argument realization is largely associated with verb meaning is developed in much greater detail by Levin (1993). In her seminal work on verb alternations, Levin categorizes verbs into semantically coherent classes based on their shared syntactic patterns. She defines 49 distinct classes which include various verbs of physical and mental causation, as well as some verbs from the social domain, such as verbs of communication or possession. Her structured inventory of verb classes and syntactic alternations is a major contribution to studies on verb meaning and argument realization. It provides a comprehensive coverage of syntactic alternations associated with major verb classes and presents strong evidence that verb meaning and argument realization are closely associated. Her work is further developed in VerbNet (Kipper et al. 2008) which is discussed in more detail in Chapter 2.

Starting from the assumption that argument realization and verb meaning are linked together in a meaningful way, a representation for verbal semantics must identify which components of verb meaning are relevant to argument realization. As Levin and Rappaport Hovav (2005) write, a lexical semantic representation must be formulated on the basis of semantic distinctions that are relevant to argument realization. This is best done by constructing generalizations about the semantics of verbs which share syntactic patterns. Consulting large inventories of verb classes that are based on the shared syntactic realization of arguments, such as Levin's (1993) study, allows one to define broader semantically-coherent categories of verbs and determine which aspects of meaning are grammatically relevant.

Indeed, theoretical approaches to verbal semantics vary depending on what are considered to be linguistically relevant aspects of verb meaning. We do not aim to cover the long list of studies that have been published on this topic to date and instead refer our reader to Levin and Rappaport Hovav (2005) and Croft (2012) for an overview and a meaningful discussion of the various approaches to verb meaning representations. In the following sections, we situate our model of a verb meaning representation within the field by discussing the most relevant literature that has served as a theoretical framework for this dissertation.

The semantic analysis developed in this dissertation assumes that grammatically relevant facets of events are cognitively salient in a "pretheoretically" intuitive way (Levin and Rappaport Hovav 2005:78). The semantic principles that lead to argument realization are hypothesized to be anchored in a cognitive understanding of the world that is not strictly defined as specific to the linguistic domain. In particular, the semantic analysis uses a more general notion of "causation" (e.g., Langacker 1991) in which entities interact with each other on a causal level. Following Talmy's (1988) theory of "force-dynamics," which has been explored as a theoretical framework for a decompositional representation of event structure by Croft (1991,1993, 1998, 2012), we analyze events as describing transmission of force between entities. Our representation establishes that grammatically relevant aspects of meaning are rooted in the force-dynamic structure of events and the causal interactions between participants.

1.2.1 Verb construal

Most verb meaning representations are lexically-based, i.e., they rely solely on lexical semantics to represent the event evoked by a verb. However, a semantic representation of verb meaning must account for alternate uses of verbs in syntactic contexts that are not inherently associated with their meaning, such as the use of the verb *kick* in the examples given in (1). *Kick*, classified as a CONTACT BY IMPACT verb by Levin (1993), can be used as a verb of *throwing* in a caused motion argument structure construction (1b), a verb of *transfer of possession* in a double object construction (1c), or a *change of state* verb in a resultative construction (1d). The events evoked by these different argument structure constructions with *kick* describe more than just forceful contact. Additional participants are constructionally specified in (1b-1d). For example, the ground in (1b) specifies the location of the *football* and the recipient in (1c) tells us to whom the *football* was directed when it was kicked.

(1) a. Pat kicked the wall.

b. Pat kicked the football into the stadium.

c. Pat kicked Bob the football.

d. Pat kicked Bob black and blue. (from Goldberg 1995:11)

Examples of verbs used in different construals, such as the ones listed in (1), are challenging for semantic representations that are purely lexically based. The argument realization rules associated with these representations do not easily account for different verb construals, especially when verbs occur in clauses with arguments that are not evoked by the lexical semantics, such as the examples in (1c) and (1d). Though lexically-based representations distinguish different senses associated with verbs, and could potentially deal with examples of *kick* in (1a) and (1b), different syntactic construals are generally associated with the same verb sense and therefore the same lexical representation.

A 'different-sense' analysis could be used for the examples in (1a) and (1b). The verb *kick* is used as a verb of force, and this sense of *kick* belongs in Levin's (1993) 18.1 verb class which contains verbs of contact by impact. In (1b), *kick* is used as a ballistic motion verb. Levin classifies this sense of *kick* as a verb of throwing in class 17.1. Lexically-based models would likely propose two different semantic representations for these two senses of the verb *kick* and would therefore be able to deal with the distinct argument realization patterns in these examples. However, this type of analysis is not always viable. In particular, one cannot convincingly argue that *kick* has a sense in which it is a transfer of possession verb or a change of state verb in order to explain its occurrence in (1c) and (1d). A more comprehensive representation that doesn't rely solely on lexical semantics is needed in order to account for the events described in these examples.

Croft and Cruse (2004:40) use the term CONSTRUAL (Langacker 2008:55, Croft 2012:13) to explain the various uses of verbs in semantically different argument structure constructions. Construal refers to a different conceptualization of a situation. In (1c), *kick* is construed as a transfer verb and in (1d), it is construed as a change of state verb. The construal of a verb is determined by the semantics of an argument structure construction in which it

occurs. The notion of verb construal has been addressed by various scholars within different frameworks (Goldberg 1995, 2006, Iwata 2005). It is agreed that a semantic representation of events needs to consider not only the meaning of a verb but also the meaning of the argument structure constructions in which the verb occurs.

In her book on Construction Grammar, Goldberg (1995) argues that argument structure constructions carry meanings that exist independently of verbs. A construction grammar approach to verb meaning has a long tradition in cognitive linguistics (Fillmore and Kay 1995, Lakoff 1987, Brugman 1988, Fillmore, Kay and O'Connor 1988, Lambrecht 1994, Fried and Östman 2004). The main premise of construction grammar is that our knowledge of language structures is organized around complex syntactic units that have conventionalized meanings associated with them. Goldberg (1995:5) argues that "simple clause constructions are associated directly with semantic structures which reflect scenes basic to human experience." As she explains, argument structure constructions are associated with experientially grounded gestalts, such as causing something to move or causing something to change state. Using this analysis, the ditransitive [SBJ V OBJ OBJ] argument structure construction in (1c) carries a transfer meaning and the verb *kick* in this syntactic context is therefore interpreted as a transfer of possession verb. Similarly, the [SBJ V OBJ RESULT-PHRASE] argument structure construction in (1d) carries a change of state meaning in which the result phrase denotes the new state of the patient. The verb *kick* in this argument structure construction describes an event of forceful contact that leads to a change of state of the entity that was kicked.

Goldberg's (1995) construction grammar approach represents the event structure as a combination of verb meaning and the meaning of argument structure constructions. Her two-tier analysis is the basis for a representation of event structure that can tease apart lexical semantics evoked by verbs and the semantics of syntactic patterns associated with particular configurations of arguments in argument structure constructions. Using her approach, a verb that is 'inserted' into an argument structure construction may be associated with a gestalt that is different from the one that the verb is commonly associated with, as we see in the

examples in (1).

The notion of construal has also been used to explain the use of verbs in syntactic alternations in which the verb maintains the gestalt that it is commonly associated with, e.g., a transfer of possession verb in the transfer double object construction (*She sold Bill the book*), the *to*-oblique argument structure construction (*She sold the book to Bill*), or the simple transitive argument structure construction (*She sold the book*). This type of construal is somewhat different from the examples in (1c) and (1d), in which the *kick* is associated with gestalts that are different from its lexical semantics. In the transfer examples, the constructional semantics and the lexical semantics evoke the same gestalt, i.e., transfer of possession. The semantic analysis presented in this dissertation mostly deals with this type of construal, which is a result of our primary focus on verb meaning as well as the nature of the data used for the analysis (see Chapter 2).

This dissertations uses a two-tier representation of event structure which is motivated by Goldberg (1995). The analysis presented in this dissertation rests on the assumption that the meaning of verbs and their occurrence in argument structure constructions are closely tied together. A two-tier representation that distinguishes verbal semantics from constructional semantics can readily deal with the notion of construal and clearly represent how these two layers of meaning converge to describe an event.

1.2.2 Event structure and predicate decomposition

Different lexical semantic representations exist depending on how they represent semantically relevant aspects of meaning. Two broad approaches to lexical representations exist. One type of representation uses semantic role labels to define the role of a participant in an event (e.g., Fillmore 1968, Gruber 1965, Jackendoff 1972, 1976). In this representation, a list of labels (e.g., AGENT, PATIENT, THEME, or INSTRUMENT) is used to identify the semantic role of each argument depending on its function within an event. The other type of representation decomposes events into semantic primitives. Semantic primitives are schematic

units that are used to describe key semantic properties or components of events. This type of representation is referred to as PREDICATE DECOMPOSITION in the literature and depicts the EVENT STRUCTURE associated with verb meaning. The force-dynamic analysis of event structure developed in this dissertation uses a decompositional approach.

The use of semantic role labels to define the role that arguments bear in a sentence is problematic for a number of reasons. A comprehensive overview of the literature on semantic roles and the criticism that this type of analysis has triggered is extensively covered in Levin and Rappaport Hovav (2005). One of the chief concerns with the use of semantic roles is that defining a limited set of labels and applying those to arguments associated with different verbs leads to various inconsistencies in semantic analyses. As many have pointed out, the level of granularity associated with the definition of semantic role labels poses a number of different issues. For example, it leads to an analysis in which the identification of roles associated with syntactic arguments is made to fit the generalized definitions whether the arguments bear precisely the same semantic role or not. Using an example from Levin and Rappaport Hovav (2005:39), the semantic role that is typically labeled as INSTRUMENT subsumes various types of facilitating objects which do not always behave grammatically alike. An instrument is typically defined as "an inanimate entity manipulated by an agent in the carrying out of an action" (Van Valin and LaPolla 1997:85). This definition subsumes intermediary instruments, which can act as causers in the absence of an agent, as well as facilitating instruments, which cannot perform the action independently. The distinct semantic roles of these instruments are reflected in their grammatical behavior (McKercher 2001:52-54, Ono 1992). In the absence of an agent, facilitating instruments cannot be expressed as subjects (**The fork ate the chicken*) while intermediary instruments can (*The stone broke the window*). In order to define a finite set of roles, sweeping generalizations are at the heart of representations that use semantic role labels.

Inventories of semantic role labels vary depending on the author and the subject matter investigated. In some cases, more distinctions between semantic roles are made depending

on the verbs that are analyzed, which Dowty (1991:553-55) refers to as "role fragmentation." Various types of semantic roles have been proposed after deeper semantic and syntactic analyses, leading to large inventories of labels. Moreover, in some cases, semantic roles that are individually tailored to specific verbs have been proposed. A unified analysis of semantic roles has not been pursued because there is not a general agreement on a finite list of semantic roles among scholars. Pertinent to the discussion of argument realization and meaning representation, "an unstructured list of semantic roles does not give any insight into why semantic roles figure in argument expression in the way they do" (Levin and Rappaport Hovav 2005:44). Formulating semantic generalizations for argument realization using semantic role labels is therefore very limited.

A decompositional analysis to verb meaning has also received much attention (Jackendoff 1976, 1990, Van Valin and LaPolla 1997, Croft 1991, 2012, Kipper et al. 2008). This type of representation decomposes verb meaning into basic semantic primitives which are used to describe the meaning of a wide range of semantically similar verbs. Depending on the underlying theoretical framework, different sets of semantic primitives are defined though frequently recurring predicates include ACT/DO, CAUSE, BECOME, GO, BE, STAY and LET (Levin and Rappaport Hovav 2005:74). For example, causative change of state verbs such as *dry* or *open* may be defined using the predicates CAUSE and BECOME. CAUSE takes two arguments as predicates: [X ACT] and [Y BECOME <DRY>]. The first argument of the predicate CAUSE is the causer (e.g., an agent or an instrument) and the second argument is the patient who undergoes a change of state specified by the predicate BECOME (Levin and Rappaport Hovav 2005:71). Decompositional analyses are designed in such a way that semantic classes of verbs that describe similar events share their representations or subparts of their representations. Verbs in these semantically coherent classes share grammatically relevant semantic components. However, as noted by Croft (2012:193), "most analysts who employ event decompositions do not use them to define relative positions of arguments in predicates."

Croft (1991, 1993, 1998, 2012) proposes a decompositional model of event structure that is substantially different from the above mentioned models, which are designed in the generative linguistics tradition. His model is event-based and uses properties of event structure to capture the role ranking of arguments that motivates their syntactic realization. Inspired by Talmy's (1998) theory of "force dynamics," Croft's analysis defines the components of verb meaning based on causal interactions between participants within the same event. As such, participant roles are defined relative to other participant roles. Argument realization is determined by the causal structure of events and, more specifically, the transmission of force-dynamic relations between participants in events (Croft 2012:198).

This dissertation uses Croft's force-dynamic model of event structure to represent the semantics of social verbs and argument structure constructions associated with them. The advantage of using a force-dynamic analysis to define verbal event structure lies in the premise that causal structure of events motivates syntactic realization of participants (Croft 2012:197). It has been shown that languages frequently employ syntactic means to distinguish between events that are causally distinct (cf. Talmy 1976, 1988, Croft 1991). Determining the underlying force-dynamic relations in events thus sheds light on the syntactic realization of participants and vice versa. A force-dynamic analysis provides a great tool for cross-examining the viability of an event structure representation with the syntactic realization of participants. Using this framework allows us to design a semantic representation for verb classes that is also informed by the argument structure constructions in which these verbs occur. The following sections discuss Croft's force-dynamic model in greater detail to provide adequate background to the semantic representation used in this dissertation.

1.3 Causality and the force-dynamic analysis of events

Force dynamics is used as a semantic category that schematically describes causal interactions between participants in events. Talmy's (1976) model of transmission of force, which was later termed FORCE DYNAMICS, is a variation of the "billiard ball" model of causation

(Langacker 1991) in which participants interact with one another using force. Talmy (1976) introduces four types of causation based on the type of initiator and endpoint: volitional, physical, inducive, and affective. Volitional and physical causation describe events in which the ENDPOINT (Croft's 1991:167 term for the entity being acted upon) represents a physical entity. In volitional causation, the causal interaction is initiated by a mental entity (2a), whereas in physical causation, it is initiated by a non-mental entity (2b). Inducive and affective causation describes events in which the endpoint is a mental entity. In inducive causation, the event is initiated by a mental entity (2c) and in affective causation, it is initiated by a non-mental entity (2d).

(2) a. Johnny broke the window.

b. The rock broke the window.

c. Sarah convinced me.

d. The dog frightened me. (from Croft 2012:199)

Talmy's (1976) model of causation informs Croft's (1991) force-dynamic approach to the analysis of participant roles in event structure and their argument realization. Croft argues that the syntactic realization of participants in event structure is determined by the force-dynamic relations between them, which is supported by cross-linguistic evidence. Participant roles within events are defined relative to other participants in the same event (Croft 2012:198). The event structure is depicted as a CAUSAL CHAIN in which each event participant is in a force-dynamic relation with another participant. The ordering of participants in causal chains is linear and the force-dynamic relations between them are asymmetric, leading to a representation that is directed and acyclic and clearly depicts the transmission of force between participants. The first member of a force-dynamic relation is termed the INITIATOR and the second member is the ENDPOINT (Croft 1991:177, Croft 2012:198). Causal chains are non-branching structures, i.e., each participant is engaged as an initiator or endpoint in exactly one force-dynamic relation.

An example of a causal chain representation is shown in Figure 1.1. The causal chain depicts the event structure for an example *Sue broke the coconut with a hammer for Greg* (adapted from Croft 1991:177). The causal chain consists of four participants, and each participant represents a 'node' in the chain. *Sue* initiates the event and is therefore the first node in the causal chain. The *hammer* precedes the *coconut* in the representation because its manipulation by the agent causally precedes the breaking event. *Greg* is the last node in the chain because he is intended to benefit from the breaking event.

Figure 1.1: A causal chain representation for *Sue broke the coconut with a hammer for Greg.*

Croft (1991, 2012) argues that the causal structure of events motivates argument realization. The ordering of participants in causal chains has consequences for their syntactic realization. As he explains, "the fundamental semantic property that determines participant role ranking for argument realization is the causal structure of events, more specifically, the transmission of force relationships between participants" (Croft 2012:198). To this end, Croft (2012:221) defines a set of linking rules and formulates a 'Causal Order Hypothesis' that explains the correspondence between participants' relative ordering in causal chains and their argument realization. The subject and the direct object (if any) link to the initiator and the endpoint of a VERBAL PROFILE, respectively. Verbal profile designates core argument roles associated with the event structure evoked by the verb and the particular argument structure construction in which the verb occurs. For example, the verbal profile for the verb *break* designates a causer and an object that is broken as core argument roles. *Sue*, the initiator of the breaking event, is expressed as a subject and the *hammer*, the endpoint of the event, is expressed as a direct object in the example *Sue broke the coconut with a hammer for Greg.*

Additional participants, such as instruments or beneficiaries, may be included in the causal chain. Depending on their role in the event structure, i.e., their ordering in the causal chain with respect to other participants, additional participants may be syntactically ex-

pressed as either "antecedent" or "subsequent" oblique arguments. Participants that causally precede the direct object in the causal chain are syntactically expressed as antecedent obliques while participants that causally follow the direct object are expressed as subsequent obliques. Croft (2012) defines a set of prepositions that are associated with antecedent and subsequent obliques in English. For example, the hammer in the example *Sue broke the coconut with a hammer for Greg* is expressed as an antecedent *with*-phrase while the beneficiary Greg is expressed as a subsequent *for*-phrase. Other antecedent oblique phrases include prepositions that express instruments (e.g., *by* as in *I went downtown by bus*), comitatives (e.g., *with* as in *I went to the park with Carol*), or causes (e.g., *of, from/out of* as in *The rabbit died from/of thirst*) (Croft 2012:223). Subsequent obliques include prepositions denoting result states (e.g., *to, into* as in *The boy carved the stick into a knife*) or prepositions that express a spatial relation between two physical entities (e.g., *on, onto* as in *He loaded hay onto the truck bed*).

In the causal chain depicted in Figure 1.1, the force-dynamic relations between participants are analyzed as CAUSAL and are depicted by arrows. However, causal chains may also consist of NON-CAUSAL relations between participants, such as a spatial relation between two entities that are in a FIGURE and GROUND relation with each other, e.g., the relation between water and cup in a placing event *He poured water into the cup* or the agent and the door in a motion event *He ran to the door*. Non-causal relations are asymmetric; the figure's location (or motion) is defined with respect to a ground object which functions as a reference point (Croft 2012:226). Following Croft (2012), non-causal relations are depicted using lines without an arrowhead to be clearly distinguished from causal interactions.

Croft's model of event decomposition in which semantic roles are derived from argument positions serves as a theoretical framework for the more formalized event structure analysis and representation proposed in Croft et al. (2016, 2017, 2021a)[1]. Their application of the force-dynamic model is used for the analysis of physical verbs, given the obvious application

[1]Deriving semantic roles from syntactic structure in event decomposition has been proposed by other scholars in the linguistic literature (e.g., Van Valin and LaPolla 1997).

of this theory to events in which entities interact with each other using physical force. Croft et al. build on Croft's (2012) causal chain model by specifying a limited set of force-dynamic relations between participants in the physical domain. The decompositional analysis and its formalization proposed in Croft et al. is based on semantic analyses of physical domain verbs presented by Dowty (1991), Tenny (1994), Hay et al. (1999), Verhoeven (2007), and others.

1.3.1 Participants and their subevents

Croft (2012) proposes a three-dimensional representation of events in which he integrates causal and aspectual structures evoked by the semantics of predicates in argument structure constructions. The three dimensions represent a qualitative and temporal dimensions (i.e., the aspectual structure) and a causal dimension (i.e., the causal structure). The temporal and qualitative scales define what each participant does or the change that it undergoes over the course of the event. The causal relation describes how the participants causally interact with one another. In this representation, each participant is associated with a subevent. The subevent describes the participant's engagement in the event, such as their action or the type of change that it undergoes.

Croft (2012:212) illustrates this analysis on the example *Jack broke the vase*, shown in Figure 1.2. Each participant has its own aspectual contour which represents the subevent of the participant. The analysis of *Jack's* subevent, which is his action of making forceful contact with the *vase*, is represented as a directed action on the qualitative dimension. The *vase* undergoes a change of state when it is broken and its aspectual contour depicts a subevent that is directed and results in a permanent change on the qualitative dimension. The event of breaking is instantaneous, which is represented by a vertical line on the temporal dimension. The causal interaction between the subevents is depicted by an arrow that is directed from *Jack's* subevent to the *vase's* subevent.

When overtly expressed, participants are syntactically realized as arguments. In the

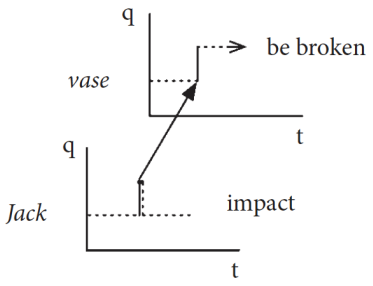

Figure 1.2: Croft's (2012) three-dimensional representation of event structure

example *Jack broke the vase*, *Jack* is the subject and *the vase* is expressed as the direct object. Their subevents are not overtly expressed in this example; however, both participants and subevents can be realized as arguments (e.g., *His erratic gesturing broke the collectibles on the shelf*). Subevents can function as semantic arguments of the main predicate; however, they are frequently omitted from analyses of argument realization (Croft and Vigus 2020:167). We include subevents in our analysis of social events but analyze them only with respect to the event's force-dynamic structure. Our semantic analysis of social events does not include an aspectual analysis (i.e., the temporal and qualitative changes) of events in the social domain because it is a distinct dimension from the force-dynamic analysis. The semantic analysis discussed here is solely focused on the force-dynamic dimension.

Croft and Vigus (2020) propose a force-dynamic analysis for participants' subevents and their representation in causal chains. In particular, Croft and Vigus focus on event nominals and their syntactic realization in argument structure constructions. As Croft and Vigus argue, either the participant or their subevent may be used to describe that participant in a sentence (3). For example, in (3a), the subject argument *tweets* is an 'event nominal' that describes an action of a participant that is not syntactically expressed. Croft and Vigus define an event nominal as any nominal that refers to an event. The example in (3a) could be paraphrased to include the participant who carries out the event as well, as shown in (3b). Alternatively, only the participant may be expressed (3c).Whether it is the participant, the participant's subevent, or both that are expressed as arguments does not change the meaning of the argument structure construction (Croft and Vigus 2020:169). In all three examples,

the president and his tweets refer to a single participant. The tweets specify the president's action, and the president is the participant in that event.

(3) a. The tweets shocked the Democrats.

b. The president's tweets shocked the Democrats.

c. The president shocked the Democrats.

Croft and Vigus (2020) analyze event nominals as SUBEVENTS of participants. They use the term subevent to refer to events and propositions that are associated with event participants but are realized as separate syntactic arguments in argument structure constructions. Croft and Vigus establish that event nominals follow the same argument realization rules as the participants that they are associated with and when both the participant and their subevent are realized as distinct arguments, the subevent is construed as subsequent to the participant in the causal chain. To demonstrate their claims, Croft and Vigus discuss the following VerbNet examples in (4) (Croft and Vigus 2020:171). In both examples, the subevent of the initiator of the event is expressed as an antecedent *with*-oblique. The endpoints of the causal interactions are expressed as direct objects. As antecedent obliques, the event nominals precede the endpoint in the causal chain representation. As such, the subevent is subsequent to the participant with whom it is associated but antecedent to the endpoint of the causal chain.

(4) a. John confronted it with emergency measures. (VerbNet)

b. Russia subjugated Mongolia with overwhelming force. (VerbNet)

Subevents represent the participant's engagement in an event and therefore do not occur in causal chains on their own without the participants with which they are associated. That is, subevents alone are not depicted as 'nodes' in causal chains since it is the participants that engage in force-dynamic interactions. The participant is therefore always included in the causal chain when their subevent is syntactically realized, whether the participant is overtly expressed or not. For example, a causal chain representation for the example in

(3a) would have to include the participant *president*. Information about the participant is frequently inferable from context when it is syntactically covert. When it is not, as in the example *They forbid smoking*, a generic participant is specified in the causal chain.

Croft et al. (2018) define ENGAGE and REFRAIN 'relations' which establish that two distinct syntactic arguments in the same clause refer to the same participant in the causal chain. The ENGAGE relation is used when a participant is engaged in an event, as in the examples in (4). The REFRAIN relation is used when a participant is not engaged in an event (e.g,. *He quit smoking*). Though Croft and Vigus (2020) focus their discussion on examples in which subevents denote events or actions and are expressed as nominals; (e.g., *the clown's antics, the army's demands,* etc.), their analysis is applicable to other semantically-diverse types of subevents such as roles or attributes. In all of these instances of subevents, the argument describes an event, a role, or an attribute that the participant is engaged in. We discuss specific examples of subevents that denote roles and attributes in our discussion of Social Role verbs in Chapter 3.

1.3.2 Force-dynamic relations

Croft et al. (2016, 2018) specify a limited set of force-dynamic relations that define the interactions between participants in the physical and mental domains. They differentiate between two main types of relations: causal and non-causal. In both cases, the interaction is directional (or 'asymmetric'); however, only causal relations lead to a change in the endpoint. Non-causal relations are directional; however, the interaction between entities does not lead to change. In the physical domain, Croft et al. (2016) define FORCE and PATH relations which are used to describe causal and non-causal interactions between participants, respectively. In the mental domain, Croft et al. (2018) define a causal AFFECT relation and non-causal EXPERIENCE, and ATTEND relations.

FORCE describes the prototypical physical transmission of force in which the initiator causally interacts with another entity. It is commonly expressed by verbs of physical force

such as *hit* or *punch* as in *He hit the ball/window* or *He punched him* in which the interaction between the agent and the theme results in the theme moving, breaking, or being affected in some other way. FORCE also defines segments in causal chains in which an event of physical causation is externally initiated by an entity, e.g., an agent or an instrument in the following change of state examples: *He broke the window* or *The rock broke the window.*

The non-causal PATH relation is used to describe a spatial relation between a figure and a ground. The spatial event may be static or dynamic. Static spatial events describe locative events in which the location of a figure is determined with respect to another entity, a ground (e.g., *The statue stood in the town square* or *Bees are swarming in the garden*). Dynamic events in which two entities are in a spatial relation with each other include motion events (e.g., *He went to the store*) or events of application and removal (e.g., *He put the cup on the table* or *He took the food from the fridge*).

Croft et al. (2018) also define force-dynamic relations for mental domain events. Unlike physical events, mental events don't describe physical transmission of force. The interaction between participants takes place on a mental level in which a person, an 'experiencer,' interacts with an external situation (a phenomenon, an entity, etc.), called a 'stimulus.' Depending on the type of interaction, three distinct relations between the two participants are posited: AFFECT, ATTEND, and EXPERIENCE. In AFFECT the stimulus causes a reaction in the experiencer (e.g., *The loud noise scared her*). In ATTEND, the agent directs their attention to a stimulus (e.g., *He watched the birds in the tree*). This type of event evokes a volitional activity by the experiencer. The stimulus does not undergo any change in the event. EXPERIENCE is a stative experiential relation between an experiencer and a stimulus. Either the experiencer or the stimulus may be construed as initiators of the event. In an example such as *Dogs frighten her*, the stimulus, *dogs*, initiates the event. In *She fears dogs*, it is the experiencer who is construed as the initiator. However, in both examples, a stative relation holds between the two participants. Croft et al. (2018) also defined a JUDGE relation in which a cognizer uses an active mental process to reason about some phenomenon (e.g.,

She analyzed it as a motion verb). This relation is different from ATTEND in that JUDGE leads to a conclusion, classification, or measurement of the given phenomenon through the process of comparing, categorizing, inferring, or measuring.

Force-dynamic relations are specific to each semantic domain. We define a different set of labels to describe the interactions between participants in social events. Similarly to the physical domain, we distinguish causal and non-causal relations. However, we also define other relations that do not describe force-dynamic interactions between participants. These types of relations are domain-independent in that they are not restricted to the description of social events. For an inventory and examples of these and other social domain relations, see section 2.3.1 in Chapter 2.

Force-dynamic relations alone are not sufficient for the description of the event structure associated with different types of events. For example, PATH is used to define the relation between figure and ground in a variety of events such as application, removal, motion, or location. Thus, establishing a PATH relation between two physical entities does not allow us to distinguish between stative locative or dynamic motion construals. It is therefore essential to the semantic analysis to also define the type of change that participants undergo in events.

1.3.3 Event types in the physical domain

The force-dynamic description of events includes information about the type of change that each participant undergoes. In every event, there is an entity that is defined as the 'theme participant.' The type of event determines what type of change the theme participant undergoes. This information allows finer-grained distinctions to be made between event types. We summarize the various theme types defined for the physical and mental domains here. For further discussion on this topic, we refer the reader to Croft and Kalm (2022).

Croft et al. (2017) define five types of changes that describe the theme participants' engagement in the event: 1) property change (PROP) in which an entity as a whole undergoes a change in a scalar property (e.g., the change that a wall undergoes in a painting event in

Event types
a. constrain, contact, contact by impact, exertion
b. application, removal, covering and filling, uncovering, combination, separation
c. directed motion, ballistic motion
d. change of state
e. creation, formation
f. existence/modes of being, location

Table 1.1: Physical domain event types (from Croft and Kalm 2022)

the example *She painted the wall blue*), 2) motion change (MOT) which involves a change in a spatial figure-ground relation between two entities in which the figure traverses a path as a whole (e.g., the change that a ball undergoes in the example *The ball rolled down the hill*), 3) mereological change (+MER, -MER) in which the motion of the theme happens part by part, rather than holistically (e.g., the application of butter in the example *I spread butter on a toast*), 4) design change (DES) in which an object is created de novo, formed from another entity, or through replication (e.g., *They built a house*), and 5) internal (INTL) change in which a participant undergoes an undirected change (e.g., the non-translational motion of a flag in the example *The flag fluttered*) or the participant is engaged in an internal process that is understood to be dynamic.

These theme types are based on the various categories of events that are found in the physical domain. Croft and Kalm (2022) distinguish six distinct categories of force-dynamic image schemas in the physical domain, listed in Table 1.1. Force-dynamic image schemas are not derived from a verb meaning or the semantics of an argument structure construction. Image schemas represent schematic conceptualizations of events that are expressed by verbs in argument structure constructions. Argument structure constructions do not determine the force-dynamic construal of the verb, they only constrain it, and verbs also don't determine the image schema as they can be construed in different ways depending on the argument structure construction in which they occur. It is the combination of the constructional and verbal semantics that determines the image schema.

Events of constraining, contact, or exertion in (a) all evoke the exertion of force from one

entity to another and can be analyzed in terms of the force-dynamic distinctions proposed by Talmy (1988). In events of constrain, the use of force results in the Agonist staying at rest, despite its tendency towards action (e.g., *He held the ball*). In contact, contact by impact and force exertion, the Agonist resists the force exerted by the Antagonist (e.g., *He tapped the window*). The endpoint of force is not specified as a theme type since no change happens to this participant in the event. However, in some examples of force exertion, a change may be contextually implied or constructionally evoked. For example, in the example *He pushed her to the floor*, the argument structure construction evokes a motion event in which the forceful interaction results in the motion of the theme. The motion event is evoked by the constructional specification of a ground participant, *the floor*, which serves as a reference point for the motion of the theme.

Events of application, removal, covering and filling, uncovering, combination, and separation evoke a mereological theme. The mereologically incremental change is analyzed with respect to a ground object. The interaction is essentially spatial; the theme moves towards or away from another physical entity. The relation between participants is therefore defined as PATH. What distinguishes these different image schemas associated with a mereological theme type is which participant is construed as the theme and therefore grammatically realized as a direct object. In application and removal events, the theme is the figure (e.g., *She smeared grease on the pipe* and *She wiped the dust off the table*). In covering/filling and uncovering events, the theme is the ground (e.g., *He sprayed the wall with paint* and *I stripped the trees of bark*). In combining and separating events, the entities are construed as being in a more symmetric relation in that there is no clear distinction between which entity represents the figure and which the ground (e.g., *I mixed the egg into the dough*). Consequently, it is possible to syntactically express the figure and the ground as a plural argument in symmetric construals (e.g., *I mixed the egg and the dough together*).

Directed motion and ballistic motion image schemas in (c) evoke a motion theme that is in a spatial PATH relation with a ground. Directed motion events may be autonomous (e.g.,

The ball rolled down the hill) or may be initiated by an entity that is 'external' to the root (motion) event (e.g., *He rolled the ball down the hill*). Ballistic motion events are always initiated by an external entity (e.g., *He kicked the ball across the stadium*). Other motion events that evoke agentive initiators can be expressed by bring, carry, or vehicular motion verbs. With vehicular motion verbs, the means of transport (i.e., the vehicle) is included in the event structure description.

The change of state image schema in (d) evokes a property theme. The entity undergoes property change, such as a change in its size, shape, consistency, or some other feature. The change may be instantenous (e.g., *The window broke*) or happen incrementally over time (e.g., *The clothes dried*). The aspectual dimension, i.e., how the change unfolds over time, is not relevant to the theme type which is defined with respect to force-dynamic properties. Following Hay, Kennedy and Levin (1999), we argue that this type of change is distinct from mereological change which is characteristic of events of application and removal. In change of state events, the change that a property theme undergoes is not defined with respect to another object, as is the case with mereological themes.

Creation and formation image schemas in (e) evoke events with a design theme. In both events, an entity comes into existence; however, the formation image schema also evokes the 'material' from which the theme is created (e.g., *He built a house out of bricks*). Creation events, such as performance events, do not obligatorily evoke the material participant (e.g., *She sang a song*). The design theme may refer to creation proper (e.g., *She baked a cheesecake*) or the replication of an entity (e.g., *She painted the queen*).

Location events in (f) evoke a static PATH relation between two entities in which one entity's location is defined with respect to another entity. Unlike in motion events, the figure does not undergo any change in location events and is identified as an existence (EXIST) theme. In some cases, the location of an object may be expressed with a dynamic verb such as *flutter* as in *The flag fluttered over the fort.* In such examples, the figure is construed as undergoing internal change that is undirected. As Croft and Kalm (2022) explain, an

internal process may be used to express a static location. Levin (1993) calls these events "modes of being". Verbs that can be used to describe such events include verbs of motion, such as *wobble, wave, flap*, or *flutter*, verbs of being, such as *flower* or *bloom* (*Roses flowered in the garden*), or verbs of sound existence, such as *echo* or *resonate* (*The voices echoed in the hall*).

Croft and Kalm (2022) also define a category of emission and ingestion image schemas, which is not included in Table 1.1. This category of events does not evoke a distinct theme type from the ones we have already covered. In fact, emission and ingestion events evoke two different theme types. Emission events evoke an emitter that creates an emission (e.g., *The fountain gushed* or *The door hinges squeaked*). The emission is a design theme as it comes to exist through the process of being emitted. Unlike creation events, the emission event evokes a spatial relation between the initiator, i.e., the emitter, and the design theme. The emission is not frequently expressed as a syntactic argument of emission verbs in English. Ingestion events evoke a different theme type from emission events. When substance is ingested, it undergoes a change of state, and it is therefore analyzed as a property theme. This analysis follows Croft at al. (2016) who analyze events of destruction as change of state events in which the ingested entity's physical properties change when it is consumed.

The above defined theme types associated with different image schemas in the physical domain inform our analysis of events in the social domain. Though theme types are originally derived from categories of events in the physical domain, they are not specific to physical events. Theme types describe more general conceptualizations of the types of change that participants undergo in events and can be used in any domain. Indeed, Croft et al. (2018) use a subset of labels identified for events in the physical domain to describe the changes that participants undergo in mental events. For example, an experiencer who undergoes a change of mental state is identified as a property (PROP) theme. In our analysis of social domain events, we use the same inventory of labels to identify the type of change that is characteristic of each participant in the event. A detailed discussion and examples of theme

types in the social domain can be found in section 2.3.2.

Participants that do not semantically function as the theme are also labeled in force-dynamic representations. The label EXIST is used for participants that do not undergo any change in the event, such as a ground participant which serves as a reference point in a spatial relation with a figure (e.g., a *hill* in the motion example *The ball rolled down the hill*). Other non-theme participants include external initiators. External initiators are participants who initiate the causal chain and are external to the core event, such as the agent in the example *He rolled the ball down the hill.* External initiators are specified for their volitionality, i.e., whether the event is initiated by an agent, who employs their mental and physical capacities, or a physical entity, in which case a mental capacity is not needed for the event to take place. In an example such as *He hit the door*, the initiator *he* is a volitional entity (VOL) but in an example such as *The stick hit the door*, the initiator is a physical entity (PHYS) (Croft et al. 2017:103). These labels are domain-independent semantic features, similarly to theme types.

1.4 Constructional vs. verbal semantics

The event structure representation developed in this dissertation for social domain verbs distinguishes constructional semantics from verbal semantics. It has been shown that an event structure is not solely predictable from lexical semantics or the meaning of the argument structure construction in which a verb occurs (Goldberg 1995, 2006, Iwata 2006). A verb can be construed in different ways depending on the argument structure construction in which it occurs, as we discussed in section 1.2.1. Our examples with *kick* showed that constructional meaning and verb meaning do not always align and a separate representation is needed to distinguish which part of the event structure is evoked by constructional semantics and which by verbal semantics.

To represent the semantics of argument structure constructions and verbs, we employ the same inventory of causal relations and labels for the type of change that participants' changes

undergo in events. The representation associated with constructional semantics is referred to as 'causal chains' and the representation associated with verbal semantics is referred to as 'verbal event structure.' As shown in Figure 1.3, causal chains 'map' to the verbal event structure. This type of representation provides a more comprehensive understanding of the semantics of the event and the correspondences between lexical and constructional semantics. A two-tier representation also allows us to effectively distinguish the semantics of argument structure constructions associated with different construals of the same verb.

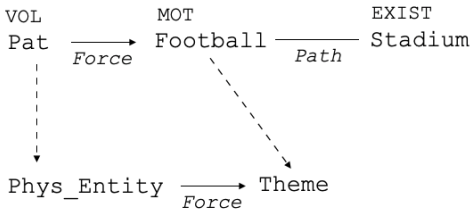

Figure 1.3: A mapping of a causal chain representation for *Pat kicked the football into the stadium* to the Force event structure.

Figure 1.3 shows an example of a mapping of a causal chain associated with the physical domain example *Pat kicked the football into the stadium.* The analysis presented here depicts the lexical semantics of the verb *kick* as a contact by impact verb in a motion construal. If the verb was analyzed as a throw verb, the verbal event structure and the constructional semantics would look the same, and there would be a one-to-one mapping between participants in the causal chain and the verbal representation.

Compared to the causal chain depicted in Figure 1.1, the representation of the event in Figure 1.3 provides a more comprehensive formalized description of the event structure by specifying the force-dynamic relations between participants and the changes that each participant undergoes in the event. The verb *kick* evokes a Force event structure in which a physical entity (labeled as Phys_Entity) initiates a FORCE relation with another physical entity (labeled as Theme). The type of change that these participants undergo in the event is not specified in the verbal representation. The Phys_Entity may be volitional or physical (i.e., it may act non-volitionally) and the type of change that the Theme undergoes is not

evoked by the verbal semantics; it is evoked contextually with specific examples. As shown in Figure 1.3, changes for each participant are specified in the causal chain representation. *Pat*, a volitional initiator of the FORCE relation, maps to the Phys_Entity, and *football*, the endpoint of the FORCE relation, is identified as a motion (MOT) theme because it moves with respect to the ground entity, the *stadium*. The relation between the *football* and the *stadium* is defined as PATH, and the *stadium* is labeled EXIST as it doesn't undergo any change in the event; it's simply a reference point for the figure in the motion event. The stadium does not map to any participant in the verbal event structure since Force verbs do not evoke anything beyond a FORCE relation between two entities. The PATH relation with a ground is constructionally evoked in the Motion construal.

Importantly, as shown on the mapping in Figure 1.3, a two-tier representation of event structure allows us to distinguish the semantics associated with argument structure constructions and verbal semantics. This is useful in identifying construals that are semantically quite different from the verb meaning as well as metaphorical extensions of argument structure constructions across domains, which are commonly encountered in the syntactic realization of arguments in social events (Kalm et al. 2020). Additionally, a separate representation of event structure associated with verbal semantics allows us to represent more complex relations between participants when needed, such as in events of ingestion or vehicular motion in the physical domain (Kalm et al. 2019, Croft and Kalm 2022).

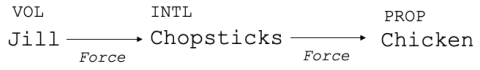

Figure 1.4: A causal chain representation for *Jill at the chicken with chopsticks*.

As Croft and Kalm (2022) explain, a causal chain associated with constructional semantics sometimes provides a simplified description of the event. For example, verbs of ingestion require a more detailed representation of the event structure to identify all the causal interactions that take place between participants. Croft and Kalm use the example of an ingestion event *Jill ate the chicken with chopsticks* to demonstrates this point. As

shown in Figure 1.4, the constructional semantics describes a change of state event in which *Jill* consumes the *chicken*. The *chopsticks* are syntactically expressed as an instrumental *with*-phrase and are therefore analyzed as an instrument participant in the force-dynamic representation. However, they are semantically different from more prototypical instruments used with other change of state verbs, such as the object *hammer* in the example *Tony broke the window with a hammer*. In this event, the *hammer* directly causes the breaking of the window. The role of the *hammer* is different from the role of the *chopsticks* because the *chopsticks* do not consume the food. As Croft and Kalm explain, the utensil causes the eating of the food only indirectly. It is the agent who consumes the food; the utensil only facilitates this event by moving the food into the agent's mouth.

The distinct semantic roles associated with different types of instruments lead to their distinct uses in argument structure constructions (McKercher 2001:52-54, Ono 1992). As an 'intermediary instrument' the hammer can be construed as a subject with the verb *break* when the agent is syntactically covert (e.g., *The hammer broke the window*). However, 'facilitating instruments', such as a utensil in the ingestion example, cannot be construed as causers and therefore do not occur in argument structure constructions in which they are expressed as subjects (e.g., **The chopsticks ate the chicken*). As Croft and Kalm explain, this fine-grained semantic difference between intermediary and facilitating instruments is not captured in the causal chain representation for the change of state [SBJ V OBJ *with*-OBL] argument structure construction. Supplementing the causal chain representation with a verbal event structure representation provides an additional layer of information that is needed to differentiate between these two types of semantic roles.

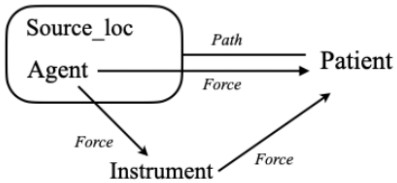

Figure 1.5: Ingestion event structure (from Croft and Kalm 2022)

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As Croft and Kalm show, in some event structure representations the interaction between participants yields a cyclic structure. Consequently, they refer to verbal representations as verbal 'networks.' As shown in Figure 1.5, the event structure evoked by Ingestion verbs is a cyclic network in which some participants are engaged in more than one causal relation with each other. The Ingestion event structure describes an event in which an Agent uses an Instrument (i.e., a utensil) to move a Patient (i.e., food) to their mouth and subsequently consumes it. The Agent is thus engaged in three separate force-dynamic relations in this event: 1) the Agent manipulates the Instrument, which is defined as a FORCE relation, 2) the Agent is in a spatial PATH relation with the Patient when the Patient moves towards the Agent, and 3) the Agent consumes the Patient, which is also defined as a FORCE relation between the Agent and the Patient.

Importantly, the event structure representation shows that the Instrument is not intermediary to the consuming event (i.e., the FORCE relation between the Agent and the Patient); its role is to facilitate the motion event in which the Patient is moved to the Agent's mouth. The motion event precedes the consumption of the food, i.e., the change of state event of the Patient. However, this temporal ordering of causal relations is not transparent from the causal chain associated with the semantics of the change of state [SBJ V OBJ *with*-OBL] argument structure construction shown in Figure 1.4. In this construction, the utensil is understood to be an intermediary participant in the change of state event, which is not an accurate description of its role.

This example demonstrates the need for a two-tier representation in which constructional semantics is analyzed independent of verbal semantics. Figure 1.6 shows the mapping of the causal chain for *Jill ate the chicken with chopsticks* to the Ingestion event structure. The cyclic event structure representation is 'unthreaded' into a linear structure to better display the sequence of causal relations[2]. The *chopsticks* map to the Instrument participant, which is an intermediary object in the motion event. The *chicken* maps to the second occurrence of

[2]The unthreaded version also specifies the subevent labels for each participant based on the causal relation that they are engaged in.

the Patient in the network because it is construed as a property theme in the constructional semantics.

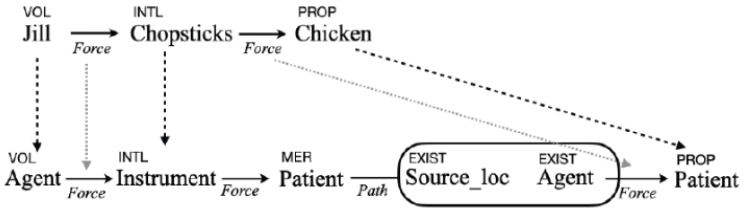

Figure 1.6: Mapping of a change of state construal to the Ingestion event structure (from Croft and Kalm 2022)

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With verbs that do not evoke cyclic representations, it is sometimes the case that the syntactic construal completely or to a large extent overlaps with the event structure evoked by the verb, particularly when all the participants evoked by lexical semantics are constructionally specified (e.g., when a Force verb occurs in a force construal) (1a). However, causal chains may evoke additional participants, as is the case in the motion construal with the Force verb *kick* in Figure 1.3, or only a subset of participants and relations that are represented in the verbal event structure. In the following Chapter 2, we provide a detailed discussion of how verbal representations are constructed, i.e., how we identify participants evoked by verbal semantics, and how various types of causal chains map to verbal representations.

1.5 Research objectives

The overarching objective of this dissertation is to provide a semantic representation for verbs that describe social events. The analysis uses VerbNet's (Kipper et al. 2008) verb classification system to determine which verb classes describe social events and group them into semantically broader categories that we refer to as 'semantic domains.' Each verb class belongs to a semantic domain. This part of the study aims to provide an inventory of social verb classes that is as comprehensive as possible and to establish their semantic similarities on a more general level based on the type of event that they describe, e.g., possession,

communication, etc. This broader categorization of verb classes is the basis for a deeper semantic analysis of events associated with verbs in these domains. The method for data selection is addressed in Chapter 2.

Verb classes are subcategorized within the general semantic domains based on their shared force-dynamic event structures. This analysis leads to a finer-grained categorization of events and results in semantically-coherent groups of verb classes that evoke the same lexical semantic representation. We refer to these semantic subdomains as VERB TYPES (see section 2.2.2, Chapter 2). The primary objective of this analysis is to provide an inventory of the different event structures evoked by verbs within each semantic domain.

Another research objective is to define force-dynamic relations between participants that are relevant to the description of events in the social domain. Force-dynamic relations serve as semantic primitives in the definition of events associated with verbal and constructional semantics. Establishing an inventory of relations contributes to our understanding of which and how many force-dynamic distinctions are needed to describe the semantics of the various social events. An inventory of force-dynamic relations, their description, and examples of their use with social verbs is discussed in detail in Chapter 2.

This dissertation also aims to provide a thorough description of constructional semantics associated with social verbs. The discussion focuses on the semantics of syntactic alternations that are listed in VerbNet since common construals associated with verb classes are most informative to the analysis of event structure and argument realization. The constructional analysis addresses various issues, including metaphorical extensions of syntactic patterns from one semantic domain to another. In particular, a parallel is frequently drawn between the syntactic expression of social events and events of physical causation. The analysis of constructional semantics is essential to the analysis of verbal semantics as constructional causal chains should be semantically compatible with the event structure and representation evoked by verbs.

Determining the underlying force-dynamic relations in events sheds light on the syntactic

realization of participants and vice versa. As such, a force dynamic analysis provides a great tool for cross-examining the viability of an event structure representation with the syntactic realization of participants. Using this framework allows for the creation of a semantic representation for verb categories that is also informed by the argument structure constructions in which these verbs occur.

The semantic representation for verb meaning presented in this dissertation is designed to be cross-linguistically applicable since the event structure representations are schematic and force-dynamic relations are defined as language-independent semantic primitives. Force-dynamic interactions between participants are hypothesized to be cognitively salient in a pre-theoretically intuitive way and so it is expected that languages that have lexical items for the same verb types as English will likely use the same causal event structures to describe these events. Moreover, the representations depict the semantics of broader verb types, which are based on shared semantic features rather than the same syntactic patterns.

Cross-linguistic application of the force-dynamic analysis requires in-depth research on the semantics of verbs and their argument realization within specific languages. Determining whether a language has a particular category of verbs (i.e., a verb type) demands that verbs are grouped together based on their semantics, i.e., the event structure that they evoke, and the syntactic realization of participants. It is possible that languages will have verbs that evoke other verb types that we did not define based on the English data. Additionally, languages other than English may not have verbs for all the verb types that we defined in this dissertation. However, the semantic principles that guide the force-dynamic analysis are cross-linguistically applicable.

Chapter 2: Data collection and analysis

2.1 Data sources

The semantic analysis carried out in this dissertation is informed by two large online resources on verb meaning: VerbNet[1] (Kipper et al. 2007) and FrameNet[2] (Fillmore et al. 2003). Both verb meaning representations offer a wealth of semantic and syntactic information related to the event structure evoked by verbs. However, the organization of information and approach to the analysis of verb meaning differ in many respects, and we have different uses for these resources in this dissertation. While FrameNet's analysis of frames can be used to identify participants that are obligatorily evoked by the event structure associated with specific verb types, VerbNet's classification of verbs is used to identify semantically coherent groups of verbs that make up these verb types. VerbNet's analysis is also used to identify the syntactic regularities observed with semantically similar verbs to further support their semantic categorization within verb types.

2.1.1 VerbNet

VerbNet is the largest computational verb lexicon available for English. Verbs are classified into semantically coherent groups or 'classes and subclasses' based on their syntactic properties. This classification system builds on Levin's (1993) work on syntactic alternations which investigates the syntactic expression of arguments with semantically similar

[1] https://verbs.colorado.edu/verbnet/
[2] https://framenet.icsi.berkeley.edu/fndrupal/

verbs. Verbs that describe similar types of events and share syntactic alternations belong to the same verb class. The numbering of classes and subclasses in VerbNet is in many cases identical to Levin's classification, though VerbNet has made major additions by which Levin's original work has been extended. VerbNet contains 329 main classes and 272 subclasses, which subsume verbs that describe verbs of physical causation, mental verbs, as well as social verbs. There are close to 200 classes in VerbNet that contain social-domain verbs, which are the focus of this dissertation.

Each verb class includes a list of verbs ('Member Verb Lemmas'), information about thematic roles that are either overtly expressed as arguments with these verbs or null instantiated when syntactically covert ('Roles'), syntactic frames and specific examples associated with these frames, and semantic descriptions for the examples.

For instance, verbs such as *hit, slap, knock*, or *tap* belong to the hit-18.1 class. Four Roles are specified for these verbs: Agent, Patient, Instrument, and Result. There are a number of different syntactic frames listed for this class, including [NP V NP], [NP V NP PP.INSTRUMENT], [NP V NP PP], and others. In the transitive [NP V NP] frame, the first noun phrase ('NP') describes an Agent and the second a Patient. The example that is provided for this frame is *Paula hit the wall.*

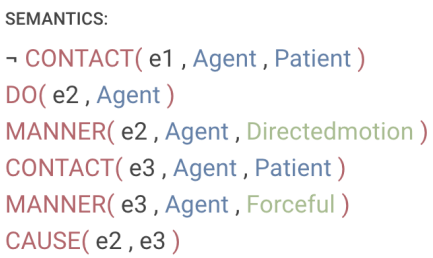

Figure 2.1: Semantic analysis for *Paula hit the wall* in VerbNet.

VerbNet's semantic analysis decomposes the event into semantic predicates with a temporal function e, following a similar event decomposition strategy introduced by Moens and Steedman (1988). The semantic analysis for the example *Paula hit the wall* is shown in Figure 2.1. VerbNet's description includes four different semantic predicates: CONTACT,

DO, MANNER, and CAUSE. The predicates are temporally ordered and their sequencing is specified by the function *e*. The Roles that are relevant to the semantic description of each temporal sequence are specified in blue.

VerbNet's analysis of verbs informs the force-dynamic analysis in various ways. We primarily use VerbNet to determine semantically coherent classes of verbs that occur in similar syntactic construals. These groups of verb classes make up more general force-dynamic categories of verbs that are here referred to as VERB TYPES (see section 2.2.2). Verb types are more schematic groupings of verbs when compared to VerbNet classes since the force-dynamic analysis does not make the same fine-grained distinctions between verbs based on their syntactic alternations; however, VerbNet's classification is essential to establishing verb types. Verb types are defined based on VerbNet classes that describe semantically similar events and exhibit shared syntactic behavior. The force-dynamic analysis makes use of the various syntactic construals identified by VerbNet to determine whether verb classes can map to the same or different underlying verbal event structure representations.

For example, VerbNet identifies a number of verb classes for verbs that describe reciprocal interactions between people, such as *meet, hug, marry,* or *visit*. *Hug* and *marry* are in the marry-36.2 class while *meet* and *visit* are in the meet-36.3 class. The two classes of verbs are semantically alike in that they describe reciprocal interactions; however, they differ in some of their syntactic alternations. Both types of verb classes occur in a collective construal in which the agent and the co-agent are syntactically expressed as a plural argument (e.g., *John and Kathy met/hugged/married*). However, verbs in the marry class cannot occur in an argument structure construction in which the co-agent is syntactically expressed as a *with*-phrase (**John married with Kathy*). Meet verbs, on the other hand, occur in the *with*-construction (*John met with Kathy*). This distinct syntactic behavior associated with marry and meet verbs drives the separate classification of these verbs in VerbNet; however, it is not directly relevant to the force-dynamic analysis. Both types of verbs describe reciprocal interactions between two agents and as such evoke the same event structure. Importantly,

all syntactic construals associated with these verbs straightforwardly map to the same event structure representation. Using VerbNet's classification system which groups semantically similar verbs into classes allows us to easily establish which verbs belong to the same verb type while giving consideration to the different syntactic construals in which these verbs occur.

There are other ways in which the inventory of syntactic frames in VerbNet is essential to the force-dynamic analysis at hand. VerbNet's comprehensive inventory of syntactic alternations with verbs in different verb classes ensures that the force-dynamic analysis of different argument structure constructions associated with verb types covers all the relevant syntactic construals. This is important for two reasons. First, it guarantees that the analysis accounts for all the common constructional causal chains and hence the causal ordering of participants in these various construals, which is expected to be the same. Second, it lends support to the semantic analysis of verbal event structure by ensuring that all the attested common syntactic construals do in fact map to the same verbal event structure. VerbNet's exhaustive account of syntactic alternations provides a reliable theoretical platform for this type of analysis.

VerbNet's semantic descriptions of syntactic frames inform the force-dynamic analysis only to a limited extent. In most cases, VerbNet's descriptions of events and the relations between participants are much more detailed when compared to our analysis. For example, the force-dynamic causal chain analysis for the example *Paula hit the wall* would not include information about manner, since it is not relevant to the force-dynamics of the event. Therefore, the force-dynamic representation for examples of forceful contact, such as this one, and non-forceful contact, such as *Carrie touched the cat*, are the same. VerbNet, on the other hand, provides a different analysis for non-forceful contact examples. VerbNet does not include MANNER as a semantic predicate for these verbs. Additionally, the force-dynamic analysis sometimes groups together verb classes that contain different semantic predicates in VerbNet's analysis. As such, VerbNet's semantic descriptions cannot be used as reliable

predictors of constructional causal chains. Given the distinct underlying approaches to the characterization of event structure in VerbNet and our dissertation, our use of VerbNet's semantic analysis is quite restricted.

We consult VerbNet's analysis of Semantic Roles to help us identify participants that are obligatorily evoked by verbal semantics. Semantic Roles are defined based on the participants that function as semantic arguments of verbs in verb classes and occur in common syntactic alternations. However, we do not fully rely on VerbNet's analysis of Roles. VerbNet's list of Roles does not always include only participants that are evoked by lexical semantics. In some cases, VerbNet also includes Roles that are evoked constructionally, rather than lexically. For example, the roll-51.3.1 class with motion verbs includes constructionally-added Agent and Result as Roles because roll verbs can occur in a causative construal (e.g., *Bill rolled the ball down the hill*) and a resultative construal (e.g., *The drawer rolled open*). Our analysis of motion verbs (Croft et al. 2021b:75) would not include an Agent or Result as participants in the verbal representation. VerbNet also sometimes includes a constructionally evoked beneficiary as a Role for a particular semantic class, as is the case in the build-26.1 class. Since our force-dynamic analysis of verb meaning includes only lexically evoked participants, VerbNet's inventories of Roles for verb classes are not ideal for the purpose of our analysis. Therefore, as discussed in section 2.1.3, we also consult FrameNet's analysis to determine which participants are obligatorily evoked by verbal semantics.

2.1.2 VerbNet's coverage of social verbs

VerbNet's coverage of social domain verbs extends beyond Levin's (1993) analysis. The analysis and classification of verbs into verb classes in Levin (1993) primarily focuses on syntactic alternations associated with physical domain verbs, such as verbs of putting and removing, verbs of sending, carrying and other motion verbs, verbs of force, creation, or change of state verbs. She also includes some verbs that describe social domain events (Levin 1993:200), such as verbs of communication (*say, tell*) or reciprocal interactions (*marry,*

hug), verbs of transfer of possession and exchange (*obtain, contribute, exchange*), verbs that describe cognitive processes that lead to a conceptual relation between entities, such as measure verbs (*measure, weigh*), or verbs that describe social role or status assignment (*appoint, declare, knight, tutor*); however, her account of social verbs is rather limited in general and within these particular semantic domains.

Based on Korhonen and Briscoe (2004) who pointed out the limited coverage of verbs in Levin (1993) (and hence the original VerbNet classification) and proposed 57 new classes of verbs that were not included, Kipper et al. (2006) extended VerbNet by recategorizing (i.e., combining and refining) and adding new verb classes and subclasses. This addition largely consisted of social verb types, such as verbs that describe various types of conceptual relations between entities (*distinguish, require, indicate*), verbs that describe social role assignment scenarios (*hire, fire, appoint, supervise*), criminal investigation events (*prosecute, trial*), verbs that denote an entity being engaged in an event (*work, act, volunteer*), response verbs (*respond, confront, reject*), and other social verbs. With the addition of these classes, VerbNet provides a more comprehensive inventory of social verbs and is therefore a more suitable data source for this dissertation.

2.1.3 FrameNet

FrameNet's database contains more than 1,000 semantic frames. FrameNet's semantic classification relies on the concept of 'Frame Semantics' (Fillmore 1976, 1982, 1985, Fillmore and Baker 2001, 2010). Frame Semantics rests on the idea that words evoke a system of concepts that represent schematic categories of experience. These schematic conceptualizations associated with particular lexical items are identified as semantic frames. Given the shared semantics of lexical items that evoke frames, frames are frequently associated with particular argument structure constructions. There is therefore a strong correlation between the semantic classification of verbs into frames and their syntactic combinatorial properties. For example, FrameNet has two separate frames for filling and placing verbs. This frame

division is primarily motivated by the semantics of these verbs. With placing verbs, the event is said to focus on the Theme while with filling verbs, the event focuses on the Goal. However, each type of verb is also clearly associated with different syntactic alternations. In placing events, the Theme is realized as a direct object (*The waiter placed the food on the table*), and in filling events, it's the Ground that is realized as a direct object (*Lionel Hutz coated the wall with paint*).

FrameNet frames consist of a prose definition that describes the category of experience, a list of Lexical Units (LUs) that evoke each particular frame, and an inventory of Frame Elements, which identify the various semantic roles that are essential to the description of the event. For example, transfer of possession verbs such as *give* or *donate* evoke a Giving frame which is described by the following definition:

> "A Donor transfers a Theme from a Donor to a Recipient. This frame includes only actions that are initiated by the Donor (the one that starts out owning the Theme). Sentences (even metaphorical ones) must meet the following entailments: the Donor first has possession of the Theme. Following the transfer the Donor no longer has the Theme and the Recipient does."

FrameNet distinguishes two types of Frame Elements in frames: Core and Non-Core. Core Frame Elements identify semantic roles that uniquely define a frame. Non-Core Frame Elements identify other aspects of events that can be syntactically expressed as arguments, such as circumstantial phrases specifying time, place, or manner, constructionally evoked participants, such as beneficiaries, instruments, or agents in causative construals, and other peripheral semantic roles that are not core to the definition of the frame.

For instance, there are three Core FEs in the Giving frame: Donor, Theme, and Recipient. The role of each FE is further elaborated on by a definition and an example in which the FE is used. For example, the Donor is defined as "the person that begins in possession of the Theme and causes it to be in the possession of the Recipient." The Recipient is defined as "the entity that ends up in possession of the Theme and the Theme is "the object that

changes ownership." The identification of Non-Core FEs is similar. A short description and an example is provided for each Non-Core FE.

FrameNet links their semantic frames together by various frame relations which are used to create a lattice-like hierarchy of frames. Frames may be related by 'inheritance,' in which one frame (i.e., child frame) is a more specific instance of another frame (i.e., a parent frame). For example, the Communication_manner frame "INHERITS FROM" a Communication frame, which is a more general frame that describes a communication scenario in which "A Communicator conveys a Message to an Addressee" without specifying the method of communication. Other types of frame-to-frame relations include 'Using', 'Perspective-on', or a temporal relation such as 'Precedes.'

The inventory of frame relations employed by FrameNet is not explored in further detail here since frame-to-frame relations are used in the force-dynamic analysis only to a very limited extent. We consult their inter-frame relations to cross-check that our verb types, which are primarily based on VerbNet's classes, are as complete as possible. In some domains, FrameNet's coverage of social events is more comprehensive and may contain verbs/social scenarios that are not included in VerbNet. Their lattice structure makes it easy to navigate the hierarchy and search for frames that may contain verbs that are not included in VerbNet. In our discussion of verb types, we include a list of VerbNet classes as well as FrameNet frames that evoke each verb type.

FrameNet's analysis informs the force-dynamic analysis in two other important ways. First, FrameNet's list of Core FEs helps us to establish which participants are obligatorily evoked by verbal semantics. Second, their annotation of corpus examples, which reveals the various syntactic uses associated with verbs in frames, is an important addition to VerbNet's inventory of syntactic frames and allows us to consider other less common construals.

FrameNet's analysis of Frame Elements that are 'core' to the event structure tends to consistently include only participants that are obligatorily evoked by the semantics of the lexical units in frames. As such, it can be directly used for the force-dynamic event struc-

ture analysis to determine which participants are obligatorily evoked by the verb meaning. FrameNet's labels for Core FEs are usually more specific when compared to VerbNet. For example, FrameNet identifies the initiator of a giving event as a Donor and an initiator of a stealing event as a Perpetrator. VerbNet, on the other hand, identifies the initiator using a more general label "Agent" in both types of events. In other cases, FrameNet or VerbNet may specify additional roles when compared to each other. For example, FrameNet identifies two types of initiators (Core FEs) of a placing event: an "Agent" and a "Cause." Agent is used when the initiator is a person, and Cause is used when the initiator is a non-agentive entity, such as a clover in FrameNet's example *[...] the clover is another plant which puts nitrogen into the soil*. VerbNet's list of roles includes only an "Agent" and their syntactic frames lack examples in which the initiator is non-agentive. In many cases, the analysis of Core FEs provided by FrameNet provides a more reliable source for the analysis of the force-dynamic event structure evoked by verbs given that their analysis is derived from an annotated corpus, rather than invented examples, as is the case in VerbNet. In most cases, the divergence in the analyses in FrameNet and VerbNet can be explained by their different approaches to the analysis of event structure and FrameNet's direct access to corpus examples, which gives them an advantage by having a broader spectrum of examples with different types of participants. However, on the whole, their analyses of semantic roles associated with particular lexical items are frequently compatible in that their inventory of core participants tends to overlap to a large extent. Our force-dynamic analysis of obligatorily evoked participants in verbal event structure representations carefully considers the analyses provided by both types of resources and attempts to clearly justify why and which participants are included in the representations.

FrameNet's syntactic annotation of corpus examples and their inventory of valency patterns for lexical items supplements VerbNet's syntactic frames in important ways. VerbNet's inventory of syntactic alternations associated with particular classes is a sufficient resource for the common construals associated with verb classes; however, FrameNet's inventory of

argument structure constructions provides a more comprehensive understanding of the many different verb construals attested in corpus. This information aids our force-dynamic analysis in identifying the various constructional causal chains associated with verb types. Although we do not propose a formal analysis for all the construals listed in FrameNet, we use their inventory to ensure that there aren't examples in the corpus that would not be compatible with our underlying verbal event structure representations. All construals are expected to syntactically express participants in such a way that the same causal ordering between participants is preserved in causal chains. As such, the semantic representation of all construals attested in corpus should straightforwardly map to the relevant verbal event structures. This additional analysis further verifies the viability of the verbal semantic representation proposed for each verb type.

2.2 Data Collection and Verb Meaning Analysis

2.2.1 Social classes in VerbNet

In the first steps, we manually isolated all VerbNet verb classes that do not describe events of physical or mental causation. In particular, we excluded verbs of physical causation that describe events of placing and removing (*put, spray, wipe*), motion and location (*roll, run, appear*), force (*hit, stab, touch*), change of state (*dry, break, cook*), creation, performance, or emission verbs (*build, draw, gush*) (Croft et al. 2016, 2017, 2021b). Additionally, we also discarded verbs of mental causation such as experiential verbs (*fear, frighten, discover*), verbs of perception (*see, listen to*), and verbs of judgment (*deduce, estimate, judge*) (Croft et al. 2018). The remaining verb classes were then sorted into broader semantic categories based on their shared event properties.

Five general categories (or "domains") were identified: 1) Interpersonal Interactions in which people conduct social interactions with each other (e.g., *meet, marry, fight, bully*), 2) Possession and Exchange events in which transfer of possession takes place as a result of giving, taking, or an exchange between two people (e.g., *give, buy, steal, own*), 3) Com-

munication events in which people share information using communicative means (e.g., *tell, say, advise, remind*), 4) Social Role events in which a person assumes or is assigned a social role that is frequently associated with a membership within a larger social institution or a group (e.g., *hire, employ, attend*), and 5) events that describe Conceptual Relations in which a relation between two or more entities is established by some cognitive process (e.g., *indicate, require, distinguish, symbolize*).

The category of Conceptual Relations could be argued to better fit into the category of mental events since the conceptual relation between entities is determined by a mental process. In this sense, these verbs don't describe *social* events, per se, since no social interaction between people has to take place for the event to happen. However, these verbs have not been previously included in linguistic studies on mental causation (Dabrowska 1994, Filip 1996, Osmond 1997, Harkins and Wierzbicka 2001, Haspelmath 2001, Klein and Kutscher 2002, Bickel 2004, Verhoeven 2007, Levin and Grafmiller 2013) because they don't describe a change of mental state, unlike experiential verbs (*amuse, frighten, fear*) or verbs of perception (*see, look, listen*). Therefore, we include a discussion of the event structure associated with these verbs in our analysis of social domain events.

We identified a few verb classes that didn't fit into these five domains: verbs that describe events that are not specific to any one domain, such as general causation and letting verbs (*force, let, allow*), verbs that describe aspectual properties (*begin, continue, stop*), internal verbs (*exist*), or verbs that describe part-whole relations, quantity, and mathematical computations (*comprise, exclude, average*). We left these verbs out of the analysis since they are not specific to the social domain and don't uniquely describe 'social' events. Events that describe change of state in the social domain are also not included in the semantic analysis. In examples such as *The price of oil soared/increased* or *The old dishwasher died*, the lexically-evoked event structure is not specific to the social domain. These verbs can be used to describe change of state events in the physical or mental domains, as well, depending on the properties of the participants involved.

2.2.2 Verb types

The event structures associated with verbs in each one of the social domains were then investigated more closely to determine which verb classes share force-dynamic representations. Verb classes in which verbs evoke the same event structures were grouped into VERB TYPES. We considered two main parameters in the analysis: 1) the force-dynamic structure of the event evoked by each verb class (i.e., the participants, the force-dynamic relations between them, and the type of change that each participant undergoes in the event) and 2) the syntactic behavior associated with verbs in verb classes.

Verb classes that evoke an event structure with the same number of event participants and force-dynamic relations between them and in which participants undergo the same type of change are grouped into the same verb type. For example, Statement verbs in the Communication domain, such as verbs in complain-37.8, confess-37.10, talk-37.2, say-37.8 and other classes, evoke the same event structure with three participants: a Speaker, a Signal, and a Message. The force-dynamic relations that define the event in these classes are the same: a Speaker uses physical FORCE to generate a Signal (by speaking or gesturing) and the Signal encodes a meaningful utterance, i.e., a Message (see Chapter 5 for a detailed discussion of Statement verbs). The type of change that each participant undergoes in these verb classes is also the same: the Speaker is a volitional entity and the Signal and Message are identified as design themes since they come into existence by being produced.[3] Consequently, these verb classes are analyzed as evoking the same verb type.

Event structures within the same semantic domain usually share many semantic similarities. This can be exemplified on the event structure evoked by verbs in the Communication domain. All Communication verb types share the same participants and sequence of force-dynamic relations in their representations. This segment of the event structure describes the event structure of Statement verbs in which a Speaker generates a Signal which en-

[3]The various types of changes that are identified for participants' engagement in events are discussed in section 2.3.1.

codes a Message. However, they differ in the number of participants evoked in their event structures. For example, Communicate verbs, such as verbs in advise-37.9, tell-37.2, or instr_communication-37.4.1 verb classes evoke an Addressee as an additional participant. The Speaker's production of a meaningful signal is directed at an Addressee who undergoes a change of state. Evoking an additional participant in the event leads to a separate event structure representation for these verbs and therefore a distinct verb type.

Verb types are semantically-based categories; however, the categorization of verbs into verb types also involves considering argument realization since semantically coherent verbs are expected to share similar syntactic patterns (Levin 1994). Levin (1994:306) argues that "verbs that are semantically related often share the same possible patterns of argument realization in a particular language [...]." With that in mind, we use argument realization to inform our analysis of verb types. Syntactic construals associated with verb classes in specific verb types are expected to map into the same verbal representation. That is, causal chains associated with the various syntactic frames in VerbNet must share the same causal ordering of participants, and the construal of the theme type must match that of the theme type in the verbal event structure. Shared representations for constructional semantics thus corroborate a semantic analysis of verbs that are assumed to belong to the same verb type.

At the same time, the force-dynamic analysis of verb types does not impose restrictions on the range of syntactic alternations associated with verbs in different verb classes. With some verbs, additional syntactic alternations may exist and vice versa. Therefore, seeing that verbs within a verb type may not allow certain construals is not necessarily indicative that a particular verb class belongs to a different verb type. For example, as noted above, the syntactic expression of participants with verbs that belong to the Reciprocal verb type is not exactly the same. Marry verbs do not occur in an argument structure construction in which the co-agent is expressed as a *with*-phrase. An important consideration in determining whether a verb belongs to a verb type is whether the schematic force-dynamic representation of the constructional causal chain is semantically compatible with the underlying verbal

representation. And this is the case with marry and meet verbs; the construals in which they occur map to the Reciprocal event structure.

2.3 Inventory of labels

In this section, we define the force-dynamic relations and types of changes that participants undergo in social events. Force-dynamic relations characteristic of interactions between entities in the social domain are discussed in section 2.3.1. The types of changes that participants undergo in events are discussed in section 2.3.2. These labels are not specific to the social domain and have been used in the description of physical domain events (Croft et al. 2017). We provide a summary and examples of how these labels are used in social event representations.

2.3.1 Force-dynamic relations

We identified seven force-dynamic relations that are specific to the social domain and have not been previously discussed by Croft et al. (2016, 2017, 2018). These include PERFORM, CONTROL, EXCHANGE, AFFILIATE, MUTUAL, ASSOCIATE, and RELATE. We summarize these relations in Table 2.1.

PERFORM is an asymmetric force-dynamic relation that is initiated by a volitional entity. The initiator uses performative illocutionary force in the sense of speech act theory (Levinson 2017) to bring about change in the endpoint (Kalm et al. 2019). PERFORM is a social equivalent to the physical FORCE relation and is used to describe a causal interaction between two entities. However, unlike with FORCE, the initiator in PERFORM is restricted to a volitionally acting agent. PERFORM is used to describe events in different semantic domains, such as Transfer of Possession verbs in which an agent volitionally initiates an event of transfer (e.g., *He gave him a gift*), Social Role events, in which an agent's performative action causes another participant to assume a role within an institution (e.g., *He hired him*), or Interpersonal Interaction events, in which agents use performative actions to interact with

RELATION	DEFINITION	EXAMPLE
Social domain		
Perform	Causal performative relation initiated by a volitional agent	*She bullied him.*
Control	Non-causal possession relation between an entity and a possessor	*He owns a house.*
Affiliate	Non-causal relation between a person and an institution or a group	*His wife works at IBM.*
Relate	An asymmetric non-causal conceptual relation between entities/concepts	*Black symbolizes mourning.*
Associate	A symmetric non-causal conceptual relation between entities/concepts	*Blue and grey match.*
Exchange	A non-causal equivalence relation between two entities	*Video replaced radio.*
Mutual	A non-causal relation between two entities that share the same role in an event	*John fought with Mary.*
Engage/Refrain	Labels that indicate a single-entity status between a participant and their subevent	*She works as a secretary./She quit her job.*
Physical domain		
Force	A causal relation that describes transmission of physical force	*He hit the door.*
Path	A non-causal spatial relation between a figure and ground	*A ball rolled down the hill.*
Mental domain		
Affect	A causal relation between a stimulus and an experiencer. It is also used to describe the relation between an event and a beneficiary.	*He built a house for her.*
Attend	A non-causal relation that describes a volitional mental activity of an experiencer directed at a stimulus.	*He responded to the crises.*
Judge	A causal relation initiated by a cognizer who uses cognitive reasoning to evaluate some phenomenon	*He distinguished between them.*

Table 2.1: Force-dynamic relations and definitions

each other on a social level (e.g., *They married* or *She bullied him*).

The CONTROL relation is primarily used in the Possession and Transfer of Possession domain (see Chapter 4). It is prototypically used to describe a socially sanctioned non-causal relation between an entity (a Possession) and an agent (a Possessor). In the CONTROL relation, an agent has possession over an entity, which tends to be an object that can be physically controlled (e.g., *He owns a car*). However, Possession and Transfer verbs can also occur with non-physical entities that are metaphorically conceptualized as items of possession (e.g., getting a job or presenting an idea to someone). We use CONTROL as a relation between

a Possession and a Possessor in constructional causal chains regardless of the identity of the Possession participant. Our representation only depicts the constructional semantics and does not aim to disambiguate whether the event describes social role assignment or communication. Such information about the semantics of the event would have to be specified on a different plane in the representation. As discussed in Chapter 4, there is a metaphorical correspondence between the social CONTROL relation and the physical PATH relation.

AFFILIATE is a non-causal relation commonly used to describe the event structure associated with Social Role verbs (see Chapter 3) in which there is an established relation between a human entity and a social institution or a group. An AFFILIATE relation may be externally initiated, as in the example *The king banished the general from the army*, or not, as in the example *His wife works at IBM*. Similarly to the non-causal CONTROL relation, events that describe an AFFILIATE relation between a person and an institution frequently use metaphorical argument structure constructions in which the AFFILIATE relation is construed as a physical PATH relation (see Chapter 3 for a more detailed discussion of metaphorical extensions in the Social Role domain).

ASSOCIATE and RELATE are non-causal relations that establish conceptual relations between two entities which may be physical objects, socially defined entities, mental concepts, or propositions. ASSOCIATE is a symmetric relation expressed by verbs such as *match* or *differ* (*Blue and grey match*, *This flyer and that flyer differ*). RELATE describes an asymmetric relation and can be expressed by verbs such as *indicate* or *symbolize* (*This indicates that he left early*, *Black symbolizes mourning*). These two force-dynamic relations are discussed in detail in Chapter 7.

EXCHANGE and MUTUAL are not specific to social events, and neither one describes a force-dynamic relation per se. EXCHANGE describes an equivalence relation between two entities (see Chapter 4 on Possession and Transfer of Possession verbs). It is semantically evoked by verbs of exchange such as *substitute* or *replace* (e.g., *Video replaced radio*) or verbs that describe events of commercial transaction in which there is an equivalence relation

between goods and money (e.g., *He bought a book for $50*). The EXCHANGE relation can also be evoked constructionally in examples such as *He used the rake instead of the shovel* in which the relation between the rake and the shovel can be said to describe equivalence between two entities.

MUTUAL is used as a 'relation' only in constructional causal chains. That is, it is not evoked lexically, only constructionally. MUTUAL designates that two entities, syntactically expressed as separate arguments in an argument structure construction, share the same role in an event. For example, the relation between *John* and *Mary* in an example *John fought with Mary* is identified as MUTUAL in the causal chain representation since the two participants are realized as separate arguments. The verb *fight* does not evoke an event structure in which there is a MUTUAL relation between the agent and the co-agent. The event structure of social Reciprocal verbs, including *fight*, evokes a PERFORM relation that is symmetrically initiated by both entities. However, the MUTUAL construal in which the agent is expressed as a subject and the co-agent as a *with*-oblique can map to this event structure. (For a more detailed discussion of the semantics of Reciprocal verbs, see Chapter 6.) The MUTUAL relation can also be used to describe the role of constructionally added participants that are not evoked by verbal semantics, such as the role of an accompanier in motion events in an example *She went to the movies with her best friend.*

We also include ENGAGE and REFRAIN in the Social domain category in Table 2.1. Croft et al. (2018) use ENGAGE and REFRAIN as annotation labels for argument structure constructions in which a participant and their subevent are expressed as separate syntactic arguments of the main verb, as in *The clown amused the children by his antics* in which the *clown* semantically functions as a stimulus and his *antics* describes his subevent. REFRAIN is used in events in which the participant is not engaged in the said subevent. ENGAGE and REFRAIN do not establish a force-dynamic relation between two entities; they are used to indicate that two syntactically separate arguments refer to the same entity. Croft et al. (2018) discuss ENGAGE and REFRAIN in the context of experiential examples in the mental

domain in which the subevent of the participant is constructionally specified since mental verbs do not lexically evoke event structures in which a subevent of a participant would have to be overtly specified. In the social domain, we also use ENGAGE and REFRAIN to describe other types of events in which two arguments refer to the same entity, such as the 'relation' between a person and their role in Social Role events (e.g., *She works as a secretary*). Neither ENGAGE nor REFRAIN describe force-dynamic relations; they are labels that establish a single-participant status between a participant and their subevent, role, or attribute in an event structure. More discussion of the various types of examples in which ENGAGE and REFRAIN are used is given in Chapter 3.

Table 2.1 also includes definitions and examples for physical domain relations, i.e., FORCE and PATH. We define these relations here because they are used in metaphorical causal chains in which social domain verbs use physical domain argument structure constructions. As discussed earlier in this chapter, FORCE describes a physical transmission of force between two entities. PATH is a non-causal spatial relation between a figure and a ground.

The mental domain AFFECT relation is included in Table 2.1 because it is frequently used in social domain causal chains when a beneficiary is constructionally added to the event structure. This relation is characteristic of verbs such as *amuse* or *scare* which describe experiential events in which a stimulus brings about a mental state of an experiencer (e.g., *He amused/scared her*). It is a causal non-physical relation (Talmy's 1976 'affective causation') in which the endpoint is identified as a property (PROP) theme. When a beneficiary is added to a causal chain as a subsequent oblique (e.g., *He built a house for her*), their mental state is always affected, whether the event is mental, physical, or social. Although beneficiaries may benefit from the event in other ways than just mentally/emotionally, we follow Croft et al.'s (2018) analysis by assuming that the change of state of the beneficiary is by default always mental and that a mental AFFECT relation is best suitable for the description of the force-dynamic relation between an event of any kind and a beneficiary (or "maleficiary" in adverse situations).

The ATTEND relation defines the event structure of Response verbs, which evoke a mental event between a responding entity and a trigger. The ATTEND relation describes a relation in which a mental entity engages in a volitional activity by attending to a stimulus (or 'target') (Croft et al. 2018). The mental entity initiates the event and is syntactically realized as a subject. The target is the endpoint of the mental relation and can be expressed as a direct object (e.g., *He answered their call*) or a *to*-oblique (e.g., *He responded to the crises*) with Response verbs.

JUDGE describes a mental relation in which a cognizer engages in an active mental process which leads to establishing a cognitive connection between entities or their attributes. Croft et al. (2018) posit this relation to describe events in which an agent engages in mental processes such as comparing (*distinguish, compare*), categorizing (*classify, categorize*), inferring (*infer, base*) or measuring (*weigh, clock*). As Croft et al. explain, JUDGE describes the result of cognitive reasoning, i.e., the conclusion, classification, or measurement arrived at. We use this relation in causal chains with Conceptual Relations verbs to define the causal segment in which an agent establishes a conceptual relation between entities.

2.3.2 Participants' changes in social events

A list of labels associated with participants' changes in events that was introduced in section 2.2 is summarized in Table 2.2. As we pointed out in our earlier discussion, these labels describe changes that are not specific to any one domain. In this section, we focus on the different theme types that are evoked by social verbs.

A property (PROP) is evoked by only a handful of verbs in the social domain (e.g., *function* or *patent*). However, it is common for social verbs to occur in metaphorical physical argument structure constructions in which a participant is construed as a property theme, such as the use of a communication or transfer of possession verb in a transitive construction *John informed me* or *Hess supplied its customers.* In other cases, a domain-independent change of state verb such as *increase* or *soar* may be used to describe a social event with a

THEME TYPE	DEFINITION	EXAMPLE
Property	An entity as a whole undergoes a change in a scalar property	*John informed me.*
Motion	An entity as a whole undergoes a change in a spatial figure-ground relation	*The king banished the general from the army.*
Mereological	An entity undergoes a change that happens part by part	*She got many gifts from her friends.*
Design	An entity is created de novo, formed from another entity or through replication	*He said a few words.*
Internal	An entity undergoes an undirected change or some internal process	*They talked.*
Exist	An entity does not undergo any change in the event	*Video replaced radio.*
Volitional	An entity that volitionally initiates a force-dynamic relation	*She hugged him.*

Table 2.2: Labels that identify changes that participants undergo in events

property theme (e.g., *The price of oil soared*).

Certain types of social verbs, such as Membership and Cause Membership verbs in the Social Role domain, tend to occur in metaphorical motion construals in which the social verb occurs in a physical motion argument structure construction (*He attends the University of New Mexico* or *The king banished the general from the army*). There is a clear semantic motivation for this construal in dynamic Membership and Cause Membership events since the theme evoked by the verbal semantics is identified as a motion (MOT) theme. In particular, Cause Membership verbs evoke an event structure in which an agent causes another person to be affiliated (or to quit their affiliation) with an institution or a group. Becoming affiliated (or quitting association) with an institution is a holistic type of change that affects the person as a whole at one time. Verbs in other social domains do not evoke holistic themes and generally do not occur in motion construals.

The event structure of transfer of possession and commercial transaction verbs in the Possession domain describes an event in which the possession and the possessor undergo an incrementally mereological (MER) change. It is common for these verbs to occur in metaphorical physical argument structure constructions that are used to describe events of placing and

removing (e.g., *She got many gifts from her friends.*). The possession is conceptualized as a mereologically incremental theme because the transfer does not necessarily have to happen holistically; the semantics of events with possession verbs entails mereological motion. For example, in *She got many gifts from her friends*, the gifts were likely given to the recipient at different times. A mereological theme is also evoked by some communication verbs such as *tell* or *advise* which describe events in which a message is transferred to an addressee. Similarly to transfer of possession verbs, communication verbs tend to occur in metaphorical argument structure constructions that describe events of physical placing and removing (e.g., *She said a few words to him*).

A design (DES) theme is evoked by the verbal event structure of communication verbs in which an agent produces a signal which is meant to represent a meaningful conceptual unit. Both the signal and the message that it encodes are conceptualized as design themes in the event structure. It is common for these verbs to occur in a metaphorical argument structure construction that is used in the physical domain for events of creation (e.g., *He said a few words*). Other social verbs do not evoke a design theme in their event structure and do not occur in a creation construal.

Participants in social events may be construed as undergoing internal (INTL) change. This is particularly common when the semantics of an argument structure construction focuses on a change that a participant undergoes without overtly specifying a force-dynamic relation with another participant in the event. The INTL label is used to describe the engagement of participants in collective construals with verbs in the Communication or Interpersonal Interactions domain when two participants are syntacticly expressed as a single argument (e.g., *They talked* or *They hugged*). As described above, INTL can also be used to describe the change that a participant undergoes in causative construals with Social Role verbs when an institution is not overtly expressed (e.g., *He hired him*).

Participants that do not undergo a change in the event are labeled EXIST. Most frequently, this label is used by default for non-theme participants since no change happens to

them in the event, e.g., the possessed entity with possession verbs, such as the car in *He owns a car*. In the social domain, EXIST is also used for non-volitional participants engaged in an EXCHANGE relation, as in the example *Video replaced radio*. The label EXIST is also used in metaphorical physical argument structure constructions for a spatial reference point, such as the ground in a figure-ground relation, such as *Steve* who is construed as a metaphorical ground in the physical removal argument structure construction *She took the book from Steve*.

2.4 Constructional analysis

This dissertation formalizes the representation of common construals associated with verb types. As explained above, analyzing the force-dynamics of argument structure constructions informs the analysis of verbal semantics. In many cases, the constructional analysis has led us to make refinements to our initial analysis of verb types when a verb class occurred in construals that were not compatible with the underlying verbal representation.

The constructional representation is frequently identical to the verbal representation, particularly when the syntactic construal matches the underlying event structure evoked by the verbal semantics. However, in other cases, the constructional causal chain may include additional or fewer participants that are not evoked by the verb meaning. We provide examples and discuss the mapping of these two types of construals to the verbal event structure representation in sections 2.4.2 and 2.4.3.

In some cases, the analysis of constructional causal chains requires that a metaphorical extension between two semantic domains be made. In particular, we frequently draw metaphorical correspondences between the physical and social domains to explain the syntactic alternations observed with social events. When an argument structure construction is used metaphorically, the force-dynamic relations that define the constructional semantics are 'borrowed' from the source domain. In such cases, mismatches in the causal chain representation and the underlying verbal representation are allowed. Examples of metaphorical mappings

are discussed in section 2.4.4.

The type of change that defines the participants' engagement in events (e.g., VOL, MER, PREP, EXIST, INTL) is defined independent of any semantic domain. These labels describe changes on a general level that is not specific to any particular domain. For example, a participant may volitionally [VOL] initiate an event of physical, social, or mental causation. In another example, a participant may undergo a change of state, which may be defined as physical, mental, or social depending on the semantics of the verb. The use of domain-general labels in our representation leads to a limited number of mismatches between the constructional and verbal representations, including metaphorical construals. Examples and justifications for mismatches between constructional and verbal representations are discussed in more detail in section 2.4.5. Mismatches in mappings that are permitted are restricted to specific construals. Such mismatches usually exist within the same domain representations when a social-domain constructional causal chain maps to a social-domain verbal representation. They are less frequent in metaphorical mappings since the same theme type usually drives the metaphorical extension.

2.4.1 Determining ordering of participants in causal chains

We use Croft's (2012) CAUSAL ORDER HYPOTHESIS to determine the relative ordering of participants in constructional causal chains. The subject argument denotes the initiator of the causal chain. The direct object denotes a participant that is causally subsequent to the initiator. Participants that are expressed as antecedent obliques precede the direct object, and participants that are expressed as subsequent obliques are causally subsequent to the direct object in the causal chain. Examples of the more common prepositions encountered with verbs in the social domain and their categorization as antecedent or subsequent obliques are inventoried in Table 2.3.

There are two prepositions that are commonly used as antecedent obliques in the social domain: *with* and *by*. The preposition *with* is commonly used to indicate a comitative

OBLIQUE	PREPOSITION	EXAMPLE
Antecedent	*with*	*They replaced the old pipe with a new one.*
Antecedent	*by*	*Ellen warned me by phone.*
Subsequent	*for, against*	*She exchanged it for cash.*
Subsequent	*as, like*	*He hired her as a new secretary.*
Subsequent	*at*	*His wife works at IBM.*
Subsequent	*from, out of*	*The thief stole money from the store.*
Subsequent	*to, into*	*Susan talked to Rachel.*
Subsequent	*on*	*He works on secret projects.*

Table 2.3: Antecedent and subsequent oblique prepositions in the social domain

relation between an initiator of the event and another participant (e.g., *Brenda met with Molly*). The *with*-preposition is also used in metaphorical argument structure constructions in which a social event is construed as a physical mereological event (e.g., *He presented Brown with a plaque*). The *with*-oblique denotes a figure in a figure - ground relation in argument structure constructions in which the ground is expressed as a direct object. The figure is construed as causally antecedent to the ground and is therefore expressed as an antecedent oblique. Additionally, the preposition *with* is commonly used in replace events in which two entities are in an EXCHANGE relation with each other. The *with* oblique denotes the new entity when the old entity is syntactically realized as a direct object (e.g., *They replaced the old pipe with a new one*).

Both prepositions *with* and *by* can be used to express instruments in social events. The use of *by* as an instrumental preposition is common with verbs of communication (e.g., *Ellen warned me by phone*). The *with*-phrase is typically used with instruments that denote body parts in communication events (e.g., *She gestured with her right hand*). Instruments can also be syntactically realized as locative phrases (e.g., *Susan said a few words on the phone*). When instruments are expressed with locative prepositions, they are construed as causally subsequent to the direct object, i.e., they are subsequent to the core event described by the verb.

Prepositions associated with subsequent obliques are numerous. The prepositions *for* and *against* can be used to indicate a beneficiary and a maleficiary in the event structure,

respectively. Beneficiaries tend to be affected by the event positively (e.g., *Kevin works for Martha*), while maleficiaries are affected adversely (e.g., *They conspired against her*). The *for*-oblique has other uses in the social domain. For example, it can be used to denote the new item with Exchange verbs when the old item is realized as a direct object (e.g., *She exchanged it for cash*). Like most prepositions in English, the *for*-oblique can also be used to denote a subevent of a participant (e.g., *I begged for her release*) (Croft and Vigus 2017). For a more detailed discussion of participants' subevents and their syntactic realization, see section 3.2 in Chapter 3.

The prepositions *as* and *like* are frequently used to indicate a function, role, or a characteristic of a participant (e.g., *The nail functions as a hook*, *He hired her as a new secretary*, or *He acted like a clown*). They commonly occur in argument structure constructions with verbs in the Social Role domain.

Spatial prepositions (*at, on, from, out of, to, into*) are used in metaphorical argument structure constructions when a social event is construed as a physical location or a motion event. In metaphorical construals, oblique arguments are analyzed following the rules from the source domain. Spatial prepositions indicate that a participant is subsequent to the direct object. The preposition *at* is commonly used in metaphorical locative construals to express a static spatial relation between two entities, such as a Member and a Group with verbs in the Social Role domain (e.g., *His wife works at IBM*). The prepositions *from* and *out of* usually denote a metaphorical ground in motion construals with Transfer of Possession verbs (e.g., *The thief stole money from the store*) or Social Role verbs (e.g., *He fired him from the company*).

To and *into* prepositions are also used in metaphorical motion construals with various verbs in the social domain. *To* can be used in metaphorical argument structure constructions with communication verbs (e.g., *Susan told a secret to Rachel*), verbs in the Possession domain (e.g., *He gave a book to his friend*), or Social Role verbs (e.g., *We committed John to prison*). The preposition *into* can be used to denote a position in the Social Role domain

(e.g., *Fair treatment of women does not end with hiring them into positions* (COCA)[4]). The preposition *on* and other spatial prepositions can be used to denote subevents of participants (e.g., *He works on secret projects*). The preposition *into* is frequently used to denote a subevent of a participant in an inducive relation (e.g., *He blackmailed him into coming*).

2.4.2 Constructionally-added participants

Constructional causal chains include only participants that are expressed as syntactic arguments. Depending on the construal, causal chains may include more or less participants than the underlying verbal representation (Goldberg 1995). Examples of constructionally added participants include agents in causative construals with verbs that do not lexically evoke an external initiator, such as the initiator *he* in (5a) with *substitute*, or beneficiaries in transfer construals with verbs that do not evoke a transfer event, such as the intended recipient *Mary* in the creation example with *paint* in (5b-5c). The semantics of *substitute* evokes an event structure with only two participants, Item 1 and Item 2, which are in an 'equivalence' relation with each other (see section 4.8 in Chapter 4 for a more detailed discussion of Replace verbs). The agent is added to the event structure by the argument structure construction which construes the exchange event as causative. The verb *paint* also evokes two participants: an agent and a design theme, which is created in the event. The beneficiary Mary, who may be syntactically realized as a direct object or a subsequent *for*-oblique, is a constructionally added participant.

(5) a. He substituted milk and lemon juice for buttermilk. (VerbNet)

b. He painted Mary a picture.

c. He painted a picture for Mary.

The mapping between the constructional causal chain and the verbal semantic representation reveals which participants are constructionally added. As shown in Figure 2.2,

[4]Corpus of Contemporary American English. https://www.english-corpora.org/coca/.

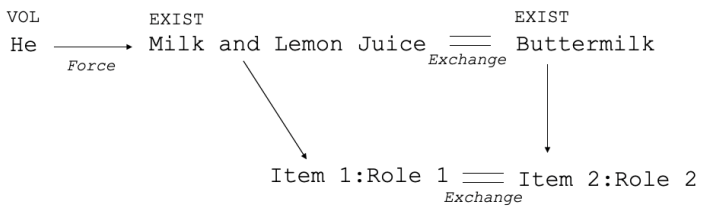

Figure 2.2: A mapping of a causative construal to the Replace event structure.

the initiator of the event in the example (5a) doesn't map to any participant in the verbal representation since the verbal event structure doesn't evokes an external initiator, only an EXCHANGE relation between two items (and their roles). The other participants that are expressed as syntactic arguments in the causative exchange construal, i.e., *milk and lemon juice* and *buttermilk*, both map to the underlying verbal representation since they are evoked by the lexical semantics of *substitute*.

In the examples (5b, 5c) in which a beneficiary is constructionally added, the causal chain representation includes an additional participant at the end of the causal chain since beneficiaries are analyzed as causally subsequent to the main event. Similarly to the mapping shown in Figure 2.2, the constructionally added beneficiary does not map to any participant in the verbal representation.

2.4.3 Constructionally-omitted participants

Mismatches in the mapping between constructional and verbal representations indicate that syntactic construals either elaborate on the event structure evoked by the verb or focus on a particular, more narrow, aspect of the event structure. In the latter case, one or more participants that are evoked by the verbal semantics are not syntactically expressed as arguments. The construal of an event may select only a subpart of the event structure evoked by the verb. In such construals, participants evoked by lexical semantics may be syntactically omitted. For example, verbs that describe events of transfer of possession, such as *contribute*, may occur in argument structure constructions in which the possession that is transferred to a recipient is syntactically omitted (6a). In other examples, it may be the

recipient that is not overtly expressed in the syntax (6b). The verb *contribute* also allows an intransitive construal in which only the agent is overtly expressed as an argument (6c).

(6) a. She contributed to the campaign.

b. She contributed $100.

c. She contributed.

Importantly, the Transfer of Possession event structure associated with the verb *contribute* evokes all three participants: an agent (Agent), theme (Possession), and recipient (Possessor), whether they are overtly expressed or not (Ruppenhofer and Michaelis 2014). When one (or more) of these participants is syntactically omitted, they are considered to be NULL-INSTANTIATED. The role associated with this argument is implicit in the event structure and is included only in the verbal semantic representation.

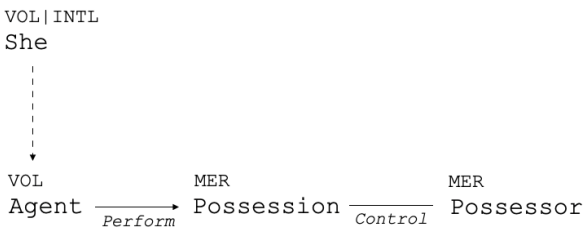

Figure 2.3: A mapping of an Internal construal to the Transfer of Possession event structure.

The topic of null-instantiated participants and their role in the event structure when they are not syntactically expressed is an interesting theoretical issue that has been extensively explored in the literature (Fillmore 1986, Goldberg 2001, Lambrecht and Lemoine 2005, Lyngfelt 2012, Ruppenhofer and Michaelis 2014). Fillmore (1986) introduces null-instantiation in his paper "Pragmatically Controlled Zero Anaphora." He distinguishes between complements that require indefinite interpretation and complements that require definite interpretation. He establishes two main types of 'Indefinite null complements' (INC): an object that is highly general, such as food in eating events (e.g., *He ate*) in which the event describes the physical activity of eating, and an object that requires semantic specialization, such as the object of baking (e.g., *I spent the afternoon baking*) which is understood

to include breads or pastries, but not potatoes or hams (Fillmore 1986:96-97). 'Definite null complements' (DNC) are entities that can be recovered contextually and have a definite interpretation, such as the recipient of a donation in the example *I contributed five dollars* (Fillmore 1986:98).

In our approach, null-instantiated participants, whether they are INC or DNC, are not included in the constructional representation.[5] Only participants that are overtly expressed in the argument structure construction are included in causal chains. In this analysis, the choice of which participants are expressed as syntactic arguments reflects the construal and which parts of the event are intended to be foregrounded. Information about participants that are not constructionally specified can be retrieved from the verbal representation, which includes all participants that are obligatorily evoked by the verbal semantics and are thus part of the event, whether implicit or overtly expressed.

For example, the mismatch in the mapping between the constructional and verbal representation shown in Figure 2.3 for the example *She contributed* in (6c) illustrates that syntactically omitted participants are recoverable from the verbal representation. In (6c), only the Agent is syntactically expressed. The Possession and the Possessor are syntactically omitted and are thus not included in the constructional causal chain. The mismatch between the causal chain and the verbal representation tells us which participants are evoked by lexical semantics and which by constructional semantics.

2.4.4 Metaphorical analysis of argument structure constructions

Depending on the construal, the force-dynamic analysis of the constructional causal chain may not be in full correspondence with the verbal representation. In many cases, the constructional analysis of social verbs requires a cross-domain reference to physical events. We draw parallels between the social and physical domains to determine the force-dynamic inter-

[5]In subsequent research (e.g., Ruppenhofer 2005, Michaelis 2015, Petruck 2019), the term 'null instantiation' has been used to refer to omitted complements. In this dissertation, we refer to participants that are syntactically omitted as 'null instantiated participants.'

actions between participants in certain argument structure constructions with social verbs. A metaphorical analysis sheds light on the use of argument structure constructions in the social domain that is motivated by the syntactic realization of participants in the physical domain.

The use of metaphor in language has received much attention in the literature. Different theoretical frameworks have been proposed to explain the underlying cognitive principles that lead to the use of figurative language (Lakoff and Johnson 1980; Lakoff 1993; Grady 1997; Fauconnier and Turner 2008; Evans 2009). One of the most prominent theories of metaphor is Conceptual Metaphor Theory (CMT) (Lakoff and Johnson 1980, Lakoff 1993), which primarily addresses metaphors that involve stable and systematic correspondences from one conceptual domain to another. In CMT, metaphorical mappings are said to originate in a 'source' domain and are extended to a 'target' domain. An example that is commonly used to demonstrate this theory involves the conceptual metaphor TIME IS MONEY, which originates in our understanding of time as a valuable commodity that can be wasted or spent. The metaphorical correspondence between these two concepts involves a connection between two domains: the concept of money in the source domain and time in the target domain.

(7) a. Linda taped the picture to the wall.

b. Linda gave a picture to Martha.

(8) a. Doug removed the smudges from the table.

b. He stole money from me.

The observation that metaphorical cross-domain mappings of constructional patterns in language use are fairly common is not novel. The role of metaphor in the extension of constructions across domains has been addressed to some extent in linguistics but theoretical accounts of this phenomenon are fairly limited (Jackendoff 1972, Goldberg 1995, de Mendoza Ibánez and Usén 2007). In many instances, a verbal description of the phenomenon is offered, rather than a formal representation that makes the semantic motivations explicit.

Such analyses only serve as descriptions of the phenomenon observed but lack depth and do not provide formalized explanations for the underlying semantic motivations that lead to metaphorical extensions. An example that is frequently discussed in the literature is the use of physical domain argument structure constructions with possession verbs (7-8) (Goldberg 1995, Grady 1997). Goldberg (1995:89) explains that there is a metaphor "that involves understanding possession as the 'possessed' being located next to the 'possessor,' transferring an entity to a recipient as causing the entity to move to that recipient, and transferring ownership away from a possessor as taking the entity away from the possessor." Goldberg's informal description points out the similarities in how the two events unfold and the semantic motivations for the extension of the physical argument structure constructions to the possession domain. Her analysis aligns with our force-dynamic analysis in which we argue that there is a semantic parallel between the physical mereological domain and the social possession domain (Kalm et al. 2019). However, unlike Goldberg (1995), we aim to provide a formal representation that makes the semantic motivations that lead to metaphorical extensions explicit.

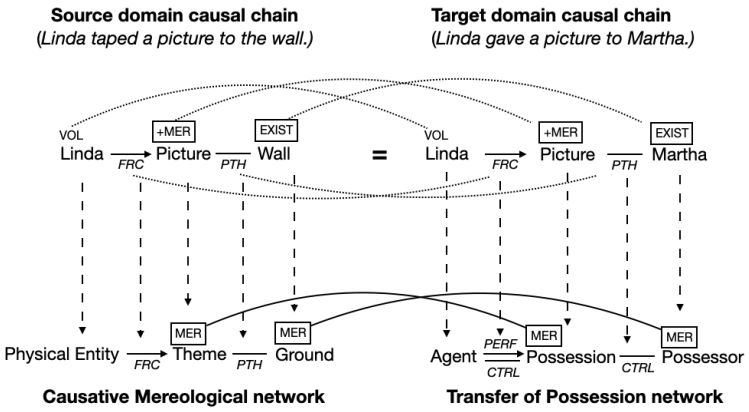

Figure 2.4: A mapping of a metaphorical mereological causal chain to the Transfer of Possession event structure (from Kalm et al. 2019).

We use a metaphorical analysis motivated by CMT to explain the use of physical-domain argument structure constructions for social examples. Metaphorical extensions of argument structure constructions (referred to as "constructional metaphors" from here on) reflect

knowledge structures that are regular and follow conventional patterns of metaphorical conceptualization. The semantics of an argument structure construction in the source domain is conventionalized and is then used to describe events in the target domain, such as the use of physical placing and removing argument structure constructions with Transfer of Possession verbs. As argued by Kalm et al. (2019), the syntactic realization of arguments with Transfer of Possession verbs, such as *give, loan, take* or *steal*, is metaphorically motivated by the argument structure constructions used with physical Mereological verbs, such as *tape* or *remove* (7-8). A set of semantic correspondences exists between physical source domain events and social events which motivates the metaphorical extension of these argument structure constructions. These correspondences exist in the underlying verbal representations, as shown in Figure 2.4.

As Kalm et al. (2019) show, the mapping between constructional causal chains and verbal event structures in cross-domain metaphors is more complex than single-domain mappings. It involves a mapping between the source domain and target domain causal chains and verbal representations. Figure 2.4 shows the mapping between a metaphorical placing causal chain associated with the example *Linda gave a picture to Martha* and the verbal event structure for the social verb *give*. The mapping consists of a source domain representation (left hand side) and a target domain representation (right hand side) and shows a set of correspondences that motivate the cross-domain extension of the 'mereological' argument structure construction.

In particular, the mapping shows that in both the source and target domain representations, the type of change that the theme participants undergo in the event is the same: the Theme and the Ground in the physical domain and the Possession and the Possessor in the social domain undergo mereological change. Additionally, both events are initiated by an external entity: a Physical Entity in the physical domain and an Agent in the social domain.[6]

[6]The verbal representation for Transfer of Possession verbs in Chapter 4 has been slightly modified and does not include a CONTROL relation between the Agent and Possession. This relation is not syntactically expressible in English because the Agent is always expressed as an initiator of the giving or taking events. There are no examples in English that would require a causal chain in which the Agent is an endpoint of a

As argued by Kalm et al. (2019:5), a structural overlap between the physical and social domain representations does not immediately yield a metaphorical analysis; however, it gives a semantic motivation for it. An overlap in semantic features in the underlying verbal representations shows that verbs in the two semantic domains share abstract semantic components in their event structures, and semantic similarities frequently motivate the use of constructional metaphors. The semantic correspondences that exist between mereological and possession verbs are depicted in Figure 2.4 by connecting the theme types in the two representations with a straight line. Correspondences are not drawn between the force-dynamic relations in the verbal representations, though in both domains, there are observable similarities: the relations between the Theme and the Ground in the physical domain and the Possession and the Possessor in the source domain are both non-causal. The non-causal relations are preceded by a causal relation initiated by an external initiator.

The semantic correspondences between the verbal event structures in the physical and social domains lead to the extension of the physical argument structure construction associated with one domain to the other. The causal chain representations (upper part of the figure) are the same in the physical and social domains. The metaphorical causal chain associated with the target domain verb is the same as the source domain causal chain. Specifically, the relation between *Linda* and *picture* is metaphorically construed as a FORCE relation and the relation between the *picture* and *Martha* is construed as a physical PATH relation. Linking the target domain causal chain to the Transfer of Possession event structure indicates that social domain force-dynamic relations are metaphorically construed as physical relations. The causal social PERFORM relation maps to the physical causal FORCE relation and the social non-causal CONTROL relation maps to the physical non-causal PATH relation. In metaphorical mappings, the mapping between source and target domain relations is not random: the causal and non-causal relations in the target domain should map to the causal and non-causal relations in the source domain, respectively.

CONTROL relation.

In our discussion of metaphorical construals associated with different types of verbs in the social domain, we depict only the mapping between the target domain causal chain and the target domain verbal event structure representation, i.e., the right half of the figure. The full representation, as depicted in Figure 2.4, is shown only in this section to provide the reader with an explanation and a complete formal representation of the underlying motivations for the metaphorical extensions from one domain to another. In the following chapters which include discussions of constructional metaphors, we provide a formal representation only for the target domain mappings and the set of correspondences that motivate the extension from the source domain to the target domain are elaborated on in the text.

2.4.5 Mismatches in mappings

The theme types (e.g., VOL, INTL, MER, DES, etc.) in constructional causal chains typically match the theme types in verbal representations. For instance, a verb that evokes a design theme (DES) frequently occurs in construals that describe creation events, in which the theme participant is identified as a design theme. For example, Statement verbs in the Communication domain evoke an event structure in which a Message is created by a Speaker. The Message is a design theme in the verbal representation. Statement verbs frequently occur in transitive argument structure constructions (e.g., *She said it*) in which the Message is construed as a design theme. The theme types in the mapping of the causal chain to the verbal representation thus match. A match also frequently exists in metaphorical mappings since theme types are defined as domain independent features and are thus not specific to any one domain. For example, as shown in Figure 2.4, the metaphorical construal of the Possession participant as a mereological theme in a physical argument structure construction matches the analysis of Possession as a mereological theme in the underlying verbal representation. However, depending on the syntactic construal, certain types of mismatches are permitted in constructional-verbal mappings.

The most common type of mismatch observed in the social domain results from examples

in which a syntactic construal does not profile a force-dynamic relation that is evoked between two participants in a verbal representation, and the constructional causal chain thus describes a 'non-relational' internal event in which the theme participant undergoes an internal (INTL) change. In such cases, an internal theme in the causal chain maps to a different theme type (e.g., MOT) in the verbal event structure. Many internal construals discussed with different types of social verbs in the following chapters generate this type of mismatch. For example, the Cause Membership event structure in the Social Role domain evokes an externally initiated AFFILIATE relation between a Member and a Group. In this relation, the Member is identified as a motion (MOT) theme (see Chapter 3 for a more detailed discussion of the event structure associated with Cause Membership verbs). However, in examples such as *He hired her*, the AFFILIATE relation is not expressed since the Group is not a syntactic argument of the verb. The Member, syntactically expressed as a direct object in the transitive argument structure construction, is analyzed as undergoing an internal (INTL) change because its relation to the Group is not overtly expressed. As shown in Figure 2.5, analyzing the Member as an internal theme in the constructional causal chain creates a mismatch in the mapping to the verbal event structure.

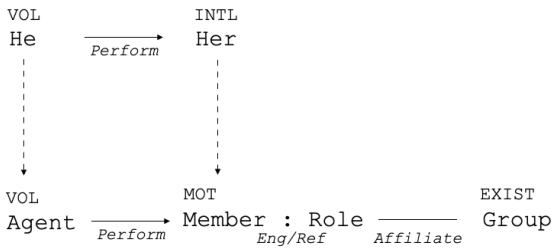

Figure 2.5: A mapping of an internal theme in the causal chain to a motion theme in the verbal event structure.

In Figure 2.5, the internal theme in the constructional causal chain maps to a motion theme in the verbal representation. This type of mismatch is not problematic for our analysis. Internal construals describe events in which a theme undergoes some type of change that is defined as independent of a force-dynamic relation with another entity. In the example *He hired her*, the Agent causes the Member to undergo a change in their social role by hiring

them. However, the Member cannot be analyzed as a motion theme in this construal because a motion theme is always defined with respect to another entity, such as a Group in the social domain or a ground in the physical domain.[7]

In other cases, a theme that doesn't undergo any change in the causal chain, and is labeled EXIST, can map to a theme that is analyzed as undergoing a change in the verbal event structure. This type of mismatch is common in mappings with Transfer of Possession verbs in which the event structure specifies both the Possession and the Possessor as mereological themes. In taking or giving construals which use metaphorical mereological argument structure constructions (e.g., *He stole the bike from him* or *He gave the bike to me*), only one of the participants, the Possession, is construed as a mereological theme. The other participant, the Possessor, is identified as an endpoint of a physical PATH relation and therefore does not undergo any change in the event, like the ground in the physical domain analysis of argument structure constructions with mereological verbs (see Chapter 4 for a more detailed discussion of metaphorical mereological construals associated with transfer of possession events).

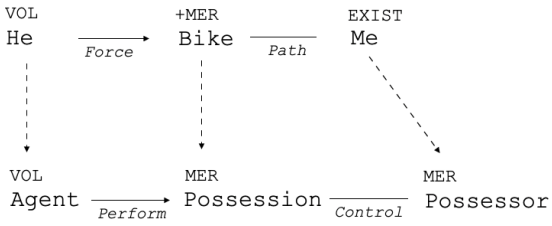

Figure 2.6: A mapping of an exist theme in the causal chain to a mereological theme in the verbal event structure.

In Figure 2.6, the *bike* is analyzed as a mereological theme (+MER) because it is syn-

[7]This analysis is consistent with our analysis of physical motion events in transitive argument structure constructions when the physical PATH relation between the figure and ground is not overtly expressed, as in the example *He kicked the ball*. In the physical domain, the event structure of the verb *kick* evokes that the figure is a motion theme (MOT) that moves with respect to a ground; however, the constructional semantics doesn't profile this relation when the ground is syntactically covert. The constructional causal chain only evokes a physical FORCE relation between the initiator and the theme. The theme undergoes internal change as an endpoint of the FORCE relation and is therefore identified as an internal (INTL) theme. The inference that the type of internal change involves motion is evoked only by the verbal semantics to which the constructional causal chain maps.

tactically realized as a direct object in the example *He gave the bike to me.* The subsequent oblique, *me*, is labeled EXIST because in the argument structure construction [SBJ V OBJ *to*-OBLIQUE], it functions as a metaphorical ground and is therefore not construed as undergoing any change in the event. Mapping the subsequent oblique participant in the causal chain to the Possessor in the verbal representation thus creates a mismatch. Similarly to the internal construal which can map to a different theme in the verbal event structure, we allow EXIST participants to map to different themes in restricted semantic environments.

Other types of mismatches may result from the underspecification of participants' changes in event structures evoked by verb types. In some verbal representations, the type of change that the participant undergoes is unspecified to accommodate different construals and different identities of participants, which may lead to different roles in the event. For example, in some verbal event structures, such as Replace verbs in the Exchange domain (see Chapter 4), the participants' changes are left unspecified. This is because the EXCHANGE relation may exist between volitional or non-volitional entities. Not specifying this information in the verbal representation allows us to map the causal chain to the verbal event structure without creating a 'true' mismatch. The causal chain then specifies the identity of the participant as either volitional (VOL) or non-volitional (EXIST) depending on the particular example given.

2.5 Conclusion

This dissertation is structured as follows. Each chapter is dedicated to the discussion of a particular semantic domain identified above: Interpersonal Interactions, Possession and Exchange, Communication, Social Role, and Conceptual Relations. The discussion within each chapter on these semantic domains follows the same format. An introductory section gives an overview of the literature that is relevant to the analysis of the semantic category as a whole. Following is a discussion of the semantics of each verb type that comprises the particular semantic domain, including the force-dynamic event structure representation associated with it and a list of VerbNet classes and FrameNet frames which contain verbs

that belong to this verb type. The analysis of verbal semantics is followed by a discussion of the different syntactic construals associated with verbs in each verb type, and the mapping of causal chains associated with these construals to the underlying verbal event structure.

Social Role events are covered in Chapter 3. They are expressed by three different types of verbs: Membership, Cause Membership, and Role verbs. Possession, Transfer, and Exchange verbs are discussed in Chapter 4. There are six distinct verb types in this category of events: Possession, Dynamic Possession, Transfer of Possession, Replace, Exchange, and Commercial Transaction verbs. Chapter 5 focuses on Communication verbs which are divided into five distinct types: Statement, Communicate, Joint Statement, Request, and Response verbs. The category of Interpersonal Interactions, which contains Reciprocal, Collective, Inducive, and Attack verbs is discussed in Chapter 6. Lastly, verbs describing Conceptual Relations are discussed in Chapter 7. They are divided into four distinct verb types based on their semantics: Associate, Differentiate, Relate and Base.

Chapter 3: Social Role verbs

3.1 Introduction

The domain of social events describes various types of situations beyond interpersonal interactions. In this chapter, we focus on Social Role verbs that describe events in which humans and their involvement in society are characterized by their roles in social institutions, such as schools, places of employment, or other socially defined groups (e.g., *She works as a tech at IBM* or *He attends the Colorado University*). In some cases, the role that an entity assumes may be socially defined but not tied to any particular institution, such as someone's occupation (e.g., *He is a doctor/lawyer/accountant*).

English has more verbs that evoke one's membership in larger social units when compared to verbs that do not evoke any affiliation. Our social identities are closely tied to social institutions and groups and there are many verbs in English that describe different scenarios in which humans enter or leave an institution or assume or leave a role. In the following sections, we discuss the semantics of these types of verbs separately from verbs that evoke roles or attributes but not a membership within an institution.

Linguistic studies that focus on Social Role verbs of any kind are very scarce. VerbNet and FrameNet provide a fairly comprehensive coverage of Social Role verbs though they do not offer a very detailed semantic analysis. VerbNet's classes cover a wide range of Social Role verbs and offer a limited semantic analysis of the syntactic frames that are associated with each class. FrameNet's coverage of Social Role verbs is also quite broad though the depth

of their semantic and syntactic analysis differs from one frame to another. For example, FrameNet provides a detailed analyses of frames for *hire* and *fire* verbs; however, their analysis of verbs such as *volunteer* is quite limited. In addition, FrameNet lacks coverage for certain types of Social Role verbs such as *supervise* or *knight*.

In our semantic analysis, we define three verb types in the Social Role domain which are determined by the distinct event structures that these verbs evoke: Membership verbs, which evoke a force-dynamic relation between an individual and a social institution or group (section 3.3), Cause Membership verbs, which evoke a Membership event structure with an external agentive initiator (section 3.5), and Role verbs, which evoke an event structure in which an individual has a role that is not tied to a particular institution or group (section 3.7).

3.2 Subevents with Social Role verbs

Social Role verbs commonly occur with syntactic arguments that denote participants' role, some other socially defined attribute (e.g., a lawyer, a nanny, or a volunteer), or an event that a participant is engaged in (e.g., a task or a meeting). Our analysis of roles and attributes follows Croft and Vigus' (2020) analysis of events that are syntactically expressed as event nominals (see Chapter 1). Roles, attributes, and events are therefore not analyzed as event participants. They denote subevents of participants that they are associated with.

As shown in (9), agents and their roles can be found in similar alternations as participants and their events. In these examples, the role specifies the position of the hired person. The hired person and the secretary are the same participant in the event structure. In (9a), the participant and her role are expressed as separate arguments. In (9b), only the participant is expressed, and in (9c), only the role is syntactically realized. Importantly, in all three examples (9a-9c), only two participants are causally involved: the hiree and the hired. The force-dynamic event structure analysis for these three examples is therefore the same.

(9) a. He hired her as a new secretary.

b. He hired her.

c. He hired a new secretary.

The syntactic expression of subevents is quite variable. In addition to being expressed as nominals, subevents may be syntactically realized as infinitival clauses or complement clauses. In the following sections, we discuss our analysis of roles and attributes (3.2.1), and events and actions (3.2.2) associated with participants in Social Role examples. Our analysis assumes that roles and attributes describe participants' subevents just like events and actions, rather than distinct participants in the event structure. The relation between the participant and their subevent in these various types of subevent categories is analyzed the same: the participant is either engaged in a subevent, which is defined as an ENGAGE relation, or the participant is not engaged in a subevent, which is defined as a REFRAIN relation. These relations are used in constructional and verbal representations to signal that the two arguments refer to the same participant in the event structure. ENGAGE and REFRAIN do not describe 'force-dynamic' relations between participants. They are used as labels to indicate that two syntactic arguments refer to one event participant.

3.2.1 Roles and attributes

Social Role verbs describe events in which participants are assigned roles, fulfill roles, or end roles. Prototypically, a role describes a formal post, a position, an occupation of an individual (e.g., a secretary, engineer, etc.) or a task that one is given within an organization (e.g., a front desk volunteer). We also analyze a participant's attribute in certain verb classes as a role. For example, attributes with verbs in the masquerade-29.6 class (e.g., *Dina masqueraded as a lawyer*) or denominal verbs in the captain-29.8 class (e.g., *She mothered his child*) are analyzed as denoting roles.

Roles do not represent participants in the event structure; they describe participants' 'subevents'. They do not function as distinct entities from the agents whom they are associated with. An entity and their role refer to the same participant. Therefore, we do not define

a force-dynamic relation between an entity and their role in constructional causal chains or verbal event structure representations. Examples of causal chains with roles can be found in section 3.6.3 or section 3.8.

(10) a. She works as a secretary.

b. I resigned my position. (VerbNet)

c. His wife works on secret government projects at IBM. (VerbNet)

d. He trained them to be blacksmiths. (VerbNet)

e. Miriam tutored her brother. (VerbNet)

Roles can describe various socially sanctioned attributes such as a person's role in a company, a job title or occupation (10a-10d), or some other private role that two (or more) people agree on, such as (10e). The syntactic realization of roles is variable. The role may be expressed as an *as*-oblique (10a), a direct object (10b), an *on*-oblique (10c) or an infinitival clause (10d). The verbal semantics determines whether the participant is in a role, entering a role, or leaving a role. With verbs such as *supervise* or *captain*, the Role is expressed by the predicate (e.g., *Martha supervises Kevin*).

Some Social Role verbs can occur in examples in which the subevent expresses an attribute of a participant (11a, 11b). Verbs from other social subdomains, such as function verbs, also frequently express an attribute as a separate argument from the participant that it is associated with. For example, in (11c), the attribute of the nail is defined by its function. In (11d), the book's attribute is defined by its weight.

(11) a. Dina masqueraded as a lawyer. (VerbNet)

b. He acts like a boss.

c. The nail functions as a coat hook. (VerbNet)

d. The book weighs a pound.

The syntactic realization of attributes is less variable than that of roles. Attributes are usually expressed as prepositional phrases with Social Role verbs, such as *as* or *like*-phrases

(11a-11c). With some verbs, it is also possible to express the attribute as a direct object (11d).

3.2.2 Events and actions

Events or actions that a participant is engaged in can also be expressed as separate arguments in clauses (Croft and Vigus 2020). Examples of Social Role verbs, such as *collaborate*, *volunteer*, *exclude* or *work* are given in (12). The participant is expressed as a subject and the event or action, which is the participant's subevent, is expressed as a prepositional phrase or an infinitival clause. Prepositional phrases that describe subevents of participants are expressed as subsequent obliques.

(12) a. They collaborated on the task. (VerbNet)

b. I volunteered for the task. (VerbNet)

c. Amanda worked at finishing the task. (VerbNet)

d. I volunteered to run the workshop. (VerbNet)

e. They excluded me from the meeting. (VerbNet)

Subevents that describe participants' events or actions are syntactically most variable. They can be expressed as event nominals and occur as arguments in various prepositional phrases, e.g., *on*-oblique (12a) or *for*-oblique (12b). Events can also be expressed by gerunds in prepositional phrases (12c) or infinitival clauses (12d). When the participant is not engaged in a subevent, the subevent is frequently realized as a *from*-oblique in English (12e).

Subevents, whether they refer to roles, attributes, events, or actions, are analyzed as subsequent to the participant in the causal chain. As Croft and Vigus (2020:172) argue, "a participant's subevent is construed as subsequent to the participant itself". Consequently, as shown in the examples above, subevents are syntactically realized as subsequent obliques, infinitival clauses, or direct objects. In some cases, a subevent may be expressed as an antecedent oblique when its participant is realized as a subject (e.g., *He managed with dealing*

the cards) (Croft and Vigus 2020:173). As Croft and Vigus argue, the relative position of the subevent and its participant is indeterminate in such examples since obliques are only ordered with respect to the direct object, not the subject. Therefore, in the causal chain representation for these examples, the subevent would still be subsequent to the participant who is engaged in it.

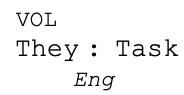

Figure 3.1: Causal chain representation for *They collaborated on the task.*

A constructional representation for an event in which a participant and their subevent are expressed is shown in Figure 3.1. The casual chain represents the semantics of the example *They collaborated on the task* in which the oblique argument task is the subevent of the participant *they*. The colon between the Member and the Role signals that they are syntactically realized as separate arguments but do not refer to two distinct participants. The label *Eng* (for ENGAGE) also indicates that the two arguments refer to the same participant in the representation. For examples in which the participant is not engaged in the event, the label *Ref* (for REFRAIN) is used. Agentive participants are always engaged in the event volitionally and are therefore labeled VOL. The subevent does not have its own label since it is not an independent participant in the event structure representation.

3.3 Membership verbs

There are various verbs in English that describe events in which an individual is affiliated with a social group or organization (e.g., *work, attend,* or *resign*). These verbs are referred to as Membership verbs in our semantic analysis, and we distinguish two types of Membership verbs: verbs that describe joining or participating in a group (e.g., *join, work* or *attend*) and verbs that describe leaving a group (e.g., *resign* or *quit*) (13). We analyze the force-dynamic event structures associated with these verbs as the same even though resigning is a reverse

event of joining. The schematic force-dynamic relation between the person (Member) and the group (Group) is the same: AFFILIATE.[1] The verb itself, rather than the force-dynamic representation, tells us whether the event is of joining or participating or leaving.

(13) a. His wife works. (VerbNet)

b. His wife worked as an engineer for IBM. (VerbNet)

c. His wife works on secret government projects. (VerbNet)

d. I attend the University of Colorado. (VerbNet)

e. He resigned from the military. (VerbNet)

f. Eventually he was able to quit his job at the market and pursue his passion full time. (COCA)

In the Membership event structure, a Member is understood to have a particular Role in a Group which may be defined as their work position, such as an engineer or a secretary (13b), or may be specified by referring to their job assignment, such as working on a specific task (13c). The Group may be an institution, such as a place of employment or a school, or any other socially defined group to which a Member belongs. For example, in (13b) the Group describes the company in which the Member is employed. In (13d), the Group is a school that the Member attends. The Role that the Member holds within a Group may also be specified in the argument structure construction (13b, 13c). In some construals, both the Group and the Role may be syntactically omitted (13a).

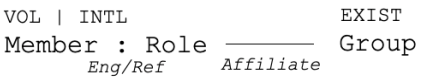

Figure 3.2: Membership event structure.

The Membership event structure shown in Figure 3.2 obligatorily evokes two participants: a Member and a Group. The Member's position or task in the company is specified as a

[1]This analysis is consistent with our analysis of motion verbs in the physical domain in which we define one spatial PATH relation between a figure and a ground in examples in which an entity moves towards or away from another entity (Croft et al. 2016).

Role in the event structure. The Member and their Role are analyzed as a single participant in the event structure and the relation between them is defined as either ENGAGE (*Eng*) or REFRAIN (*Ref*). With participate verbs, which describe a Member's affiliation with a Group, the relation between the Member and the Role is ENGAGE. With resign verbs, the Member's leaving an organization involves stepping down from their Role and the relation between the Member and the Role is therefore defined as REFRAIN. REFRAIN is the reverse of ENGAGE.

The Member is in an AFFILIATE relation with the Group. The AFFILIATE relation is non-causal but directional, similarly to the PATH relation in the physical domain: the Member is the initiator of the AFFILIATE relation and the Group is the endpoint. Whether the event denotes a participate or a resign scenario is specified by the verb but is not represented in the verbal event structure.

The Member is identified as a volitional (VOL) entity in the event structure. The Member's engagement in the Group is volitional in that they have to employ mental capacities that allow them to consent to, leave, or be in a Group. Belonging to a Group may entail working, attending school, or participating in various group-mandated activities. In our analysis, even a very passive type of membership involves some type of engagement and thus entails a volitionally acting Member. The Group is labeled EXIST because it doesn't undergo any change in the event.

Membership verbs occur in the following VerbNet classes: attend-107.4, supervision-95.2.2, and employment-95.3. We give special attention to supervise verbs in section 3.3.1 since they are semantically a bit different from attend and employment verbs. The Role of the Member is part of the lexical semantics of these verbs.

FrameNet frames that contain participate verbs include: Membership, Being_employed, Becoming_a_member, Leadership, and Working_a_post. The Working_a_post frame doesn't include an Employer (which is equivalent to the Group in our representation) as a Frame Element since these verbs (e.g., *staff* or *man*) typically don't occur in argument structure constructions in which an Employer is overtly expressed. However, the examples

in this frame (e.g., *Volunteers were staffing the telephones* or *Man your stations!*) suggest that the event structure requires that the job is assigned by an employer or a supervisor.

There are fewer verbs that describe resign events in the English lexicon when compared to participate verbs. Resign verbs occur in the resign-10.11 class in VerbNet. There is also only one FrameNet frame that contains Resign verbs: Quitting.

3.3.1 Supervise verbs

Supervise verbs (e.g., *supervise, command, lead*, and others) encode the Member's Role in their definition. For example, the verb *lead* in (14a) entails that *Martha*'s Role is to be a leader of a research group and the verb *supervise* in (14b) entails that *Miriam* is Kevin's supervisor. Unlike other Membership verbs, supervise verbs don't frequently occur in construals in which the Group is overtly expressed (14a)[2]. It is more common for these verbs to occur in argument structure constructions in which a beneficiary of the event is overtly expressed (14b). In (14b), *Kevin* is a beneficiary of *Miriam's* supervision.

(14) a. Martha led a big research project at CU Boulder.

b. Miriam supervises Kevin.

We do not analyze the semantics of these verbs as obligatorily evoking a beneficiary in the event structure. That is, we do not propose a separate verbal representation for these verbs that is distinct from Membership verbs though they frequently occur with an additional beneficiary participant. Being a leader or a supervisor is a role that one holds within an institution, not unlike being a secretary or a president of a company. The difference seems to be that with verbs such as *lead* and *supervise*, it is in the job description to closely work with another person, whereas with other Membership verbs, such as *work*, it is not.

(15) a. Kevin works for Martha.

b. She clerkes for a federal judge.

[2]VerbNet does not include this example in their syntactic frames for the supervision-95.2.2 class.

The expression of beneficiaries as direct objects in English is not uncommon; however, this syntactic behavior is restricted to specific classes of verbs in the social domain. The syntactic alternation of beneficiaries as either *for*-obliques or direct objects appears to be semantically motivated. Beneficiaries with supervise verbs, i.e., supervisees, are frequently expressed as direct objects (14b) while beneficiaries with verbs that describe working for someone, i.e., supervisors, tend to be expressed as *for*-obliques (15). The syntactic realization of the beneficiary appears to be semantically motivated, namely by an authority dynamic in the event: a beneficiary that has higher authority than the Member is expressed as a *for*-oblique and a beneficiary with lower authority is expressed as a direct object. We do not distinguish between these two types of beneficiaries in our event structure representation. In both cases, the beneficiary is a participant that is constructionally added and is subsequent to the main event in the causal chain.

3.4 Semantics of argument structure constructions with Membership verbs

Membership verbs occur in various argument structure constructions that are metaphorically extended from the physical domain. In particular, the AFFILIATE relation between the Member and the Group tends to be metaphorically construed as a physical PATH relation in which the Member is metaphorically construed as a figure and the Group as a ground. This metaphorical correspondence leads to Membership verbs occurring in argument structure constructions that are characteristic of physical location and motion events. With verbs such as *work*, the event is construed as static and the argument structure construction describes metaphorical location (section 3.4.1). With verbs such as *attend, go to*, or *resign*, the event is construed as dynamic and a metaphorical motion argument structure construction is used (section 3.4.2).

Location and Motion metaphors are also motivated by the metonymy between institutions and physical locations given that traditionally institutions always had physical presence. For example, most schools have campus locations or companies having headquarter buildings.

This metonymy is another factor leading to the metaphorical link between social institutions and physical ground entities.

Internal construals in which only the Member is overtly expressed are also common (e.g., *She quit* or *His wife works*). The semantics of such examples are discussed in section 3.4.3. With participate verbs, the Group may also be construed as a beneficiary of the event. For example, when the Group denotes an employer, the employer may be construed as benefiting from the Member's work (e.g., *She works for IBM*). We discuss this type of construal in section 3.4.4. Causal chains in which a Role is syntactically realized are discussed in section 3.4.5.

3.4.1 Location construal

Membership verbs can occur in argument structure constructions that describe metaphorical physical Location. In Location construals, the Member is syntactically realized as a subject and the Group as an *at* or *in*-oblique (16a-16b). It is also possible to use the possession verb *belong* to describe membership events (16c). We analyze the [SBJ V *to*-OBL] argument structure construction with *belong* as metaphorical Location, following our analysis of *belong* in the Possession domain.

As we discuss in Chapter 4 (section 4.3), the use of the verb *belong* in this argument structure construction (e.g., *The book belongs to him*) points to a metaphorical Location construal. In this analysis, the Possession, the *book*, is metaphorically construed as a figure and the Possessor, *he*, as a ground in a physical PATH relation. The force-dynamic relation between the Possession and the Possessor is static, just like the relation between figure and ground in the physical domain. The Possession is also causally antecedent to the Possessor, analogous to the physical figure and ground. As noted in Chapter 4, the verb *belong* can also be used to describe a spatial relation between two physical entities, as in the example *The barn belongs to the house.* The example describes a 'co-location' relation between the barn and the house. With Participate verbs, *belong* denotes a metaphorical spatial relation

between a Member (=figure) and a Group (=ground).

(16) a. His wife works at IBM.

b. The 450,000 employees, 300,000 of whom work in the postal service, are unhappy. (COCA)

c. Only one of the three victims belonged to the Free Aceh Movement. (COCA)

The causal chain associated with the physical Location construal for the examples in (16a-16c) is shown in the upper part of Figure 3.3. The relation between the Member and the Group is defined as metaphorical PATH. In the physical Location construal, the ground doesn't undergo any change in the event and is identified as EXIST. The Group in the target domain inherits the same subevent label. In the source domain, the figure may be volitional (e.g., *He was in a building*) or non-volitional (e.g., *The statue stood on a pedestal*). In the target domain, the Member is always a volitional entity and is therefore identified as Volitional (VOL) in the causal chain. The member also undergoes internal change in the event structure.

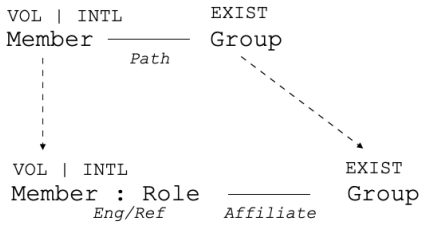

Figure 3.3: Location construal with Participate verbs.

3.4.2 Motion construal

Membership verbs can occur in dynamic construals in which the Member's participation in a Group or institution is not construed as a static event. For example, the participate verb *attend* describes a dynamic construal of a static membership event in (17a). The motion verb *go to* also construes the event as dynamic (17b) though the event of attendance itself is understood as static. More commonly, the motion metaphor is used with verbs that describe

the act of joining or leaving a Group, such as *join* (17c) or *resign* (17d). Motion verbs such as *enter* (17e) or *leave* (17f) are also commonly used to describe Membership events in motion construals.

(17) a. I attend the University of Colorado.

b. I go to the University of Colorado.

c. Carmack eventually joined the company as chief technology officer. (COCA)

d. I recently I resigned from a company operating world wide, I held the position of National Service Manager. (COCA)

e. The 23-year-old applied to an aviation school so he could enter the military as a pilot. (COCA)

f. Associates believe Perlozzo will leave the organization before facing another interview. (COCA)

The causal chain associated with the motion construal with Membership verbs is shown in Figure 3.4. The causal chain depicts the semantics of argument structure constructions in which a Role is not overtly expressed. Following the analysis of motion events in the physical source domain, the Member is identified as a metaphorical theme and labeled MOT. The Member is also identified as a volitional (VOL) participant since their engagement in the event is volitional. The Group is identified as a metaphorical ground. The ground doesn't undergo internal change in the physical motion event. The Group is therefore labeled EXIST.

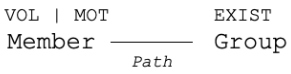

Figure 3.4: Motion construal with Membership verbs.

A transitive argument structure construction (e.g., *He entered/quit a new job*) and a *from*-oblique construction (e.g., *He resigned from his job*) can be used to describe a relation between a Member and a Role. In these examples, the syntactic realization of the Role is the same as the Group in motion construals. However, unlike Member and Group, Member and

Role are not two distinct participants in the event structure and the relation between them lacks an equivalent in the physical domain. As such, it would not be accurate to establish a metaphorical mapping from the ENGAGE or REFRAIN relations to the non-causal PATH relation in the physical domain.

Importantly, the syntactic realization of a participant's subevent as a direct object or a *from*-oblique is not unique to Social Role verbs. These argument structure constructions can be used to express a relation between a participant and subevent with other verbs, such as *avoid* (e.g., *He avoided his nagging*) or *refrain* (e.g., *He refrained from eating*). The relation between the participant and the subevent in these examples describes social REFRAIN.

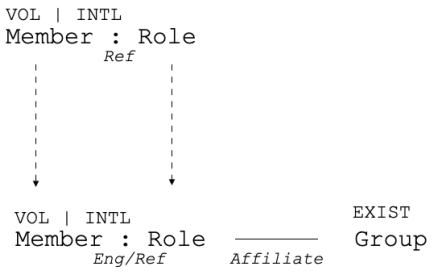

Figure 3.5: Refrain construal with Membership verbs.

Argument structure constructions with dynamic Membership verbs can also express all three participants, as shown in (18b-18c). The analysis of the Group in these examples is different from the prototypical metaphorical motion construal in (18a) discussed above. The syntactic alternation observed with the verb *resign* in (18) points to two distinct analyses depending on the syntactic realization of the Group. In (18a), the Group is syntactically realized as a *from*-oblique and construed as an endpoint of PATH in a metaphorical motion construal, as discussed above. However, in (18b-18c), the Group is syntactically realized as an *at*-oblique, which is a static preposition commonly used in locative construals. As shown in (18d), it is not possible to use a *from*-oblique for the Group when the Role is overtly expressed. This evidence suggests that the event cannot be construed as metaphorical motion when the Role is included in the causal chain. We analyze the Group as describing the location of the job when it is expressed as an *at*-phrase. In this analysis, the Group

modifies the Role in these construals and is not a separate participant in the constructional semantics: *He resigned from [his job at IBM]*.

(18) a. He resigned from IBM.

b. He resigned his job at IBM.

c. He resigned from his job at IBM.

d. He resigned his job *from IBM.

Our analysis of the constructional semantics associated with examples such as (18b) and (18c) and its mapping to the Membership event structure is shown in Figure 3.5. The causal chain for these examples is identical to the causal chain for examples in which the Group is not overtly expressed (e.g., *He resigned from his job*). The causal chain describes an event in which a Member refrains from having a Role. A more detailed analysis of argument structure constructions in which a Role is overtly expressed can be found in section 3.4.5.

3.4.3 Internal construal

Membership verbs can also occur in argument structure constructions in which only the Member is syntactically realized (19). In these examples, neither their Role or the Group are expressed as syntactic arguments of the verb. We analyze intransitive [SBJ V] argument structure constructions with Membership verbs as internal events since the Member is not engaged in a force-dynamic relation with another participant. For example, (19a) describes an event in which a Member undergoes internal change by resigning. In (19b), *his wife* is engaged in an internal activity by working.

(19) a. He resigned.

b. His wife works.

Argument structure constructions in which the Member's Role is overtly expressed as in *His wife works as an engineer* are also analyzed as internal construals since the Role is the

Member's subevent, and we do not define a force-dynamic relation between a participant and their subevent. We discuss these types of internal examples in section 3.4.5.

The constructional semantics associated with the examples in (19) are depicted in the upper part of Figure 3.6. The causal chain includes only the Member as an event participant. The Member is identified as a volitional (VOL) entity since their engagement in the event requires their mental capacities. The label INTL indicates that the Member undergoes internal change in the event. Any other type of change is not further specified since the Member is not engaged in a force-dynamic relation with another participant.

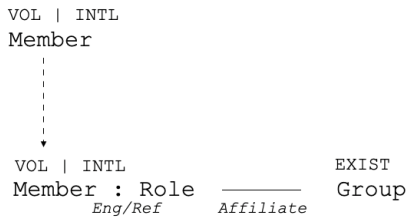

Figure 3.6: Mapping of a causal chain associated with the examples in (19) to the Membership event structure.

3.4.4 Causal chains with beneficiaries

Participate verbs can occur in argument structure constructions in which the Group is construed as a beneficiary of the event. In this construal, the Group is usually expressed as a subsequent oblique *for*-phrase (20), which is typical for beneficiaries. The Group is therefore analyzed as subsequent to the core event denoted by the main verb, and the ordering of participants in the constructional causal chain is the same as in the verbal representation: the Member is causally antecedent to the Group. However, the force-dynamic relation between the Member and the Group in this construal is different from the verbal representation, as shown in Figure 3.7. The Member is not in an AFFILIATE relation with the Group.

(20) a. His wife worked for IBM.

b. His wife worked as an engineer for IBM.

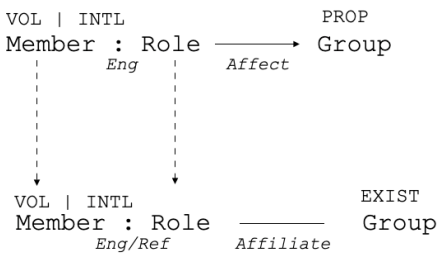

Figure 3.7: A causal chain for the example *His wife worked as an engineer for IBM.*

Figure 3.7 shows the mapping of the constructional semantics to the verbal semantics. The Group is analyzed as an endpoint of an AFFECT relation in the constructional causal chain, following our analysis of beneficiaries in event structure. The causal chain includes the Member, their Role, and the Group. Both the Member and their Role map to the same participants in the verbal representation; however, the Group in the constructional causal chain doesn't map to the Group in the verbal representation in this construal. The causal AFFECT relation in the causal chain cannot map to the non-causal AFFILIATE relation in the verbal representation. The endpoint of the AFFECT relation therefore cannot map to the endpoint of the AFFILIATE relation. Additionally, the construal in which the Group is a beneficiary leads to an analysis of this participant as external to the core event denoted by the verbal semantics.

This analysis can be better explained using an example in which both a beneficiary and an employer are overtly expressed, such as *His wife worked for Linda at the president's office.* In this example, the beneficiary is the supervisor and the Group is the employer. When both a beneficiary and a Group are overtly expressed, it is clear that only the Group is evoked by the verbal semantics. The beneficiary is a constructionally-added participant. The Group is syntactically expressed as an *at*-oblique and therefore semantically functions as the ground in a location construal (as we discussed above). When the Group is expressed as a *for*-oblique, as is the case in the examples in (20), the construal is that the Group is a beneficiary rather than a ground in a metaphorical physical construal. In this analysis, the beneficiary doesn't map to the Group in the event structure, even when it does denote the employer (= Group).

We analyze beneficiaries as endpoints of an AFFECT relation. The AFFECT relation is defined as a mental domain relation in which the endpoint undergoes a change of state in their mental property. The AFFECT relation describes an event in which a stimulus affects the mental state of an experiencer. The experiencer is analyzed as a property theme. We do not distinguish different types of property changes (i.e., mental, physical, or social). Mental verbs that prototypically describe an AFFECT relation between a stimulus and an experiencer include verbs such as *amuse* or *scare* (e.g., *The big thunder scared him*). When a beneficiary is constructionally added to an event structure, they are affected by the event by benefiting from it. Though the benefit may be physical or social, the beneficiary is always a human entity and as such, the event always affects their mental state. Therefore, we use the same AFFECT force-dynamic relation when a beneficiary is added to the event structure with physical or social verbs.

The construal in which the Group is construed as a constructionally-added beneficiary is not possible with refrain verbs which describe events in which a Member leaves a Group. With resign verbs, the Group is always realized as a *from*-oblique and is construed as a metaphorical Ground in a motion construal.

3.4.5 Causal chains with Engage and Refrain relations

When a Role is syntactically expressed, the constructional causal chain represents the relation between the Member and the Role as ENGAGE or REFRAIN, depending on the verb. Though the Role is frequently syntactically realized as a separate argument from the Member, we do not analyze it as a distinct participant in the event structure. It describes a 'subevent' of the Member, as explained in section 3.2. The argument structure construction may overtly express either just the Member and the Role (21a-21b) or may also include the Group (22d). As noted above in sections 3.4.2 and 3.4.4, different construals are available when the Group is overtly expressed; however, in this section, we only focus on examples that express the relation between a Member and their Role.

The Role may refer to a Member's job assignment (21a), their position in general without specifying anything about it (21b), or the tasks that a Member is responsible for when they are affiliated with a Group (21c).

(21) a. His wife worked as an engineer. (VerbNet)

b. I resigned my position. (VerbNet)

c. His wife works on secret government projects at IBM. (VerbNet)

The causal chain for the example in (21b) shown in Figure 3.8 identifies the Member as a volitional (VOL) initiator. The Role does not have its own subevent label; it 'inherits' the subevent of the participant to which it belongs. The relation between the Member and Role is identified as REFRAIN. The Member is no longer engaged in fulfilling the Role they were assigned to do by the Group.

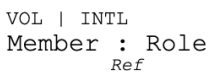

Figure 3.8: A causal chain associated with the example *I resigned my position.*

3.5 Cause Membership verbs

Cause Membership verbs describe events in which the AFFILIATE relation between a Member and a Group is externally initiated by an Agent. Verbs that describe this event structure include *hire* or *fire*, though the event structure is not necessarily restricted to employment scenarios and includes other verbs such as *banish* or *confine*. The external initiator (= Agent) causes a Member to be (or not to be) affiliated with a Group by having a position of authority that allows them to make such a decision.

(22) a. I hired two secretaries. (VerbNet)

b. I hired two secretaries as helpers. (VerbNet)

c. The king banished the general from the army. (VerbNet)

d. I fired him as my chief of staff. (VerbNet)

Examples in (22) show various argument structure constructions used with Cause Membership verbs. As shown in (22a-22c), the Member may be referred to by their Role. For example in (22a), the Members hired into a Group are referred to by their official position, i.e., *secretaries*. Similarly, the person dismissed from the army in example (22c) is referred to by their rank, i.e., a *general*. In some cases, the Role of the Member may be elaborated, as shown in (22b). The argument structure construction in this example includes an *as*-phrase, which specifies that the *secretaries* are employed as *helpers*. The Member and Role may also be expressed as separate arguments (22d), as is commonly seen with Membership verbs discussed in the preceding section.

The event structure that depicts the semantics of Cause Membership verbs is shown in Figure 3.9. The first segment of the causal representation describes an externally initiated event in which an Agent uses social performative force (PERFORM) in order for the Member to become affiliated with a Group. The second segment is identical to the Membership event structure (section 3.3) with the exception that the Member is identified as a motion (MOT) theme, rather than an internal theme. With Cause Membership verbs, the event is dynamic; the Member either joins or leaves a Group. The Member's entering or departing a Group is a holistically incremental event in that the Member's social 'motion' affects the Member as a whole at one point of time, rather than 'part by part.' The Member is therefore analyzed as a motion theme (rather than a mereological theme). The Member is volitionally involved in the event; however, we do not specify its subevent as VOL in the verbal event structure; only MOT is specified. We aim to identify only one label per participant in our representations depending on which one is most relevant and in this case, MOT is more relevant than VOL because the Member does not generally occur in argument structure constructions in which it is a volitional initiator of the event.

VerbNet classes that include Cause Membership verbs include fire-10.10, banish-10.2, hire-13.5.3, and confine-92. Confine-92 verbs are discussed in more detail in section 3.5.1 to

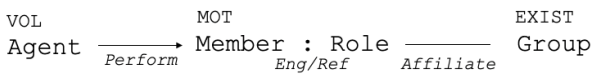

Figure 3.9: A Cause Membership event structure.

explain why they are analyzed as Cause Membership verbs.

Cause Membership verbs can be found in the following FrameNet frames: Hiring, Employing, Firing, and Inhibit_movement. The Inhibit_movement frame contains verbs such as *confine* or *imprison*; however, it is not restricted to social events. FrameNet defines this frame as describing more general events of confinement and includes examples in which non-volitional entities are restricted to a particular physical location. We include this frame here because it also contains social examples. FrameNet does not have a frame for verbs such as *banish, exile,* or *deport*.

3.5.1 Confine verbs

We analyze confine verbs such as *institutionalize, incarcerate, jail, imprison*, etc. as Cause Membership verbs. These verbs describe events in which a person of authority commits another person to a social institution, such as a prison (23). These verbs obligatorily evoke an external initiator. The person who becomes affiliated with the institution denotes the Member and the institution denotes the Group.

(23) a. We committed John. (VerbNet)

b. We committed John to prison. (VerbNet)

In our analysis, the event structure evoked by confine verbs is on a schematic level the same as the event structure associated with Cause Membership verbs. However, VerbNet's analysis of these verbs is different from other Cause Membership verbs, such as *hire* or *fire*. In VerbNet, the theme changes their physical location by which their status changes from 'not confined' to 'confined'. This is different from hire verbs in which the agent causes the theme to have a role in an organization.

Figure 3.10 shows VerbNet's analysis for the simple transitive argument structure construction with confine and hire verbs. With confine verbs, the analysis does not include authority_relationship or has_organization_role. This distinction is valid; however, it is not relevant to the event structure representation that depicts the force-dynamic relations between participants. In our analysis, the Agent and the Member needn't be in an authority relationship with each other. What is relevant force-dynamically is that the Agent is an external causer of the AFFILIATE relation between the Member and the Group. The semantics of confine verbs thus fits the Cause Membership event structure. Unlike VerbNet's analysis, we consider the Member to assume a Role when he becomes affiliated with a Group. For example, when one is committed to prison, their role in a society is defined as a prisoner.

a. Semantic analysis of *commit* b. Semantic analysis of *hire*

Figure 3.10: VerbNet's semantic analysis of examples with *commit* and *hire*.

We acknowledge that with confine verbs, the change of location is more permanent than the change of location that is associated with other types of events such as going to work after being hired. However, the social aspect of the event is the same: a Member becomes affiliated with a Group. Our analysis of social verbs focuses solely on social relations that are evoked by verbal semantics. We do not aim to represent physical motion or other physical relations that may take place in social events. With confine verbs, physical confinement

comes only after the social AFFILIATE relation has been established.

3.6 Semantics of argument structure constructions with Cause Membership verbs

Cause Membership verbs occur in argument structure constructions that are metaphorically extended from the physical domain. When the Group is overtly expressed, they occur in a motion construal (section 3.6.1). When the Group is not syntactically realized and only Member is expressed in the argument structure construction, the event is construed as internal (section 3.6.2). The constructional semantics is analyzed analogous to physical motion events in which the theme undergoes internal change. When the Role is overtly expressed, the relation between the Member and the Role is analyzed as either ENGAGE or REFRAIN depending on whether the event describes assuming or leaving a position, respectively (section 3.6.3).

3.6.1 Motion construal

Cause Membership verbs use metaphorical motion argument structure constructions when all three participants (i.e., Agent, Member, and Group) are overtly expressed (24). Cause Membership verbs describe dynamic events in which the Member either enters or leaves a Group. The Member's motion subevent in the verbal event structure and the direct correspondence between the social AFFILIATE and physical PATH relation contribute to the extension of the motion argument structure construction to the social domain. In (24a) and (24b), the Agent causes the Member to no longer be affiliated with a Group, which is metaphorically construed as a caused motion event in which the Member moves away from the Group. In (24c), the physical motion argument structure construction describes an event in which the Member's metaphorical motion results in his spatial co-location with the Group.

(24) a. I fired two secretaries from the company. (VerbNet)

b. The king banished the general from the army. (VerbNet)

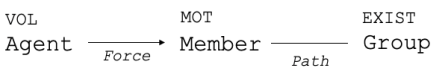

Figure 3.11: A causal chain associated with examples in (24).

c. We committed John to prison. (VerbNet)

The causal chain associated with examples in (24) is shown in Figure 3.11. Following the analysis of caused motion examples in the physical source domain, the relation between the Agent and the Member is analyzed as physical FORCE. The relation between the Member and the Group is analyzed as physical PATH. This analysis is consistent with our analysis of Membership verbs in which the AFFILIATE relation also maps to the PATH relation in the physical source domain in metaphorical motion construals. The Agent is analyzed as a volitional (VOL) initiator since they carry out the action using their mental capacities. The Member acts volitionally as well but the metaphorical motion construal yields an analysis in which the Member is a motion (MOT) theme in the event structure. The Group does not undergo a change in the event and is therefore analyzed as EXIST.

A mapping of the causal chain in Figure 3.11 to the Cause Membership event structure is shown in Figure 3.12. The labels assigned to participants in the causal chain and the verbal event structure match: the volitional initiator in the constructional causal chain maps to the volitional Agent, the motion theme maps to the Member in the verbal event structure, and the endpoint of PATH, which is EXIST, maps to the Group, which is also labeled EXIST in the event structure. The causal social PERFORM relation maps to the causal physical FORCE

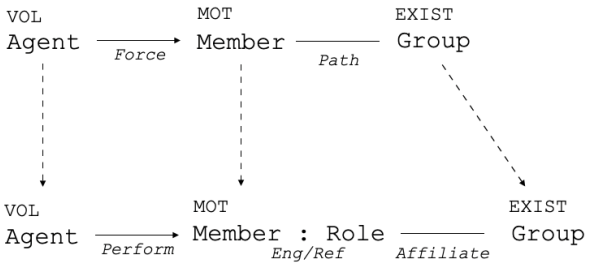

Figure 3.12: A mapping of a metaphorical Caused Motion construal to the Cause Membership event structure.

relation in the physical source domain. The non-causal social AFFILIATE relation maps to the non-causal physical PATH relation. As the mapping shows, there is a clear analogy between physical motion events and social cause membership events which motivates the metaphorical motion construal with Cause Membership verbs.

3.6.2 Internal construal

Cause Membership verbs can also occur in a construal in which the Group is not syntactically expressed in the argument structure construction (25). The causal chain associated with such examples describes a relation between the Agent and the Member. We analyze the semantics of these examples as describing an internal event in which the Agent's action causes the Member to undergo internal change. The theme's change is specified as internal in the constructional causal chain since the constructional semantics does not tell us more about the type of event. However, as shown in the mapping of the causal chain to the Cause Membership event structure in Figure 3.13, the verbal event structure supplies this additional information about the event. The internal theme maps to a motion theme in the verbal representation.

(25) a. I fired two secretaries. (VerbNet)

b. The king banished the general. (VerbNet)

c. I hired two secretaries. (VerbNet)

The analysis of the Member in the transitive argument structure construction with Cause Membership verbs is consistent with our analysis of the motion theme in the physical domain when the ground is syntactically omitted. Specifying that the theme undergoes motion in the constructional semantics is only possible when the argument structure construction syntactically expresses the metaphorical path of motion, i.e., when the Ground is overtly expressed. When the Ground is not syntactically expressed in the constructional semantics, the causative construal depicts only a causal relation between the initiator and the endpoint

of the FORCE relation. The endpoint of the FORCE relation undergoes change but the type of change is not readily available from the constructional semantics. The same is true for the endpoint of the social PERFORM relation. The type of change is therefore only inferable from the verbal event structure, as shown in Figure 3.13.

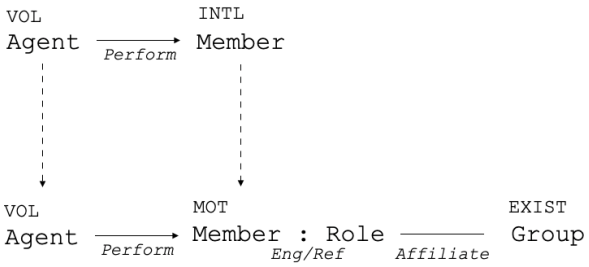

Figure 3.13: A mapping of an Internal construal to the Cause Membership event structure.

The simple transitive [SBJ.AGENT VERB OBJ.MEMBER] argument structure construction is not analyzed as metaphorically extended from the physical domain despite being used analogously with physical verbs. Drawing a metaphorical link between the physical FORCE relation and the social PERFORM relation is not necessary because the causal PERFORM relation in the social domain also causes change in the endpoint. This analysis contrasts with our analysis of argument structure constructions in which the relation between the Member and the Group is analyzed as metaphorical PATH, which necessitates the metaphorical analysis of social PERFORM as a physical FORCE relation, in order for the causal chain to be defined within a single semantic domain.

3.6.3 Causal chains with Engage and Refrain relations

Cause Membership verbs can occur in argument structure constructions in which both the Member and their Role are overtly expressed (26). Similarly to Membership verbs, the Role with Cause Membership verbs may denote the Member's official job title, such as a chief of staff in (26a), their responsibility within a Role, such as helpers in (26b), or their occupation such as blacksmiths in (26c). In (26c), the profession that the Member is trained to do results in their affiliation with a particular Group in which members share the same training. The

Role has variable syntactic realizations with Cause Membership verbs, as shown in (26).

(26) a. I fired him as my chief of staff. (VerbNet)

b. I hired two secretaries as helpers. (VerbNet)

c. I trained them to be blacksmiths. (VerbNet)

The relation between the Member and the Role is analyzed as ENGAGE or REFRAIN depending on the semantics of the verb. With hire verbs in which the Member comes to take on a Role, the relation is ENGAGE. With fire verbs, the Member leaves a Role and the relation is defined as REFRAIN. The causal chain in Figure 3.14 represents the constructional semantics associated with the example *I trained them to be blacksmiths* in (26c). The causal chain describes an internal event in which the Member is an endpoint of a social PERFORM relation, similarly to the examples in (25) depicted in Figure 3.13. The causal chain also includes the Role since it is overtly expressed as an argument in the syntax.

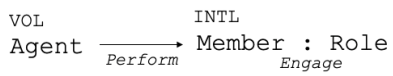

Figure 3.14: A causal chain associated with the causative engage example in (26c).

Similarly to Membership verbs, the Group may be syntactically realized as a stative locative phrase when a Role is overtly expressed, e.g., an *in* or *at*-phrase as in *I fired my chief of staff at IBM*. As discussed in section 3.3, this syntactic realization of the Group points to an analysis in which the Group semantically functions as a modifier of the Role. The verb and the argument structure construction describe a dynamic event but the prepositional phrase that denotes the Group is stative. A dynamic construal in which the Group is expressed as a *from*-oblique is not possible when the Role is overtly expressed: *I fired my chief of staff *from IBM*. The stative preposition used with the Group in *I fired my chief of staff at IBM* is not compatible with an analysis in which the Group is metaphorically construed as a ground in a motion construal, unlike the Group in an example *I fired him from IBM*.

3.7 Role verbs

Role verbs, such as *behave, masquerade, tutor*, or *function*, describe events in which an entity is engaged in an activity that either changes or specifies their role or attribute. These verbs evoke an event structure with a single participant: an entity that is engaged in a role. With Role verbs, no organizational membership is implied, which is different from Membership and Cause Membership verbs. As shown in the examples in (27), the role may denote an attribute of an entity (27a, 27b) or a more formal role, such as being a tutor (27c). The role can be expressed as a separate argument in the clause (27a, 27b) or may be encoded in the verb. In (27c), the verb *tutor* denotes the role of the participant Miriam.

(27) a. Dina masqueraded as a lawyer. (VerbNet)

b. Dina acted like a cretin. (VerbNet)

c. Miriam tutored her brother. (VerbNet)

The event structure evoked by Role verbs consists of an Entity and their Role, as shown in Figure 3.15. The Entity's engagement or disengagement in a Role is analyzed as an internal (INTL) activity. The Entity undergoes internal change when they take on a Role or cease to have a Role. The Entity is also specified as a volitional (VOL) participant because they engage in the event volitionally. The relation between the Entity and their Role in the verbal representation may be either ENGAGE or REFRAIN[3].

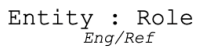

Figure 3.15: A Role event structure.

VerbNet classes that include Role verbs include: captain-29.8 and masquerade-29.6. Some examples in these classes describe formal roles that are defined within an institution, such as

[3]English does not have any verbs that evoke a REFRAIN relation between an Entity and a Role without also obligatorily evoking a Group. However, given that our verbal representations aim to be language-independent, we include a REFRAIN relation in the event structure for Role verbs to make sure that we accommodate languages that may have such verbs.

a place of employment (e.g., *He had served in financial planning positions*). Such construals suggest that *serve* can also be analyzed as a Membership verb. However, in the masquerade-29.6 class to which it belongs, the verb does not obligatorily evoke a Group.

Role verbs can be found in the Posing_as FrameNet frame. FrameNet defines this frame as an event in which an Agent behaves in such a way as to mislead an observer into believing that they are someone else, i.e., a 'Simulated_entity'. In this frame, the 'Role' may thus denote another human being (e.g., *At the ritual earlier Tao Chu had impersonated Tsu Tiao*), not necessarily a socially defined role or attribute.

3.7.1 Captain verbs

We analyze captain-29.8 verbs, such as *volunteer, babysit, coach, or captain*, as Role verbs. This VerbNet class also consists of various verbs that describe one's profession, such as *judge, lawyer, valet, doctor*, etc. Though it is the case that one's profession is frequently associated with their place of employment, i.e., a Group, the event structure associated with these verbs does not obligatorily evoke a membership scenario in which the Entity is affiliated with an employer.

An employer may be constructionally added to the event structure, as shown in (28b). However, in this example, the employer *Judge Davis* is construed as a beneficiary, rather than a Group, since he is syntactically realized as a *for*-oblique. Though this example does imply a formal employment setting, the interpretation that the agent worked within an institution is constructionally evoked when a particular kind of beneficiary is overtly expressed in the syntax; it is not evoked by verbal semantics.

(28) a. Miriam tutored her brother. (VerbNet)

b. Her cousin clerked for Judge Davis. (VerbNet)

In our analysis, verbs in the captain-29.8 class describe events in which the Entity's Role is encoded in the verb. This analysis is compatible with VerbNet which analyzes the

semantics of these verbs as describing the agents' attributes. For example, the semantics of the example in (28a) is analyzed as ACT (e1, Agent, V_Attribute). The direct object is analyzed as a beneficiary: BENEFIT (e1, Beneficiary). VerbNet's analysis is consistent with our analysis of the direct object and the *for*-oblique as denoting beneficiaries in the event structure.

3.8 Semantics of argument structure constructions with Role verbs

Role verbs are syntactically different from other Social Role verbs. They usually occur in internal construals with the Role overtly expressed as an argument of the verb (section 3.8.1). Denominal verbs that describes the Role of the Entity (e.g., *clerk* or *tutor*) tend to include a beneficiary in the event description (section 3.8.2).

3.8.1 Internal construal

In our discussion of Role verbs, we follow the same analysis of internal events as we proposed for Membership verbs in which a Member and their Role are overtly expressed (section 3.4.3). However, with Role verbs the relation between an Entity and their Role is always ENGAGE given that English doesn't have any Role verbs that evoke events in which an Entity REFRAINS from a Role. In Role events, the Role may refer to a quality of a person, e.g., a *brave man* or a *coward* (29a) or describe a profession, e.g., *electricians* or *herbalists* (29b) and (29c).

(29) a. Would you behave like a brave man or like a coward? (COCA)

b. The NYPD is looking for two men who posed as electricians and broke into the home of an elderly man in Queens. (COCA)

c. There were also lots of women who acted as unofficial herbalists as well. (COCA)

The causal chain in Figure 3.16 depicts the semantics of all three examples in (29). The

argument structure constructions describe events in which a Member is ENGAGED in a Role. The causal chain for these examples is shown in Figure 3.16. The Entity is identified as a volitional (VOL) participant in the event. The Entity's engagement in a Role entails a dynamic event in which the Entity is engaged in some activity that is characteristic of that Role. Therefore, we analyze the Entity as undergoing internal change (INTL).

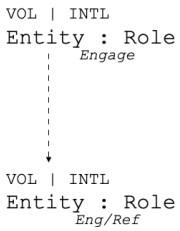

Figure 3.16: A causal chain associated with the examples in (29).

3.8.2 Internal construal with a beneficiary

Denominal role verbs, such as verbs in the captain-29.8 class (*judge, butcher, referee*, etc.) usually occur in argument structure constructions with a beneficiary (30). As discussed in section 3.3.1, the syntactic realization of beneficiaries with Social Role verbs appears to be semantically motivated. In events in which the beneficiary is not in a position of higher authority over the Entity and the Entity does not report to them, the beneficiary is expressed as a direct object (30a). When the beneficiary has higher authority than the Entity and the Entity reports to them, the beneficiary is expressed as a *for*-oblique (30c).

In (30b), the *President* is expressed as a direct object despite holding higher authority over the person who escorts him and the escort having to report to them. This syntactic realization of the *President* is unexpected given our proposed analysis for the direct object-*for* alternation observed with beneficiaries. Our justification is that this construal of the event is likely motivated by the job dynamics in which the escorted person has to follow the escort's directions to safely move around. In the alternative construal in which the president is expressed as a *for*-phrase (e.g., *We escort for the President*), the *President* is construed

as the employer.

(30) a. She had mothered her siblings because it was right, and impossible not to. (COCA)

b. "We have to escort the President to safety!" shouted a soldier early in the demo. (COCA)

c. I refuse to be bullied into policing for a goddamn phantom. (COCA)

The causal chain associated with the examples in (30) is shown in Figure 3.17. The Entity is analyzed as undergoing an internal (INTL) change when it is engaged in a Role, even if the Role is not syntactically expressed. The beneficiary is analyzed as subsequent to the core event denoted by the verb. Similarly to our analysis of beneficiaries with other Social Role verbs, the beneficiary is an endpoint of an AFFECT relation and undergoes a property (PROP) change.

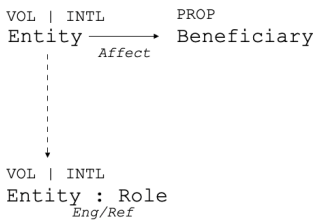

Figure 3.17: A causal chain associated with the examples in (30).

3.9 Conclusion

This section focuses on the semantics of verbs that describe events in which humans have, enter into, or leave social roles that are associated with their membership in social institutions or other socially-defined groups. Two distinct verb types were identified with respect to these events: Membership verbs and Cause Membership verbs. Another verb type was defined in this domain: Role verbs. These verbs evoke socially-sanctioned roles (such as being a tutor) that an entity may be associated with independent of any institutional membership.

In this section, we do not cover verbs that describe events such as *befriend* or *marry*. Though these verbs can be said to describe scenarios in which a participant takes on a social 'role', such as being a friend or a spouse (husband or wife), and thereby form a socially-sanctioned reciprocal relationship by which they bear a special 'role,' these verbs also denote interpersonal interactions. The primary reason for not including these verbs in this section is that they belong to VerbNet classes that consist of various Interpersonal Interaction verbs, such as *hug, kiss,* or *date*, which do not evoke a change of social role. We devote Chapter 6 to the analysis of verb classes that describe these events.

Social Role verbs that are not addressed in this chapter and need further scrutiny include verbs in the acquiesce-95.1 and subordinate-95.2.1 classes. These verbs do not necessarily evoke an AFFILIATE relation with an institution. They establish an authority relation between people (e.g., *Kevin reported to Martha*, *The enemy soldiers yielded to us*). As such, they denote an asymmetric relation in which the roles that people hold define their social status with respect to each other. It could be argued that the authority relation evoked by subordinate-95.2.1 verbs is defined within an institution; however, this is not necessarily the case with acquiesce-95.1 verbs which simply define an asymmetric social standing of two (or more) people with respect to each other. Neither acquiesce nor subordinate verbs can be said to share the event structures that are identified for Social Role verbs in this chapter. The initiator of the social relation is the entity of lower status and the endpoint is the authority. The subordinated entity is syntactically expressed as a subject and the authority as a subsequent *to*-oblique. If the event structure evoked by these verbs includes only the two entities, it may be justifiable to analyze these verbs as belonging to the Interpersonal Interactions domain. However, this analysis would not account for the social role aspect of the event. The description of the semantics of these verbs thus needs to be investigated in more detail.

Chapter 4: Possession and Transfer of Possession verbs

4.1 Introduction

In this chapter, we discuss the semantics evoked by possession verbs (e.g., *own, have, belong to*), verbs that describe events of acquiring, losing, or transferring a possession (e.g., *give, take, relinquish*), exchange verbs (e.g., *exchange, replace, switch*), and commercial transaction verbs (e.g., *sell, buy, pay*). Our discussion of possession verbs is restricted to verbs that describe events of 'ownership' in which an agent has an immediate physical control over an object (e.g., *She has a key* or *He gave her a key*). Though our analysis allows for a metaphorical extension of this prototypical ownership sense to argument structure constructions in which more abstract ownership situations are expressed, such as obtaining or transferring socially defined non-physical entities (e.g., *She acquired a college degree* or *She owns shares in their company*), we do not include such examples in our discussion. We also do not address other semantic functions observed with possession verbs that have been discussed in the literature, such as the highly polysemous verb *have* in various grammatical constructions in English (cf., Brugman 1988, Langacker 1995, Francis 2000).

Distinct semantic functions have been argued to be associated with the semantics of argument structure constructions with possession verbs in English depending on the semantics of the participants involved in the event (e.g., Aikhenvald 2013). For example, construc-

tions which describe a relation between an agent and their body part (e.g., *John's arm*) are semantically different from ownership constructions (e.g., *John's car*). In other cases, possession constructions may describe kinship relations (e.g., *John's father*). Crosslinguistically, the category of "possession" has been found not to be a unitary cognitive category (Goddard and Wierzbicka 2019). The category of possession "represents an aggregation of diverse semantic schemas which center around three distinct conceptual anchor points: ownership, body-part, and kinship relations" (Goddard and Wierzbicka 2019:224, cf. Aikhenvald 2013:3). The authors argue that cognitively, these different phenomena represent different "semantic primes": the ownership schema can be described by the semantic prime MINE, body-part by PARTS, and kinship by the "semantic molecules 'mother' and 'father' " (Goddard and Wierzbicka 2019:225). In their view, "possession" as a category should be conceptualized as a set of interrelated cognitive schemas.

The semantic analysis of possession verbs presented here investigates the event structure associated with possession verbs in ownership contexts, in which there is a socially sanctioned CONTROL relation between an agent and an owned entity. Our semantic analysis of the force-dynamic event structure evoked by the semantics of possession verbs reveals that possession verbs can be grouped into three distinct semantic categories: Possession verbs (section 4.2), which describe a stative relation between a Possessor and a Possession, Dynamic Possession verbs (section 4.4), which describe a dynamic relation between a Possessor and a Possession, and Transfer of Possession verbs (section 4.5), which describe a dynamic relation between an Agent, a Possession and a Possessor. The event structures associated with these verb types overlap to a great extent. All verbs evoke a CONTROL relation between a Possessor and a Possession. With Possession and Dynamic Possession verbs, the Possessor is the initiator of the event. With Transfer of Possession verbs, the initiator of the event is an Agent, who is a distinct participant from the Possessor.

This chapter also includes a discussion of the semantics of verbs that describe events of exchange, such as *exchange*, *replace*, *switch*, and others. We define two distinct event

structures associated with these verbs: Exchange verbs (section 4.9) and Replace verbs (section 4.8). In the Replace event structure, the EXCHANGE relation is externally initiated by an Agent and a Co-Agent. Exchange verbs do not evoke an external initiator(s). The analysis of exchange events is relevant to our discussion of Commercial Transaction verbs, which we cover in section 4.11.

4.2 Possession verbs

Possession verbs such as *own, have,* or *belong to* have received much attention in the linguistics literature. Studies have focused on the grammatical encoding of possession verbs in different languages (e.g., Heine 1997, Stassen 2009, Aikhenvald and Dixon 2013), the historical origins of possessive morphemes and verbs (e.g., Heine 1997), or the semantics of a particular possessive construction in a language (e.g., Taylor 1996).

Possession verbs describe events of ownership between an agent and their possession (31). The agent has physical control over their possession in the most prototypical possession sense. Neither participant undergoes change in the event. The stative nature of examples with Possession verbs contrasts with the event structure associated with Dynamic Possession verbs which evoke dynamic events in which the agent either acquires or loses their possession (see section 4.4).

(31) a. She owns a house.

b. He has a book.

c. The book belongs to him.

Our semantic analysis of Possession verbs is guided by cross-linguistic evidence that many Possession verbs in world's languages originated in physical Constrain verbs, such as *grasp* and *hold* (cf. Langacker 1995:64, Stassen 2009, Aikhenvald 2013:28). The close correspondence between these two events is best illustrated by examples such as *She held the book*, in which the agent's physical constraining of the object can also be interpreted as them

having control over it. In the physical domain, Constrain verbs evoke an event structure in which there is a physical FORCE relation between an agent and a theme. The FORCE relation describes the physical *holding* or *gripping* action in which the agent constrains the theme from falling or moving. In the Constrain event structure, there is also a non-causal CO-LOCATION relation between the agent and the theme. This relation specifies that the participants are in a close spatial configuration together, which is a necessary semantic component of the event.

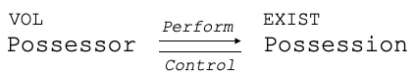

Figure 4.1: Possession event structure.

The Possession event structure shown in Figure 4.1 describes the non-causal relation between the Possession and the Possessor as CONTROL. There is a metaphorical correspondence between the CONTROL relation in the social domain and the CO-LOCATION relation in the physical domain. The causal relation between the Possessor and the Possession is defined as PERFORM. The Possessor uses a performative action to establish their ownership of a Possession. The PERFORM relation in the Possession event structure metaphorically corresponds to the physical FORCE relation evoked by Constrain verbs.

The Possessor is analyzed as a Volitional (VOL) entity in the verbal event structure since initiators of the PERFORM relation are always volitional. The PERFORM relation requires an agentive initiator. The Possession doesn't undergo any change and is therefore labeled EXIST. Though the participants are both engaged as initiators and endpoints in two distinct force-dynamic relations, we specify only the most relevant types of changes. For the Possessor, it's their volitional involvement and for the Possession, it is its role in the event as an initiator of the CONTROL relation in which it doesn't undergo any change.

Syntactically, Possession and Constrain verbs are not exactly alike. Constrain verbs always occur in argument structure constructions in which the agent initiates the event and are thus construed as events of 'forceful contact', expressing the FORCE relation between the agent and the theme. Possession events, on the other hand, can construe either the

Possessor or the Possession as an initiator. Consequently, Possession verbs can occur in argument structure constructions that metaphorically describe either the PERFORM relation or the CONTROL relation (see section 4.3)

Possession verbs can be found in the own-100.1 class in VerbNet. FrameNet has two frames for Possession verbs: Possession and Retaining. Retaining verbs (e.g., *retain, keep*) describe ongoing possession.

4.3 Semantics of argument structure constructions with Possession verbs

There are two argument structure constructions that are used with Possession verbs in English: a transitive [SBJ V OBJ] construction and an intransitive [SBJ V *to*-OBL] construction. In the transitive construction, the Possessor is syntactically expressed as a subject and the Possession as a direct object. This construal is used with verbs such as *own* and *have* (31a) and (31b). In the intransitive construction, the Possession is expressed as a subject and the Agent is expressed as a *to*-oblique. This construal is used with the verb *belong* (31c). It has been argued that this syntactic alternation is "pragmatically-based," depending on which of the two participants is in focus (Aikhenvald 2019:29, Heine 1997). Our analysis of the constructional semantics does not address this issue though we do propose a distinct analysis for each of the two variants in section 4.3, arguing that the semantics of these events differ given the distinct syntactic realization of participants.

In our analysis, the two distinct argument structure constructions used with Possession verbs originate in two distinct metaphors extended from the physical domain: a Constrain metaphor and a Location metaphor. In the Constrain metaphor, the Possessor is causally antecedent to the Possession and the force-dynamic relation between the two participants is causal. In the Location metaphor, the Possession precedes the Possessor in the causal chain and the relation between the participants is non-causal.

4.3.1 Constrain metaphor

We analyze the semantics of the transitive argument structure construction (e.g., *He owns a car*) as a metaphorical Constrain event. The causal PERFORM relation between the Possessor and the Possession is metaphorically construed as a physical FORCE relation in the constructional semantics. The Possessor's owning of a Possession is metaphorically construed as a physical event of 'holding' in which the Possessor exerts physical FORCE to gain control over the Possession. The causal chain associated with the semantics of the Constrain argument structure construction *He owns a car* is shown in Figure 4.2.

The force-dynamic relation between the Possessor and the Possession is identified as a metaphorical FORCE. We do not define a distinct CONSTRAIN force-dynamic relation in the physical domain. FORCE is used as a superordinate term for force and constrain events. Our motivation for not distinguishing CONSTRAIN from FORCE as a force-dynamic relation is motivated by the fact that physical force is used in both types of events, and the same argument structure construction, namely the transitive construction, is used with both verbs in English.

The Possessor is identified as a volitional entity. The type of change that the Possession undergoes in the causal chain is not specified. This analysis is inherited from the source-domain constructional representation in which we do not specify the type of change that the theme undergoes as an endpoint of FORCE. The Possession is identified as EXIST in the verbal event structure and the mapping of the causal chain to the verbal representation reveals that the Possession doesn't undergo any change in the event. The FORCE relation

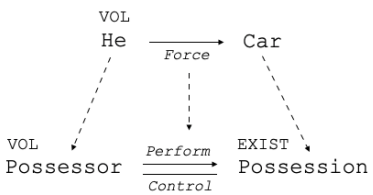

Figure 4.2: Mapping of a Constrain causal chain to the Possession event structure.

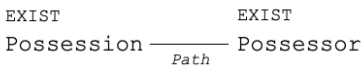

Figure 4.3: Location construal with Possession verbs.

in the causal chain maps directly into the social PERFORM relation in the Possession event structure.

4.3.2 Location metaphor

Possession verbs can occur in argument structure constructions in which the relationship between the Possession and the Possessor is metaphorically construed as a physical location. The English verb *belong* in the example *The book belongs to him* occurs in such a construal. The Possession is metaphorically construed as a figure and the Possessor as a ground. The Possession thus precedes the Possessor in the causal chain representation, as shown in Figure 4.3. *Belong* can also be used in a purely physical context in which it describes a spatial "co-location" relation between two physical entities, e.g., *The barn belongs to the house.* In this example, the *barn* is a figure and the *house* is a ground.

Interestingly, the [Sbj V *to*-Obl] argument structure construction uses a 'dynamic' preposition to describe a stative possessive relation. It is not common to use the *to*-oblique to syntactically express the ground in physical location events.[1] A possible motivation for the encoding of the Possessor as a *to*-oblique in Possession examples is that recipients in transfer events are also expressed as *to*-obliques (e.g., *She gave the book to him*). The semantics of these two types of events have much in common, despite the stative vs. dynamic interpretation. In both types of examples, the Possession causally precedes the Possessor. The relation between the two participants is CONTROL, and the CONTROL relation is metaphorically construed as a physical PATH relation, as shown in Figure 4.4.

In the locative construal, the Possessor is not a volitional agent. The Possessor is metaphorically construed as a physical ground which serves as a reference point for the location

[1]However, it is possible to use dynamic prepositions to describe Location events in fictive motion examples (e.g., the preposition *through* in *The voices echoed through the hall* or *The river runs through the valley*).

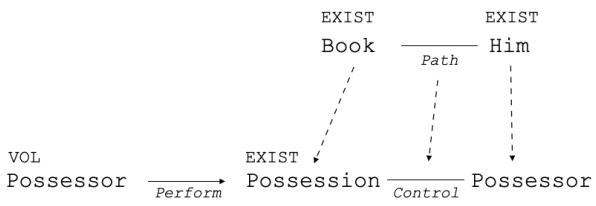

Figure 4.4: Mapping of a causal chain for *The book belongs to him* to the Possession event structure.

of the figure, i.e. the Possession. The Possessor is labeled EXIST, which is parallel to our analysis of ground participants in the physical source domain. As shown in Figure 4.4, the locative causal chain maps to the second segment of the verbal representation. To provide a clear mapping of the PATH relation to the CONTROL relation in the social domain, the verbal event structure is "unthreaded" into two segments. The CONTROL relation is subsequent to the PERFORM relation.

4.4 Dynamic Possession verbs

Dynamic Possession verbs such as *get*, *obtain*, or *relinquish* describe events in which a Possessor either gains or relinquishes/loses control over a Possession (32). These verbs are generally covered with Transfer of Possession verbs (e.g., *give, take*) in the literature, though they are semantically different. They evoke only two participants in the event: a Possessor and a Possession. The example in (32a) describes an event in which the Possessor gained control over her keys by locating them. In (32b), the Possessor comes to have ownership or control over a book. The verbal semantics of *getting* doesn't entail an original possessor or 'giver'. Lastly, in (32c), the event describes the Possessor losing control over their shoe. The event of *losing* doesn't evoke a recipient.

(32) a. She found her keys.

b. He got the book.

c. She lost her shoe.

d. She got the book from him.

The event structure representation evoked by Dynamic Possession verbs is very similar to that of Possession verbs described above. Dynamic Possession verbs obligatorily evoke the same two participants: a Possessor and Possession. However, unlike Possession verbs, Dynamic Possession verbs describe a dynamic event in which the Possessor comes to have (or lose) CONTROL over their Possession. The dynamic nature of the event is represented by the MER label assigned to the Possession participant (see Figure 4.5). The Possession is identified as undergoing a mereologically incremental change since gaining or losing something may happen part by part, analogous to the incremental change characteristic of application and removal events in the physical domain (Dowty 1991). For example, in an example such as *The child found all the Easter eggs* or *He gradually lost all his assets*, the Possessor gains/loses control over the Possession one piece at a time. We do not distinguish whether the incremental theme is [+/-MER] as it is not relevant to the verbal event structure; it is only relevant to the syntactic realization of participants.

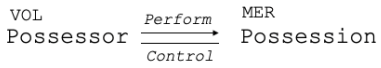

Figure 4.5: Dynamic Possession event structure.

The Possessor is identified as a volitional (VOL) entity in the event structure. The Possessor is considered a volitional entity even in events that happen accidentally, such as when someone loses their belongings. The outcome of the Possessor's action may not be intentional in such events but it is carried out volitionally. The Possessor also undergoes mereological change in the event by gaining/losing their Possession; however, we specify only one label for each participant, whichever is more relevant to the event structure and the syntactic construal of participant roles in the event. With Dynamic Possession verbs, the Possessor is always syntactically realized as a subject and is therefore construed as an initiator of the event, which is a volitional entity. Dynamic Possession verbs do not occur in construals in which the Possessor is realized as subsequent to the Possession, i.e., an endpoint of the

CONTROL relation. Labeling the Possessor as a volitional entity is therefore more relevant to the event structure description when compared to the Possessor's mereological change.

VerbNet classes that contain Dynamic Possession verbs are obtain-13.5.2, get-13.5.1, earn-54.6, contribute-13.2, and consume-66. VerbNet does not have a class for verbs that describe a loss of possession. We categorized obtain-13.5.2 and get-13.5.1 verb classes as describing Dynamic Possession events despite there being some verbs in these classes that evoke more complex event structures. For example *borrow*, *receive* or *inherit* in the obtain-13.5.2 class evoke an original possessor or a giver in the event structure and would be better analyzed as Transfer of Possession verbs. However, other verbs in this class, such as *recover*, *grab*, or *acquire* do not necessarily evoke a giver. Given that our verbal event structures map to VerbNet classes, rather than particular verbs in these classes, we decided to have a unified 'class' analysis and classified the obtain-13.5.2 and get-13.5.1 classes as Dynamic Possession verbs.

There are three frames in FrameNet frames that include Dynamic Possession verbs as Lexical Units: Amassing, Earnings_and_losses, and Expend_resource.

4.5 Transfer of Possession verbs

There is considerable coverage of the semantics and syntax of Transfer of Possession verbs in the literature. The focus has been on a very narrow range of verbs, however. For example, Newman (1996) looks specifically at the verb *give* and its lexical semantics and syntactic behavior from a typological perspective. Similarly, Viberg (2010) uses a combination of lexical typology and corpus-based analysis to study *get, give,* and *take* verbs in Swedish, English and a number of other European languages. Other studies focus on the "dative alternation", a syntactic alternation observed with English Transfer of Possession verbs, verbs of ballistic motion, and send verbs (e.g., Oehrle 1976, Beavers 2011, Rappaport Hovav and Levin 2008, Goldberg 1995). Levin (2008) discusses "dative verbs" from a crosslinguistic perspective. The semantics of the dative alternation is further discussed in section 4.6.3.

Transfer of Possession verbs, such as *give, take,* or *steal* evoke an event in which a Possession is transferred from one agent to another (Newman 1996, Viberg 2010), as shown in examples in (33). The transfer event may be cooperative (33a, 33c) or adversarial (33b, 33d). Verbs such as *steal* or *cheat* describe events in which the original possessor does not willingly give up their possession.

(33) a. They lent me a bicycle. (VerbNet)

b. The thief stole the painting from the museum. (VerbNet)

c. Brown presented a plaque to Jones. (VerbNet)

d. The swindler cheated Pat out of her fortune. (VerbNet)

Our semantic representation does not aim to to represent the full complexity of verbal semantics or the nuances between different possession verbs in their 'lexical semantic frames'. Our verbal event structure focuses on obligatorily evoked participants and the relations between them that are syntactically expressible. Consequently, we do not represent a direct cooperative or adversarial relation between the two agents in the verbal event structure.[2]

The verbal event structure evoked by Transfer of Possession verbs is shown in Figure 4.6. The representation is similar to Dynamic Possession and Possession verbs in that the Possession participant is an endpoint of a PERFORM relation and an initiator of a CONTROL relation. Transfer of Possession verbs describe dynamic events, like Dynamic Possession verbs; however, they evoke three distinct participants: a volitionally acting Agent who initiates the transfer event, a Possession that is transferred, and a Possessor who either gains

[2]The semantics of many transfer events evokes more complex relations between participants than what is represented in our force-dynamic verbal event structure. For example, receive verbs evoke an event in which a recipient and a donor are cooperatively engaged. The donor willingly relinquishes a Possession which the recipient willingly accepts. The semantics of receive verbs is different from obtain or get verbs which do not necessarily evoke a cooperative donor. For example, one can *get* something from another person without that person wanting to give it.

The cooperative engagement of the two agents does not appear to be force-dynamically relevant because it is not syntactically expressible in English. Receive verbs use the same argument structure constructions as get verbs. Both types of verbs express the recipient as a subject and the giver as an oblique argument: e.g., *He received it/got it from him.* As such, the recipient is always construed as the initiator of the transfer event, and the semantic role of the giver as a volitional agent in the receive event is never syntactically expressed in English.

or relinquishes control over their Possession. With Dynamic Possession verbs, the Agent and the Possessor are the same entity in the event structure: the Possessor initiates the PERFORM relation and is also the endpoint of the CONTROL relation. With Transfer of Possession verbs, the Agent and the Possessor are distinct entities.

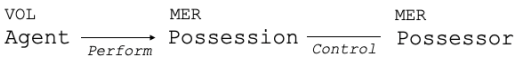

Figure 4.6: Transfer of Possession event structure.

The Possession and the Possessor are both analyzed as mereological (MER) themes in the event structure. The Possession undergoes mereological change by being transferred, similarly to the Possession participant with Dynamic Possession verbs, and the Possessor undergoes mereological change by receiving or losing the Possession. This is also true of the Possessor with Dynamic Possession verbs; however, as we explained in section 4.4, this change is not specified in the representation for Dynamic Possession verbs because the Possessor is syntactically never construed as a mereological theme (i.e., a direct object), and only one label is generally specified for each participant in the representation.

We do not specify a CONTROL relation between the Agent and the Possession. Although we recognize that in many cases, a giving verb entails that the Agent loses control over the Possession and a taking verb entails that the Agent gains control over the Possession, it is not the case that the CONTROL relation between the Agent and Possession is lexically evoked. Some transfer events do not entail this CONTROL relation, such as the example *The FBI provided the informant with a new identity* (discussed in section 4.6.3) in which the FBI doesn't own the identity prior to giving it to the informant. Additionally, English argument structure constructions do not express this relation; the Agent is always construed as an external initiator of a CONTROL relation between the Possession and the Possessor.

VerbNet classes with Transfer of Possession verbs include: bill-54.5, cheat-10.6, contribute-13.2-2-1, deprive-10.6.2, equip-13.4.2, fulfilling-13.4.1, future_having-13.3, give-13.1, rob-10.6.4, and steal-10.5. Verbs in the future_having-13.3 class are semantically a little bit

different from other Transfer of Possession verbs, and we discuss them in more detail in section 4.5.1.

VerbNet doesn't have separate verb classes for Commercial Transaction verbs such as *sell* or *buy*. However, Commercial Transaction verbs are different from Transfer of Possession verbs in that they evoke an additional participant, Money, and a relation between Money and Possession, which is EXCHANGE. We discuss the event structure evoked by these verbs separately in section 4.11.

FrameNet frames that include Transfer of Possession verbs as Lexical Units include: Robbery, Theft, Taking, Prevent_or_allow_possession, Billing, Commerce_collect, Commerce_pay, Commerce_sell, Delivery, Supply, Giving, and Offering.

4.5.1 Future having verbs

Future having verbs such as *promise* or *offer* are analyzed as evoking a Transfer of Possession event structure despite there not being an entailment that the Possessor (= intended recipient) actually receives the Possession (34). In (34a) and (34b), the agent has the intention of giving somebody their house at a future time. In (34c), the event of transfer is not only dependent on the agent following through with their offer but also depends on the Possessor accepting the offer. And in (34d), the dispersement of the allocated money is set to happen at a later time provided that the agent follows through.

(34) a. I promised my house to somebody. (VerbNet)

b. I promised him my house. (VerbNet)

c. We offered our paycheck to her. (VerbNet)

d. We allocated money to the organization for pensions. (VerbNet)

Koenig and Davis (2001:76) argue that the semantics of future having verbs "is fundamentally the same as that of *give*, but contains some additional modifying elements" specified in the SUBLEXICAL MODALITY of the verb (see also Croft 2003). Specifically, promise verbs

entail a transfer of possession event in a world in which people honor their promises. That is, a promise event is a transfer of possession event when the set of circumstances in which the person performing the speech act carries out their promises is fulfilled (Koenig and Davis 2001:101).

In our analysis of verbal semantics, we do not aim to represent the sublexical modality as it does not change the force-dynamic relations between participants in the event structure. The relations between participants in *promise* and *give* events are the same; the entailment of future transfer with promise events does not change the force-dynamics of the event. Therefore, there is no need to distinguish between the force-dynamic event structure associated with future having verbs and other Transfer of Possession verbs. Using the same event structure representation for future having verbs and other Transfer of Possession verbs shows the shared force-dynamic relations between participants in these events (or the "situational core" in Koenig and Davis 2001).

Additionally, future having verbs occur in the same syntactic alternations as other Transfer of Possession verbs which further supports our joined semantic analysis of these verbs. Specifically, they occur in the double object/*to*-oblique recipient alternation, as shown in examples (34). The semantics of these argument structure constructions is discussed in section 4.6.

Importantly, our analysis of future having verbs as Transfer of Possession verbs is compatible with VerbNet's analysis of this class of verbs. VerbNet's analysis of these verbs is the same as their analysis of verbs in other Transfer of Possession classes with the exception that VerbNet has an additional "IRREALIS" predicate for future having verbs. Unlike VerbNet, we do not specify sublexical modality in our verbal representations.

4.6 Semantics of argument structure constructions with Dynamic Possession and Transfer of Possession verbs

We discuss the semantics of argument structure constructions with Dynamic Possession and Transfer of Possession verbs in one section because they occur in similar construals. With Dynamic Possession verbs, an additional participant, such as an original possessor or 'donor' may be constructionally added to the event structure and syntactically expressed as an oblique argument, as shown in (35). The event describes a transfer between the original possessor and the new possessor who comes to gain ownership or control over a Possession. The original possessor is syntactically expressed as a *from*-oblique. We discuss the semantics of these argument structure constructions with Dynamic Possession and Transfer of Possession verbs in section 4.6.4.

(35) a. She got the book from him.

b. Carmen obtained the spare part from Diana. (VerbNet)

Both types of verbs can also occur in a metaphorical Place construal in which the recipient is overtly expressed as a *to*-oblique (e.g., *He gave a book to his mom*). We discuss the semantics of this argument structure construction in sections 4.6.3. Dynamic Possession and Transfer of Possession verbs can also occur in a metaphorical Constrain construal (section 4.6.2), in which only the initiator of the event and the Possession are overtly expressed, and a metaphorical COS construal (section 4.6.5), in which only the initiator of the event and the Possessor are overtly expressed. The double object "Transfer" argument structure construction discussed in section 4.6.1 is restricted to Transfer of Possession verbs.

Dynamic Possession and Transfer of Possession verbs can also occur in argument structure constructions in which the event of obtaining requires an exchange with another item (e.g., *She obtained it for a small gift in exchange*) or the event describes a commercial transaction scenario (e.g., *She obtained it for five dollars*). The semantics and syntax of exchange events is discussed in section 4.9. Commercial Transaction events are discussed in section 4.11.

4.6.1 Transfer construal

Transfer of Possession verbs may use a double object [SBJ V OBJ OBJ] argument structure construction to express events in which an Agent causes that a Possession is transferred to a Possessor (36). The semantics of the ditransitive construction in English has been well studied. It has been widely accepted that the construction describes an event of transfer or "caused possession" (e.g., Rappaport Hovav and Levin 2008, Beavers 2011). Studies on the dative alternation (see section 4.6.3 for a more detailed discussion), in which a recipient is expressed either as direct object or a *to*-oblique, support this analysis (e.g., Levin 2008). Various classes of verbs, including ballistic motion verbs or send verbs, which do not evoke transfer in their lexical semantics, occur in the dative alternation. Regardless of the semantics of these various verbs, the double object construction entails a transfer event. For example, *throw* in *She threw him the ball* or *send* in *He sent her a letter* entail transfer events in which the 'indirect' object denotes a recipient and the direct object a transferred object. The evidence that motion verbs describe transfer events rather than merely motion events in the double object construction supports the analysis that the constructional semantics encodes transfer of possession. Transfer in the double object construction is thus not evoked only by lexical semantics with Transfer of Possession verbs but also by the semantics of the argument structure construction.

(36) a. They lent me a bicycle. (VerbNet)

b. He transferred me 5000 pounds.

c. He gave me a book.

As shown in Figure 4.7, we use social domain force-dynamic relations to represent the semantics of this argument structure construction since it is not extended from the physical domain. The causal chain is therefore very similar to the Transfer of Possession event structure. There is a one-to-one mapping between participants and the force-dynamic relations between them in the two representations.

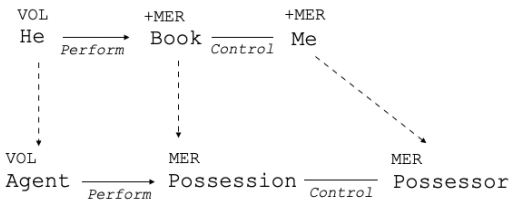

Figure 4.7: Mapping of a Transfer causal chain to the Transfer event structure.

The Agent uses a PERFORM relation to initiate the transfer event. Both the Possession and the Possessor are specified as mereological themes given their syntactic realization as direct objects in the "Transfer" [SBJ V OBJ OBJ] argument structure construction. The MER labels are specified with the "+" sign to signal that the Possession is *given* to the Possessor, rather than *taken* from the Possessor. The use of +/- signs with mereological themes in the social domain follows the same rules as their use in the physical domain. Events of giving in which the Possession is given (moves) to the Possessor have +MER themes and events of taking in which the Possession is taken (moves away) from the Possessor have -MER themes.

(37) a. The thief stole Mary some paint. (VerbNet)

b. Carmen bought Mary a dress. (VerbNet)

c. We got the gas and I let her buy me a coffee from the cashier. (COCA)

The Transfer argument structure construction is prototypically used with giving verbs. However, taking verbs can also occur in the Transfer construction in English (37). In this construal, the first direct object is the final recipient who is intended to possess the Possession, it is not the original possessor (or the victim) from whom the Possession is taken. For example, in (37c), the direct object, *me*, encodes the intended recipient and the *from*-oblique, *cashier*, encodes the original possessor.

The semantics of the Transfer construction with taking verbs has not been addressed in the literature. This is likely because taking verbs, unlike giving verbs, do not occur in the dative alternation, and the dative alternation has been the primary focus of studies on the Transfer construction. The use of taking verbs in the Transfer construction is somewhat

unexpected because the indirect object denotes a recipient in this construction, and recipients are not evoked by the lexical semantics of taking verbs. The Possessor participant with taking verbs is the original possessor rather than a recipient. The original possessor is syntactically encoded as a *from*-oblique, not a *to*-oblique like recipients (37c). As such, the Possessor with taking verbs is a -MER theme and therefore cannot map to the +MER theme evoked by the constructional semantics. This is different from the Possessor with giving verbs who comes to have control over the Possession and is therefore labeled +MER.

The constructional semantics of the double object [SBJ V OBJ OBJ] argument structure construction with taking verbs is shown in the upper part of Figure 4.8. The causal chain depicts the force-dynamics of the example *The thief stole Mary some paint* in which the indirect object is the intended possessor and the direct object is the Possession. The intended possessor is construed as a recipient of the possession in this argument structure construction. However, the mapping of the Transfer causal chain with taking verbs to the verbal representation is different from giving verbs. The recipient with taking verbs denotes a participant that is constructionally added, i.e., the recipient is not evoked by the verbal semantics. As shown in Figure 4.8, the endpoint of the CONTROL relation, *Mary*, doesn't map to the Possessor in the verbal event structure because the Possessor with taking verbs refers to the original possessor of the stolen item. *Mary* is constructionally added as an intended recipient of the item that the thief stole from someone.

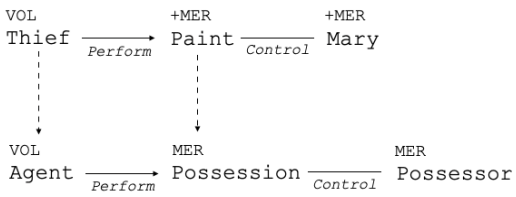

Figure 4.8: Mapping of *The thief stole Mary some paint* to the Transfer of Possession event structure.

Taking verbs can occur in argument structure constructions in which both the original possessor and the intended recipient are overtly expressed, such as in (37c). In this example,

the original possessor is the *cashier* and the intended recipient of the transferred item is the indirect object, *me*. To depict the semantics of this argument structure construction, a more complex causal chain representation is required. In particular, two distinct core events have to be represented: a metaphorical removal event, in which the agent takes a *coffee* from the original possessor, and a transfer event in which the agent intends to give the *coffee* to the intended recipient. Therefore, the semantic representation requires two distinct causal chains since the agent is engaged in two separate core events. The constructional representation for (37c) is shown in Figure 4.9.

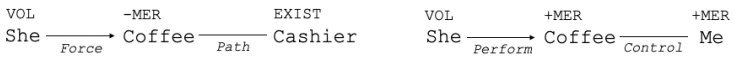

Figure 4.9: Causal chain representation for *She bought me a coffee from the cashier.*

The two causal chains are temporally ordered: The buying event temporally precedes the (intended) giving event. The first causal chain describes the event structure associated with the argument structure construction *She bought coffee from the cashier*. The example is analyzed as a metaphorical use of the physical remove construction discussed in section 4.6.4. The second causal chain represents the semantics of the argument structure construction *She bought me coffee*, which corresponds to the Transfer causal chain discussed in the current section above.

Unlike giving verbs, taking verbs do not occur in the dative variant. Rather, they express the intended recipient as a benefactive *for*-oblique: *The thief stole some paint for Mary.* The Transfer-*for* alternation is also common with other verbs, such as verbs of creation or performance in the physical domain (38). The indirect object in these argument structure constructions describes the intended recipient of the creation event or the performance. This analysis of the indirect object is also transparent in possessive constructions in which the intended recipient is grammatically expressed as a Possessor of the Possession as a result of the event: e.g., once the hole is dug, "the hole is *mine*," and once Donna grills the steaks, "the steaks are *mine*".

(38) a. David dug me a hole. (VerbNet)

b. David dug a hole for me. (VerbNet)

c. Donna grilled me steaks. (VerbNet)

d. Donna grilled steaks for me. (VerbNet)

e. Sandy sang me a song. (VerbNet)

f. Sandy sang a song for me. (VerbNet)

Based on this evidence, we argue that the Transfer argument structure construction can alternate with either the giving [SBJ V OBJ *to*-OBL] or the benefactive [SBJ V OBJ *for*-OBL] argument structure construction in English. The alternation is determined by the semantics of the verb. The causal chain associated with the *for*-oblique variant with taking verbs (e.g., *He bought a coffee from the cashier for me*) is shown in Figure 4.10. The constructional semantics describes an event in which the participant expressed as a *for*-oblique is intended to benefit from the taking event by receiving the Possession from the Agent at a later time. This is what motivates the construal of the intended recipient as a beneficiary. In the *for*-variant, the beneficiary is causally subsequent to the core taking event. The beneficiary is analyzed as an endpoint of an AFFECT relation, which is consistent with our analysis of beneficiaries with other verbs in the social domain.

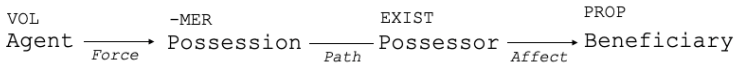

Figure 4.10: Double object argument structure causal chain with an original possessor.

The Transfer argument structure construction can also be used with Communication verbs (e.g., *He told him the secret*). The constructional semantics for these examples are analyzed as instances of metaphorical Transfer since the domain is communication rather than possession. For more discussion of our analysis of Communication verbs, see Chapter 5.

4.6.2 Metaphorical Constrain construal

Dynamic and Transfer of Possession verbs[3] occur in a metaphorical Constrain argument structure construction in which the Agent is expressed as a subject and the Possession as a direct object (39). This construal describes an event in which an Agent obtains or relinquishes a Possession.

(39) a. Carmen obtained the spare part. (VerbNet)

b. He lost the book.

c. She got a new car.

d. The thief stole the paint. (VerbNet)

Similarly to Possession verbs, the Constrain metaphor with Dynamic and Transfer of Possession verbs originates in the causal PERFORM relation between the Agent and the Possession in the verbal event structure. The PERFORM relation directly links to the FORCE relation in the physical source domain. The Agent's obtaining of a Possession is metaphorically construed as a physical event of 'picking up' in which an Agent gains physical control (and is spatially co-located) with an object by grasping it. Similarly, the event of relinquishing is metaphorically construed as an event of 'dropping' or 'letting go of' an object in which an Agent willingly loses physical control (and is spatially no longer co-located) with an object.

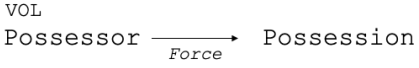

Figure 4.11: Metaphorical Constrain causal chain with possession verbs.

Figure 4.11 depicts the constructional semantics associated with the examples in (39). The causal chain representation is identical to the representation used for static Constrain

[3]Only taking verbs, such as *take* or *steal*, occur in this construal. It is uncommon to use the Constrain metaphor with giving verbs (e.g., **He gave the book*) since they generally require that the Possessor (i.e., recipient) is overtly expressed in the syntax.

examples with Possession verbs in section 4.3.1. As noted above, Constrain events are subsumed under a more general Force schema, and we do not specify the change that the theme undergoes in Force events. Consequently, we do not distinguish static events of Constrain from dynamic ones. The verbal representation supplies this information about the event.

4.6.3 Metaphorical Place and Provide construals

Dynamic Possession and Transfer of Possession verbs can occur in a [SBJ V OBJ *to*-OBL] argument structure construction (40) in which the *to*-oblique denotes the Possessor (= recipient) of the transferred Possession.[4]

(40) a. We contributed our paychecks to her. (VerbNet)

b. Brown presented a plaque to Jones. (VerbNet)

c. We offered our paycheck to her. (VerbNet)

The semantics of the [SBJ V OBJ *to*-OBL] construction has received much attention in the literature. This argument structure construction has been scrutinized as a syntactic alternation of the double object construction, referred to as the "dative alternation", with various types of verbs, including physical verbs of ballistic motion (41a, 41b), sending verbs (41c, 41d), and transfer verbs (41e, 41f) (e.g., Fillmore 1965, Pinker 1989, Pesetsky 1995, Beavers 2011, Rappaport Hovav and Levin 2008, Beavers 2011). We take the approach that the semantics of the intransitive dative variant is distinct from the transitive double object argument structure constructions, following Goldberg (1995), Rappaport Hovav and Levin (2008), and many others. That is, we assume that the distinct realization of participants in these argument structure constructions is semantically motivated.

(41) a. He threw her the ball.

[4]The *to*-variant is not commonly used with Dynamic Possession verbs which describe events in which the Agent *relinquishes* or *loses* their Possession. There are no examples in VerbNet, though examples of *relinquish* in this construal can be found in the COCA corpus: *September relinquished the key to his brother.*

b. He threw the ball to her.

c. She sent him a letter.

d. She sent a letter to him.

e. I gave John a book.

f. I gave a book to John.

Most semantic accounts agree that the *to*-variant encodes caused motion (Beavers 2011) in which "X causes Y to go to Z" (Goldberg 1995, Pinker 1989), and the verb supplies the transfer interpretation. For example, in (41b) or (41d), the intended recipient may or may not receive the theme being thrown or sent. In addition, the *to*-oblique is not semantically restricted to a human entity; it may denote a location instead, as in *He threw the ball to the garden* or *She sent the letter to London*. A caused possession reading is available only with verbs that denote events of transfer of possession, e.g., *give* in (41f). In this example, it is entailed that *John* did receive the *book*. Since transfer of possession is entailed with transfer verbs, it is not possible to express the location as a *to*-oblique with *give*: **I gave a book to London*.

We argue that the entailment of caused possession in the *to*-variant is lexically determined. The constructional semantics describes an event of caused motion in which transfer of possession is metaphorically construed as a motion event. However, unlike the examples with throw and send verbs in which the theme moves holistically, the semantics of events with possession verbs entails mereological motion. Consequently, we analyze the *to*-variant with possession verbs as a metaphorical Place construal in which the theme undergoes mereological (MER) change, rather than holistically incremental motion (MOT) change.

The metaphorical extension of the physical Place [SBJ V OBJ *to*-OBL] construction to the possession domain is motivated by the Possession being conceptualized as a mereologically incremental theme when it is transferred to a recipient. Analogous to physical Place events in which the Figure comes to be spatially co-located with the Ground, the Possession in prototypical transfer events ends up being spatially co-located with the Possessor.

The causal chain for the metaphorical Place argument structure construction with possession verbs and its mapping to the Transfer of Possession event structure is shown in Figure 4.12. The target domain causal chain is identical to the source domain casual chain. In the source domain, physical application verbs such as *apply, spray,* or *tape* tend to occur in the mereological Place construal. In this construal, an initiator applies physical FORCE which causes a theme to move along a PATH towards the ground (e.g., *Jessica sprayed paint onto the wall*). The motion event is mereologically incremental in that the theme moves part by part, rather than as a whole all at once. The theme is labeled +MER since the motion is *towards* the ground, as opposed to *away* from it. In a Remove construal (discussed in section 4.6.4), the theme is labeled -MER. The Possession is the theme and the ground is the Possessor in the target domain.

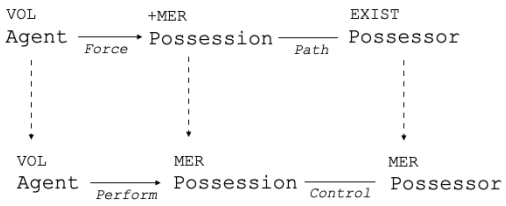

Figure 4.12: Mapping of a Metaphorical Place causal chain to the Transfer of Possession event structure.

Transfer of Possession verbs also occur in a metaphorical Provide [SBJ V OBJ *with*-OBL] argument structure construction used with cover verbs such as *cover* or *fill* in the physical domain (e.g., *He covered the bed with blankets*). In this construal, the ground, rather than the figure, is construed as a mereological theme. Examples of this construal with possession verbs are shown in (42). The direct object denotes the Possessor and the oblique argument denotes the Possession.

(42) a. Brown equipped Jones with a camera. (VerbNet)

b. Brown presented Jones with a plaque. (VerbNet)

The causal chain associated with the metaphorical Provide argument structure construction is shown in Figure 4.13. The representation is similar to the Place causal chain in that

the ordering of participants and the relations between them are the same. However, the Possession, which is expressed as a *with*-oblique, is labeled as INTL in the Provide construal. In the source domain, the figure is also analyzed as INTL because it undergoes change in the event by being in motion. However, because the figure is not syntactically realized as a direct object, and therefore not construed as the theme, it is labeled INTL rather than +MER. The Possession undergoes metaphorical motion in the Provide construal but it is the Possessor who is realized as a direct object and is therefore analyzed as a mereological +MER theme.

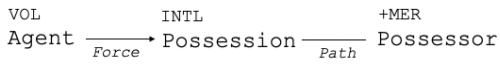

Figure 4.13: Metaphorical Provide causal chain with possession verbs.

Transfer, in its prototypical possession sense, is defined as a change in which a Possession is transferred from an Agent to a Possessor. The Agent has to lose control over the Possession in order for the Possessor to gain control over it. However, in many instances of transfer in which the Possession is a non-physical entity, the transfer event does not require that the Agent loses control over the Possession. For example, in *The FBI provided the informant with a new identity*, the identity is not a Possession that belonged to the FBI. The FBI has the authority to give such a document but no one 'loses' their identity in the process of the informant receiving it.[5]

(43) a. She sprayed paint on the wall./She sprayed the wall with paint.

b. He stripped bark from the trees./He stripped the trees of bark.

Examples in which the Possession is a non-physical entity suggest that it is not the verbal or constructional semantics that denotes transfer, i.e., the relinquishing of a Possession by the Agent and its obtaining by the Possessor. The verb simply denotes the acquisition (or

[5]In our definition of the CONTROL relation, the FBI does not have control over the new identity. However, it could be argued that under a different definition of CONTROL, the FBI does have control over the possession by having the authority to give it. In this sense, they do lose the authority over it when they give it to the informant. However, our definition of CONTROL does not account for this type of 'owning' relation between the FBI and the identity.

loss) of the Possession by the Possessor. The semantics of events with possession verbs thus closely resembles events with physical mereological verbs in which the original (or final) location of the theme is not verbally or constructionally specified (43). For example, in (43a), the *paint* comes to be spatially co-located with the *wall*. However, neither the verbal nor the constructional semantics specifies where the paint was located before it was handled by the agent. It wasn't spatially co-located with the agent until the agent started painting. Similarly, in (43b), the example describes an event of removal in which the *bark* is no longer on the *tree*. The verbal or constructional semantics doesn't specify the goal location of the bark. The bark may be on the ground but it is not necessarily spatially co-located with the agent at the end. The inference about the theme's old or new location comes from commonsense physics, rather than the semantics of the construction. We argue that this analysis holds for the *to*-variant with possession verbs. The inference that the Agent is the 'original possessor' of the Possession in transfer events is not constructionally entailed and is therefore not represented anywhere in our semantic representation.[6]

4.6.4 Metaphorical Remove and Deprive construals

Dynamic Possession and Transfer of Possession verbs can occur in a metaphorical Remove [SBJ V OBJ *from*-OBL] argument structure construction (44a, 44b) and a Deprive [SBJ V OBJ *out of/of*-OBL] argument structure construction (44c, 44d). In the Remove construal, the direct object is the Possession while in the Deprive construal, the direct object is the Possessor from whom the Possession is taken. Transfer of Possession verbs occur in both construals; however, the use of Dynamic Possession verbs in these construals is more limited. Dynamic Possession verbs, such as *obtain*, can occur in the Remove argument structure construction

[6]With obtain and get verbs, the pairing of constructional and verbal semantics does entail that the Agent comes to have CONTROL over the Possession in argument structure constructions in which a *from-oblique* is overtly expressed (e.g., *She got the book from him*). The verbal semantics evokes a CONTROL relation between the subject participant and the Possession and the constructional semantics evokes a CONTROL relation between the Possession and the original Possessor. In this case, it is the combination of the two representations that yields this interpretation, rather than the verbal or constructional semantics independently.

(e.g., *He obtained it from the owner*) but not in the Deprive construal. This syntactic behavior is semantically motivated: obtain verbs evoke an event structure with only two participants: an Agent and a Possession. When a third participant, i.e., a Possessor, is added to the event, it is constructionally specified. Generally, a constructionally added participant cannot be expressed as a direct object.[7] Such a participant has to be expressed as an oblique argument. Consequently, the Deprive construal is semantically incompatible with Dynamic Possession verbs. The Remove construal is possible because the Possession is construed as the mereological theme by being expressed as a direct object. The Possessor, a constructionally added participant, is expressed as an oblique argument. Transfer of Possession verbs can occur in both construals because they evoke an event structure with two mereological themes: a Possession and a Possessor. As such, either the Possession or the Possessor can be expressed as a direct object.

(44) a. The thief stole the painting from the museum. (VerbNet)

b. The swindler swindled 20 dollars from his boss. (VerbNet)

c. The swindler cheated Pat out of her fortune. (VerbNet)

d. They deprived Pat of sleep. (VerbNet)

The causal chain for the metaphorical Remove argument structure construction with possession verbs is shown in Figure 4.14. The force dynamic relations are metaphorically extended from the physical source domain. In the physical domain, the Agent applies FORCE which causes the theme not to be spatially co-located with the ground (e.g., *Doug cleared the dishes from the table*). The theme moves mereologically along a PATH with respect to

[7] One obvious exception to this observation is the syntactic realization of an intended recipient as a direct object in the Transfer construal, see section 4.6.1.

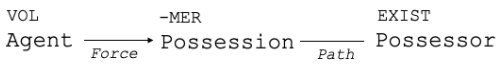

Figure 4.14: Metaphorical Remove causal chain with possession verbs.

the ground. In the target domain, the Agent metaphorically exerts FORCE on the Possession which results in the Possessor not being spatially co-located with the Possession. The Possession is analyzed as -MER because it is taken away from the Possessor.

Figure 4.15 shows the causal chain representation for the Deprive argument structure construction. The ordering of participants in the Deprive and Remove causal chains is the same. However, in the Deprive construal, the Possessor is construed as a mereological (-MER) theme given its syntactic realization as a direct object.

Figure 4.15: Metaphorical Deprive causal chain with possession verbs.

The mapping of the Remove and Deprive causal chains to the underlying verbal representations is similar to that of Place and Provide causal chains discussed above. With Transfer of Possession verbs, the endpoint of metaphorical FORCE, i.e., Possession, maps to the Possession in the verbal representation, and the endpoint of the metaphorical PATH relation, i.e., Possessor, maps to the Possessor. With Dynamic Possession verbs, the endpoint of PATH is constructionally added and therefore doesn't map to any participant in the verbal representation.[8]

4.6.5 Metaphorical Change of State construal

Transfer of Possession verbs also occur in a transitive argument structure construction in which the direct object describes the Possessor (45). The Possession is not syntactically expressed in these examples. The constructional semantics describes an event in which there is a direct force-dynamic relation between the Agent and the Possessor.

(45) a. Brown equipped his soldiers. (VerbNet)

b. Hess supplied its customers.(VerbNet)

[8]This construal is not commonly seen with Dynamic Possession verbs as they do not evoke a Possessor in their verbal event structure. Dynamic Possession verbs require that the Possession is overtly expressed.

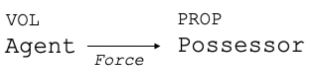

Figure 4.16: Change of State construal with possession verbs.

c. The swindler cheated Pat. (VerbNet)

This transitive construal is analyzed as a metaphorical Change of State ("COS") event in which the Possessor undergoes change by receiving a Possession (which is syntactically covert) and is analyzed as a property (PROP) theme. A causal chain associated with this construal is shown in Figure 4.16. A metaphorical COS construal with Transfer of Possession verbs is likely motivated by the syntactic behavior of physical mereological verbs, which also occur in a transitive argument structure construction in which the ground is expressed as a direct object (e.g., *He painted the wall*). In the transitive construal, the physical ground is analyzed as a property theme: the *wall*'s property changes when it is *painted*. Analogous to the ground in this physical domain, the Possessor metaphorically undergoes a change of state when it is given or relinquished of a Possession. The relation between the Agent and the Possessor is analyzed as metaphorical FORCE, following our analysis of the source domain causal chain.

(46) a. He donated directly to JSP members. (VerbNet)

b. The thief stole from the museum. (VerbNet)

Transfer of Possession verbs can also express the Possessor as a *to*-oblique or *from*-oblique in a COS construal (46). The Possession is not overtly expressed in these examples. Our semantic analysis of the intransitive argument structure constructions in (46) is the same as our analysis of the transitive construction shown in Figure 4.16. In this analysis, the Possessor is analyzed as a property theme. This analysis is motivated by our analysis of mereological verbs in argument structure constructions in which the ground is expressed as an oblique argument and the figure is syntactically covert. Various place and remove verbs allow this construal (47b, 47d). We analyze the semantics of these examples in the physical domain

as COS events. This syntactic pattern alternates with the transitive variant and seems to be semantically motivated, particularly with place verbs such as *paint* in (47a) and (47b). The transitive variant entails a fully affected patient while the intransitive variant correlates with a partially affected patient. The semantic motivation for the syntactic alternation between the transitive and the oblique variants also appears to determine the syntactic realization of the patient with COS verbs (47e, 47f). We argue that the same semantic motivation leads to this syntactic alternation being used with physical Remove verbs (47c, 47d).

(47) a. He painted the wall. (VerbNet)

b. He painted on(to) the wall. (VerbNet)

c. The men mined the mine.

d. The men mined from the mine.

e. She cut the bread. (VerbNet)

f. She cut into the bread. (VerbNet)

Our analysis does not aim to capture the semantic difference between the two syntactic variants since it is not related to the force-dynamic structure of the event. In both construals, the patient undergoes a change of state and is therefore analyzed as a property theme. The causal chain representation for the metaphorical COS [SBJ V *to*-OBL] argument structure construction with Transfer of Possession verbs is the same as the causal chain for the transitive variant in Figure 4.16.

With Transfer of Possession verbs, the syntactic realization of the Possessor in the COS

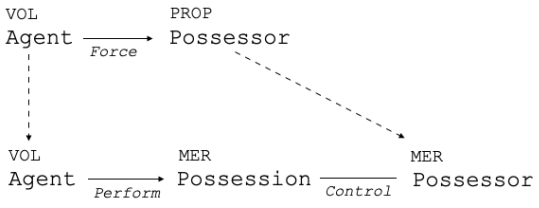

Figure 4.17: Mapping of a Change of State causal chain to the Transfer of Possession event structure.

construal is mostly determined lexically (e.g., *He donated *me/to me* but *He equipped his solders/*to his soldiers)*. The syntactic alternation between the transitive and the intransitive construals is not common with Transfer of Possession verbs. Indeed, the semantic motivation for the two syntactic variants in the source domain does not carry over to the target domain. The inference of partial versus full affectedness is not relevant to the syntactic realization of the Possessor with verbs in the Possession domain.

A mapping of a COS causal chain to the Transfer of Possession event structure is shown in Figure 4.17. The property theme in the causal chain maps to the mereological theme in the verbal representation. This type of mismatch of theme types in the mapping between constructional and verbal semantics is not common. We allow this mismatch because the metaphor originates in the physical domain and the same mismatch is found in the physical source domain.

4.6.6 Internal construal

Transfer of Possession verbs can occur in an Internal construal, in which only the Agent is overtly expressed as an event participant (48). The causal chain associated with examples such as these and its mapping to the Transfer of Possession event structure is shown in Figure 4.18. The causal chain is non-relational in that the event doesn't evoke a force-dynamic relation between two participants. The Agent is construed as a sole participant who acts volitionally and undergoes internal change by being engaged in the event. This construal is not common with Dynamic Possession verbs and there are no examples of the Internal construal with Dynamic Possession verbs in VerbNet.

(48) a. Some of the members may donate privately. (VerbNet)

b. Some people just take and take and never give. (COCA)

The mapping of an Internal causal chain to the Transfer of Possession event structure is shown in Figure 4.18. The Agent in the constructional representation maps to the Agent in the verbal representation. Since neither the Possession nor the Possessor are overtly

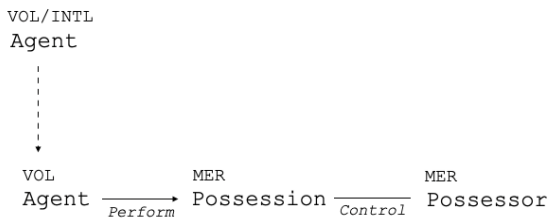

Figure 4.18: Internal construal with Transfer of Possession verbs.

expressed, there is no mapping from the causal chain to these participants in the verbal representation.

4.7 Replace and Exchange events

The semantics of verbs that denote an exchange between two entities (or their roles) has received some attention in the literature; however, only certain types of construals observed with these verbs have been discussed depending on the focus of the linguistic study. Exchange events have been either subsumed under the category of "verbs of possession and exchange," in which exchange of possession takes place (*They exchanged cars* or *He bought the book for $20*) (Koenig and Davis 2006, Newman 1998) or under the category of "reciprocals," in which the exchange of two entities is understood to be symmetric (e.g., *Bell ringers switched places* or *They traded rings*) (Nedjalkov 2007, König and Gast 2008). However, as we discuss in this chapter, the lexical semantics of exchange verbs doesn't necessarily evoke transfer or a reciprocal interaction (Croft 1991:225-226).

In some cases, exchange events evoke transfer of possession in which two agents collaboratively exchange their belongings. However, exchange verbs do not evoke transfer or acquiring/losing a possession. Specifically, exchange verbs do not evoke an event structure in which two entities are in a CONTROL relation with each other. A scenario in which an agent swaps lightbulbs in a lamp is a good example that demonstrates this point. Exchanging an old light bulb for a more efficient one doesn't entail relinquishing the old one. The old functioning bulb may be kept. Since there isn't a change of ownership in this example, there

is not a CONTROL relation between the agent and the exchanged items in the event structure representation. This example also shows that a CONTOL relation is not evoked by lexical semantics of exchange verbs.

In many cases, the event of exchange may be construed as symmetric and understood as a reciprocal interaction. However, exchange verbs do not necessarily evoke reciprocity in their event structure, etiher. Exchange verbs make up a semantically diverse category of verbs and frequently occur in construals in which participants are not reciprocally involved. For example, in replace events, one entity may take on the role of another entity but reciprocity is not entailed, as in *Milk and lemon juice may substitute for buttermilk. Milk and lemon juice* take on the role of *buttermilk* in a recipe but *buttermilk* doesn't take on the role of *milk and lemon juice* as a result of the replace event. As such, exchange verbs are semantically different from prototypical reciprocal events.

We distinguish two types of verbs based on the event structure that is obligatorily evoked by their verbal semantics: Replace verbs and Exchange verbs. With both types of verbs, an EXCHANGE relation is evoked between two participants and their roles in the event structure. With Exchange verbs, the EXCHANGE relation is externally initiated by two agents who act cooperatively (section 4.9). With Replace verbs, no external initiator is obligatorily evoked (section 4.8).

4.8 Replace verbs

Replace verbs describe exchange scenarios in which participants switch their roles or one participant takes on a role of another participant (49). Replace verbs occur in various argument structure constructions depending on the construal of the event. Replace events may be construed as symmetric when both participants exchange each other's roles (49a, 49b) or asymmetric, when one participant takes the role of the other (49c, 49d). In asymmetric construals, it is not entailed that the exchange of roles was reciprocal. The role(s) may or may not be constructionally specified, as shown in these examples.

(49) a. The bell ringers switched places. (VerbNet)

b. One bell ringer swapped places with another. (VerbNet)

c. Milk and lemon juice may substitute for buttermilk. (VerbNet)

d. They replaced the Queen as the head of state. (VerbNet)

The event structure associated with Replace verbs is shown in Figure 4.19. Replace verbs evoke events with two participants: Item 1 and Item 2. Each participant is associated with a Role. The EXCHANGE relation between Item 1 and Item 2 is an 'equivalence' relation, rather than a force-dynamic relation. It represents that the two items are similar in value or function and may be replaced by one another in a replace event. The EXCHANGE relation is 'noncausal' and there is no obvious directionality coercion in the causal interaction between participants (Croft 1991:225-226). The non-directionality of the EXCHANGE relation allows for symmetric construals in which both entities engage in the event reciprocally, i.e., both participants take on the Role of the other. In symmetric construals, one or both of the exchanged Items are grammatically expressed as the subject. If only one of the Items is expressed as a subject, the other Item is syntactically realized as an antecedent *with*-phrase (49b).

However, despite the non-directional nature of the EXCHANGE relation, exchange events can be construed as asymmetric. The linear representation of the event structure in which Item 1 precedes Item 2 reflects the tendency of Item 1 being syntactically encoded as antecedent to Item 2 in asymmetric construals (49c) and (49d). We discuss the semantics of argument structure constructions with Replace verbs in section 4.10.

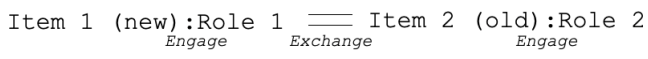

Figure 4.19: Replace event structure.

The participant labels are unspecified in the verbal event structure. This is so that participants who act volitionally, e.g., (49a) and (49b), as well as participants who represent

inanimate entities and are therefore non-volitional, e.g., (49c), can map to the same verbal representation. Constructional causal chains associated with particular examples specify the type of engagement that each participant undergoes in the event.

Replace verbs occur in the substitute-13.6.2 VerbNet class. FrameNet frames with Replace verbs include Taking_place and Replacing.

4.8.1 Causative events with Replace verbs

An external initiator of the EXCHANGE relation may be constructionally specified with Replace verbs. For example, in (49d), the subject participant causes the exchange between the *Queen* and her successor. In this example, the 'old' entity, i.e., the *Queen*, is expressed as a direct object. The 'new' entity would be expressed as an antecedent *with*-oblique if it were overtly expressed. The syntax of this example clearly conforms to the ordering of participants in the verbal event structure: Item 1, which denotes the 'new' entity, is causally antecedent to the 'old' entity, i.e., Item 2, in the constructional causal chain.

However, it is not uncommon for English to express the old entity as antecedent to the new entity in causative construals. In fact, there appears to be a rarely noted syntactic alternation with Replace verbs in which the direct object may be either the new or the old entity when the event is externally initiated. Consider the examples with *switch* (50a, 50b), *replace* (50d, 50c), and *substitute* (50e, 50f) in which the syntactic encoding of participants in these alternations points to an analysis in which the old entity is either antecedent (with-variant) or subsequent (for-variant) to the new entity.

(50) a. She switched her uniform for a tutu. (COCA)

b. Somebody switched my cake with a pile of dog turds. (COCA)

c. the mother or father [come] during the night and replace the tooth for cash. (COCA)

d. Some parishes replace the water with sand. (COCA)

e. He substituted buttermilk for milk and lemon juice. (VerbNet)

f. He substituted buttermilk with milk and lemon juice. (VerbNet)

Interestingly, this issue does not come up in non-causative construals in which the event is not initiated by an external initiator. In non-causative construals, the old item is always causally subsequent to the new item. For example, the verb SUBSTITUTE may express the old item as either a direct object (e.g., *Video substituted radio*) just like Item 2 with *replace* or a subsequent *for*-oblique (e.g., *Milk and lemon juice may substitute for buttermilk*). The ordering of participants in the constructional causal chain remains the same: Item 2 is subsequent to Item 1.

The alternative syntactic construal of the old item as antecedent to the new one is likely motivated by the syntactic realization of participants with Exchange verbs, discussed in the following section 4.9. Exchange verbs evoke an external initiator, and unlike Replace verbs, the old item precedes the new item in their event structure (e.g., *Gwen exchanged the dress for a shirt*). Arguably, the causative nature of events and the reverse ordering of participants evoked by Exchange verbs has resulted in a similar syntactic variant being used with Replace verbs when they occur in causative construals. This construal alternates with the more prototypical replace construal in which the new entity is causally antecedent to the old entity.

4.9 Exchange verbs

Exchange verbs evoke events in which the EXCHANGE relation is externally initiated (51). The event structure of Exchange verbs elaborates on the semantics of Replace verbs. The EXCHANGE segment between Item 1 and Item 2 is preceded by an Agent and a Co-agent who collaboratively initiate the exchange event, as shown in Figure 4.20. In the verbal event structure, a reciprocal exchange of two items is always evoked. As such, the relation between the Agent and the Co-Agent is always construed as symmetric with these verbs. Additionally, the ordering of the new and old entity in the causal chain is reversed in exchange events when compared to replace events: the old entity (Item 1) is causally antecedent to the new entity

(Item 2) (Croft 1991:225-226).

(51) a. Gwen exchanged the dress for a shirt. (VerbNet)

b. Cathy is swapping equity stakes with the U.S. carrier. (VerbNet)

c. They exchanged rings. (VerbNet)

The verbal event structure in Figure 4.20 describes an event structure in which an Agent and a Co-Agent engage in a PERFORM relation to bring about an EXCHANGE of Item 1 and Item 2. Their engagement in the same force-dynamic relation is represented by a plus sign. As initiators of the PERFORM relation, the Agent and the Co-Agent act volitionally (VOL). We do not specify the type of engagement of the Items in the verbal representation, similarly to the Replace event structure. This information is specified in the constructional semantics. In causal chains, the exchanged Items are frequently labeled EXIST since they don't undergo any internal change in the event and are commonly inanimate non-volitional entities.

The exchange event with Exchange verbs results in the Agent and the Co-Agent having control over the exchanged Item that wasn't previously theirs, i.e., the Agent receives Item 2 (and gives up Item 1) and the Co-Agent receives Item 1 (and gives up Item 2). This part of the verbal semantics is not represented in the Exchange event structure because the CONTROL relation between the Agents and the exchanged Items is not relevant to the construal of exchange events, and it is not syntactically expressible in English.

We specify the Roles that are associated with each Item in the verbal representation to demonstrate the overlapping event structures evoked by Exchange and Replace verbs; however, neither Role 1 nor Role 2 tend to be syntactically expressed with Exchange verbs.

Verbs that evoke the Exchange event structure can be found in the exchange-13.6 class in VerbNet. There is an Exchange frame for Exchange verbs in FrameNet.

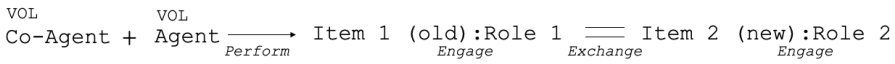

Figure 4.20: Exchange event structure.

4.10 Semantics of argument structure constructions with Replace and Exchange verbs

The syntactic realization of participants with Replace and Exchange verbs overlaps to a great extent. We discuss the common construals observed with these verbs here. Both verb types can occur in an Exchange construal in which both Item 1 and Item 2 are overtly expressed (4.10.1). An Exchange construal may or may not be externally initiated with Replace verbs. With Exchange verbs, the Exchange relation is always externally initiated. In an Internal construal, the Items are syntactically realized as a conjoined or plural argument (4.10.2). Exchange verbs can also occur in a metaphorical Constrain construal in which only the Agent and the Item 1, which the Agent exchanges, are overtly expressed as arguments (4.10.3).

4.10.1 Exchange construal

Replace and Exchange verbs frequently occur in an Exchange construal in which both exchanged items are overtly expressed as separate arguments in the argument structure construction (52). The argument structure construction associated with this construal may be a [SBJ V OBJ *for*-OBL] or [SBJ V OBJ *with*-OBL] construction when the event is externally initiated (52a, 52b) or a simple transitive [SBJ V OBJ] construction when an external initiator is not present (53b). We do not distinguish which participant in the constructional causal chain refers to the old item (or role) and which to the new item (or role). This information is supplied by linking the causal chain to the relevant verbal event structure.

(52) a. Gwen exchanged the dress for a shirt. (VerbNet)

b. He replaced his radio with a tv.

c. Video replaced radio. (VerbNet)

Causal chains associated with the Exchange construal closely resemble the event structure of Replace and Exchange verbs since the EXCHANGE relation is part of the constructional semantics. Figure 4.21 shows a representation for the example in (52a) and its mapping to the Exchange event structure. The Agent, *Gwen*, uses performative force (PERFORM) to

initiate the EXCHANGE relation between Item 1, the *dress*, and Item 2, a *shirt*. *Gwen* is identified as a volitional (VOL) participant and the exchanged Items are labeled as EXIST since they don't undergo internal change in the event. Examples in which external initiators are not constructionally evoked, such as the example in (52c), lack the first segment of the causal chain and only include an EXCHANGE relation between Item 1 and Item 2.

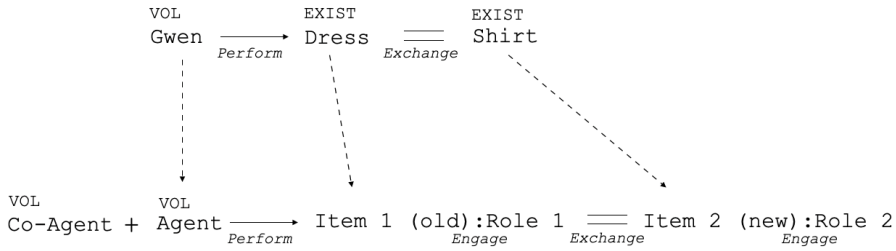

Figure 4.21: A mapping of an Exchange causal chain to the Exchange event structure.

In the example *The bell ringers switched places*, both participants switch Roles. However, many exchange examples describe events in which only one of the Items assumes a new role, e.g., *Twelve years later, oil replaced coal as the energy of choice*. In this example, the Role, the *energy of choice*, is associated with the old filler, the *coal*, in the constructional causal chain. This analysis is syntactically motivated since the Role is realized as a subsequent *as*-oblique and thus follows the direct object in the causal chain, as shown in Figure 4.22. Despite the constructional representation, the example arguably primarily focuses on the new filler, the *oil*, taking the Role. However, in the constructional representation, there is not an ENGAGE relation between Item 1 (new filler) and the Role, since the Role is analyzed as Role 2 and thus describes the Role of Item 2 (old filler). The mapping of this example to the Replace event structure is shown in Figure 4.22.

4.10.2 Internal construal

Replace and Exchange verbs can also occur in Internal construals in which the exchanged Items or their Roles are syntactically realized as plural arguments (53). This construal is possible with Replace verbs only when the participants in the event are volitional entities

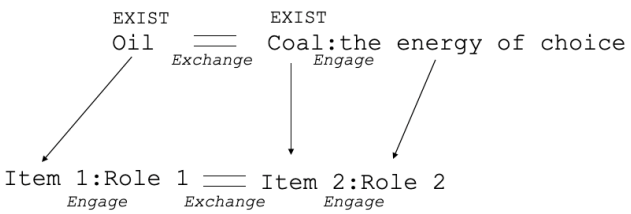

Figure 4.22: A mapping of an Exchange causal chain to the Replace event structure.

(53c) or when the exchange event is externally initiated by an Agent or Agents (53d).

(53) a. They exchanged rings. (VerbNet)

b. The bells ringers switched places. (VerbNet)

c. They switched. (VerbNet)

d. He/they switched the keys.

The analysis of the exchanged Items as undergoing internal change when they are expressed as a plural argument is motivated by our analysis of combining, mixing, and separating events in the physical domain, in which the figure and the ground may be expressed as a plural (or a conjoined plural) argument (e.g., *He mixed the eggs* or *The yolk and the white separated*).[9] In the Internal construal, the participants are construed as undergoing the same change in the event; distinguishing which one denotes the figure and which one the ground is not relevant. Their engagement in the event is construed as symmetric. They undergo internal change by being combined or separated. Similarly, in the social domain, the exchange event may be construed as symmetric when both Items replace each other in their Roles. In such a scenario, the event is construed as Internal and the participants are syntactically realized as a plural (or a conjoined plural) argument.

The causal chain associated with the Internal construal always represents the exchanged Items as a single participant that undergoes an internal (INTL) change. Figure 4.23 shows a mapping of a causal chain associated with the example *He switched the keys* to the Replace

[9]The Internal construal alternates with Placing (e.g., *He mixed the eggs into the milk*) or Providing (e.g., *Herman mixed the eggs with the cream*) construals in the physical domain in which the distinction between figure and ground is syntactically encoded.

event structure. The Items, *keys* in the causal chain map to Item 1 and Item 2 in the verbal representation. The initiator of the PERFORM relation is constructionally evoked and therefore doesn't map to any participant in the verbal event structure. A causal chain for an example without an external initiator, such as (53c), would include only "Items" as a single participant in the constructional representation.

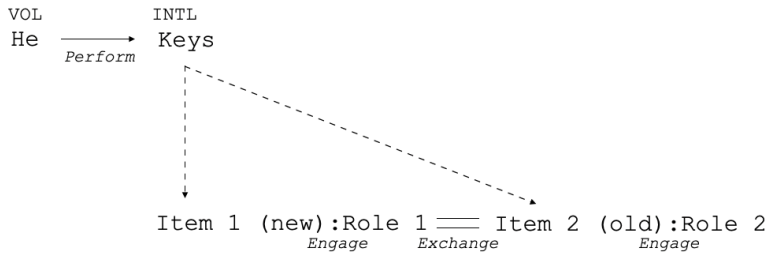

Figure 4.23: Mapping of an Internal causal chain to the Replace event structure.

4.10.3 Metaphorical Constrain construal

Exchange verbs may occur in a metaphorical Constrain [SBJ V OBJ] argument structure construction in which the direct object denotes the Item 1 associated with the Agent (54a, 54b). Replace verbs may also occur in this construal but only when the exchange event is initiated by an external entity (54c). The event describes the relinquishing of an old Item by the Agent. Similarly to the Constrain metaphor with possession verbs, the use of this argument structure construction is motivated by the event describing a metaphorical 'dropping' or 'letting go' event in which the Agent willingly loses control over the Item. The PERFORM relation between the Agent and Item 1 in the verbal event structure is analyzed as a metaphorical FORCE relation in the source domain constructional causal chain.

(54) a. I spent all the money. (VerbNet)

b. She exchanged the purchase. (VerbNet)

c. He switched the key.

The metaphorical Constrain causal chain and its mapping to the Exchange event structure

is shown in Figure 4.24. The causal chain represents the semantics of the example *She exchanged the purchase* in (54b). The causal chain describes a metaphorical FORCE relation between the Agent and Item 1. The constructional representation is identical to that of dynamic Constrain examples with Possession verbs discussed in section 4.6.2. The type of change that the Item undergoes is unspecified and the Agent is identified as a volitional (VOL) initiator.

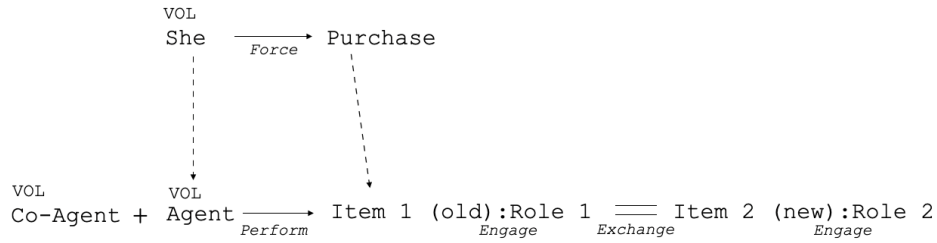

Figure 4.24: Constrain causal chain with exchange verbs.

4.11 Commercial Transaction verbs

Commercial Transaction verbs, such as *buy, sell,* or *pay*, evoke a more complex event structure compared to Transfer of Possession verbs or Exchange verbs (Fillmore 1977, Koenig and Davis 2006). The semantics of these verbs obligatorily evokes four participants: a seller, a buyer, goods, and money. The buyer buys goods from the seller and, at the same time, the seller sells goods to the buyer for money (55). The event of buying and selling is cooperative in that both the seller and the buyer have to willingly engage in the transaction together (Jackendoff 1987:281, Dowty1991:556).

(55) a. I just bought the cutest little pumpkin yesterday. (COCA)

b. I bought an angle grinder for 25 bucks. (COCA)

c. I know this because I bought one from Sears. (COCA)

d. But this year, our paper was sold to a land developer. (COCA)

e. I sold all my belongings, home, auto and invested a lot of money.(COCA)

The event structure representation for Commercial Transaction verbs is consistent with our analysis of other verbs in the possession domain. The analysis focuses on the semantics of buy and sell verbs as each evoking only a subpart of an otherwise very complex semantic frame that is associated with events of commercial transaction. In addition, we include only relations between participants in the verbal representation that are syntactically expressible in English.

Commercial Transaction verbs describe the event from the perspective of either the buyer or the seller. With buy verbs only the buyer *buys*, and with sell verbs only the seller *sells*. The event is never construed as reciprocal or symmetric despite commercial transaction being understood as entailing a joint cooperative interaction between the two agents. This contrasts with the semantics of reciprocal Exchange verbs such as *trade* or *swap* which entail a reciprocal engagement and both agents can be said to *trade* or *swap*. This semantic difference between Commercial Transaction and Exchange verbs has syntactic consequences: with Commercial Transaction verbs, the agents cannot be expressed as a comitative *with*-phrase or a plural subject, unlike agents with Exchange verbs when both agents are overtly expressed (e.g., *He swapped bikes with his friend*).

We do not define a reciprocal (MUTUAL) relation between agents in the Commercial Transaction event structure. In our analysis, their cooperative engagement in the event is not evoked by the verb itself. Rather, the participants' reciprocal engagement is evoked by a larger semantic frame associated with the commercial transaction scenario. Consequently, the cooperative nature of the event is therefore not syntactically relevant and is not expressed with Commercial Transaction verbs in English.

Syntactic construals observed with Commercial Transaction verbs and the semantics associated with them quite closely resemble construals with Transfer of Possession verbs such as *receive* or *borrow* in which only one participant is construed as the agent and overtly expressed as the grammatical subject in the argument structure construction. Though the semantics of *receive* and *borrow* also entails a cooperative event in which a donor willingly

relinquishes their possession, the verbs don't occur in symmetric construals, similarly to Commercial Transaction verbs. We do not establish a separate event structure for the handful of taking verbs that evoke a cooperative giver and analyze them as describing the same event structure as other Transfer of Possession verbs. As discussed in section 4.5, the Transfer of Possession event structure does not represent a MUTUAL relation between the two human participants. The event structure describes an event in which an Agent causes that a Possession is either transferred to or taken from a Possessor.

Figure 4.25: Commercial Transaction event structure.

Analogously, the Agent with Commercial Transaction verbs causes that Goods are either transferred to or taken from the Possessor. We define a single event structure for buying and selling verbs, following our analysis of taking and giving verbs. With taking and giving verbs discussed in section 4.5, the initiator of the transfer event is analyzed as an Agent, whether it is a 'taker' or a 'giver' and the other human participant is analyzed as a Possessor. The initiator of the event structure causes that the Possessor either loses or obtains a Possession. Whether the event describes taking or giving is determined by the verb used in the argument structure construction. Given our schematic force-dynamic analysis of the relations between participants in verbal event structures, this analysis can be extended to Commercial Transaction verbs.

As depicted in Figure 4.25, the initiator of the event structure with Commercial Transaction verbs causes that the Possessor either gains or loses control over the Goods. With buy verbs, the Agent is the buyer and the Possessor is the seller. The buyer causes that the Possessor loses control over the Goods. With sell verbs, the Agent is the seller and the Possessor is the buyer. The seller causes that the buyer gains control over the Goods.

Similarly to the Transfer of Possession event structure, the Goods and the Possessor are construed as mereological (MER) themes. We do not specify whether the Goods are

transferred to the Possessor or taken from the Possessor in the verbal representation. This information is specified in the constructional causal chain, parallel to our analysis of Transfer of Possession verbs.

The relation between the Agent and the Goods is defined as PERFORM and the relation between the Goods and the Possessor as CONTROL. This part of the event structure is identical to the Transfer of Possession event structure. The PERFORM relation establishes that the Agent is an external causer of the CONTROL relation between the Goods and the Possessor. The CONTROL relation and the MER labels assigned to the Goods and the Possessor participants provide a schematic description of the event in which either the Possessor is the seller who relinquishing the goods or the Possessor is the buyer who comes to have control over the goods.

We do not represent a CONTROL relation between the Money and the Agent, though the event does entail that the Agent either relinquishes the Money when it is a buyer or receives the Money when it is a seller. This relation is never overtly expressed in argument structure constructions. Money is always construed as an endpoint of an EXCHANGE relation rather than an endpoint of a CONTROL relation with the Agent. Given that the CONTROL relation between the Agent and Money is not syntactically relevant, we do not include it in the verbal semantic representation. We also don't include a direct relation between the Goods and Money, though Money always expresses the value of Goods. That is, the amount of money paid equals the price of the Goods. This relation is expressed by other verbs, such as *cost* in *The book costs $25*. Examples such as these describe an ENGAGE relation between the goods and its value.

Commercial Transaction verbs do not occur in construals in which an ENGAGE relation between Goods and Money is overtly expressed. The role of Money in commercial transaction events is different. The Money describes the object that is exchanged for the Goods in the event. The transaction takes place because Money is exchanged in the event. We analyze Money as an endpoint of an EXCHANGE relation in the event structure.

With Replace verbs discussed in section 4.8, the EXCHANGE relation describes an equivalence relation between two entities. However, with Commercial Transaction verbs, the EXCHANGE relation describes an equivalence relation between an entity (i.e., Money) and an event (i.e., buying or selling).

This analysis is motivated by the use of the EXCHANGE relation in other types of events, such as change of state or placing events in the physical domain, as shown in (56). As shown in (56a), the constructional semantics describes an exchange of money for a service. It does not describe an equivalence relation between *$20* and the *windows*. Put differently, *$20* does not refer to the value of the windows but rather to the value of washing the windows. Similarly, in (56b), the amount of money given to the agent is not for the hay but for loading the hay. The EXCHANGE relation in these examples thus specifies an equivalence relation between the event and its value.

(56) a. He washed the windows for $20.

b. He loaded hay on the truck for $50.

The syntactic realization of the endpoint of the EXCHANGE relation as a *for*-oblique is very common in English. Verbs from various verb classes can occur in argument structure constructions in which the *for*-phrase denotes an exchanged item. Besides physical Change of State and Mereological verbs, verbs of Exchange (57a), Commercial Transaction verbs (57b-57d), and Transfer of Possession verbs (57e, 57f) occur in this construal, as well.

(57) a. He exchanged his car for $2,000.

b. He sold his car for $2,000.

c. He bought his car for $2,000.

d. He paid $2,000 for his car.

e. He gave him his car for $2,000.

f. He got his car for $2,000.

The *for*-phrase can also be used to describe a purpose relation in English (e.g., *He killed him for $1000* or *She married him for money*). In these examples, the participant expressed as a *for*-phrase describes an intended outcome. In the kill example, the purpose of the event is to get *$1000* and in the marry example, the purpose is to obtain *money* through marriage. The use of the *for*-phrase in the examples in (57) has different semantic motivations. It describes an item that is exchanged in the event. A distinct analysis of the *for*-phrase in the examples in (56) and (57) is also supported by cross-linguistic evidence from Czech.

Czech uses the same syntactic alternation for the examples in (56) and (57); however, a different prepositional phrase is used for a purpose relation. Specifically, the endpoint of an EXCHANGE relation is expressed as a *za*-phrase but the endpoint of a purpose relation is expressed as a *pro*-phrase. The oblique arguments in (56) and (57) are syntactically encoded as *za*-phrases (58) but the kill and marry examples discussed in the preceding paragraph are encoded as *pro*-phrases in Czech (59).

(58) a. Umyl okna za $20.
Washed windows for $20
'He washed the windows for $20.'[10]

b. Naložil seno do náklaďáku za $50.
Loaded hay into truck for $50
'He loaded the hay on the truck for $50.'

c. Vyměnil si svoje auto za $2,000.
Exchanged REF his car for $2,000
'He exchanged his car for $2,000.'

d. Prodal svoje auto za $2,000.
Sold his car for $2,000
'He sold his car for $2,000.'

e. Koupil si auto za $2,000.
Bought REF car for $2,000
'He bought his car for $2,000.'

[10]The prepositional phrase in this example and the others that follow is analyzed as an argument of the verb. As such, there is no ambiguity as to the attachment of the prepositional phrase. For more literature on the ambiguity of PP attachments in Czech, see Markéta Straňáková (2001).

f. Zaplatil $2,000 za svoje auto.
Paid $2,000 for his car
'He paid $2,000 for his car.'

(59) a. Zabil ho pro $1000.
Killed him for $1000
'He killed him for $1000.'

b. Vzala si ho pro peníze.
Married REF him for money
'She married him for money.'

Evidence from English and Czech strongly points to a unified analysis of the *for*-phrase in (56) and (57). The EXCHANGE relation in the Commercial Transaction event structure can be analyzed as describing a relation between Money and the event as a whole, rather than the Goods as a single participant. This analysis is also motivated by metaphorical argument structure constructions in which the EXCHANGE relation is construed as subsequent to the core event (see section 4.12).

In summary, the analogy between the physical and social examples in which the EXCHANGE relation is overtly expressed is that in the physical domain, performing a task equals a sum of money, which is defined by the value of the task. With Commercial Transaction verbs losing or gaining control over Goods also equals a sum of money, which is defined by the value of the Goods.

VerbNet does not have separate classes for buying and selling verbs. These verbs are subsumed under their classes which contain Transfer of Possession verbs. FrameNet, on the other hand, has many different frames for these verbs including Commerce_buy, Renting, Commerce_sell, Renting_out, and Commerce_collect.

4.11.1 Pay and Charge verbs

Pay and charge verbs give a different perspective on commercial transaction events when compared to buy and sell verbs. Pay and charge verbs describe events in which the theme

refers to the Money and the exchanged item to the Goods (60). The buyer loses control over the Money in the process of buying Goods, and the seller gains control over the Money in the process of charging for Goods. As shown in (60), the direct object which denotes the theme participant is the Money and the *for*-oblique is the exchanged item, i.e., the Goods.

(60) a. He paid/charged 500 pounds.

b. He paid/charged 500 pounds for the car.

c. He paid/charged me 500 pounds for the car.

d. He paid 500 pounds to the seller.

Pay and charge verbs evoke the same event structure; however, their sublexical modality is different (Koenig and Davis 2001). Charge verbs describe events in which the transfer of Money takes place in the future, similarly to some Transfer of Possession verbs such as *promise* (as in *He promised him a house*). The modulation of charge verbs is of negative transfer in which the Money is not given to the Possessor but taken from them. Given their unique modulation, charge verbs are syntactically different from both sell and buy verbs. Unlike sell verbs, which also express the Seller as the subject, charge verbs do not occur in argument structure constructions in which the Possessor is a *to*-oblique. Charge verbs are also different from buy verbs because they construe the seller, rather than the buyer, as the initiator. In addition, unlike buy verbs, which evoke an event in which the Possessor loses control over the theme participant, charge verbs do not occur in argument structure constructions in which the Possessor is a *from*-oblique.

Charge verbs always express the Possessor as a direct object and can occur in the double object Transfer argument structure construction in which the indirect object is the Possessor, like pay and buy verbs (60c). This syntactic behavior is unexpected given the semantics of the Transfer causal chain in which the theme is transferred to the Possessor. With charge verbs, the theme, i.e., Money, is taken *from* the Possessor. The recipient of the Money is the seller, i.e., the Agent in the causal chain.

We analyze the double object construction with charge verbs as a Transfer event in which the transfer takes place in a negative future modulation, following the analysis of Koenig and Davis (2001). The constructional analysis of this example and others with charge verbs is the same as our analysis of examples with pay verbs. We do not represent sublexical modality in our force-dynamic representation.

The verbal event structure for pay and charge verbs is shown in Figure 4.26. The event structure is very similar to Transfer of Possession verbs except that Money, rather than Goods, is defined as the mereological theme participant with pay and charge verbs. As such, the Money is the endpoint of the PERFORM relation and the initiator of the CONTROL relation.

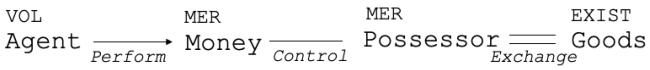

Figure 4.26: Pay and charge event structure.

Pay and charge verbs can be found in the pay-68 and bill-54.5 classes in VerbNet. VerbNet defines only three participant Roles in the billing-54.5 class: Agent, Asset, and Recipient. However, in our verbal semantic analysis, we also include Goods as a participant since billing requires the exchange of Money for Goods. FrameNet frames with pay and charge verbs include Commerce_pay and Commerce_collect.

4.12 Semantics of argument structure constructions with Commercial Transaction verbs

Similarly to Transfer of Possession verbs, Commercial Transaction verbs use various argument structure constructions that are metaphorically extended from the physical domain. In particular, the event of commercial transaction can be construed as a physical Constrain event in which only the Agent and the theme participant are overtly expressed (section 4.12.1). When the Possessor is part of the causal chain, the event may be construed as a metaphorical Place event with sell and pay verbs (sections 4.12.2) or a metaphorical Remove event with buy verbs (4.12.3). All Commercial Transaction verbs can also occur in

the double object Transfer construction (section 4.12.4); however, the indirect object which denotes the recipient is not the same person as the Agent with buy verbs. Similarly to taking verbs in the Transfer construction discussed in section 4.6.1, the indirect object denotes a beneficiary. We discuss our analysis of the Transfer argument structure construction with different Commercial Transaction verbs in section 4.12.4.

4.12.1 Metaphorical Constrain construal

Commercial Transaction verbs can occur in construals in which only the Agent and the Possession are overtly expressed (61). The Agent is expressed as the subject and the Possession as a direct object. The Possessor is not expressed as a syntactic argument. We analyze the semantics of examples in (61) as metaphorical Constrain, following our analysis of Transfer of Possession verbs in the transitive argument structure construction in which the direct object is the Possession (section 4.6.2). The Agent's selling results in their relinquishing of the Goods and buying results in the Agent's obtaining the Goods. With Pay verbs, the Agent relinquishes the Money. The event is metaphorically construed as a physical event of 'letting go' and 'picking up', respectively. In the physical source domain, events of letting go, dropping, or picking up are analyzed as describing Constrain causal chains in which an agent either loses or gains physical control over a physical object.

(61) a. He paid 500 pounds.

b. She bought a pumpkin for Halloween.

c. He sold all his merchandise.

In the absence of the Possessor in the constructional causal chain, the PERFORM relation is metaphorically construed as a physical FORCE relation, as shown in Figure 4.27. The causal chain depicts the semantics of the examples in (61c). The initiator of the causal chain is analyzed as a volitional (VOL) participant. The type of change that the endpoint of the FORCE relation undergoes in the event not specified in the constructional representation,

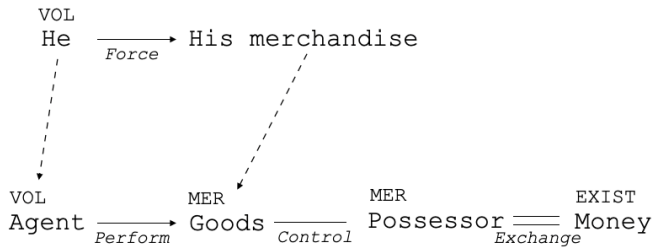

Figure 4.27: Metaphorical Constrain causal chain with Commercial Transaction verbs.

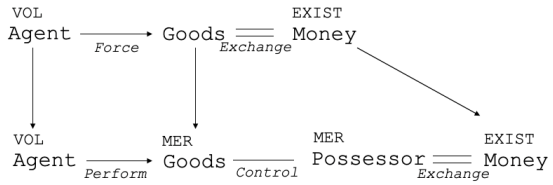

Figure 4.28: Metaphorical Constrain causal chain with Money.

which is motivated by our analysis of Constrain events in the source domain. Thus, the constructional causal chain does not distinguish whether the event describes relinquishing or obtaining.

Money may be overtly expressed in the Constrain construal, as shown in (62). In both examples, the participant expressed as a *for*-oblique refers to the sum of money that was exchanged in the event. In the example in (62a), a *few thousand dollars* describes the amount of money that one had to give to the seller in exchange for the seller to relinquish his *merchandise*. In (62b), the *$15* describes the amount of money that was needed for the agent to buy a *pumpkin*. The causal chain associated with the examples in (62) is shown in Figure 4.28. The EXCHANGE relation between the Goods and Money is subsequent to the constraining event.

(62) a. He sold all his merchandise for a few thousand dollars.

b. He bought a pumpkin for $15.

4.12.2 Metaphorical Place construal

Sell and pay verbs can occur in argument structure constructions in which the Possessor is expressed as a *to*-oblique (63). With sell verbs, the Possessor denotes the buyer who gains control over the sold Goods. With pay verbs, the Possessor denotes the seller who receives the Money. Similarly to our metaphorical analysis of giving verbs discussed in section 4.6.3, the Agent with sell and pay verbs is metaphorically construed as an external initiator of a physical co-location relation between the Goods and the Possessor. The Possessor is metaphorically construed as a ground in a PATH relation with a figure. The semantics of sell and pay verbs lend themselves to a Place construal because the event in the target domain identifies the Goods as a mereological theme and the relation between the Goods and the Possessor is non-causal, just like the PATH relation between the theme and the ground in the source domain.

(63) a. If you have to pay a fee to a travel agent, [...]. (COCA)

b. The city again attempts to sell the land to a private group. (COCA)

c. Julie had sold the car to him for $1,500. (COCA)

In the traditional commercial transactions scenario, purchased items may be physical objects. Prototypically, the purchased item undergoes physical motion when fit is transferred from the seller to the buyer. This physical aspect of the commercial transaction event can be considered to also motivate the use of the physical Place and Remove argument structure constructions with buy, sell, and pay verbs. We do not attempt to represent the physical aspect that accompanies many social events. In the case of commercial transaction verbs, the social aspect of the event in which the buyer gains control and the seller loses control over the purchased item is more relevant to the semantics of these verbs than the physical motion event. The physical aspect is secondary to the transfer event and is not always present in commercial transactions.

The causal chain that describes the semantics of the metaphorical Place argument struc-

ture construction for the examples in (63b) is the same as shown for Transfer of Possession verbs discussed in section 4.6.3 (Figure 4.12). The Goods are construed as a mereological (+MER) theme and the Possessor is construed as an endpoint of a physical PATH relation. The mapping of the Place causal chain to the Commercial Transaction event structure is shown in Figure 4.29.

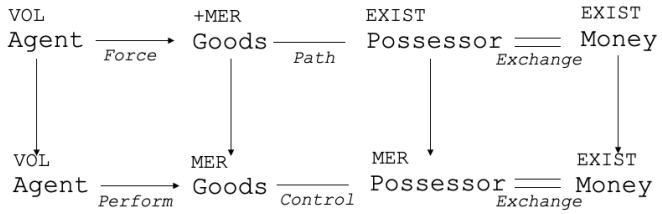

Figure 4.29: Metaphorical Place causal chain with Money.

An EXCHANGE relation can be part of the causal chain when Money is overtly expressed (63c). The causal chain for this example and its mapping to the Commercial Transaction event structure is shown in Figure 4.29. The causal chain includes an additional EXCHANGE relation at the end of the causal chain. Similarly to the EXCHANGE analysis in the Constrain construal, the EXCHANGE relation is subsequent to the core event which describes an event of metaphorical placing in (63c).

Similarly to the metaphorical analysis of argument structure constructions with Transfer of Possession verbs, the social PERFORM relation maps to the physical FORCE relation and the CONTROL relation maps to the PATH relation in the source domain. The EXCHANGE relation remains the same in both construals since it is not specific to any domain when it is construed as subsequent to the core event. The source domain causal chain for a physical domain examples such as *He loaded the hay on the truck for $20* would be exactly the same as the causal chain shown in Figure 4.29. The *for*-oblique would be identified as an endpoint of an EXCHANGE relation with physical domain verbs, as well.

Sell and pay verbs do not occur in a Provide construal in which the Possessor is syntactically realized as a direct object and the Goods as an oblique argument. This construal is common with giving verbs but does not extend to commercial transaction events in English.

4.12.3 Metaphorical Remove construal

Buy verbs can occur in a metaphorical Remove construal in which the Possessor is syntactically realized as a *from*-oblique (64). The motivations for the use of the Remove argument structure construction with Commercial Transaction verbs are the same as for the Place construal discussed in the previous section. The theme in the physical Remove construal undergoes mereological change, which matches the theme type with buy verbs. In buying events, the Agent causes that the Possession is metaphorically removed from the Possessor. For example, in (64a), the *knife* is metaphorically removed from *Diver Tech Supply*. Similarly to selling and paying events, physical motion of the Goods may take place when they are purchased.

(64) a. Witness says you purchased a knife from Diver Tech Supply. (COCA)

b. That said, I could buy a car from a private party with no ID at all. (COCA)

The semantic representation of metaphorical Remove construals with buy verbs is very similar to Place construals, as shown in Figure 4.30. The ordering of participants and the force-dynamic relations between them are the same. The only difference is that the Goods in the Remove causal chain are labeled as -MER since they are metaphorically removed from the Possessor.

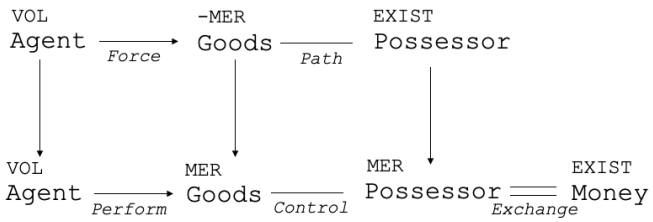

Figure 4.30: A Remove causal chain and its mapping to the Commercial Transaction event structure.

Remove verbs can also occur in argument structure constructions in which an EXCHANGE relation with Money is overtly expressed (e.g, *You purchased a knife from Diver Tech Supply*

for $20). The constructional analysis for such examples is analogous to the analysis for sell and pay verbs in the metaphorical Place construal.

Buy verbs do not occur in a Deprive construal in which the Possessor is syntactically realized as a direct object and the Goods as an oblique argument. Though this construal is common with taking verbs, it does not extend to Commercial Transaction verbs in English. The Goods are always construed as the mereological theme with buy verbs.

4.12.4 Transfer construal

Sell, pay, and charge verbs can occur in the double object Transfer construction in which both the Goods (or Money with pay verbs) and the Possessor are syntactically realized as direct objects (65). The semantic analysis of Commercial Transaction verbs is the same as our analysis of giving verbs in this argument structure construction (see section 4.6.1). Both the Possessor and the Goods are construed as mereological themes and the Agent as an initiator of the event, as shown in Figure 4.31.

(65) a. I sold him a car. (COCA)

b. He paid me 500 pounds.

c. He charged me 500 pounds for the table.

Figure 4.31 shows the mapping of the Transfer causal chain to the Commercial Transaction event structure. The participants in the causal chain map to the respective participants in the verbal event structure. Since the semantics of the Transfer argument structure con-

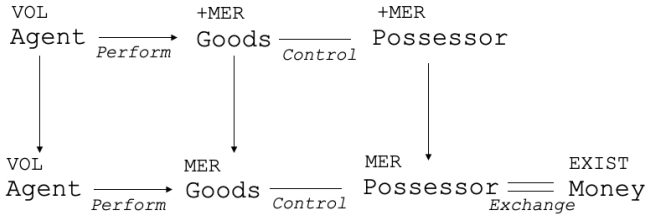

Figure 4.31: A Transfer causal chain with Commercial Transaction verbs.

struction originates in the social domain, the relations between participants in the constructional causal chain and the verbal event structure match.

(66) a. And [I] went to the mall, where I bought her some blouses. (COCA)

Similarly to taking verbs, buy verbs can also occur in the Transfer construal (66a). However, as noted for taking verbs, the direct object refers to a recipient rather than the original Possessor with buy verbs. The recipient is intended to own the Goods after the buyer purchases it from the original Possessor. Though the causal chain for buy verbs in the double object argument structure construction is the same as for pay and sell verbs, the mapping to the verbal event structure is different. As shown in Figure 4.32, the endpoint of the CONTROL relation in the constructional representation does not map to the Possessor in the verbal event structure.

As shown in Figure 4.32, which represents the semantics of the example in (66a), the recipient, *her*, is a distinct participant from the Possessor. The Possessor with buying verbs refers to the seller from whom the goods are bought. The recipient is the intended possessor of the purchased goods. Therefore, there is no link between her and the Possessor in the mapping. However, it is possible for the Possessor to also be expressed in the Transfer construal and thus included in the constructional causal chain.

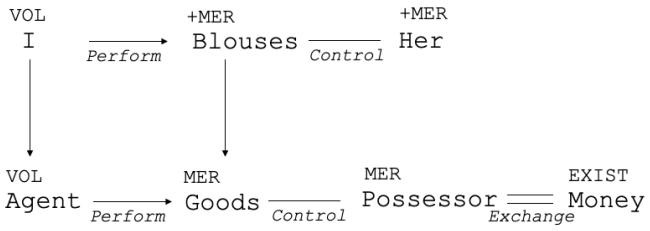

Figure 4.32: A Transfer causal chain with a beneficiary direct object.

A more complex causal chain representation is needed for examples in which the Possessor is syntactically expressed as an argument (e.g., *I bought her some blouses from the store*). As explained in section 4.6.1 with taking verbs, the constructional analysis must represent two distinct core events: a removal event in which the agent takes the merchandise from the seller

and a transfer event in which the agent gives the merchandise to the intended recipient. As shown in Figure 4.33, the semantic representation for the example *I bought her some blouses from the store* requires two distinct causal chains. The two events are temporally ordered: the metaphorical remove event temporally precedes the giving event. The *blouses* can only be given to someone after they have been purchased from the store.

Figure 4.33: A Transfer causal chain with an overtly expressed Possessor and a beneficiary.

In an even more complicated scenario, Money can also be overtly expressed in the argument structure construction (e.g., *I bought her blouses from the store for $20*). In such examples, the EXCHANGE relation is added to the metaphorical Remove causal chain, i.e., the EXCHANGE relation is subsequent to the removal event, as shown in Figure 4.34. The buyer giving the seller money allows the buyer to buy the *blouses*. The buying event temporally precedes the giving event which is depicted by the second (Transfer) causal chain.

Figure 4.34: A Transfer construal with an overtly expressed Possessor, Money, and a beneficiary.

4.12.5 Instrument as a subject

Buy verbs can occur in a construal in which the Money is expressed as a subject and the Goods as a direct object (67). The recipient may be syntactically omitted (67a) or realized as a direct object (67b). The recipient is commonly understood to be the buyer but this inference is evoked by the constructional semantics. If we consider a similar example with a build verb, such as *$100,000 builds you a house*, then it is clear that the indirect object (i.e., the future owner) is not the agent who does the building. Analogously, the indirect object with buy verbs is not necessarily the agent who does the buying. The indirect object in the

double object construction in (67b) refers to the intended recipient and therefore alternates with the benefactive *for*-oblique (67b) commonly used with other non-transfer verbs (as discussed in section 4.6.1).

Nonetheless, the agent who does the buying is implicitly part of the event structure since Money on its own cannot initiate a buying event. Money is used by the buyer in order for the transaction to take place. In this sense, Money is semantically similar to an instrument in that it enables an agent to perform an action. It is not surprising then that Money can also be expressed as the instrumental *with*-phrase in statements such as *He bought a ticket to the game with his last $5* or as a direct object with the verb *use* as in *He used his last $5 to buy a ticket to the game.*

(67) a. $5 bought a ticket to the game.

b. $5 bought me a ticket to the game.

c. $25 bought tickets to the game for the entire family.

The syntactic realization of instruments as subjects is quite common with certain classes of verbs such as verbs of force (*The stick hit the door*), change of state verbs (*The ball broke the window*), verbs of vehicular motion (*This bus goes to Denver*), or verbs of communication (*The letter stated that he was accepted*). Such examples show that instruments can be construed as initiators of causal chains in the absence of an overtly expressed agent. Therefore, we analyze Money in (67) as denoting an instrument used by an Agent who is not syntactically realized as an argument.

Figure 4.35 shows the Transfer causal chain for the example in (67b). The Agent and the

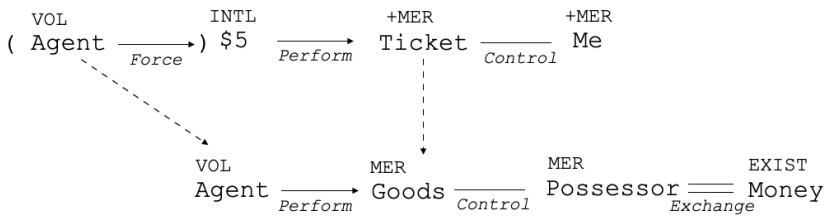

Figure 4.35: A Transfer construal in which Money is construed as the initiator.

FORCE relation, which represents the Agent's physical manipulation of Money, is not part of the causal chain; however, it is included in brackets to show that the Agent is antecedent to Money when Money is construed as an instrument. There is no EXCHANGE relation between the Money and the Goods in the causal chain. In fact, defining an EXCHANGE relation between these two participants is not possible since Money with buy verbs is causally subsequent to Goods in the verbal representation, and the ordering of participants in the causal chain is reversed. Money precedes Goods because it is syntactically realized as a subject and Goods as a direct object. Indeed, this evidence further supports a semantic analysis in which Money is construed as an enabling instrument, rather than an exchanged item in the constructional semantics.

This analysis diverges from VerbNet's analysis in which the participant expressed as a subject argument in *$5 bought a ticket* is analyzed as an Asset. VerbNet's analysis also analyzes participants expressed as *for*-obliques (e.g., *He bought the ticket for $5*) as Assets. As such, their analysis does not distinguish the instrument role from the money that is exchanged in the event.

In the example (67b), the instrument does in fact refer to the Money exchanged in the transaction; however, this linking is not constructionally evoked. In other examples with buy verbs, the instrument may refer to an entity that is distinct from the Money: *He used his political connections to buy the company's share for $500/His political connections got him a share in the company.* As such, there is not an established linking between the instrument participant in the causal chain and Money in the verbal event structure.

The participant *me* is analyzed as an endpoint of a CONTROL relation as they are construed as a recipient of a Transfer event. The recipient does not map to the Possessor in the event structure since the Possessor denotes the seller with buy verbs. Consequently, only Goods in the causal chain map to the underlying Commercial Transaction representation.

4.13 Conclusion

This chapter discusses the semantics of various types of verbs that describe events of possession, transfer of possession, or exchange. We distinguish the following verb types based on their event structures: Possession, Dynamic Possession, Transfer of Possession, Replace, Exchange, and Commercial Transaction verbs. Commercial Transaction verbs are further divided into buy/sell verbs and pay/charge verbs.

Other verbs in English can be used to describe events of transfer, particularly when they occur in the double object Transfer argument structure construction. These classes of verbs include sending verbs (e.g., *He sent me a book*), verbs of ballistic motion (e.g., *He kicked me a ball*), or carry verbs (e.g., *He brought me a cake*) (Beavers 2011). We do not discuss the semantics of these verbs in this chapter given that their underlying verbal event structure evokes events of physical causation, rather than social events.

Chapter 5: Communication verbs

5.1 Introduction

Verbs that describe speech events make up a large part of the verbal lexicon, and human interactions facilitated by language have been extensively addressed in philosophy as well as linguistics (Austin 1962, Searle 1969, Tsohatzidis 1994, Blume 1998, Urban Ruppenhofer 2001, Shi 2008, Viberg 2017). In philosophy, Communication verbs have been discussed with a particular emphasis on the meaning and structure of speech acts and their pragmatics. Speech act theory views communicative interactions as 'performative' acts which serve various social functions (Austin 1962). The act of speaking, such as making statements, promises, or asking questions has been analyzed as a rule-governed form of behavior (Searle 1969:16).

We do not address the performative function of communication verbs in great detail in our semantic analysis. In most cases, the social functions that these verbs can be used for do not directly inform our analysis, which focuses on the force-dynamic relations between participants that are obligatorily evoked by verbal semantics. With some verb classes, such as *pronounce* or *declare*, the communication event may result in a change of a social 'role' of one or more participants (Austin 1962). For example, in *He pronounced them man and wife*, two people come to be married following this formal statement. Our analysis of these verbs does not represent the social function associated with these verbs in English. In our analysis, the verb primarily evokes a communication event in which a speaker makes a

statement. Social functions are language specific, and our semantic representation aims to be cross-linguistically applicable.

There are numerous linguistic studies that focus on communication verbs; however, most of them take a narrow approach and only look at the semantics of a few verbs, such as *tell* or *say* (e.g., Cuyckens and Parret 1982) or a small class of verbs that are semantically very similar, such as manner and noise verbs (e.g., Urban and Ruppenhofer 2001). Occasionally, an argument structure construction that is used with a category of physical and social verbs, including communication verbs, such as the English dative alternation, may receive isolated attention (e.g., Rappaport Hovav and Levin 2008). Cross-linguistics studies of communication verbs have also been published (Shi 2008, Viberg 2017). Shi (2008) presents a contrastive study that looks at Chinese and English communication verbs and their semantic components. Viberg (2017) presents a corpus-based contrastive study on verbal communication verbs in English and Swedish.

A comprehensive semantic representation of communication verbs has not been presented in linguistics. Levin's (1993) verb classification provides one of the more comprehensive discussions of communication verbs in English. Levin divides communication verbs into distinct classes based on their semantic and syntactic properties; however, her account of verb classes is incomplete. She fails to include various types of communication verbs, such as *inquire* and *interrogate* verbs, *beg* verbs, *lecture* verbs, *spell* and *pronounce* verbs and others. Additionally, her description of communication verbs provides "an abbreviated treatment of some of the classes of verbs" (Levin 1993:202). One of the reasons for her abbreviated account of communication verbs is that they commonly occur with sentential complements. Including argument structure constructions with sentential complements was outside of the scope of Levin's book. Our discussion of the syntactic behavior associated with communication verbs includes argument structure constructions with sentential complements; however, the semantics of sentential complements is not decomposed into semantic primitives, unlike the semantics of main clauses. Online resources such as FrameNet and VerbNet provide

considerably broader coverage of communication verbs.

Communication verbs describe events in which an agent produces a signal which represents a meaningful conceptual unit. The production of the signal may be spoken, signed, or gestured. Many communication verbs highlight a social communicative function of speech while other verbs focus on the creation of the utterance itself. There are four main types of communication verbs that we distinguish based on their distinct event structures: Statement verbs (5.4), Communicate verbs (5.5), Joint Statement verbs (5.7), and Request verbs (5.9). These verb types focus on different aspects of communication events, and their distinct verbal event structures reflect these semantic differences. We also define a Response verb type for verbs such as *reply* or *answer*. The event structure evoked by Response verbs is not specific to the Communication domain.

All communication verbs share a common sequence of causal relations in their event structure representations. This shared sequence consists of three event participants: SPEAKER, SIGNAL, and MESSAGE, as shown in Figure 5.1. The Speaker, a volitionally acting agent, produces a Signal which is decoded as a contentful utterance, i.e. "Message". The relation between the Speaker and Signal is defined as physical FORCE since the creation of the Signal takes place in the physical domain. The Signal is a design theme in the event structure. The Signal is decoded as a contentful unit by way of there being a symbolic relation between it and the Message. This is represented as a RELATE relation which is used to define an asymmetric conceptual relation between two entities in the social domain. The Speaker's production of the Signal is tied to the intentional creation of the Message. Hence, the Message is also identified as a design theme in the verbal event structures of communication verbs.

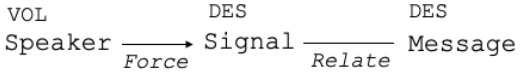

Figure 5.1: A shared causal sequence in communication event structures

5.2 Message vs. Topic

Communication verbs frequently occur in argument structure constructions in which the communicated statement (i.e., Message) or the subject matter (i.e., Topic) are overtly expressed as arguments, see examples in (68) and (69). VerbNet does not distinguish Message from Topic in their semantic analysis of communication events. Specifically, VerbNet uses a single "Topic" Role for Message and Topic. FrameNet distinguishes Message and Topic as having different semantic functions in the description of the event. In most frames with communication verbs, FrameNet defines a Message FE and a Topic FE.

(68) a. Heather cabled **the news**. (VerbNet)

b. John suggested **eye glasses** to her. (VerbNet)

c. They confessed **their stealing**. (VerbNet)

d. John declared **how to do it**. (VerbNet)

e. Susan complained **that the party would be tonight**. (VerbNet)

f. Ellen warned, **'Avoid that hole in the sidewalk'**. (VerbNet)

We analyze Message as semantically distinct from Topic, following FrameNet's analysis. Message decodes the Signal as a meaningful utterance to be conveyed to the Addressee. Topic, on the other hand, describes the subject matter of what is communicated. It provides a short conceptual summary that places the Message within a broader context. Message and Topic differ in how they are syntactically realized in argument structure constructions in English.

Message may be syntactically realized as a direct object (68a-68c), complement clause (68d, 68e), or a direct speech clause (68f). With some verbs, e.g., *suggest*, the direct object may refer to a subevent of the Addressee. For example in (68b), *eye glasses* stands for the suggested subevent that the Addressee '*use/buy eye glasses*'. Less frequently, Message may also be syntactically realized as a *for*-Obl: *[...] he argued for the cut-off in American aid to*

Pakistan (FrameNet). The use of the preposition *for* in this example reveals the Speaker's positive attitude towards the proposition. English uses the preposition *against* to signal a negative attitude toward a proposition (e.g., *Ellen argued against the cut-off in American aid*).

In contrast, Topic is usually syntactically expressed as an *about*-phrase (69a), though other prepositions (e.g., *of, regarding* or *over*) may also be used (69b-69d):

(69) a. Someone called **about this the other day**. (FrameNet)

b. Several readers have already contacted me **regarding foul play and the role of the touch-judge**. (FrameNet)

c. Morland [...] openly boasted **of his skill as a forger**. (FrameNet)

d. John Stewart laments **over the quality of programs[...]**. (FrameNet)

Topic and Message do not commonly co-occur in the same argument structure construction; however, they are not mutually exclusive. When expressed together, Topic may be used to specify what the Message pertains to (e.g., *She told him the news about the president*). There appears to be a tendency for Topic to be expressed when Message is contextually underspecified. For example, the news in this example would not be very informative as a Message if the Topic wasn't also included in the utterance.

It has been argued that communication verbs are pragmatically different in terms of what aspect of the speech event they perspectivize (Dirven et al. 1982). Some verbs, such as *tell* and *say*, perspectivize the Message (in which case Topic is not in focus and is not likely to be expressed), while other verbs, such as *speak* and *talk*, perspectivize the Topic. *Talk* verbs denote the linguistic action in its entirety and usually refer to a larger amount of verbal output (Dirven 1982:39). As such, *talk* verbs tend to occur with Topic rather than Message. *Speak* is semantically and syntactically very similar to *talk*.[1]

[1]FrameNet does not distinguish between the semantics of *tell, say, speak, and talk.* These verbs all belong to the Statement frame. VerbNet's analysis distinguishes between these verbs by classifying them into different verb classes given their distinct syntactic behavior.

Topic and Message also differ in their syntactic 'obligatoriness'. Topic is not obligatorily expressed in the syntax with communication verbs, whether they pragmatically perspectivize it or not (e.g., *She talked/She talked about it*). Message, on the other hand, is syntactically obligatory with many communication verbs that perspectivize it, such as *say* (**She said*).

We analyze Topic as a circumstantial phrase that situates the communication event in a conceptual domain. As such, Topic is not included as a participant in causal chain representations. The use of Topic as a circumstantial phrase is not limited to the communication domain. It can be used to situate other social actions, such as interpersonal interactions, in a conceptual domain. For example, Topic can be used to set the background for an action of fighting or battling (e.g., *They battled about it* or *They fought about/over it*).

Additionally, the semantics of intransitive argument structure constructions with verbs that perspectivize Topic (e.g., *talk, speak*) strongly point to an event in which the Speaker is engaged in a non-causal one-participant ("internal") event, rather than an event of creation. *Talk* verbs are frequently used to describe an extensive linguistic action (70a). They can also be used to describe various aspects of a linguistic action, such as the physical aspect of speech production (70b), psychological action (70c), or cognitive action (70d) (Dirven 1982:43-47).

(70) a. She is out there talking in the dark.

b. Don't talk with your mouth full.

c. I breathe, I walk, I talk, I smile, I think.

d. Babies walk and begin to talk about one year old.

In (70b), the event focuses on the movement of one's mouth while talking, rather than the creation of a Message. In (70c), the ability to speak, expressed with *talk*, occurs alongside with verbs such as *breathe*, a verb of substance emission, *walk*, an internal motion verb, *smile*, a gesture verb, and *think*, a cognition verb, all construed as describing internal events. Lastly, in (70d), *talk* describes a cognitive ability which is construed as an internal action.

The semantics of intransitive argument structure constructions with verbs such as *talk* strongly point to an analysis in which the production of speech is construed as an internal action, rather than an event in which a Message is created. Whether Topic is overtly expressed or not with verbs such as *talk* does not affect this construal. We

5.3 Instruments in Communication events

A medium, which denotes an instrument participant, may be used to describe objects by which a Signal is transmitted, such as a telephone, TV, or a computer. We do not include a medium as a participant in our verbal event structures with communication verbs because it is not obligatorily evoked by verbal semantics. Communication verbs obligatorily evoke the use of a body part, i.e. vocal cords or hand movements; however, a Medium has a different role in the event structure when compared to a body part instrument. Body part instruments are generally antecedent to the theme in the event structure. For example, vocal cords in communication events causally precede the Signal. A Medium, on the other hand, is causally subsequent to the Signal (and Message) in the event structure. The Signal is produced first before it is transferred to an Addressee via a Medium.[2]

When an Addressee is not overtly expressed, the Medium tends to be syntactically realized as a subsequent oblique (71a), rather than an antecedent oblique (71b). This syntactic realization of a Medium is different from a body part instrument, which is expressed as an antecedent *with*-oblique with communication verbs (71c). When an Addressee is part of the causal chain, a Medium may be expressed as either an antecedent or subsequent oblique (71d). The syntactic realization of the Medium as an antecedent oblique when the Addressee is overtly expressed is largely determined lexically. For example, *warn* can occur with either an antecedent or subsequent oblique, while *complain* only occurs with a subsequent oblique (71e). The syntactic realization of a Medium does not affect its antecedent position to the

[2]We do not include a body part instrument as a participant in the verbal event structure representations with Communication verbs. Instruments are included in verbal representations only if they introduce cyclicity to the verbal event structure (see Kalm et al. 2019). Instruments are included in constructional causal chains if they are overtly expressed in the syntax.

Addressee in the casual chain.

(71) a. Susan said a few words on the phone.

b. *Susan said a few words by phone.

c. Susan gestured with her right hand.

d. Ellen warned me about it by phone/on the phone.

e. Susan complained to her ?by phone/on the phone.

5.4 Statement verbs

Statement verbs describe an aspect of communication that highlights the production of a Signal and the Message associated with it. Statement verbs are similar to sound emission verbs in the physical domain in that the Signal can be equated to an emitted sound which is created by an emitting entity (e.g., *The door hinges squeaked*). However, unlike physical sound emission events, the emitted sound in communication events is intended to represent a meaningful utterance. Statement verbs do not evoke an Addressee in the event structure (72a and 72b), though an Addressee may be constructionally added (72c and 72d).

(72) a. They confessed it. (VerbNet)

b. Susan talked. (VerbNet)

c. He suggested it to her. (VerbNet)

d. Susan whispered to Rachel. (VerbNet)

Statement verbs describe the simplest event structure of all communication verbs. Figure 5.2 shows the Statement event structure, which is identical to the sequence of causal relations shared by all communication verbs, as discussed in section 6.1. The Speaker uses physical FORCE to generate a Signal which represents a meaningful Message.

The Speaker is usually realized as the subject and semantically functions as an initiator of the causal chain. The Signal can be expressed as a direct object (e.g., *She said a few words*)

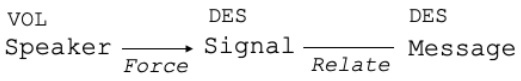

Figure 5.2: Statement event structure

or may be construed as an instrument-like participant and realized as an antecedent oblique in argument structure constructions with an overtly expressed Message (e.g., *She said it all with a smile*). However, the Signal is not commonly expressed in the syntax. Statement verbs, and Communication verbs in general, more frequently occur with an overtly specified Message, which is expressed as a direct object or a complement clause.

Some Statement verbs (e.g., *lecture, talk*) do not occur in transitive argument structure constructions. The semantics of these verbs focuses on the Speaker's activity of talking rather than the creation of a Signal or Message. Our analysis of these verbs does not distinguish their verbal event structure from other Statement verbs because this syntactic behavior is primarily motivated by English having a number of distinct lexical items for various semantically distinct communication events, such as *speak, talk, say,* and *tell*. It is not our aim for verbs in the same semantic verb type to share the same syntactic patterns. Verbal event structures are constructed based on shared semantics.[3]

An Addressee may be constructionally added to the causal chain as a subsequent *to*-oblique (73). Argument structure constructions with an Addressee most commonly signal joint actions in which both Speaker and Addressee engage in discourse. However, unlike examples in which the Addressee is expressed as a comitative *with*-phrase (e.g., *talk with someone*), the asymmetric *to*-construal does not necessarily imply joint cooperative action. The following examples show the use of the *to*-phrase when an Addressee is not the intended receiver of the communicative action (73a), is a doubtful receiver (73b), or a mere 'receptor' (73c, 73d) (Dirven 1982:50-53).

[3]Whether it is common for languages to have Statement verbs that do not perspectivize Message would have to be investigated further. If it is cross-linguistically common, it might be better to have a separate verbal event structure for these verbs that does not include Message as an obligatory participant.

(73) a. I am not talking to you, Flynn.

b. Are you talking to me?

c. I tried talking to him but he never said a word.

d. You're the only person I can talk to, and even you never answer me. (examples are from Dirven 1982)

Importantly, certain Statement verbs, such as *speak*, never imply an active engagement of the Addressee in the communication event. For example, in *He spoke to the crowd*, it is understood that the Addressee is not involved in the discourse as a Speaker, only as a listener. The communicative action is clearly asymmetric in that only the Speaker is communicating a Message to the Addressee, not vice versa.

Consequently, we do not analyze the relation between the Speaker and Addressee as MUTUAL when the Addressee is overtly expressed as a *to*-oblique, despite the possibility of a joint action interpretation. Instead, we analyze the semantics of the argument structure construction as metaphorically extended from the physical mereological domain (see section 5.6.4). A symmetric MUTUAL relation between two interlocutors is signaled by the *with*-phrase (e.g., *She talked with him*). A Collective construal is also possible with Statement verbs when the Speaker and Addressee are symmetrically engaged and syntactically realized as a plural subject (e.g., *They/Susan and Mary talked*). For a more detailed discussion of symmetric communication events, see section 5.7.

Different Statement verbs allow different types of Messages to be syntactically realized as direct objects, as shown in examples in (74). For example, the verb *state* in (74a) can occur with the direct object *problem* but this is not the case for the verb *say* in (74c). Interestingly, both verbs can occur with the direct object *truth*. This semantic incompatibility doesn't appear to play a role when the Message is expressed as a complement clause (74b, 74d).

(74) a. She stated the problem/the truth.

b. She stated what the problem/the truth was.

c. She said *the problem/the truth.

d. She said what the problem/the truth was.

We are not aware of any corpus studies investigating the effect of lexical semantics on the type of Message expressed as a direct object. Such a study is outside of the scope of this project and we do not further address this phenomenon here.

VerbNet classes that contain Statement verbs include: characterize-29.2, complain-37.8, confess-37.10, declare-29.4, lecture-37.11, talk-37.2, overstate-37.12, pronounce-29.3.1, curtsey-40.3, reflexive_appearance-48.1.2, say-37.7, manner_speaking-37.3, and transfer_mesg-37.1.1. Curtsey-40.3 and pronounce-29.3.1 verbs are semantically somewhat different from other Statement verbs and are discussed separately in section 5.4.1 and 5.4.2.

FrameNet frames that include Statement verbs as Lexical Units include: Statement, Communication, Spelling_and_pronouncing, Complaining, Reveal_secret, Communication_noise, and Communication_manner.

5.4.1 Curtsey verbs

Curtsey verbs (e.g., *salute, genuflect, bow*) describe non-verbal communication events in which an Agent uses a conventionalized gesture that is interpreted as a meaningful social act. For example, the action of saluting conveys a greeting. Genuflecting is a gesture that conveys respect for another person. Commonly, these verbs occur in intransitive argument structure constructions (75a). In such cases, the gesture is interpreted as conveying the meaningful act that it serves to represent. Curtsey verbs can also be used to signal communicative events in which a more contentful Message, rather than just a conventionalized gesture, is intended to be conveyed (75b). The Addressee may or may not be overtly expressed.

(75) a. The princess curtseyed. (VerbNet)

b. The princess curtseyed her assent (to the queen). (VerbNet)

Curtsey verbs occur in the same syntactic construals as other Statement verbs, which we

cover in section 5.6. Consequently, our analysis of the event structure of curtsey verbs doesn't distinguish them from other Statement verbs. This analysis is also compatible with VerbNet which analyzes the intransitive frame in (75a) as a transfer of information event. VerbNet's semantic description of the example in (75a) is identical to their analysis of intransitive syntactic frames with other Statement verbs, such as *say* or *speak*.

5.4.2 Pronounce verbs

Pronounce verbs (e.g., *pronounce, spell*) describe an event of sounding a word or creating a gesture. These verbs always occur with a direct object (76). This syntactic behavior distinguishes them from other Statement verbs which don't require a direct object and commonly occur in intransitive construals (e.g., *She spoke/talked,* etc.). However, pronounce verbs are semantically similar to other Statement verbs in that they describe an event structure in which a Speaker produces a Signal that represents a meaningful utterance.

(76) a. You spelled 'Kalamazoo' incorrectly. (VerbNet)

b. She pronounced it 'con-TROV-er-sy'. (VerbNet)

c. She spelled it to us.

In the syntactic frames in VerbNet, pronounce verbs can occur with an overtly specified 'Attribute,' which refers to the pronunciation of a word. However, in our analysis, the Attribute Role is not evoked by the verbal semantics; it is constructionally added. Other Statement verbs (e.g., *say*) can also be used to describe pronounce events if an Attribute is overtly expressed, e.g., *He said it incorrectly* or *He said it as 'con-TROV-er-sy.* Like other Statement verbs, pronounce verbs can occur in argument structure constructions with an Addressee (76c). In such an example, the spelled word is construed as a Message intended to be communicated to an Addressee.

Similarly to our analysis of argument structure constructions with pronounce verbs, VerbNet describes the semantics of examples in (76a) and (76b) using the predicate CHARACTER-

IZE. VerbNet analyzes these examples as events in which the Agent CAUSES a CHARACTER-IZE relation between a Theme and an Attribute.[4] Our causal analysis of the example in (76b) also treats '*con-TROV-er-sy'* as an Attribute of the participant expressed as a direct object. We define an ENGAGE relation between *it* and *controversy*. Our analysis of the example in (76a) doesn't include '*incorrectly*' in the causal chain representation as it is grammatically expressed as an adverb rather than a nominal. We do not include adverbs in causal chains.

Our constructional analysis of pronounce examples is thus compatible with VerbNet's analysis. However, our verbal event structure representation deviates from VerbNet since we don't include the Attribute as a participant.

5.5 Communicate verbs

Communicate verbs describe events in which a Speaker creates a Signal with the intention of conveying a Message to an Addressee (77). Communicate verbs are different from Statement verbs in that the Addressee is obligatorily evoked in the event structure. As a result, the Addressee can be expressed as a direct object in argument structure constructions with Communicate verbs (77a-77c).

(77) a. Heather cabled Sara the news. (VerbNet)

b. I promised him that he would arrive in time. (VerbNet)

c. John informed me of the situation. (VerbNet)

d. I promised to him that he would arrive in time. (VerbNet)

The event structure evoked by Communicate verbs is shown in Figure 5.3. The Message is analyzed as undergoing two different types of changes: a design (DES) change and a

[4]This analysis was recently changed to the predicates TRANSFER_INFO(e1, Agent, Theme, Recipient) and MANNER(e1, Manner, Agent), which describe an event of information transfer. VerbNet's new analysis of examples in this class is not compatible with ours in that their event structure representation includes a Recipient. However, in their list of Roles, a Recipient is not included. We do not analyze a Recipient as evoked by the semantics of pronounce verbs. If the pronunciation of a word is analyzed as describing the manner in which the word was said, the causal chain would not include the pronunciation as an Attribute since we do not represent manner in our force-dynamic analysis.

mereological (MER) change. It is analyzed as a design theme that is created along with the Signal, and it is also a mereological theme in the intended communicative event in which the Speaker communicates a Message to an Addressee. The Message is identified as a mereological theme with Communicate verbs because its conveyance to an Addressee happens one sound/word at a time. The relation between a Message and an Addressee is analyzed as mental AFFECT. Hearing a Message affects the mental state of an Addressee who undergoes a change of state in the event. The Addressee is therefore identified as a property (PROP) theme.

The communicative event may have an intended Addressee who does not hear the Message. This information can be inferred from context, rather than from the verbal or constructional semantics. For example, in (77a), it is not clear whether *Sara* heard the *news* or not. Our causal analysis of verbal and constructional semantics does not attempt to represent whether the communicative event was successful or not given that this does not impact the syntactic realization of participants in English.

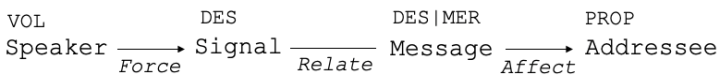

Figure 5.3: Communicate event structure

Communicate verbs occur in the following VerbNet classes: advise-37.9, promise-37.13, tell-37.2, initiate_communication-37.4, instr_communication-37.4.1, interrogate-37.1.3, and inquire-37.1.2. We discuss inquire and interrogate verbs in more detail in section 5.5.1. Advise and promise verbs are discussed in sections 5.5.2 and 5.5.3, respectively.

FrameNet frames that include Communicate verbs as Lexical Units include: Telling, Speak_On_Topic, Prevarication, Communication_means, and Commitment.

5.5.1 Inquire and interrogate verbs

Inquire and interrogate verbs obligatorily evoke an Addressee in their verbal event structure. Unlike an Addressee with other Communicate verbs (e.g., *tell* or *warn*), the Addressee with

verbs of questioning is expected to reply to the Message they hear. As such, inquire verbs are semantically similar to Request verbs (e.g., *urge, beg*) in that they describe an action in which the Speaker asks the Addressee to do something, i.e. to answer. However, they are different from Request verbs syntactically. Neither interrogate nor inquire verbs occur in argument structure constructions in which the subevent of the Addressee (i.e. the requested action) is overtly expressed (e.g., **She interrogated him to answer*). This is different from Request verbs which can express the Addressee's subevent in the syntax (e.g., *She urged him to come*). We analyze the Addressee with interrogate and inquire verbs as an endpoint of a Communicate event rather than an endpoint of inducive causation in a Request event.

Inquire and interrogate verbs are not 'request for action' verbs in our analysis. The inference that the Addressee is expected to reply is supplied by lexical semantics. We analyze the content of the Signal with inquire verbs as a Message that is conveyed to an Addressee. The Message with inquire verbs may be realized as a direct object (78a) or a complement clause (78b). Inquire verbs also occur in argument structure constructions in which the Addressee is not expressed as a direct object but can be inferred contextually or from the Message. For example, in (78c) the subject of the complement clause may be understood to be the intended Addressee.[5]

(78) a. They asked him a question. (VerbNet)

b. They asked him what to do. (VerbNet)

c. They inquired if he went to the store. (VerbNet)

Interrogate verbs do not occur in argument structure constructions with a Message. They are semantically different from Communicate verbs in this respect. The action of interrogating perspectivizes larger amounts of output, similarly to some Statement verbs

[5]As mentioned above, we do not decompose the semantics of complement clauses into force-dynamic primitives. Complement clauses are treated as describing the Message. One reason for not decomposing complement clauses is that our semantic analysis of argument structure constructions is not supplemented with contextual information and making a judgment about the identity of the subject of the complement clause in (78c) is not possible without context. However, in principle, the same force-dynamic analysis could be used to represent the semantics of complement clauses.

such as *talk*. As such, interrogate verbs can occur either with a Topic, which is analyzed as a circumstantial phrase (e.g., *They questioned him about the accident*) or in an argument structure construction in which only the Speaker and Addressee are expressed (e.g., *They questioned him*).

(79) a. Vyslýchali ho.
Interrogated he.ACC
'They interrogated him.'

b. Řekl mu to.
Told he.DAT that
'He told him that.'

In some languages such as Czech the Addressee in the transitive argument structure construction with interrogate and inquire verbs is marked ACCUSATIVE (79a) as opposed to the prototypical transitive construction with Communicate verbs in which the Addressee is marked DATIVE (79b). It is likely that the accusative construal in Czech is motivated by the Addressee being an endpoint of an AFFECT relation in the Communicate event structure. This evidence poses a question as to whether the transitive argument structure construction with inquire and interrogate verbs should be treated as semantically different from the transitive construction with Communicate verbs, particularly in languages such as Czech. As for English, we have concluded that there is no syntactic evidence for having two separate analyses for the transitive construction with communication verbs.

Although VerbNet has two distinct classes for interrogate and inquire verbs, FrameNet does not distinguish these verbs from each other. There is a single Questioning frame for both verbs in FrameNet. This is largely because their semantics are so similar and FrameNet's verb classification is not strictly based on syntactic patterns.

5.5.2 Advise verbs

Advise verbs share the same verbal event structure as Communicate verbs though the Speaker's intention for speaking is to advise the Addressee to do something rather than

to just transfer a Message. Consequently, advise verbs frequently occur in inducive construals in which the advised action is expressed as a subevent of the Addressee (80a). Other Communicate verbs can also occur in inducive construals, as discussed in section 5.6.6. Like other Communicate verbs, advise verbs can be construed as describing an event in which a Message is conveyed to an Addressee. In such construals, the Addressee's subevent is expressed as a complement clause (80b).

(80) a. He advised him (not) to skate on thin ice. (VerbNet)

b. Earl warned Helen that the party would be tonight. (VerbNet)

c. Earl warned Helen against skating on thin ice. (VerbNet)

Advise verbs can also occur in constructions in which the subevent of the Addressee is expressed as an *against*-phrase (80c). The constructional semantics describes an inducive event and the preposition *against* signals that the Addressee is advised not to engage in an action. This syntactic behavior is specific to advise verbs; other Communicate verbs do not occur in this construal and generally only allow the use of an infinitival clause to express the Addressee's subevent in inducive argument structure constructions.

5.5.3 Promise verbs

Promise verbs describe a speech act in which the Speaker expresses either their own commitment to a future event (81a) or a desired future event that the Speaker wants the Addressee to engage in (81b) (cf. Farkas 1988). The Speaker may also commit a third party to a future event (81c). In all of these cases, the future event may be syntactically realized as a complement clause. We do not distinguish the semantics of these argument structure constructions considering that we do not decompose causal relations in complement clauses.

(81) a. I promised him that I would come. (VerbNet)

b. I promised him that he would arrive in time. (VerbNet)

c. I promised him that Helen would arrive in time. (VerbNet)

d. I promised him the house. (VerbNet)

e. I promised him to arrive on time. (VerbNet)

We analyze the complement clauses in (81a-81c) as a Message, which is consistent with our analysis of complement clauses with other communication verbs. Many Communicate verbs can be used to describe promise events in argument structure constructions with complement clauses (e.g., *I told him that I would come*). The inference that the event describes a promise comes from the semantics of the complement clause rather than the argument structure construction. The [SBJ V OBJ COMP] argument structure construction is also used to describe communication events in which a Speaker transfers information to an Addressee (e.g., *I told him that she arrived*). We do not distinguish semantics of argument structure constructions with complement clauses in the communication domain. Complement clauses are analyzed as describing a Message with different types of verbs.

It is also possible to express the future event as a direct object (81d). The direct object always refers to the Addressee's subevent. For example, the *house* in (81d) describes the future event of the Addressee, i.e. him getting the house. The example could be paraphrased as *I promised him that he would get the house.* The semantic analysis of the double object argument structure construction in (81d) follows our analysis of other Communicate verbs in this construction (see section 5.6.5).

The future event can also be syntactically realized as an infinitival clause (81e) which always describes the Speaker's commitment to a future event, not the Addressee's. We analyze the infinitival clause as a Message, similarly to the complement clause. It describes the content of the Signal. However, the analysis of the infinitival clause as denoting a Message does not carry over to argument structure constructions with other Communicate verbs (e.g., *She told him to arrive on time*). With Communicate verbs such as *tell*, the infinitival clause always refers to the Addressee's subevent. The constructional semantics of the infinitival clause with tell verbs describes an event of inducive causation.

The Addressee can be syntactically omitted with promise verbs (e.g., *I promised to arrive*

on time). In such examples, the constructional causal chain does not include an Addressee. The causal chain for this example describes a relation between a Speaker and Message; the Speaker generates an utterance which describes their commitment to an event. The semantics of this causal chain is discussed in section 5.6.2. Our analysis of this example is consistent with our treatment of examples with infinitival clauses in which an Addressee is overtly expressed.

5.6 Semantics of argument structure constructions with Statement and Communicate verbs

The syntactic realization of participants with Statement and Communicate verbs is very similar. We discuss the semantics of argument structure constructions associated with these verb types in the same section even though their syntactic behavior does not fully overlap. Statement verbs more commonly occur in intransitive argument structure constructions which construe the communication event as an internal activity that the Speaker engages in (section 5.6.1). This construal is much less common with Communicate verbs which include an Addressee in their verbal event structure and tend to occur in argument structure constructions in which the Addressee is syntactically expressed. Communicate verbs can construe the communicative action as a metaphorical Change of State event when Message is not overtly expressed and the Addressee is expressed as a direct object (section 5.6.4) or a Transfer event when both the Addressee and the Message are expressed as direct objects (section 5.6.5). Neither one of these construals is used with Statement verbs, which always occur with an Addressee expressed as an oblique argument.

When Signal or Message are overtly expressed, the communication event may be metaphorically construed as a physical creation event (section 5.6.2) with both types of verbs. Statement and Communicate verbs also use a metaphorical Place [SBJ V OBJ *to*-OBL] argument structure construction to describe the conveyance of a Message to an Addressee (section 5.6.3). Other construals that are found with Statement and Communicate verbs are discussed in section 5.6.6.

5.6.1 Internal construal

Intransitive [SBJ V] argument structure constructions with communication verbs are analyzed as Internal events. Examples of this construal are provided in (82). The Internal construal is primarily characteristic of Statement verbs since their semantics does not focus on the conveyance of a Message to an Addressee, given that an Addressee is not obligatorily evoked in the event structure. As such, these verbs are more likely to occur in an intransitive argument structure construction without overtly expressing the Message or constructionally adding an Addressee. In the examples in (82), the constructional semantics focuses on the Speaker and their engagement in a speech event. As such, the causal chain associated with these examples is 'non-relational' in that it consists only of the Speaker who is the sole participant in the event.

(82) a. She lectured. (VerbNet)

b. Susan whispered. (VerbNet)

c. Susan complained. (VerbNet)

As shown in Figure 5.4, only the Speaker is specified as a participant in the Internal causal chain. There is no mapping from the Signal or Message to the causal chain representation. The Speaker is analyzed as a volitional VOL initiator and an internal INTL theme.

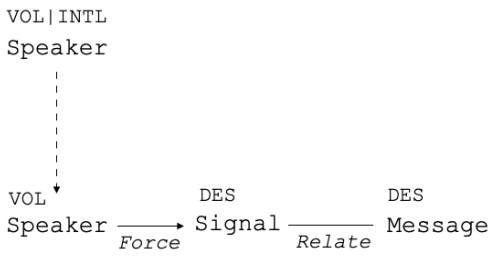

Figure 5.4: Mapping of an Internal causal chain to the Statement event structure.

5.6.2 Metaphorical Create construal

Statement and Communicate verbs can occur in transitive argument structure constructions in which the direct object describes either a Signal or a Message. In (83), the direct objects denote a Message. The constructional semantics describes a relation between a Speaker and a Message. We analyze these examples as metaphorical creation events extended from the physical domain. The Speaker metaphorically uses physical FORCE to create a Message. When the direct object denotes the Signal, the creation event is not metaphorical; the FORCE relation between the Speaker and Signal takes place in the physical domain.

(83) a. Heather cabled the news. (VerbNet)

b. John declared how to do it. (VerbNet)

c. John suggested that he should go. (VerbNet)

The causal chain associated with the example in (83a) and its mapping to the Communicate event structure is shown in Figure 5.5. The event evoked by the argument structure construction focuses on the creation of the Message and the theme is therefore construed as a design theme rather than a mereological theme. The theme participant, *news*, in the causal chain representation maps to the Message in the verbal representation. The FORCE relation between *Heather* and *news* is metaphorically extended from the physical source domain causal chain.

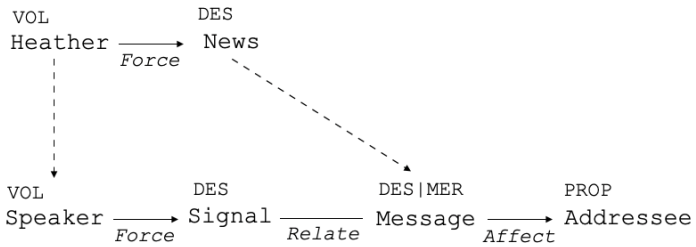

Figure 5.5: Metaphorical Create causal chain with Communication verbs

The creation theme in the social (target) domain has varied syntactic realizations when compared to the theme in the physical (source) domain. A Message may be expressed as

a complement clause (83b, 83c) or a direct speech complement. Regardless of the syntactic realization of the Message, the argument structure construction is analyzed as a metaphorical Create event. It is expected that the realization of a Message deviates from the source domain when the Message refers to a participant's subevent rather than the participant himself.

5.6.3 Metaphorical Place construal

Statement and Communicate verbs can occur in a metaphorical causative Place [SBJ V OBJ *to*-OBL] construal when the Addressee is overtly expressed (84). In the physical domain, the causative Place construction describes an event in which an external initiator causes an object, i.e., figure, to undergo a mereologically incremental motion towards another object, i.e., ground. The metaphorical extension of this argument structure construction to the communication domain is motivated by the Message being conceptualized as a mereologically incremental theme when it is transferred to an Addressee. The Message is metaphorically understood to 'reach' the Addressee which is analogous to the physical Place event in which the figure comes to be spatially co-located with the ground.

(84) a. I presented a solution to him. (VerbNet)

b. Susan whispered to Rachel how to avoid the crowd.(VerbNet)

c. I explained the matter to them. (VerbNet)

The connection between metaphorical motion in the communication domain and the physical source domain has been recognized by other scholars (Beavers 2011). In his short discussion of communication events, Beavers (2011:7) states that "direct objects [with communication verbs] are like paths of traversal of the subject (i.e., *John read the story to Mary* involves John traversing the story end to end in a manner similar to *John walked the plank*)." His analogy is different from ours in that his analysis involves comparing a holistically incremental motion associated with physical motion verbs to a mereologically incremental change associated with the transfer of a Message to an Addressee. In our analysis, traversing a story end to end presupposes a mereologically incremental event: the story is read one

word/paragraph/page at a time, while John walking the plank is a holistically incremental event in which John moves as a whole along a path. We therefore argue that the extension of the [SBJ V OBJ *to*-OBL] construction to the communication domain involves a metaphorical mereological event, rather than a holistically incremental motion event.

The causal chain associated with the metaphorical Place argument structure construction and its mapping to the Statement event structure is shown in Figure 5.6. The target domain causal chain is identical to the source domain causal chain. In the source domain, the initiator applies physical FORCE which causes the theme to move along a PATH towards the ground. The initiator of the causal chain maps to the Speaker and the endpoint of FORCE maps to the Message (or Signal) in the verbal event structure. With Statement verbs, the Addressee is constructionally added and does not map to any participant in the verbal event structure. With Communicate verbs, the endpoint of PATH maps to the Addressee in the verbal representation.

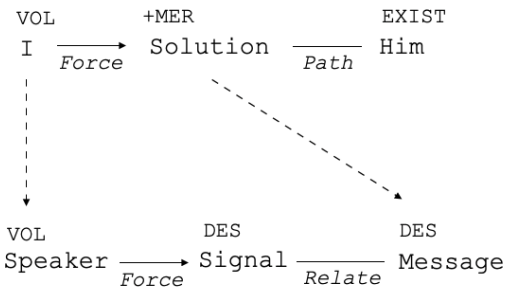

Figure 5.6: Metaphorical Place causal chain with Statement verbs

5.6.4 Metaphorical Change of State construals

Communicate verbs can occur in transitive argument structure constructions in which the direct object denotes the Addressee (85). In these examples, the Message is not overtly expressed. The semantics of the argument structure construction describes a direct causal relation between the Speaker and Addressee.

(85) a. John informed me. (VerbNet)

b. Earl alerted Helen. (VerbNet)

c. Wanda taught the students. (VerbNet)

The casual chain associated with these examples is shown in Figure 5.7. The event is analyzed as a metaphorical Change of State ("COS") event in which the Addressee is a property theme. The Addressee undergoes a change of their mental state by hearing the Message. A COS construal is also common with physical place (and remove) verbs when the ground is expressed as a direct object (e.g., *He painted the wall*). In the causal chain with physical mereological verbs, the ground is construed as a property theme. In the example *He painted the wall*, the *wall* undergoes a change of state by being *painted*. This syntactic behavior of mereological verbs likely motivates the use of the transitive argument structure construction with communication verbs, similarly to the use of this construction with transfer of possession verbs (discussed in chapter 4).

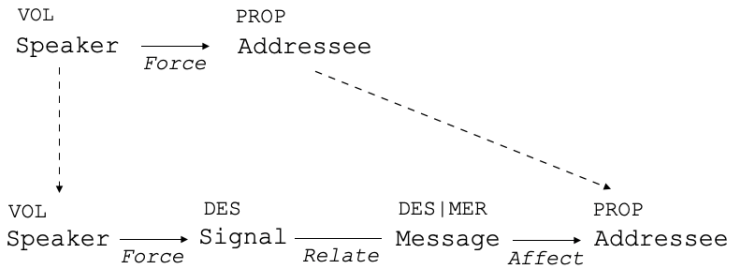

Figure 5.7: Metaphorical COS causal chain with Communicate verbs

Both Statement and Communicate verbs can also express the Addressee as a *to*-oblique when Message is not overtly expressed as a direct object (86). The semantics of this argument structure construction is also analyzed as metaphorically extended from the physical mereological domain. The *to*-oblique describes a metaphorical ground with communication verbs, just like the *to*-oblique in the metaphorical Place construal (87b).

(86) a. Susan complained to Rachel. (VerbNet)

b. Susan talked to Rachel. (VerbNet)

c. They confessed to us. (VerbNet)

The physical source domain [SBJ V *to*-OBL] argument structure construction is analyzed as a COS event. Some mereological verbs may express the ground as an oblique argument when the figure is not syntactically realized. This syntactic pattern alternates with the transitive variant and seems to be semantically motivated (87a-87b). As we noted in our discussion of Transfer of Possession verbs which also occur in this syntactic alternation, the source domain alternation correlates with a patient that is fully affected by the event while the intransitive variant correlates with a partially affected patient. Though this alternation is possible with physical remove verbs (*The men mined the mine/from the mine*) or social taking verbs (*They stole from me*), there are no corresponding communication verbs that occur in the *from*-oblique variant.

(87) a. He painted the wall. (VerbNet)

b. He painted on(to) the wall. (VerbNet)

c. She cut the bread. (VerbNet)

d. She cut into the bread. (VerbNet)

We do not capture a semantic difference between the two syntactic variants in our force dynamic analysis. The constructional causal chains are the same for both argument structure constructions. In both cases, the ground undergoes a change of state and is identified as a property theme. The causal chain analysis for the metaphorical COS [SBJ V *to*-OBL] argument structure construction with communication verbs is thus the same as the analysis for the transitive [SBJ V OBJ] variant depicted in Figure 5.7.

Communication verbs generally occur in either the transitive or the intransitive variant. The syntactic realization of the Addressee with communication verbs is mostly determined lexically (e.g., *He confessed *me/to me* but *He informed me/*to me*). In addition, there doesn't appear to be an underlying semantic inference of partial vs. full affectedness that would motivate the realization of the Addressee as either a direct object or an oblique argument in the communication domain.

5.6.5 Metaphorical Transfer construal

Only Communicate verbs occur in the double object argument structure construction which describes Transfer and originates in the social possession domain (88). The communicative action is metaphorically construed as a transfer event; a Speaker transfers a Message to an Addressee (cf., Levin 1993:202, Goldberg 1995). The event structures of Communicate and Transfer verbs share certain semantic correspondences that motivate this metaphorical construal (see Chapter 4 for a more detailed discussion of Transfer of Possession verbs). In particular, the themes in both verbal event structures (i.e., the Message in the Communicate event structure and the Possession in the Transfer of Possession event structure) are conceptualized as mereological and the Addressee is conceptualized as an intended recipient of the Message in communication events.

(88) a. Heather cabled Sara the news. (VerbNet)

b. She told him what to do. (VerbNet)

c. John informed me that this situation had changed. (VerbNet)

The semantics of the double object argument structure construction with Communicate verbs is identical to the semantics of the source domain causal chain with Transfer of Possession verbs, as shown in Figure 5.8. In the source domain, an Agent causes a Possession to be transferred to a new Possessor. The Agent uses a performative (PERFORM) force to bring about the transfer of a Possession. The relation between the Possession and new Possessor is defined as CONTROL. In transfer of possession events, the CONTROL relation indicates

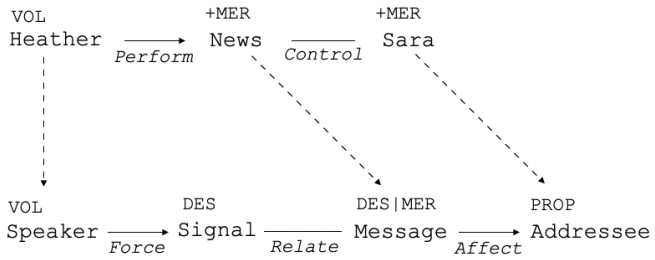

Figure 5.8: Metaphorical Transfer causal chain with Communicate verbs

that the Agent (or Possessor) either loses or gains control of the Possession. In the Communication target domain, the Speaker metaphorically maps to the Agent, the Message maps to the Possession, and the Addressee maps to the Recipient in the source domain. In this construal, the Addressee metaphorically receives the Message as though it was a Possession.

5.6.6 Other construals

Statement and Communicate verbs may occur in argument structure constructions with a Co-Speaker. The Co-Speaker may be expressed as a *with*-phrase in a Mutual construal (e.g., *Susan talked with Rachel*) or the Speaker and Co-Speaker are expressed as a plural subject in a Collective construal (e.g., *Susan and Rachel talked*). In these two construals, the Speaker's and the Co-Speaker's engagement in the event is symmetric. The Mutual and Collective argument structure constructions are particularly common with Joint Statement verbs, and we discuss the constructional representation for these causal chains in section 5.8.

(89) a. The president declared Smith professor. (VerbNet)

b. He characterized him as smart. (VerbNet)

c. The president declared the matter closed. (VerbNet)

Statement verbs can also occur in construals in which they designate a relation between an entity and their attribute (89a, 89b) or the entity's subevent (89c). The semantics of these examples describes an event in which the Speaker uses verbal means to assign an attribute or subevent to an entity. The causal chain associated with the example in (89a) is shown

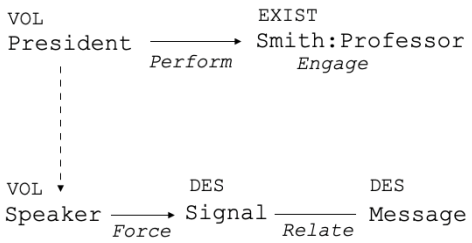

Figure 5.9: An externally initiated Engage relation with Statement verbs

in Figure 5.9. The force-dynamic relation between the President and Smith is defined as PERFORM since the President is a volitional [VOL] initiator and uses his social power to assign Smith the attribute of a professor. The relation between Smith and his attribute is ENGAGE. Smith and the attribute professor are not distinct participants in the event though they are syntactically expressed as separate arguments. Smith does not undergo any change in the event and is therefore labeled EXIST. The attribute does not have its own label; it inherits the label of the participant to which it belongs.

(90) a. Heather told Sara (not) to come. (VerbNet)

b. Ellen warned Helen against skating on thin ice. (VerbNet)

Communicate verbs can also be used to describe inducive events in which an Agent asks or orders an Addressee to engage (or not to engage) in an event (90a). An inducive construal is common with Request verbs (discussed in section 5.9) and the causal chain associated with inducive examples can be found in Figure 5.14 (section 5.10). The subevent in inducive construals may also be expressed as an *against*-phrase (90b). The preposition *against* signals a REFRAIN relation between the entity and their subevent: the entity does not engage in the stated subevent.

5.7 Joint Statement verbs

The event structure associated with Joint Statement verbs, such as *discuss, chat*, or *agree* is similar to that of Statement verbs in that they don't evoke an Addressee. However, unlike Statement verbs, Joint Statement verbs describe events in which two (or more) Agents are engaged in the same communicative event as Speakers (91). In their description of the Discussion frame which consists of Joint Statement verbs, FrameNet states that "no person is construed as only a speaker or only an addressee. Rather, it is understood that both (or all) participants do some speaking and some listening - the process is understood to be symmetric or reciprocal." Not only is an Addressee not evoked by the verb meaning,

it is not possible to express this participant in the constructional causal chain (e.g., **She agreed/debated/chitchatted to him*). This is another aspect in which Joint Statement verbs differ from Statement verbs.

(91) a. They agreed. (VerbNet)

b. Susan chitchatted about it with Rachel. (VerbNet)

c. Susan and Rachel chitchatted. (VerbNet)

d. We debated the matter. (VerbNet)

e. They agreed (about) what to do. (VerbNet)

The verbal event structure in Figure 5.10 represents the semantics of Joint Statement verbs. The representation depicts the communication event as a joint action in which both the Speaker and Co-Speaker create the Signal and Message together. The symmetric relation between the two interlocutors is depicted as a plus sign. The event structure only represents the role of the interlocutors as Speakers, i.e., the initiators of the causal chain. Their engagement in the event as Addressees is not represented since it is not syntactically relevant. Neither the Speaker nor the Co-Speaker are construed as endpoints of a transfer event with Joint Statement verbs.

Additionally, the event structure in Figure 5.10 does not represent the 'reciprocal' nature of the interaction in which the Speaker produces an utterance that the Co-Speaker hears, and the Co-Speaker produces an utterance that the Speaker hears. Since the speakers are analyzed only as initiators of the event (and not as endpoints), the reciprocal nature of the event is not represented. Therefore, the event structure depicts only the symmetric role that the Speaker and Co-Speaker have in the event as initiators.

Joint Statement verbs occur in the following VerbNet classes: settle-36.1.2, chit_chat-

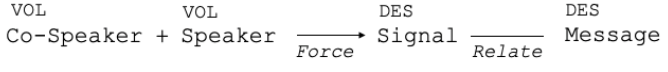

Figure 5.10: Joint Statement event structure.

37.6, and correspond-36.1.1. FrameNet frames that include Joint Statement verbs as Lexical Units include Discussion, Be_in_agreement_on_assessment, and Chatting.

5.8 Semantics of argument structure constructions with Joint Statement verbs

Joint Statement verbs occur in internal construals in which only the Speaker and Co-Speaker are syntactically realized (91). Neither the Signal nor the Message tend to be overtly expressed with Joint Statement verbs. We distinguish two distinct causal chains associated with the Internal construal depending on the syntactic realization of participants: a Collective causal chain (section 5.8.1) and a Mutual causal chain (section 5.8.2). In the Collective construal, the event is construed as symmetric and the participants are realized either as a plural subject (91a, 91d) or a conjoined subject (91c). In the Mutual construal, the event is construed as less symmetric. One of the interlocutors is expressed as a subject and the other interlocutor is expressed as a *with*-oblique (91b).

(92) a. We agreed what to do. (VerbNet)

b. They agreed about what to do. (VerbNet)

c. They debated it. (VerbNet)

d. We debated about it. (VerbNet)

Joint Statement verbs can occur in argument structure constructions with a Topic. The Topic may be expressed as the prototypical *about*-phrase or as a direct object (91d) or a complement clause (91e). Direct objects and complement clauses usually denote the Message rather than Topic with other communication verbs. However, evidence from syntactic alternations observed with Joint Statement verbs strongly points to an analysis in which direct objects and complement clauses denote the Topic. In particular, verbs in the VerbNet correspond-36.1.1 class occur in argument structure constructions in which the direct object or the complement clause may or may not be preceded by the preposition *about* (92). Whether the preposition *about* is expressed in the syntax or not does not change the construc-

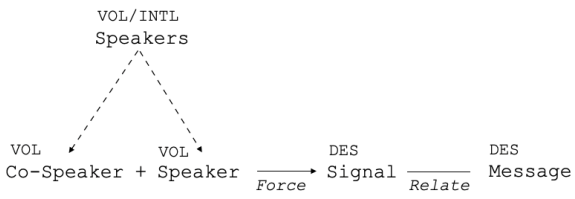

Figure 5.11: Collective construal with Joint Statement verbs

tional semantics. In all of the examples in (92), the direct objects and complement clauses situate the communication event within a conceptual domain, just like the *about*-phrase.

The syntactic realization of the Topic with Joint Statement verbs is also lexically motivated. While some verbs, e.g., many correspond verbs, allow the Topic to be expressed as a direct object or a complement clause, this syntactic behavior is not common with other verbs, e.g., chitchat verbs, which usually occur with the Topic realized as an *about* phrase.

5.8.1 Collective construal

In the Collective construal, the Speaker and the Co-Speaker are syntactically realized as a single argument, i.e., a plural subject or a conjoined plural subject (93). We use the term 'Collective' to describe all construals in which participants that are analyzed as separate entities in the verbal event structure are construed as a single entity in the constructional semantics. This type of construal is also common with Reciprocal and Collective verbs in the Interpersonal Interactions domain (discussed in Chapter 6). Participants in the Collective construal are represented as a single participant in the constructional causal chain, as shown in Figure 5.11.

(93) a. They debated. (VerbNet)

b. We debated about it. (VerbNet)

c. Susan and Rachel chitchatted. (VerbNet)

d. Susan and Rachel chitchatted about it. (VerbNet)

Figure 5.11 depicts the semantics of examples in (93). The Co-Speaker and the Speaker

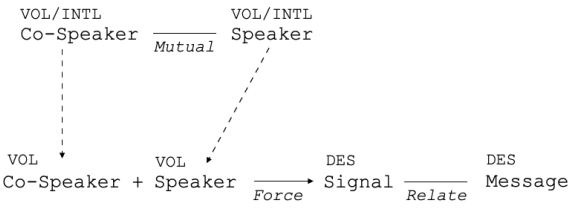

Figure 5.12: Mutual construal with Joint Statement verbs

in the verbal representation map to Speakers in the causal chain. The causal chain does not include the Topic since we treat Topic as a circumstantial phrase and not as a participant. The constructional representation for all the examples in (93) thus looks the same.

5.8.2 Mutual construal

The Co-Speaker may be realized as a comitative *with*-phrase (94). The constructional semantics describes a Mutual event in which the two agents have the same role in the event but are syntactically expressed as distinct arguments. The causal chain representation for these examples is shown in Figure 5.12.

(94) a. Susan chitchatted with Rachel (about it). (VerbNet)

b. They agreed with her (how to do it). (VerbNet)

We do not define a MUTUAL relation between the Speaker and Co-Speaker in the verbal representation since MUTUAL is not a force-dynamic relation. It merely specifies that two participants share the same role in the event structure but occur as distinct arguments in the argument structure construction. MUTUAL is thus used only in the description of constructional semantics. The comitative relation evoked by the lexical semantics is represented by a + sign, instead. Similarly to our discussion of the Collective examples above, the Topic is not part of the causal chain and the representation for the examples in (94) is the same. The Speaker and the Co-Speaker are both analyzed as volitional (VOL) and undergoing internal (INTL) change, similarly to other communication events in which only the Speaker is constructionally evoked.

5.9 Request verbs

Request verbs (e.g., *beg, order, ask*) evoke an event structure in which a Speaker communicates a request to an Addressee (95). The goal of the communication event is for the Addressee to fulfill this request. The request is semantically and syntactically different from a Message with other communication verbs and is represented as the Addressee's subevent in the Request event structure shown in Figure 5.13.

(95) a. I begged her. (VerbNet)

b. I begged him to be civilized. (VerbNet)

c. Pat begged them to forgive him. (FrameNet)

d. I begged her for release. (VerbNet)

e. He asked forgiveness from Jews who [...] (FrameNet)

The Request event structure includes the same participants as the Communicate event structure but the force-dynamic relation between Message and Addressee in the last segment is different. With Request verbs, this relation is analyzed as PERFORM. The PERFORM relation is initiated by the Speaker; however, the Speaker is 'displaced' from the relation in the event structure representation by also being the initiator of the creation event in which the Signal and Message are produced.[6]

[6]A similar issue of 'displacement' between a participant and a force-dynamic relation that they initiate is also observed with events that describe intention or purpose (e.g., *He searched the cave for treasure*). As Croft et al. (2018) note, the INTEND relation describes a force-dynamic image schema "between a volitional agent and the agent's as yet unrealized, and possibly never realized, action with respect to the other participant. The INTEND relation can be used for an intended subevent of a physical action." In the example *He searched the cave for treasure*, the intention of the agent (i.e., *to find treasure*) is subsequent to the location of searching since it is syntactically realized as a subsequent *for*-oblique. The agent's intention is therefore displaced from the agent who initiates it, similarly to the PERFORM relation in the Request event structure.

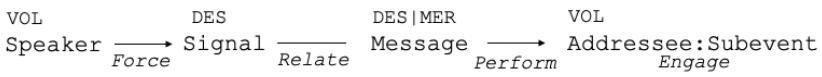

Figure 5.13: Request event structure

The Addressee is identified as a volitional (VOL) participant, unlike the Addressee with Communicate verbs. Aside from being the intended hearer of the Message, the Addressee's role is also to volitionally engage in the requested action, i.e., their subevent. We represent only the volitional engagement of the Addressee in the event structure since they are an endpoint of a PERFORM relation, rather than AFFECT, as is the case with the Addressee in the Communicate event structure. The Addressee with Request verbs may not always willingly comply with the request; however, the Addressee is considered a volitional participant even if they are forced into doing something that they don't want to do.

The subevent of the Addressee is in a future-oriented 'mental space' (Fauconnier 1994) which is different from the speech event. Unlike the communicative action which takes place in the reality space, the subevent refers to a request that may or may not be fulfilled by the Addressee in the future. This is not reflected in the event structure representation for Request verbs. Our force-dynamic event representations do not aim to capture different mental spaces if there is no indication that a different mental space affects the syntactic realization of participants.

The following VerbNet classes contain Request verbs: urge-58.1, beg-58.2, and order-58.3. The only FrameNet frame that includes Request verbs as Lexical Units is Request. This frame includes more verbs than the two VerbNet classes; however, many of the Lexical Units cannot occur in the syntactic frames that are listed in VerbNet.

5.10 Semantics of argument structure constructions with Request verbs

As an initiator of the causal chain, the Speaker is always syntactically realized as the subject. Neither the Signal nor the Message are overtly expressed in argument structure constructions with Request verbs. The existence of a Message is implied in that the Speaker uses communicative means to ask the Addressee to do something; however, the direct object in argument structure constructions with Request verbs denotes the subevent rather than the Message (96). The Addressee is always syntactically realized as a direct object and never as

a *to*-oblique. This syntactic behavior reflects the Addressee's distinct role as an endpoint of inducive causation in the verbal event structure when compared to an Addressee with other communication verbs.

The subevent of the Addressee may be expressed as an infinitival clause (95b, 95c), a *for*-phrase (95d), or a direct object (95e). The direct object denotes the subevent of the Addressee whether it refers to an event, such as *release* (96a), a physical item, such as *keys* in (96a), or information, such as *advice* in (96c).

(96) a. I begged her for release. (VerbNet)

b. She begged him for his keys.

c. She asked him for advice.

In the example in (96a), the Speaker asks the Addressee to release them. The subevent is associated with the Addressee rather than the Speaker, and the example could be paraphrased as *I begged her to release me.* In (96b), the Addressee is requested to relinquish his keys, and in (96c), the Speaker asks that the Addressee gives his advice. The *for*-oblique in all of these examples clearly refers to the Addressee's subevent rather than a Message. The

5.10.1 Inducive construal

Request verbs most commonly occur in inducive argument structure constructions in which there is a direct PERFORM relation between the Speaker and the Addressee (97). This construal is not restricted to the communication domain. The inducive [SBJ V OBJ argument structure construction is also used with other verbs in the social domain. In particular, it is used with Inducive verbs in the Interpersonal Interactions domain, such as compel verbs (e.g., *pressure, bully* or *trick*).

(97) a. I begged her.

b. She asked him.

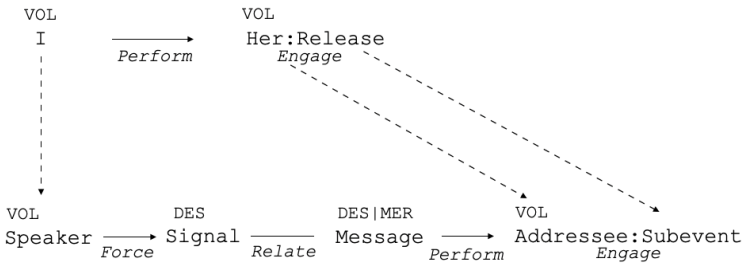

Figure 5.14: A mapping of an Inducive construal to the Joint Statement event structure.

The transitive argument structure construction in which the Speaker is the subject and the Addressee is the direct object is also used with Communicate verbs (e.g., *He told her*); however, we analyze the constructional semantics of the transitive construction with Communicate verbs differently from Request verbs. With Communicate verbs, the Addressee is a property theme as it undergoes a change of state in the event by hearing a Message. With Request verbs, the Addressee is an endpoint of inducive causation and is asked to engage in an action, rather than just hear a Message.

Figure 5.14 illustrates the causal chain associated with the example *I begged her for release*. In this example, the subevent is overtly expressed and is therefore part of the causal chain. However, when the subevent is not expressed as an argument of the verb, it is not included in the constructional representation. Unlike their subevent, the Addressee is always part of the causal chain; whether they are syntactically expressed or not. For instance, the causal chain for an example such as *She begged for release* would include the Addressee as a null instantiated participant because a subevent cannot function as a 'participant' on its own. The actual participant whose subevent it is has to be included in the causal chain.

5.11 Communication events with non-communication verbs

Communication events may be expressed with various semantically different types of verbs that do not inherently evoke a communication event structure. For example, Transfer of possession verbs (section 5.11.1) or mental Experience verbs (section 5.11.2) can be used to describe events of communication. Other verbs that can be used to describe communication

events include animal sounds or other sound emission verbs (section 5.11.3).

5.11.1 Transfer of possession verbs

Transfer of possession verbs can be used to metaphorically describe the conveyance of information as a transfer event (99) (cf., Goldberg 1995:148). For example, verbs such as *provide* or *supply* can be used to describe communication events (98a). Other examples in which the Addressee is metaphorically construed as a recipient include (98b) and (98c). This extension pattern is cross-linguistically not uncommon and is documented with a few examples of *give* in Newman (1996:136-137). Newman (1996:137) notes that the conceptual mapping between transfer and communication is "an easy one to make: the transmission of a message to someone is understood as the giving of a thing to someone." However, he adds that despite these semantic structural similarities, communication events are different from transfer events in that a Speaker does not lose control over the Message when it is shared with an Addressee (Newman 1996:138). This semantic difference does not appear to have an impact on the metaphorical use of transfer verbs in communication events.

(98) a. She provided him the information.[7]

b. Jo received the information from Sam. (Goldberg 1995:148)

c. He got the ideas across to Jo. (Goldberg 1995:148)

Transfer verbs can be used to perspectivize either the Speaker or the Addressee. The perspectivized participant is syntactically expressed as a subject in the argument structure construction (99). Successful communication requires that the Addressee actively participate in the event. The Addressee has to attend to the Speaker in order for the Message to be effectively communicated. However, this part of the event structure is not profiled by communication verbs. English doesn't have communication verbs that describe a causal

[7]The use of the double object construction with *provide* in the transfer domain is not as common as with some other transfer verbs; however, examples such as *We will continue to provide them milk and fresh produce* can be found in COCA.

chain initiated by the Addressee. Transfer verbs and mental Experience verbs may be used to describe this part of the event.

(99) a. He gave him advice.

b. The Russians supplied the Syrians with information. (VerbNet)

c. He received the news.

The syntax of communication events with transfer verbs is inherited from the possession source domain. The communication event may be construed as a metaphorical Transfer event (99a), a metaphorical physical mereological event such as a Provide event in (99b) or a metaphorical physical Constrain event (99c). Transfer of possession verbs do not occur with complement clauses or direct speech complements when they are used to describe communication events.

5.11.2 Mental Experience verbs

English uses mental Experience verbs such as *discover* or *learn* to describe the Addressee's cognitive engagement in the communication event (100).

(100) a. He discovered the truth from him. (VerbNet)

b. He learned that she didn't leave.

Discover and *learn* are mental domain verbs; they evoke an event structure in which an Experiencer experiences a Stimulus (e.g., *I discovered the fleece*). In the mental domain, these verbs may occur with a constructionally added "Source" participant which describes the source of the information, e.g. *facts* in *He learned the truth from the facts.* The Source in mental Experience events is analogous to the Speaker in communication events (100a). The extension of *discover* and *learn* to communication events stems from an analogy made between the Experiencer (=Addressee) who comes to experience new content (=Message) provided by the Source (=Speaker).

Many Experience verbs that are used to describe communication events occur in metaphorical Remove argument structure constructions in which the Addressee is expressed as the subject, the Message as a direct object or a complement clause, and the Speaker as a *from*-oblique (100a). This constructional metaphor is not unexpected given the use of the mereological Place argument structure construction with communication verbs. In both cases, the event is construed as mereologically incremental.

5.11.3 Sound Emission verbs

Communication events can be described by verbs that refer to noises that are not inherently produced by humans (cf., Urban and Ruppenhofer 2001). The inference that the verb is used to describe a communication event stems from the argument structure construction in which the sound emission verb is used as well as the participants expressed as arguments (101). However, there are various syntactic and semantic constrains associated with the use of sound emission verbs in communication events (Levin 1991, Urban and Ruppenhofer 2001).

(101) a. 'Shut up, Doreen,' Silas barked [...]. (Urban and Ruppenhofer 2001)

b. He honked a goodbye.

c. Grandson Richard rumbled a reply.

d. The dog barked a warning to his owner.

As shown in (101a-101c), an animal sound or a sound emission verb may be used to describe a manner of communication initiated by a Speaker. However, it is also possible to conceptualize of animals as initiators of communication events (101d). In some cases, animals may be conceptualized as emitters of meaningful sounds whether the communicative event is intentional or not. For example, in (101d) the dog's barking is most likely an instinctual reaction to a stimulus, not an intentional action to communicate a Message to the owner. But the noise is interpreted as a *warning* by the owner. This results in an acceptable description of

a situation as a communicative event in which the noise that the dog makes is grammatically encoded as a Message. Whether the dog's intention was to produce a meaningful sound or not is not a deciding factor in allowing animals to be expressed as subjects in communication events. The event can be described as a communication event if it is conceptualized as such by the observer. It is generally not common to conceptualize inanimate objects as initiators of communication events (**The door squeaked a warning*) because one would not attribute a meaning to a noise produced by an object.

Sound emission verbs behave syntactically like Statement verbs, though there are additional restrictions on the syntactic expression of participants with sound emission verbs (see Urban and Ruppenhofer 2001). They may occur in simple transitive argument structure constructions in which the direct object refers to the Message (101a-101c) or constructions in which an Addressee is constructionally added as a *to*-oblique (101d).

5.12 Response verbs

Some communication verbs (e.g., *reply, answer,* or *respond*) can evoke response events in which an agent responds to a question or a call by using communicative means (102). The question or call in these examples functions as a trigger that elicits a reaction from the agent. The triggers in these examples denote the entity who generated them. For example, in (102a and 102b), the agent is responding to *me* since the call and the question are specified to be *mine*. The semantics of the trigger points to an analysis in which the trigger is analyzed as a subevent of the entity that created it. The call and the question are subevents of the participant *me* who is syntactically expressed as a possessive pronoun. In (102c), no trigger is overtly expressed. Instead, the *with*-phrase denotes the response that the agent took. In these examples, the response denotes the agent's subevent, and the agent and their response refer to the same participant. In some examples, the entity who created the trigger may be null instantiated but is inferable from larger context (102d and 102e). In (102e), the agent, their response, and the trigger are expressed in the same argument structure construction.

(102) a. He responded to my call. (VerbNet)

b. He responded to my question with a smile.

c. He answered with another question. (FrameNet)

d. I can't answer questions over the telephone. (FrameNet)

e. He would reply to such comments with honest, inappropriate looks of deep appreciation. (FrameNet)

When the trigger is overtly expressed with communication response verbs in English, such as in (102a) and (102b), the response is directed towards the triggering entity who initiated the interaction in the previous turn. As explained above, the trigger describes the entity's subevent and the entity is thus always part of the causal chain. It could therefore be argued that the triggering entity in causal chains with communicative Response verbs such as *He responded to his call* denotes an Addressee, similarly to examples in which the Addressee is expressed as a *to*-oblique (e.g., *He replied to him*). However, this analysis cannot be extended to other response verbs in this argument structure construction, particularly when the triggering entity does not refer to a human participant, as shown in (107). The inference that the event of responding is directed at the triggering entity as a Message is only possible with human participants. Therefore, we do not analyze the *to*-phrase with Response verbs as an Addressee.

Response verbs that evoke general response scenarios in which an agent's reaction to a trigger does not necessarily involve communication include *react* or *retaliate*. Examples in (107) are instances of events that do not involve a communicative response. In (107a), the response may have involved supplying building materials or other assistance. In (107b), the agent's cowardly reaction could have been running away or hiding.

(103) a. They swiftly responded to the destruction that was caused by flooding.

b. He reacted to the situation as a coward.

Response verbs that evoke communicative events are classified into two distinct verb

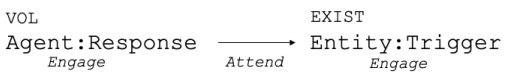

Figure 5.15: Response event structure.

classes in VerbNet: say-37.7 class which contains our Statement verbs and respond-113 class which consists of our Response verbs. As such, these two classes are associated with distinct event structures in our analysis. Depending on the event structure the verbs evoke, they occur in different syntactic alternations. For example, response verbs that evoke the Statement event structure can occur in argument structure constructions in which a Message is overtly expressed (e.g., *He responded to me that he couldn't attend the event*). Response verbs that describe the Response event structure cannot occur with a Message since this participant is not lexically evoked (e.g., **He responded to my call that he couldn't attend the event*). When a Message is overtly expressed, an Addressee, rather than their subevent (i.e., the trigger) is expressed. As such, the underlying lexical semantic representation of the event is different depending on the relevant sense of the verb.

The event structure evoked by Response verbs is presented in Figure 5.15. The event structure is not specific to communication verbs and therefore does not overlap with other communication event structures that we defined in this chapter. The Agent and their Response is causally antecedent to the Entity and the Trigger since the Agent is always syntactically realized as the subject and the Response as an antecedent oblique. The Entity and the Trigger can be realized as a direct object or a subsequent oblique. The semantics of argument structure constructions with response verbs always construe the Agent as an initiator of the response event, even though the triggering event temporally precedes the response.

The force-dynamic relation between the Agent and the Entity is defined as mental ATTEND. The Trigger causes that the Agent directs their attention to it. The ATTEND relation is characteristic of mental domain events. It describes the force-dynamic interaction between an Agent and a Target (104). However, in mental Attend events the Target does not func-

tion as a trigger; the Target simply exists and the Agent attends to it. Some Triggers in response events are similar to Targets in this sense, specifically when the Trigger is a non-agentive entity, such as flooding or an earthquake, which do not actively trigger the Agent's response. The conditions brought about by a natural disaster exist and the Agent responds to them. This is why we do not represent a 'trigger' relation between the Entity and the Agent in the event structure representation. It is not obligatorily evoked by the lexical semantics. Unlike mental Attending verbs which evoke only the Agent's mental attention, and the Agent does not usually take action to attend to the Target, Response verbs evoke that the Agent carries out a response. The response may denote physical action (e.g., motion or supplying materials), social response (e.g., transferring information), or a mental event (e.g., feeling happy/sad). Though the response of the Agent is not necessarily a mental event, the force-dynamic relation between the Agent and the triggering entity is defined as mental.

(104) a. He looked at the clock.

b. He watched the night sky.

c. He listened to the concert.

Given the distinct underlying lexical representations associated with Response and Statement verbs, our analysis of the semantics of the [SBJ V *to*-OBL] argument structure construction with Response verbs is different from Statement verbs (e.g., *He spoke to him*). With Response verbs, the triggering Entity is not an endpoint of a communicative event. The Agent directs their attention to a Trigger by responding to it. Cross-linguistic evidence also points to two distinct semantic analyses. We present examples from Czech which uses two different argument structure constructions with the verb *odpovědět* ('to answer') depending on whether *answer* is used as a Communication verb or a Response verb. The causal chain associated with the English [SBJ V *to*-OBL] construction is discussed in section 5.13.

(105) a. Odpověděl mu.
Answered he.DAT
'He answered (to) him.'

b. Odpověděl na jeho telefonát.
Answered on his phonecall.ACC
'He answered (to) his phone call.'

c. Odpověděl mu na jeho telefonát.
Answered he.DAT on his phonecall.ACC
'He answered him by returning his phone call.' (Lit. 'He answered him to his phone call.')

As shown in (105), Czech uses two distinct syntactic patterns with *answer*. When the event involves communication between a Speaker and an Addressee, the Addressee is marked dative (105a), just like with other communication verbs, e.g., *tell* in *Řekl mu* 'He told he.DAT'. However, when the same verbs is used to describes an event of response, a preposition *na* and accusative case marking is used to signal the trigger (105b). Unlike English, Czech also allows that both the Addressee and the trigger are expressed in the same argument structure construction (105c). The Addressee is marked dative and the trigger is marked accusative. The argument structure construction describes a communication event that is a response to a trigger.

With Response verbs that cannot be used in communicative scenarios, such as *reagovat* 'react', only the *na*-construction in which the oblique argument is marked accusative is used (106). The use of the *na*-construction for response events in Czech provides syntactic evidence that the two distinct underlying event structures associated with communicative Response verbs lead to two distinct syntactic construals.

(106) a. Evropské země rychle zareagovali na Ruskou invazi Ukrajiny.
European countries swiftly reacted on Russian invasion.ACC Ukraine.GEN
'European countries swiftly reacted to the Russian invasion of Ukraine.'

b. Vláda zareagovala na krizi zpusobenou povodní.
Government reacted on crises.ACC caused by_flooding
'The government reacted to the crises caused by flooding.'

Response verbs can be found in the respond-113, reject-77.2 class, confront-98, reciprocate-112, and defend-72.3 classes in VerbNet. VerbNet uses only communication examples in

the respond-113 class but their semantic analysis of the syntactic frames does not include transfer of information, which indicates that the class is not supposed to be restricted to communicative scenarios. FrameNet defines two distinct frames to distinguish communicative response verbs from non-communicative response verbs: Response and Communication_response frames.

5.12.1 Response events with non-agentive subjects

The initiator of the response event is prototypically an agentive entity who acts volitionally. However, the role of the initiator as a volitional entity in response events can be metaphorically extended to other types of initiators in English. Corpus examples indicate that animate and other living entities, such as plants, may also be initiators of response events (107a, 107b). In (107a), the initiator of the event are people; however, their engagement in the event is not volitional. It is implied that the event refers to their bodies, i.e., it is the people's bodies that do not respond to certain medications. As such, the initiator of the response event is not agentive in this example. Similarly, in (107b), the subject people refers to the people's minds. In both of these examples, the subject is a human entity but it is used metonymically for their bodies and their engagement in the event is not understood to be volitional.

(107) a. Some people respond well to certain medicines for cholesterol reduction and some do not. (FrameNet)

b. ... people with schizophrenia were likely to respond to understimulation by withdrawal and regression. (FrameNet)

c. The injury has failed to respond to treatment and he has decided to retire. (FrameNet)

d. Animals and plants respond to these changes through a process known as photoperiodism. (FrameNet)

The metaphorical extension of an agentive entity as an initiator of a response event can be further extended to bodily functions and immune responses, such as an injury in (107c). Moreover, living entities such as animals or plants can also be construed as initiators of response events, as shown in (107d).

Inanimate entities are generally not compatible with the semantics of response events though sporadically examples of such metaphorical extensions can be found, e.g. *This plastic responds well to pressure*. What appears to be relevant in whether an inanimate entity can be metaphorically construed as an initiator of a response event is its ability to undergo a dynamic event as a response to the trigger, e.g., a change of shape or consistency. Therefore, the metaphorical extension of response events to inanimate entities is largely dependent on the physical properties of the responding entity and the type of trigger.

5.13 Semantic analysis of argument structure constructions with Response verbs

Response verbs can occur in an Attending or Internal construals. In the Attending construal, both the Agent and the Trigger (or Entity) are syntactically expressed (section 5.13.1). In the Internal construal, only the Agent and possibly their subevent are expressed (section 5.13.2). In the Attending construal, the syntactic realization of participants with Response verbs is similar to Attending events with mental verbs such as *listen* which express the Target as a *to*-oblique (e.g., *He listens to music*). In Czech, the syntactic realization of the Trigger in response events and the Target in mental events is also the same: the Trigger and the Target are both realized as *na*-obliques (e.g., *Podíval se na něj* 'He looked at him').

With some Response verbs, such as *retaliate* the Trigger is syntactically expressed as an *against*-oblique (e.g., *He retaliated against his enemies*). This syntactic realization of the trigger signals negative attitude of the agent towards the trigger. The interaction between the agent and the triggering entity is understood to be adversary and is limited to specific Response verbs which denote adversarial events. The causal chain associated with this argument structure construction is the same as the *to*-variant which we discuss in section

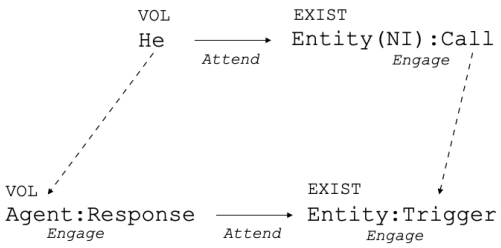

Figure 5.16: Mapping of an Attend construal to the Response event structure.

5.13.1 below.

5.13.1 Attend construal

The causal chain associated with the Attend construal expresses an ATTEND relation between the Agent and the triggering Entity. A representation for the constructional semantics of the example *He responded to the call* is shown in Figure 5.16. Only the Agent *he* and the Trigger *call* are constructionally specified. However, the Entity has to be part of the causal chain as a null instantiated participant ("NI") since a subevent does not represent an event participant on its own. In examples in which the Entity can be inferred from the possessive pronoun that modifies the Trigger (e.g., *He returned my call*); the Entity is still analyzed as NI in the causal chain since they are not expressed as a separate argument in the syntax.

(108) a. He hit at the door.

b. He yelled at/to him.

c. He waved at/to him.

d. He attended to his visit.

e. He smelled the cheese to see if it was fresh.

The Attend construal is not unique to mental Attending and Response verbs. Various physical domain verbs can also construe the relation between an agent and a theme as mental, particularly when the theme is not affected by the action of the agent. Many physical verbs, such as verbs of contact by impact (108a) or verbs of sound emission (108b-108c) use

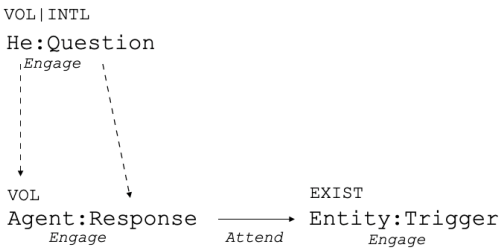

Figure 5.17: Mapping of an Internal construal to the Response event structure.

the *at*-construction characteristic of visual perception verbs in English (e.g., *He looked at him*). With sound emission verbs, the preposition *to* signals a communicative event with an Addressee and so the Attending construal uses the *at* preposition, instead. However, it is common to use the *to*-construction with other mental verbs, such as *attend* (108d). In other cases, the Target of Attending may be realized as a direct object (108e). Response verbs occur in Attending constructions in which the Trigger is expressed as a *to*-oblique or a direct object.

5.13.2 Internal construal

When only the Agent is overtly expressed, the constructional semantics describes an Internal event (109). The causal chain may include the Response, as well (109c). Figure 5.17 shows the causal chain for the example in (109c) and its mapping to the Response event structure. Both the Agent and the Response are part of the causal chain since they are expressed as separate arguments. Since the causal chain doesn't include the Entity or Trigger, the Agent is not in an ATTEND relation with another participant. Consequently, the event is construed as Internal in which the Agent engages in their subevent.

(109) a. He responded.(VerbNet)

b. They retaliated.

c. He responded with a question. (VerbNet)

When the Response is not overtly expressed in the syntax, as is the case in (109a) and (109b), the Internal causal chain includes only the Agent as a participant.

5.14 Conclusion

In this chapter, we discuss the semantics of verbs that evoke communication events in which a Speaker produces a meaningful utterance, i.e., a Message. We define five distinct verb types based on their semantics: 1) Statement verbs which describe the production of a Message, 2) Communicate verbs which describe the conveyance of a Message, 3) Joint Statement verbs which describe a cooperative communicative interaction between two (or more) Speakers, 4) Request verbs which describe events in which a Speaker requests that an Addressee engage in an event, and 5) Response verbs which describe events in which an Agent attends to a Trigger.

Some Communication verbs are used as speech acts by which an authority assigns a status or a role to oneself or another person by communicative means (e.g., *proclaim* in *He proclaimed himself a king*). In these examples, the event describes both a communicative event and a social role assignment event. In the analysis presented here, we do not represent the social role aspect of the event. The event structure evoked by speech act verbs only evokes a communication event in which a Speaker produces a meaningful signal. The complement *himself a king* in the example *He proclaimed himself a king* is therefore analyzed as a Message that is communicated to an audience. The semantic analysis of this example is therefore the same as the analysis of *He proclaimed that he would become the king* in which the Message is syntactically expressed as a complement clause.

Chapter 6: Verbs of Interpersonal Interactions

6.1 Introduction

This chapter discusses the semantics of verbs that describe events in which people interact with each other on an interpersonal level. This category comprises of verbs that describe symmetric reciprocal interactions (such as *meet* or *marry*) (110a-110b), joint interactions in which two participants are engaged in an event collectively as a unit (e.g., *conspire* or *collaborate*) (110c-110d), and asymmetric interactions in which one participant's action leads another participant to engage in some event (e.g., *blackmail* or *bully*) (110e-110f).

(110) a. They met.

b. They married.

c. They conspired. (VerbNet)

d. They collaborated (on the task). (VerbNet)

e. He bullied him. (VerbNet)

f. He blackmailed him into coming. (VerbNet)

The semantic category of Interpersonal Interactions is restricted to verbs that evoke force-dynamic relations between event participants in the social domain; this category does not include verbs of physical or mental level causation though such verbs can also be used

to describe interactions between human entities (e.g., *He hit him* or *He scared her*). Many social verbs that evoke events in which an interpersonal interaction between two humans takes place, such as transfer of possession or communication verbs, are also excluded from the Interpersonal Interaction category. These verbs evoke additional participants in their event structure and the semantics of these events are therefore not just about interpersonal interactions. For example, transfer verbs such as *give* or *take* (discussed in Chapter 4) evoke three participants: an Agent, a Possessor, and a Possession. Communication verbs such as *tell* or *inform* (discussed in Chapter 5) evoke four participants: a Speaker, a Signal, a Message, and a Recipient. The semantic analysis of transfer and communication verbs requires additional considerations beyond the nature of the interpersonal interaction between the human participants. Separate chapters in this dissertation are devoted to the discussion of these verbs.

Semantic analyses of Interpersonal Interaction verbs in the linguistics literature are quite sparse. Although there has been a large body of literature published on the semantics of various types of reciprocal interactions (e.g., Lichtenberk 1985, 1991, Kemmer 1993a, Haspelmath 2007, Knjazev 2007, Nedjalkov 2007), other types of events in this domain haven't received the same coverage. The literature on reciprocal verbs is not restricted to social events but it does subsume symmetrical interactions between two agents and thus informs the semantic analysis of Reciprocal verbs and argument structure constructions, as discussed in the following section 6.2.

Semantic studies of Interpersonal Interaction verbs that span beyond Reciprocal verbs are rather limited. Collective (or 'joint action') verbs, which are discussed in section 6.4, have received some attention, primarily in the context of the syntax associated with collective vs. distributive events and their semantic opposition. Languages tend to grammatically distinguish between situations in which the action is carried out jointly by two or more people (e.g., *The children built the raft*) and actions in which the people who are involved act separately (e.g., *The children lifted their books*) (Lichtenberk 1985, Kemmer 1993a). The

discussion of collective events has primarily focused on overt marking strategies in different languages (e.g., Lichtenberk 1985, Filip and Carlson 2001) as well as their occurrence in shared argument structure constructions with reciprocal and reflexive verbs (Lichtenberk 1985, Kemmer 1993a, Fernandez-Montraveta and García 2016). How these studies inform the present analysis of the force-dynamic event structure associated with Collective verbs is discussed in section 6.4.

The semantics of asymmetric Interpersonal Interaction verbs, here discussed as Inducive and Attack verbs, has received less attention in the linguistics literature. In some studies, interpersonal events have been discussed in the context of causative argument structure constructions (Shibatani 2002). In other studies, interpersonal causation has been approached from a typologically-informed cultural perspective (Givón and Young 2002). Asymmetric interpersonal verbs have also been discussed in the literature on force-dynamics. Talmy's (1988) article includes a discussion of the force-dynamics of inducive events and its relation to more general causative and letting verbs, such as *force*, *allow*, or *prohibit*. He provides examples of events that describe interpersonal interactions between two (or more) people as well as examples of other non-social (and non-physical) types of causation. The specifics of his analysis of the relevant verbs in the social domain and its direct application to the force-dynamic analysis developed in this dissertation is discussed in sections 6.6 and 6.8.

Interpersonal interaction verbs have been explored in other disciplines, such as psychology or philosophy (Brown and Fish 1983, Schlesinger 1992, Rudolph and Föstrling 1997). The discussion of these verbs in psychology primarily focuses on the semantics of asymmetric interactions in which there is a clear causal ("causer-causee") relationship between two participants. Various taxonomies have been proposed for interpersonal verbs in psychology at different levels of abstraction (cf., Malle 2002). The most basic distinction has been made between Action and State verbs. With Action verbs (e.g., *help* or *cheat*), the subject argument describes the agent, or "causer," whose action causally influences a patient, syntactically realized as the direct object. With State verbs (e.g., *scare* or *amuse*),

the human entities engaged in the event are referred to as an "experiencer" and a "stimulus person" (Brown and Fish 1983). In most cases, the causality attributions with State verbs elicit the subject argument the role of a "stimulus" and the object argument the role of an "experiencer." However, as Malle (2002) and other scholars have pointed out, the causal attributions can be reversed with State verbs depending on the semantics of the verb, as in *She fears him because he is big.* In this example, the subject is the experiencer and the object the stimulus. This and other issues have been brought up in the literature to argue that causal attributions given to particular syntactic roles offer an inadequate description of causal relations between participants.

Studies discussing "Interpersonal verbs" carried out in the field of psychology are thus very limited in terms of their possible application to linguistics since they tend to distinguish only two very basic 'semantic' roles. In addition, the discussion usually covers a wide spectrum of verbs that denote events outside of the social domain, including mental affective verbs, such as *scare* in examples such as *He scared her*, or physical verbs such as *punch*, as in *She punched him.* As such, the analysis of interpersonal verbs in psychology focuses on the semantics of interpersonal *events* rather than the lexical semantics of a particular domain of verbs. The category of Interpersonal verbs in psychology is thus much too broad to be used for a linguistic analysis of the type explored in this dissertation.

In philosophy, the discussion of interpersonal verbs has primarily focused on communication verbs that are used for illocutionary acts (such as *order, request* or *command*) and other speech acts (such as *declare* or *pronounce*) (Austin 1962, Searle 1969, Wierzbicka 2003, Edmondson 2015). Though these verbs certainly describe interpersonal interactions, their semantics primarily evokes an event structure associated with Communication verbs (see Chapter 5). The speaker does not just interact with the addressee on an interpersonal level, they also intend to communicate a message to the addressee. The pragmatic functions of utterances with speech acts are not represented in the force-dynamic analysis developed here. The proposed semantic analysis of these verbs is in line with the approach taken by

FrameNet and VerbNet, which also analyze these verbs as describing communication events rather than serving other social functions.

6.2 Reciprocal verbs

A considerable amount of research has been done on verbs that describe reciprocal events (or "lexical reciprocals") and argument structure constructions that evoke reciprocal readings (or "grammatical reciprocals") (Haspelmath 2007). Grammatical reciprocals (also referred to as derived reciprocals) include various syntactic and morphosyntactic strategies for deriving reciprocal readings such as combining verbs with words meaning 'each other' or 'mutually' or using morphemes or clitics that indicate a reciprocal interaction between event participants (Filip and Carlson 2001, Nedjalkov 2007). It has been said that "the prototypical reciprocal meaning [...] is usually defined as describing situations with at least two entities (participants) which are in the identical reverse relation to each other, i.e. the semantic arguments have the same semantic content, in particular, they perform two identical semantic roles (e.g., of agent and patient) each" (Nedjalkov 2007:6). In an example such as *Ben and John hit each other*, both Ben and John are understood to be engaged in the same event. They are both agents who initiate the hitting event as well as patients who are affected by the forceful contact.

Events with two participants are considered to exemplify prototypical reciprocals since both participants are necessarily the agent and the patient of the same action (Lichtenberk 1994:2506, Kemmer 1993a:96). As Kemmer (1993a:97) notes, it is presupposed that when only two participants are evoked by the event, they are symmetrically engaged; however, in events in which multiple entities are involved, such as *Everyone in the crowd was fighting*, it is not necessarily the case that every single person in the crowd was engaged in fighting. As such, these types of situations "deviate to a greater or lesser extent from a primary reciprocal type in which there are only two entities" (Kemmer 1993a:98). The semantic analysis of lexical reciprocals presented in section 6.2.2 depicts the prototypical two-participant scenario

though most lexical reciprocals in English do not evoke exactly two participants. When a verb evokes just two participants in the event, it is usually determined by social standards. For example, the verb *marry* necessarily evokes just two participants because marriage as an institution is limited to two people in western cultures.

In the force-dynamic analysis of Reciprocal verbs, we focus on the semantics of lexical reciprocals which necessarily evoke reciprocal engagement of participants, such as verbs like *meet* or *marry* (Lichtenberk 1985:21) and verbs that frequently entail reciprocity between participants, such as *fight, hug* or *kiss* (Knjazev 2007). These two types of verbs have been referred to as "natural reciprocals" when discussed as a semantically homogenous class (e.g., Knjazev 2007, Kemmer 2003a) or as "symmetric" vs. "semi-symmetric" reciprocals when their semantic differences are distinguished (e.g., Knjazev 2007:116). Unlike symmetric reciprocals, such as *meet*, which have a logical entailment in which the patient and the agent in a transitive argument structure can be reversed (i.e., Julia met Sam = Sam met Julia), semi-symmetric reciprocals, such as *hug*, do not have such entailment: Julia can hug Sam but Sam may not hug Julia back (cf. Kruitwagen et al. 2021).

Despite these semantic differences, it has been argued that symmetric and semi-symmetric verbs belong to the same semantic class. Cross-linguistically, they tend to occur with light or zero markers in reciprocal argument structure constructions. For example, in English symmetric verbs such as *meet* or semi-symmetric verbs such as *hug* occur in an intransitive [SBJ V] argument structure construction (*They met/hugged)* in which reciprocity is not grammatically marked. Yet, the examples evoke reciprocal readings between the participants involved. The use of natural reciprocals contrasts other transitive verbs, which can occur in reciprocal events but the argument structure construction must include a "heavy marker" such as *each other* in English: *They hit each other* (Kemmer 1993a:105). The use of the light and zero markers in languages is relatively restricted and generally applies to a narrow range of semantic classes (Kemmer 1993a:105, Haspelmath 2007:2090). In particular, predicates that occur in light or zero-marked reciprocal constructions include semantic classes

that describe social actions and relations (such as *marry, quarrel, friend*), spatial relations (such as *adjoin, next to*), and relations of (non-)identity (such as *same as, different from, resemble*) (Haspelmath 2007:2090). This chapter focuses on the semantics of Reciprocal verbs that evoke agentive initiators in the social domain and does not address the event structure associated with lexical reciprocals that describe physical spatial events. Examples of (non-)identity predicates such as 'same as' and 'different from' are discussed in Chapter 7 which focuses on conceptual relations between entities.

The force-dynamic analysis developed here does not distinguish the event structure evoked by symmetric and semi-symmetric predicates given their shared syntactic behavior cross-linguistically. A unified analysis of natural reciprocals as a single semantic class also aligns with VerbNet's classification of these verbs. VerbNet distinguishes different classes of natural reciprocals; however, their classes do not distinguish symmetric and semi-symmetric predicates. For example, the marry-36.2 class contains both types of reciprocals, such as *divorce, date, kiss*, or *hug*.

VerbNet distinguishes the following classes with social reciprocal verbs: interact-36.6, marry-36.2, meet-36.3, and battle-36.4. Verbs in these classes evoke two participants: an Agent and a Co-Agent. The interact-36.6 and meet-36.3 classes contain symmetric predicates such as *go out*, *split up*, *meet*, or *reunite*. Marry-36.2 contains both symmetric and semi-symmetric predicates such as *divorce, date, kiss*, or *hug*. The semantics of syntactic frames associated with these verbs is defined as "SOCIAL_INTERACTION" between an Agent and a Co-Agent. The semantics of examples with adversarial verbs in the meet-36.3-1 and battle-36.4 class (such as *battle, fight*, or *debate*) are further specified as denoting "CONFLICT" between the Agent and the Co-Agent. In some classes, the omission of the Co-Agent is possible, e.g., with interact verbs (*Kathy hooked up*). In other classes, such as marry-36.2, both the Agent and the Co-agent have to be syntactically expressed (*Bill married Kathy*). With other Reciprocal verbs, such as verbs in the battle-36.4 class, a transitive construal of the event is not possible (e.g., **He competed him*). A force-dynamic analysis of these

different argument structure constructions with Reciprocal verbs is discussed in section 6.3.

There is also a trifle-105.3 class in VerbNet, which is also analyzed as describing a SOCIAL_INTERACTION between two humans. However, the participants are identified as an Agent and a Theme in this class, rather than an Agent and a Co-Agent. In addition, VerbNet only includes one syntactic frame for this class: NP V PP.theme. The corresponding example is *She trifled with him.* Although these verbs use the comitative *with-phrase* to express the Theme participant, it is not clear that the analysis for this class is meant to be the same as for other reciprocal verb classes. This appears to be particularly the case because VerbNet does not include syntactic frames in which both participants are realized as a subject argument (e.g., *They trifled* or *Trisha and John trifled*). For these reasons, we do not analyze trifle-105.3 as a Reciprocal class in VerbNet.

Reciprocal verbs can be found in the following FrameNet frames: Make_acquaintance, Forming_relationships, Hostile_encounter, Quarreling, and Meet_with. All of these frames describe a reciprocal relation between the participants. Hostile_encounter and Quarreling also include "Issue" as a Core FE, which denotes the topic of arguing. Meet_with is a little bit different from the other frames in that the interaction between participants is not analyzed as reciprocal. FrameNet's definition of this frame state: "Party_1 meets with Party_2 at a prearranged Time and Place. If expressed, Purpose only applies to Party_1". However, in our analysis, the event of meeting is reciprocal in that it presupposes the engagement of both parties. FrameNet's frame analysis focuses on the asymmetric construal of the meeting event in which one participant is construed as the initiator. We distinguish this construal in our constructional analysis. The verbal event structure evoked by *meet* is reciprocal.

6.2.1 Battle verbs

Verbs such as *argue, collide, bargain* or *compete* describe events in which two agents engage in an event symmetrically. Though some of the verbs in the battle-36.4 class entail communication between agents (e.g., *argue* or *bargain*), the battle class in VerbNet as a whole

does not evoke a communication event. The communicative aspect of the interaction is not a relevant force-dynamic feature for the event structure evoked by these verbs.

The defining semantic attribute characteristic of the semantics of these verbs is that the agents share the same role in the event structure, i.e., the agent and the co-agent are conceptualized as initiators of the event. However, battle verbs are in some ways syntactically different from other Reciprocals. In particular, battle verbs frequently occur in argument structure constructions in which the reason for the conflict or a topic of the argument is specified (e.g., *Sparta battled with Athens about whether Athens should rule the island* or *They battled about it*). Expressing a topic or a reason as a syntactic argument with other reciprocal verbs such as marry or meet verbs is not common in English.

In VerbNet, the topic/reason is identified as a Theme with battle verbs. This analysis is consistent with their analysis of topic with communication verbs (e.g., *They spoke about the issue*). The force-dynamic analysis does not include topic as a participant in event structure representations. As argued in Chapter 5 on Communication verbs, topic is used to situate various social events, such as communication events and interpersonal interactions within a conceptual domain. When it is included in the event description as a syntactic argument, it is identified as a circumstantial phrase. Consequently, it is not analyzed as an event participant; it does not interact with event participants on a force-dynamic level. Given this analysis of topic, which excludes it from the event structure representation, battle verbs share the same semantic representation as other Reciprocal verbs.

6.2.2 Event structure representation of Reciprocal verbs

The semantics of Reciprocal verbs obligatorily evokes two participants: an agent and a co-agent. The agent and co-agent are engaged in the same event and share the same participant roles in the event structure. For example in (111a), both participants, *Bill* and *Kathy*, are the initiators as well as the endpoints of the event. A transitive argument structure construction in which either *Bill* or *Kathy* is the initiator can be used to describe the same event: Bill

married Kathy/Kathy married Bill. In (111b), the participants are also understood to have the same roles in the event structure. Either *Brenda* or *Molly* can be construed as the initiators of the event: Brenda split up with Molly and Molly split up with Brenda.[1] Similarly in (111c) the two participants are both initiators and endpoints of the meeting event. The transitive argument structure construction signals an asymmetric construal of the event, as discussed in section 6.3. Reciprocal verbs may also describe adversarial interactions in which the participants' reciprocal engagement in the event is induced by conflict (111d, 111e). In (111d), the subject is a collective noun and entails that a group of individuals, rather than precisely two people, fought each other.

(111) a. Bill and Kathy married. (VerbNet)

b. Brenda and Molly split up. (VerbNet)

c. Anne met Cathy. (VerbNet)

d. The populace fought. (VerbNet)

e. Sparta battled with Athens. (VerbNet)

The force-dynamic representation of verbal semantics does not distinguish cooperative and adversarial interactions from each other. In both types of events, the agents are engaged reciprocally. Cross-linguistically, the syntactic realization of participants with cooperative and adversarial verbs is frequently the same. In English, the co-agent with adversarial verbs, such as *fight* can be syntactically realized as a subject in a conjoined plural phrase (e.g., *Sparta and Athens fought*), a direct object (e.g., *Sparta fought Athens*), or a *with*-phrase (e.g., *Sparta fought with Athens*). The same syntactic alternations are also common with cooperative verbs, as discussed in section 6.3. The shared syntactic behavior of verbs that denote cooperative and adversarial interactions is also attested in other languages, such as

[1]With the verb *split up*, the construal in which one of the participants is expressed as a *with*-phrase strongly suggests that the agent, expressed as the grammatical subject, initiated the event of splitting up. That is, the co-agent, expressed as a *with*-phrase, may have not had the intention of splitting up. Nonetheless, the event of splitting up requires that both participants undergo the same event and so the roles of the two participants in this construal are the same, intentions set aside.

Czech. In Czech, the co-agent in adversarial and cooperative events can be expressed as a subject in a plural or a conjoined plural phrase (112a-112b) or a *with*-phrase (112c). The transitive [SBJ V OBJ] argument structure construction is not used with either cooperative or adversarial verbs in Czech.

(112) a. Jirka a Katka se hádali/prali/potkali.
Bill and Kathy REF argued/fought/met
'Bill and Kathy argued/fought/met.'

b. Hádali se/prali se/potkali se.
Argued REF/fought REF/met REF
'They argued/fought/met.'

c. Jirka se hádal/pral/potkal s Katkou.
Bill REF argued/fought/met with Kathy
'Bill argued/fought/met with Kathy.'

The event structure representation that depicts the semantics of Reciprocal verbs is shown in Figure 6.1. The relation between the Agent and the Co-agent is defined as PERFORM. The same relation also defines the interaction between the Co-agent and the Agent. Both participants are both initiators and endpoints of a PERFORM relation in the event structure. Though the interaction may also have a physical aspect to it, as is the case with verbs such as *fight*, *battle*, or *hug*, the representation depicts only the social aspect of the event in which two human entities interact with each other on a social level. The analysis focuses on the aspect of the action that describes social behavior, such as the form of disagreement or affection. In the case of *hug* or *kiss*, the physical part of the event is contact but with verbs such as *meet*, the physical aspect of the event is motion. In many other cases such as *split up* or *marry*, the interpersonal interaction is accompanied by a different dimension: a change of social status or role.

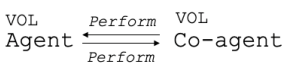

Figure 6.1: Reciprocal event structure.

For example, verbs such as *marry*, *divorce*, *split up*, or *friend* denote events in which the participants reciprocally begin or end a socially sanctioned relationship. With these verbs, the participants involved also undergo a change of social status or social role that they are either formally assigned by a social institution (such as being married as opposed to single and taking on the role of a husband or a wife) or informally given (such as being a friend to someone). However, the force-dynamic representation of these verbs does not include information about the change of social status that accompanies the reciprocal semantics. Our analysis is consistent with VerbNet's account of these verbs, which does not single out verbs such as *marry* in their analysis to specify that the reciprocally-initiated event results in a change of formal social status of the participants. Verbs such as *marry* or *hug* belong to the marry-36.2 class and are analyzed as denoting SOCIAL_INTERACTION between two agents.

6.3 Semantics of argument structure constructions with Reciprocal verbs

The syntactic means for indicating a reciprocal action between two or more participants has been explored in great detail cross-linguistically (Nishigauchi 1992, Dalrymple et al. 1994, Knjazev 1998, König and Gast 2008, Evans 2008 Labelle 2008). It has been reported that languages use various syntactic and morphosyntactic strategies to encode mutual events. Studies on reciprocal events generally include a variety of verbs from different semantic domains since they discuss the grammatical means associated with a particular type of event and are not limited to verbs that evoke a Reciprocal event structure. In fact, Reciprocal verbs (or lexical reciprocals) are not always a focus of syntactic studies since they don't frequently occur in grammatically-marked reciprocal argument structure constructions (Kemmer 1993a, Haspelmath 2007). On the other hand, grammatical reciprocals, i.e., verbs that do not evoke reciprocality in their lexical semantics, are more commonly used in examples of grammatically-marked argument structure constructions that describe reciprocal events.

In this chapter, we focus on the semantics of lexical reciprocals and argument structure constructions associated with these verbs in English. We do not discuss the grammatical means by which reciprocal events are syntactically encoded with non-reciprocal verbs. The semantic analysis focuses on the force-dynamic relations between participants in argument structure constructions with Reciprocal verbs. This section discusses four distinct construals with Reciprocal verbs depending on the syntactic realization of event participants: a Collective construal (6.3.1), a Mutual construal (6.3.2), an Internal Construal (6.3.3), and a metaphorical physical Force construal (6.3.4).

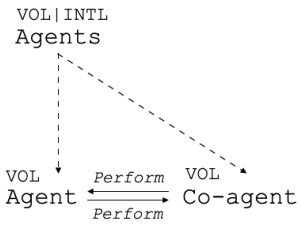

Figure 6.2: Collective construal with Reciprocal verbs.

6.3.1 Collective construal

In a collective construal, the participants are expressed as a subject argument denoted by a plural (113a) or a conjoined plural noun phrase (113b). It is also possible to express the participants by singular nouns such as a *committee* or *populace* which refer to multiple entities in the event and are thus semantically plural (113c). The term 'collective' is adopted here to describe construals in which the participants are realized as a single argument in the argument structure construction, i.e., the constructional semantics construes the Agent and the Co-agent as a single participant.

(113) a. They battled about it. (VerbNet)

b. Brenda and Molly fought. (VerbNet)

c. The committee met. (VerbNet)

It is the verb's semantics rather than the argument structure construction that evokes a reciprocal engagement of the two participants. The constructional semantics describes an internal event in which no causal interaction between participants takes place. This is depicted by the causal chain shown in Figure 6.2. Given their syntactic status as a single argument, the participants are construed as referring to a single participant in the causal chain, which is labeled "Agents".

The term 'collective' is not reserved for interpersonal domain verbs. The term has a more general application and can be used to describe the semantics of other types of reciprocal events in which participants are expressed as a single argument, such as symmetric conceptual relations (e.g., *They resemble each other*), events of exchange (e.g., *The bell ringers switched places*) or physical spatial relations (e.g., *The houses are adjacent to each other*).

The Agents in the causal chain in Figure 6.2 are labeled [VOL|INTL] because they are volitionally acting entities. The INTL label describes that participants undergo internal change in the event since they are not in a causal relation with another participant. Identifying the causal chain as 'Internal Collective' yields an event description in which multiple participants are expressed as a single argument but map to two distinct participants in the verbal network, as shown in Figure 6.2. This contrasts other Internal causal chains in which the participant in the causal chain maps to only a single participant in the network (e.g., the example *Kathy hooked up* discussed in section 6.3.3).

6.3.2 Mutual construal

Participants in reciprocal events can be expressed as distinct arguments. In a 'Mutual' construal, the Agent is expressed as a subject and the Co-agent as a *with*-phrase (114). When the participants are expressed as distinct arguments, it is also possible to express the Co-agent as a direct object with some Reciprocal verbs; however, this construal is not symmetric and is therefore not analyzed as Mutual. The transitive argument structure construction with Reciprocal verbs is discussed in section 6.3.4.

(114) a. She flirted with him.

b. Brenda met with Molly. (VerbNet)

c. Fred is going steady with Amanda. (VerbNet)

d. I battled with him about whether to go. (VerbNet)

As was noted in the introductory section, some verbs that belong to the class of 'natural reciprocals' do not always entail a symmetric construal when the participants are expressed as separate arguments (Kruitwagen et al. 2021). The example in (114a) is a case in point: there is no semantic entailment as to the engagement of the Co-agent in the flirting event. Since fully symmetric and semi-symmetric Reciprocal verbs occur in the same VerbNet classes and argument structure constructions, the present analysis does not distinguish the semantics of examples such as (114a) from examples that entail reciprocal engagement of both participants (114b). In both cases, the role of the Co-agent in the [SBJ V *with*-OBL] construction is analyzed as reciprocating the event denoted by the verb.

This analysis presupposes that the *with*-phrase in argument structure constructions with all Reciprocal verbs is used in its comitative sense and describes accompaniment between an agent and another participant (or participants) in an event. That is, the comitative *with*-phrase signals that the participant is engaged in the same event as the agent (Stassen 2001). The 'comitative' phrase is abundantly used in English to express this type of a relation between participants across different semantic domains (e.g., *She went to the movies with her friend* or *He watched the stars with his dad*) and alternates with the coordinating conjunction *and* (e.g., *She and her friend went to the movies* or *He and his dad watched the stars*). Semantically, the collective "and-construction" and the mutual "with-construction" are very similar in that they describe a single event and ascribe the event simultaneously to two participants (Stassen 2001:6); however, as Stassen (2001:6) points out, "one of the participants [in the with-construction] is backgrounded." Likely, this results in the acceptability of examples such as *She flirted with him* despite the Co-agent not being necessarily reciprocally involved in the event. Thus, although accompaniment generally evokes a symmetric involve-

ment in the event, the participant expressed as an oblique argument with semi-symmetric Reciprocal verbs has a different, less agentive, status than the same participant expressed as a subject in Collective argument structure constructions.

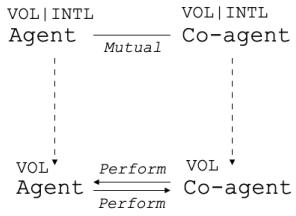

Figure 6.3: Mutual construal with Reciprocal verbs.

The causal chain associated with the semantics of examples in (114) and its mapping to the Reciprocal network is shown in Figure 6.3. The relation between the Agent and the Co-agent is identified as MUTUAL. The MUTUAL relation signifies that the participants are engaged in the same event denoted by the verb but are syntactically expressed as distinct arguments. MUTUAL is not a force-dynamic relation. As an endpoint of a MUTUAL relation, the Co-agent in the causal chain inherits the subevent label of the Agent. Similarly to the semantics of Collective causal chains discussed in the previous section, the participants undergo internal change in the event as they are not in a force-dynamic relation with each other or some other participant in the event.

The Agent and the Co-agent in the constructional causal chain map to the respective participants in the verbal network. The MUTUAL relation between the participants in the causal chain doesn't directly link to the PERFORM relation in the verbal network but the Mutual construal of the event is permitted by the symmetric interaction between participants who are both engaged in a PERFORM relation with each other in the verbal representation.

With verbs that describe adversarial interactions, the Co-agent in the MUTUAL relation may be expressed as an *against*-oblique (e.g., *He fought against the enemy*). The preposition *against* signals that the agents engage in a hostile encounter. With many battle verbs, it is possible to express the Co-agent as either a *with* or *against*-oblique (*He fought with/against the enemy*).

6.3.3 Internal construal

Argument structure constructions in which only the Agent is overtly expressed describe Internal events. The examples in (115) describe events in which an Agent is engaged in some event that is understood to be reciprocated by another participant. Though verbal semantics evokes the second participant, the Co-agent is not constructionally evoked because it is not syntactically realized.

(115) a. Kathy hooked up.

b. He went out.

The causal chain associated with this construal contains only the Agent as an event participant, as shown in Figure (6.4). The Agent is a volitional participant and by engaging in the event, undergoes Internal (INTL) change. The Agent maps to the Agent participant in the verbal network. There is no mapping of the Co-agent to the causal chain since the Co-agent is not syntactically realized as an argument.

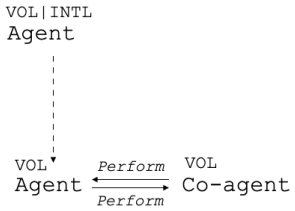

Figure 6.4: Internal construal with Reciprocal verbs.

In English, this construal is only possible with verbs in the interact-36.3 class in VerbNet. With other Reciprocal verbs, both the Agent and the Co-agent have to be syntactically realized in argument structure constructions.

6.3.4 Metaphorical Force construal

Some Reciprocal verbs can express the Co-agent as a direct object, yielding a construal that is asymmetric (116). In the transitive construal, the semantics of the argument structure

construction does not evoke that the Co-agent is reciprocally involved in the event. The asymmetric reading of the transitive argument structure construction is most clearly exemplified when a semi-symmetric verb, such as *hug* or *kiss*, occurs in this construal. The example in (116a) describes an event in which *Anne* hugged *Cathy* but does not entail that *Cathy* hugged *Anne* back (cf. Kruitwagen et al. 2021). With symmetric verbs, which obligatorily evoke a reciprocal interaction between the Agent and the Co-agent, such as *marry* in (116d), the transitive argument structure construction still describes an event in which the two participants engage in the same event reciprocally. The symmetric event evoked by the verbal semantics is more prominent than the asymmetric construal evoked by the constructional semantics.

(116) a. Anne hugged Cathy.

b. Anna met Cathy. (VerbNet)

c. Anne fought Cathy. (VerbNet)

d. Bill married Kathy. (VerbNet)

The transitive construal highlights the causal PERFORM relation initiated by the Agent in which the Co-agent is the endpoint. The constructional semantics does not highlight the Co-agent's role in the event as an initiator of a reciprocal PERFORM relation, which is evoked by the verbal semantics. The semantics of the transitive construal with Reciprocal verbs is analyzed as describing a metaphorical physical Force event. As shown in Figure 6.5, the Agent is analyzed as an initiator of a metaphorical FORCE relation in the constructional causal chain. The Co-agent is the endpoint. The social PERFORM relation is a social equivalent to the physical FORCE relation. This causal correspondence between domains and the metaphorical use of physical Force constructions is seen with other types of social verbs, such as verbs of Possession or Communication discussed in Chapters 4 and 5, respectively.

The Co-agents' subevent label is unspecified in the constructional causal chain. In the physical source domain, the patient in a Force event may or may not undergo change.

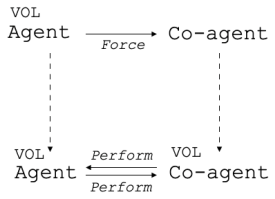

Figure 6.5: Force construal with Reciprocal verbs.

Whether any type of change happens (e.g., *He hit the wall*) or doesn't (e.g., *He hit him unconscious*) with physical Force verbs is not entailed by the transitive argument structure construction in English; it may be determined contextually or specified by a different argument structure construction, such as the resultative construction in English (e.g., *He swatted the fly dead*). Consequently, the type of change that happens to the Co-agent in the metaphorical Force event is also unspecified in the target-domain constructional causal chain, as depicted in Figure 6.5.

However, unlike physical Force verbs, some Reciprocal verbs do evoke that the participants undergo a change of social status or role. For example, *marry* entails that both participants undergo a change of social state by going from single to married. Though this is not directly represented by verbal or constructional semantics in the collective or mutual construals, one could argue that the transitive argument structure construction with these types of verbs, such as *Bill married Kathy*, describes a change of state construal, in which the endpoint of the FORCE relation is defined as a property theme. This type of analysis is plausible but it is not further explored here. The main reason is that this analysis cannot be applied to other Reciprocal verbs such as *hug* or *kiss*, which belong to the same VerbNet class as *marry*. In order to have a unified semantic analysis for the transitive argument structure construction for all verbs in this class, the Force construal is preferred for the schematic semantic description of the [SBJ V OBJ] construction with marry verbs.

6.4 Collective verbs

Interpersonal interactions can also be described by "Collective" verbs that describe events in which two participants are engaged in the same event simultaneously but the event is not reciprocal in nature (117). For example, the examples with *conspire* in (117a-117c) describe events in which *John* and *Sarah* engage in the same event but there is no causal relation between them. Unlike the semantics of Reciprocal verbs, Collective verbs don't evoke that the participants are causally affected by the conspiring event. If an endpoint of the collective event is specified, it is constructionally evoked and syntactically expressed as a subsequent *against*-oblique, as shown in (117c).

(117) a. John and Sarah conspired. (VerbNet)

b. John conspired with Sarah. (VerbNet)

c. They conspired against her. (VerbNet)

d. They collaborated on the task. (VerbNet)

e. John worked with Paul at finishing the task. (VerbNet)

Collective events have received some attention in the linguistics literature. Cross-linguistic studies primarily focus on the grammatical encoding of collective actions (or 'joint' actions) when compared to distributive actions (Kemmer 1993b, Filip and Carlson 2001). Indeed, joint actions are not restricted to verbs in the social domain. It has been put forth that there are four main semantic factors that are relevant to collective interpretation of an event: spatial proximity, temporal proximity, sameness of action/state, and cooperation of the participants (Kemmer 1993b:86). With social domain verbs such as *conspire* or *collaborate*, the semantic factors that are most relevant to the collective interpretation of the event are that the participants are engaged in the same actions and that the actions are temporally proximal. In English, the cooperation of participants also appears to be highly relevant, since most verbs in the VerbNet conspire and collaborate classes consist of cooperative verbs. However, as Kemmer (1993b:86) notes, cooperation is cross-linguistically not

always necessary: "collective markers cross-linguistically can be used for situations in which the participants are not aware of each other's actions, and hence cannot be cooperating."

The notion of "sameness of action/state" does not necessarily entail that the two participants are doing exactly the same thing. Kemmer (1993b:86) argues that an event can be marked as collective even when the participants are engaged in perceptually dissimilar activities. She gives the example *Mary and her mother made a dress together* in which the collective marker *together* can be used even if Mary and her mother carried out different tasks in the event, e.g., Mary cut and measured the fabric and her mother was doing the sewing on the machine. Similarly, social verbs such as *collaborate* or *cooperate* do not require that the agents carried out the exact same actions but the semantics of these verbs does signal that the actions are viewed as a 'single event' at a certain level of granularity (Kemmer 1993b). Clark (1996:19) calls these events 'joint actions' and notes that the participants do dissimilar things in many joint actions. Social Collective verbs represent joint actions and thus impose a 'unitary frame' (Kemmer 1993b:86) on the agents' involvement in the event.

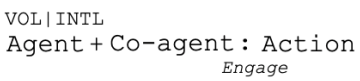

Figure 6.6: Collective event structure.

The event structure associated with the semantics of Collective verbs is shown in Figure 6.6. The representation uses a plus sign between the Agent and the Co-agent to indicate that the participants are engaged in the event as a unit. The plus sign also signals that the relation between the Agent and the Co-agent in the Collective event structure is not force-dynamic. The interaction between the two participants can't be described as causal or non-causal since they are not in a force-dynamic relation with each other. The verbal event structure representation doesn't use the label MUTUAL to describe the 'relation' between the Agent and the Co-agent. Mutual is used only in constructional representations when the entities are construed as separate arguments in argument structure constructions, such as when the Co-agent is syntactically realized as a *with*-phrase (e.g., *He collaborated with his*

friend). In contrast, the plus sign is a schematic representation of a collective engagement of participants in an event and allows that different construals, such as a Mutual or a Collective construal, can map to the same verbal representation.

The Agent and the Co-agent are engaged in the event volitionally and are thus labeled VOL. The change that both participants undergo is defined as internal (INTL). The participants' engagement in an Action represents an internal process in the social domain. An ENGAGE relation is used to describe the 'relation' between a participant and their subevent. The Action is not analyzed as a distinct 'participant' from the Agent and the Co-agent; the Action specifies the subevent that the agents are engaged in. The analysis of participants and their subevents when subevents are syntactically realized as separate arguments is discussed in more detail in Chapter 1 (section 1.3.1). A colon is used to denote that a participant and their subevent is evoked by the event structure. We do not use a dash (which is otherwise used for non-causal relations) or an arrow (used for causal relations) given that the relation between the participant and their subevent is not force-dynamic. Though the Action directly follows the Co-agent in the linear event structure representation, it describes a subevent of the Agent, as well. The plus sign between the Agent and the Co-agent signals that they semantically form a 'unit' in the event structure and the ENGAGE relation therefore denotes a subevent of both participants.

6.4.1 Collective verbs in VerbNet and FrameNet

There are two classes with Collective verbs in VerbNet: conspire-71 and cooperate-73.1. The semantics of both types of verbs evoke an Agent, a Co-Agent, and a Theme (which is used to describe the Action in VerbNet). VerbNet also includes a Beneficiary as a Role for conspire verbs. However, the Beneficiary is not analyzed as a null-instantiated argument in examples in which it is not overtly expressed, such as (117a) or (117b). This analysis reveals that the Beneficiary is evoked constructionally in the event structure, rather than lexically.

VerbNet's decision to have two separate classes for these verbs is syntactically motivated:

cooperate verbs tend to occur in argument structure constructions in which the Action is overtly expressed as an *in* or *on*-oblique (e.g., *They collaborated on the task*) and generally do not occur with constructionally added beneficiaries. Conspire verbs can occur in argument structure constructions in which the Action is expressed, e.g., as an infinitival clause (e.g., *They conspired to overthrow the UN*). In addition, conspire verbs can occur with constructionally evoked beneficiaries (e.g., *They conspired against him*).

In the present analysis, conspire and collaborate verbs describe the same event structure in which two participants engage in a collective event. Though the syntactic realization of the Action is different for each class of verbs, this by itself does not point to a semantically distinct analysis. As discussed in Chapter 1, the syntactic realization of subevents that describe participants' events or actions is very variable in English. The important consideration is that with both verbs, the Action describes the participants' subevent rather than a distinct event participant.

FrameNet has a single Collaboration frame for verbs such as *conspire, collaborate*, or *collude*. There are no other frames for Collective verbs in FrameNet. This frame evokes only three Core Frame Elements: Partner_1 and Partner_2 (or Partners), and Undertaking, which describes the Action that the Partners are engaged in. FrameNet's semantic analysis of this frame is thus compatible with the force-dynamic event structure proposed for Collective verbs in this chapter.

6.5 Semantics of argument structure constructions with Collective verbs

The syntactic realization of participants with Collective verbs is quite similar to that of Reciprocal verbs. The Agent and Co-agent may be construed as a single collective 'unit' and syntactically realized as a plural or conjoined plural subject (6.5.1), or they may be construed as two separate entities and syntactically realized as two distinct arguments in a Mutual argument structure construction (6.5.2). With some Collective verbs, it is possible to construe the event as describing an Internal process and overtly express only the Agent

(6.5.3). Unlike with some Reciprocal verbs, the Co-agent is never expressed as a direct object with Collective verbs.

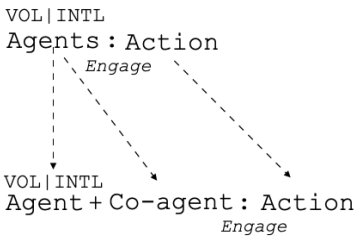

Figure 6.7: Mapping of a Collective construal to the Collective network.

6.5.1 Collective construal

Collective verbs can occur in argument structure constructions in which the Agent and the Co-agent are both expressed as a subject argument (118). In, (118a), the Agent and the Co-agent are expressed as a plural noun and in (118b), the participants are expressed as a conjoined plural noun phrase. As shown (118c, 118d), the Action may be overtly expressed as a prepositional phrase in the Collective construal.

(118) a. They collaborated. (VerbNet)

b. John and Sarah conspired. (VerbNet)

c. They worked on the task. (VerbNet)

d. John and Sarah collaborated on the task. (VerbNet)

The causal chain associated with the Collective construal when the Action is not overtly expressed is the same as shown for Reciprocal verbs in Figure 6.2 (section 6.3.1). The Agent and the Co-agent are analyzed as a single participant, labeled as "Agents," in the constructional semantics but map to two distinct entities in the verbal network.

When the Action is syntactically realized, it is part of the causal chain representation, as shown in Figure 6.7. The Action is analyzed as the Agents' subevent, just like it is analyzed in the verbal event structure. The relation between the Agents and the Action is analyzed

as ENGAGE. Similarly to the Collective construal in Figure 6.2 (section 6.3.1), the agents are analyzed as a single participant but the collective analysis leads to this participant being mapped to two distinct entities in the verbal network. The Action maps to the Action subevent in the verbal network.

6.5.2 Mutual construal

A Mutual analysis is used to describe argument structure constructions in which the agents are expressed as separate syntactic arguments. In particular, the Agent is expressed as a subject and the Co-agent is a comitative *with*-phrase (119). When the Action is overtly expressed, it may be realized as an *on* and *at* phrase (119b, 119c).

(119) a. John conspired with Sarah. (VerbNet)

b. John collaborated with Paul on the task. (VerbNet)

c. John work with Paul at finishing the task. (VerbNet)

The causal chain that describes the semantics of Mutual argument structure constructions with an overtly expressed Action is shown in Figure 6.8. The Agent and the Co-agent are analyzed as separate participants in the causal chain and are connected by a MUTUAL relation which signifies that the two participants are engaged in the same event, i.e., Action.

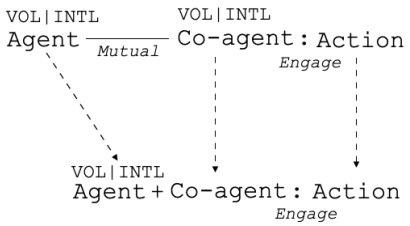

Figure 6.8: Mapping of a Mutual construal to the Collective network.

The mapping of the causal chain to the Collective verbal network depicted in Figure 6.8 shows that there is a one-to-one correspondence between the constructional semantics and the verbal event structure when both agents and their subevent are overtly expressed in the

syntax. The MUTUAL relation in the syntactic representation and the plus sign in the verbal representation are semantically compatible.

6.5.3 Internal construal

Conspire verbs can occur in argument structure constructions in which only the Agent is overtly expressed, such as *The US conspired to overthrow the UN*. The semantics of this example describes a one-participant Internal event in which the Agent engages in an Action. The Co-agent is not syntactically realized as an argument and is therefore not part of the constructional causal chain, as shown in Figure 6.9. The Agent is the sole event participant evoked by the argument structure construction. There is an ENGAGE relation between the Agent and their subevent, i.e., the Action. The Agent is identified as a volitional (VOL) entity who undergoes Internal (INTL) change in the event.

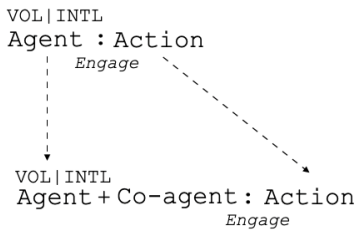

Figure 6.9: Mapping of an Internal construal to the Collective network.

The semantics of conspire verbs evoke that a Co-agent is part of the event structure; however, the Internal construal does not evoke this part of the event. It is the mapping of the causal chain to the verbal network that provides the information about the Co-agent's participation in the event.

6.5.4 Argument structure constructions with a beneficiary

An additional participant, a beneficiary, may be constructionally evoked with conspire verbs. The beneficiary denotes the entity against whom the event of conspiring is targeted. Since this participant 'benefits' from the event negatively, the term "maleficiary" is used here to

refer to that participant. A maleficiary tends to be syntactically realized as an *against*-oblique in English. A beneficiary is usually expressed as a *for*-oblique or a direct object with some verbs (e.g., Reciprocal verbs or Social Role verbs discussed in Chapter 3).

(120) a. And you conspire with him against me. (COCA)

b. John and Sarah conspired against her.

c. John conspired against her.

As shown in the examples in (120), a maleficiary can be added to any of the causal chains discussed above. In (120a) and (120b), a maleficiary is constructionally added to a Mutual and Collective construals, respectively. In (120c), a maleficiary is added to an Internal construal in which the Co-agent is not syntactically realized. Argument structure constructions in which a maleficiary is overtly expressed don't generally specify the Action.

When the purpose of the action is overtly expressed, it usually includes information about the identity of the maleficiary. For example, in *The US conspired to overthrow the UN*, the infinitival clause that specifies the purpose of conspiring (*to overthrow the UN*) tells us who the maleficiary is: the UN. An example in which the maleficiary is syntactically expressed as a separate participant along with the purpose is not included in VerbNet. Such argument structure constructions are not common in English, though they are possible. In an example such as *My mum and dad conspired against me to put me in a mental hospital* (Google), the maleficiary is syntactically expressed as an *against*-oblique and the purpose as an infinitival clause.

Figure 6.10 depicts the constructional semantics associated with a Collective construal with a constructionally-added maleficiary (e.g., 120b) and its mapping to the Collective event structure. The maleficiary does not map to any participant in the verbal network since it is not evoked by the verbal semantics. Unlike the maleficiary with Reciprocal battle verbs, the maleficiary with Collective verbs does not map to the Co-agent. The Co-agent with Collective verbs always refers to the collaborator.

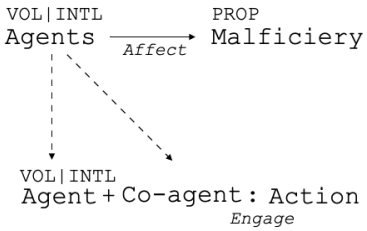

Figure 6.10: Mapping of a Collective construal with a maleficiary to the Collective network.

The semantic analysis of a maleficiary in causal chains is the same as of a beneficiary. A maleficiary is an endpoint of a mental AFFECT relation and undergoes a change of state in the event. The maleficiary is therefore identified as a Property ("PROP") theme. A benefactive AFFECT relation is always causally subsequent to the main event, unless the verb's event structure evokes AFFECT as describing the main event (as is the case with certain mental verbs, such as *scare* or *amuse*). Beneficiaries and maleficiaries are not specific to any one semantic domain. They may be constructionally added to events that describe physical, social, or mental scenarios. We do not distinguish different benefactive relations based on the domain of the verb. No matter the semantics of the verb, the beneficiary is always affected by the event on a mental level. For this reason, all beneficiaries (and maleficiaries) are analyzed as endpoints of a mental relation. Additionally, the label [PROP] is not specific to any particular domain. Change of state events can be described by social, mental, or physical verbs.

6.6 Inducive verbs

A large semantic category of verbs that describe interpersonal interactions evokes events in which a person causes another person to engage in or refrain from an event or action, such as *bully* (121a), *blackmail* (121b), or *lure* (121c). Such events are always asymmetric in that there is a unidirectional causal relation between two human entities. One entity is the initiator of the event and the other is the endpoint. The initiator exerts some form of social force on the endpoint and the endpoint acts or doesn't act as a result of the interaction.

The action that the endpoint undertakes may be syntactically expressed as a prepositional gerund (121b) or a prepositional noun phrase (121c). In (121c), the prepositional phrase, *into a job*, denotes the action, and the example could be paraphrased as *You lured me into taking a job.*

(121) a. I bullied him. (VerbNet)

b. I think he resigned because they were trying to blackmail him into lying about Benghazi. (COCA)

c. You lured me into a job, and then you fired me. (COCA)

The force-dynamic representation of the semantics of Inducive verbs is shown in Figure 6.11. The initiator of the social PERFORM relation is identified as a Causer and the endpoint as an Agent. The event that the Agent is forced to ENGAGE in or REFRAIN from is labeled as Action. The Causer volitionally (VOL) initiates the event. The Agent is also identified as a volitional (VOL) entity in the event structure because their engagement in or refrainment from the demanded Action is volitional. A volitional label does not mean that the Agent acts willingly, it signals that the Agent has to employ mental faculties in order for the event to take place. The forcefulness of verbs such as *blackmail* or *bully* certainly implies an uncooperative and unwilling Agent; however, their engagement in the requested Action requires their volition.

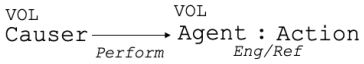

Figure 6.11: Inducive event structure.

The change that the Agent undergoes in the event as an endpoint of PERFORM is not specified in the network. In most, if not all, Inducive events, the Agent could be analyzed as undergoing a change in their mental state; however, the verbal representation proposed here only specifies one type of change that the Agent undergoes in the event: the Agents' volitional engagement in an Action. Not specifying the change in the endpoint of PERFORM in the social

domain is consistent with our analysis of its equivalent in the physical domain, the endpoint of physical FORCE. In addition, typically only one type of change for each participant is relevant to the event structure and tends to be syntactically expressed. In English, it is the Agent's engagement in an Action that is syntactically specified. As we discuss in section 6.8, Attack verbs evoke an event structure in which the endpoint of PERFORM is identified as a property theme; however, this participant doesn't consequently engage in an Action.

The event structure representation in Figure 6.11 defines the relation between the Agent and the Action as ENGAGE/REFRAIN (*Eng/Ref*). The semantic representation is therefore not restricted only to verbs that describe events in which the Agent engages in an Action but also to verbs in which the event describes the Causer preventing the Agent from engaging in an Action. VerbNet's semantic classification does not have a class for Inducive refrain verbs which suggests that there may not be verbs that are specific to the interpersonal social domain in English; however, this may not be the case cross-linguistically. Considering that the verbal representation aims to depict language-independent event structures associated with verb types, a REFRAIN relation is included in Figure 6.11.

Domain-general verbs such as *allow* or *forbid* can be used to describe interpersonal interactions between a volitional Causer and an Agent in English (e.g., *He forbid us from smoking*). As discussed in the following section 6.6.2, *forbid* and other domain-general verbs have a different underlying event structure representation since they don't obligatorily evoke an agentive initiator. Hence, the force-dynamic relation initiated by the initiator can't be identified as PERFORM with these verbs, and they are not analyzed as Inducive.[2]

6.6.1 Inducive verbs in VerbNet and FrameNet

Inducive verbs can be found in the following VerbNet classes: trick-59.2, lure-59.3, compel-59.1, and stimulate-59.4. In most of these classes, two participants corresponding to the

[2]In English, the use of the verb *forbid* invites an Inducive analysis since the initiator is almost always agentive or the agent's subevent is grammatically expressed as a subject (e.g., *The rules forbid us from smoking*). However, other verbs in the forbid-64.4 class, such as *prevent, stop* or *inhibit*, do not necessarily evoke an agentive initiator. As a whole, the class is analyzed as consisting of domain-general verbs.

Causer and the Agent are specified. In VerbNet, the Causer is identified as an "Agent", and the Agent is analyzed as either a "Patient" or a "Beneficiary". The Action is labeled "Predicate" in all these classes. Though VerbNet's semantic description of the interactions between participants is not the same, on a force-dynamic level, all of these classes can be said to describe the same type of event. A Causer's social action denoted by the verb results in another person (i.e., an Agent) engaging in an event.

FrameNet has a Manipulate_into_doing frame for Inducive verbs. FrameNet distinguishes four distinct Frame Elements in this frame: Manipulator (which corresponds to our Causer), Victim (which corresponds to our Agent), Resulting_action (which corresponds to our Action), and Goods (which also correspond to our Action). In their analysis, Goods "may stand in for the Resulting_action of the Victim giving the Manipulator the Goods," as in *Leslie blackmailed the watch out of John.* The noun watch denotes the desired action, which is that the Agent relinquishes their possession. As discussed in section 6.14, when the Action is described by a noun phrase and refers to Goods, the event is metaphorically construed as a physical mereological argument structure construction.

6.6.2 Letting, Allowing, and Forbidding

VerbNet has three separate classes for letting verbs: allow-64.1, let-64.2 and forbid-64.4. VerbNet's examples of syntactic frames associated with verbs in these classes all include interpersonal interactions between two human entities (122). As shown in (122), the subject participant, the referent of *they*, has a social authority over the agent to either allow or forbid the agent to engage in an action or not. The semantics of these examples are not that different from examples with Inducive verbs in that the participant grammatically expressed as a subject functions as an external initiator of the ENGAGE or REFRAIN relation between the agent and their subevent. However, unlike Inducive verbs, such as *conspire*, *collaborate*, etc., allow and let verbs cannot be said to be specific to the social domain; that is, their use is not restricted to interpersonal interactions. For example, the verb *prevent* can be used with

inanimate causers such as *The recent earthquake prevented them from crossing the bridge.* The more general non-social semantics of these verbs is reflected in VerbNet's description of participant roles in allow-64.1 and forbid-64.4 classes, which identifies the initiator as a Causer rather than an Agent[3]. The label Causer accommodates other types of initiators that are not agentive.

(122) a. They allow us to smoke. (VerbNet)

b. They let us smoke.

c. He forbid us from smoking. (VerbNet)

Events of 'letting' in the physical domain have been argued to be force-dynamically different from events of 'causing' (Talmy 1988:57). In prototypical letting events, which Talmy refers to as 'onset letting of motion', "a stronger Antagonist that has been blocking an Agonist with tendency toward motion now disengages and releases the Agonist to manifest its tendency" (Talmy 1988:58). He exemplifies this type of force-dynamic interaction on the example *The plug's coming loose let the water flow from the tank* in which the waters tendency is toward motion, i.e., to flow out of the tank in its natural downward direction. The plug blocks the flow and its removal allows the water to flow out. The event of the plug coming loose describes an event of letting. This is different from 'causing onset of motion' events in which the Antagonist causes an Agonist, whose tendency is toward rest, to move (e.g., *He kicked the ball over the fence*).

The concept of letting in the physical domain can be extended to the use of letting verbs in the social domain (cf. Talmy 1988). Talmy gives the example *He (finally) let her present her opinion* and explains that in this example, "blockage and release of blockage exist in a communicative and interpretive realm of convention-guided and volitionally initiated actions, not as physical impingements" (Talmy 1988:76). His discussion of social examples of letting

[3]The initiator is identified as an Agent with let-64.2 verbs but this analysis seems inconsistent with their analysis of allow and forbid verbs. There is even some inconsistency of labeling the subject argument as Causer vs. Agent in specific examples in the allow-64.1 class itself despite their overarching analysis of the initiator having a 'Causer' role in the event structure. Additionally, let verbs do not require an agentive initiator, which points to a 'Causer' role.

is restricted to a short footnote but the analogy between the physical and social domains with letting and causing is justified and in most cases quite clear. For example, when verbs such as *allow* are used in a social domain context such as *They allow our smoking*, the Agonist's tendency is towards being engaged in the said action, i.e., smoking. Allowing the Agonist to smoke is an event of letting in which the Antagonist is free to manifest their tendency. The verb *prohibit* in *They prohibited our smoking* describes the Antagonist's not allowing the Agonist to engage in the action which 'blocks' the event of smoking from taking place.

We do not attempt to formulate a formal analysis of causal chains associated with letting verbs here. Though the examples in the relevant VerbNet classes do describe interpersonal interactions, the verbs themselves cannot be analyzed as social verbs and are thus not a subject matter for this dissertation. The theoretical literature on the force-dynamics of letting and causing points to a distinct analysis of letting and causing. The relation between two human participants in events of letting should be analyzed as distinct from the relation between a Causer and Agent in causing events with verb such as *bully* or *blackmail*, which describe events in which the Antagonist's tendency is towards not engaging in the action described by the subevent but the Causer forces them to do so.

In their force-dynamic analysis of physical and mental verbs, Croft et al. (2017, 2018) do not propose a separate analysis for letting events. However, letting verbs do not fall into either one of these domains as they are domain-independent verbs (cf. Talmy 1988). In the physical domain, Croft et al. (2017) analyze letting examples with verbs such as *drop* as caused motion, rather than letting motion. For example, *He dropped the ball* would be analyzed by Croft et al. (2017) as an event in which the agent causes the ball to move. Their analysis doesn't recognize that the ball's tendency is toward motion, i.e., to fall to the ground. In other words, the Antagonist's physical constrainment of the ball causes the ball to remain in a certain position and the release of the impingement results in the ball's motion towards the ground. This example could be paraphrased with the verb *let*: *He let the ball fall to the ground by ungrasping it.* Their unified analysis of letting and causing with verbs

of motion is justified; it is clearly motivated by VerbNet's analysis of these verbs, which is syntactically-based. Verbs such as *drop* are not treated as semantically distinct from other physical motion verbs in VerbNet because in English 'letting verbs of motion' occur in the same transitive argument structure constructions as 'causing verbs of motion.' The syntactic behavior of these verbs supports a unified analysis of these events.

In the social domain, we have established the relation PERFORM for causal interactions that are initiated by volitional agents and involve non-physical interaction. With Inducive verbs, a physical interaction may also take place; however, we only represent the social aspect of the event. As discussed in this section, Inducive verbs evoke an event structure with a volitional Causer. The semantics of verbs in the allow-64.1, let-64.2 and forbid-64.4 VerbNet classes do not always evoke a volitional Causer and are thus not analyzed as Inducive verbs. The constructional representation for the interpersonal letting and allowing examples in (122) will likely be the same as the representation for examples with interpersonal causing verbs, provided that a force-dynamic distinction is not made between causative and letting causation in the social domain. In both types of examples, an agentive Causer causes an Agent to engage in an action. However, the underlying verbal representation for Inducive and Letting verbs has to be different to clearly distinguish that Inducive causation is obligatorily initiated by an agentive initiator but letting causation may be initiated by a non-agentive initiator, as well.

6.6.3 General non-physical verbs of force and communication verbs

To describe events in which a Causer pressures an Agent to engage in an event, general (non-physical) force verbs such as *force, make*, or *pressure* can also be used (123). Though the semantics of these verbs are not restricted to the social domain, they can describe interpersonal interactions in certain argument structure constructions; particularly when the Causer represents a volitional entity. In the examples in (123), the initiator puts social pressure on the agent who then acts as a result of it. Though the means by which the social

pressure is carried out is likely communicative in nature because most interactions between human entities entail communication, this inference is not implied by verbal semantics. The verb evokes a causal relation between two entities and the constructional semantics evokes that the causal relation resulted in the endpoint of the relation to be engaged in a subevent, such as leaving in (123).

(123) a. He forced him to leave.

b. He made him leave.

c. He pressured him to leave.

Some Communication verbs (discussed in Chapter 5) can also occur in an Inducive construal (124). Though communication verbs evoke a transfer of information in their most prototypical use (e.g., *He told him about his accident*), they can be construed as Inducive verbs in the [SBJ V OBJ INF] argument structure construction. In the Inducive construal, the Speaker uses communicative means to pressure an Addressee to engage in an event. The communication event is not about information transfer, it has a social performative function.

(124) a. He begged him to leave.

b. I gotta beg her into taking me back, whatever it takes. (COCA)

c. He told him to leave.

d. He asked him to leave.

A particular class of communication verbs tends to be construed as primarily describing inducive events: Request verbs (see section 5.9 in Chapter 5 for more discussion). Request verbs occur in the same argument structure constructions as Inducive verbs, expressing the desired action as an infinitival clause (124a) or a prepositional gerund (124b); however, Request and Inducive verbs are semantically different. Unlike Inducive verbs, Request verbs don't entail that the Addressee actually engaged or will engage in the said action. One can beg someone to leave but it doesn't mean that their request will be fulfilled. The entailment

about whether the action took place or didn't is not semantically encoded in the 'Inducive' [SBJ V OBJ *to/into*-OBL/INF] argument structure construction. It is lexically evoked with Inducive verbs but not with Request verbs.

The constructional semantics of the Inducive argument structure construction is analyzed the same irrespective of the verb that occurs in it. The entailment about the Agent engaging in the Action rests in the *sublexical modality* of the verb (Koenig and Davis 2001) rather than the semantics of the argument structure construction itself. This analysis is consistent with the analysis of future having verbs (such as *promise* or *offer*) which we argue share the same event structure as giving verbs (see section 4.5.1 in Chapter 4 for more discussion on sublexical modality with Possession verbs).

6.7 Semantics of argument structure constructions with Inducive verbs

6.7.1 Inducive construal

Inducive verbs occur in argument structure constructions in which both the Causer and the Agent are syntactically realized (125). The social interaction between the participants in this construal is asymmetric: the Causer uses a PERFORM relation to interact with the Agent. The Action may or may not be overtly expressed. When the Action is overtly expressed, it is most commonly realized as an infinitival clause (125c) or a gerund preceded by the preposition *into* (125d).

(125) a. I bribed him.

b. I forced him.

c. He convinced him to leave.

d. I spurred the community into taking environmental issues more seriously.

The causal chain analysis distinguishes whether the Action is overtly expressed as a syntactic argument or not. In both instances, the event describes an INDUCIVE relation between two human entities. However, when the Action is overtly expressed, an ENGAGE

relation and the Agent's subevent is part of the casual chain, as shown in Figure 6.12. The semantics of the causal chain associated with the inducive construal originates in the social domain and the relation between the Causer and the Agent is therefore defined as PERFORM. There is no clear analogy to physical events to justify a metaphorical analysis of these social examples. The Agent is analyzed as a volitional (VOL) entity in the constructional representation, following the analysis of the event structure associated with Inducive verbs, to which it maps.

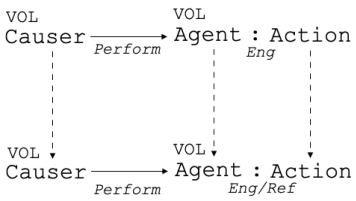

Figure 6.12: Inducive construal with Action overtly expressed.

The analysis of the transitive argument structure construction in which the Action is not syntactically realized is essentially the same. As shown in Figure 6.13, the constructional semantics describes an inducive event. The relation between the Causer and the Agent is analyzed as social PERFORM. The Agent's change in the event is specified as volitional (VOL). In inducive examples, both participants are labeled as volitional entities, whether the Action is overtly expressed or not. However, the analysis of the transitive argument structure construction may vary across languages. The inference that the Agent engages in the Action may be aspectual rather than force-dynamic in this construal. If the Agent's engagement in the Action is not entailed, the Agent may be analyzed as a property theme. In this analysis, the semantics of the transitive construction is construed as a metaphorical change of state event, like the transitive construction with Attack verbs discussed in section 6.8.

Though there is frequently a metaphor established between the social PERFORM relation and the physical FORCE relation which results in social events metaphorically using physical argument structure construction (as is the case with possession and communication verbs, see

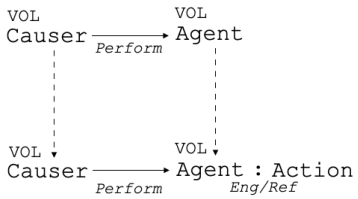

Figure 6.13: Inducive construal without Action overtly expressed.

Chapters 4 and 5), the endpoint of the PERFORM relation with Inducive verbs undergoes a different type of change when compared to the endpoint of the FORCE relation in the physical domain. In the transitive argument structure construction, the social event always describes the Causer's successful manipulation of the Agent into an Action, which leads to an analysis in which the Agent is a volitional (VOL) participant. The transitive construal with Inducive verbs (125a-125b) thus always entails that the Agent engaged in the demanded action. The result of the inducive event is entailed even when the Action is not overtly expressed.

With physical Force verbs, the type of change that the endpoint of the FORCE relation undergoes is not constructionally specified. The transitive argument structure construction with the force verbs *hit* or *punch* (e.g., *He punched the wall*) does not encode any information about what happened to the wall as a result of the punch. Wider context provides this information. For example, a change of state event may be described with the addition *and there was a big hole in it.* Alternatively, only a contact by impact event may be contextually evoked in examples such as *He punched the wall and his hand hurt from it.* Therefore, the analysis of the type of change that the endpoint of PERFORM undergoes in the social domain cannot be metaphorically equated to the endpoint of the physical FORCE relation.

It should be noted that the [SBJ V OBJ *to/into*-OBL] argument structure construction can be used with some physical Change of State verbs (e.g., *twirle, twist*, etc.), as in *She twisted the dough into a pretzel*). However, the semantics of Change of State verbs and the resultative argument structure construction is very different from the social inducive reading. Change of State verbs describe an event structure in which the patient is a property theme. In the resultative argument structure construction, the oblique argument specifies the result of the

change of state event. With Inducive verbs, the Agent is primarily a volitional participant, rather than a property theme. Therefore, an analogy between change of state events and the social inducive argument structure construction cannot be made.

6.7.2 Metaphorical Remove construal

Inducive verbs can occur in argument structure constructions in which the Action is syntactically realized as a direct object (126). This construal is not included in VerbNet but there are examples of such argument structure constructions in FrameNet. The direct object *keys* and *a few pounds* in (126a) and (126b), respectively, describe the desired action of the Agent in which the Agent surrenders the object. The action is construed as a taking event in which an Agent causes a Possessor to relinquish their Possession.

(126) a. He blackmailed the keys out of him. (FrameNet)

b. Conning a few pounds from Mr Yarrow [...] held little appeal. (FrameNet)

The semantic analysis of these examples with Inducive verbs follows the analysis proposed for the [SBJ V OBJ *from/out of*-OBL] argument structure construction with Transfer of Possession verbs in Chapter 4. The Inducive verb describes a metaphorical remove event in which the participant expressed as a direct object denotes the Possession. Figure 6.14 shows a mapping of the example in (126a) to the Inducive event structure. The blackmailed person maps to the Agent; however, the *keys* do not map to the Action in the verbal representation. In the Removal construal, the *keys* do not stand for the Agent's action, they refer to the actual object that is taken from the Agent. There is no equivalent participant in the verbal representation that denotes a physical object and the *keys* in the causal chain therefore do not map to anything in the event structure.

As the direct object represents a separate participant from the Agent in the causal chain, it has to denote a physical object and never an action. The use of metaphorical argument structure constructions in which the direct object refers to a physical object rather than the Agent's action is limited to the Removal construal with Inducive verbs. A transitive

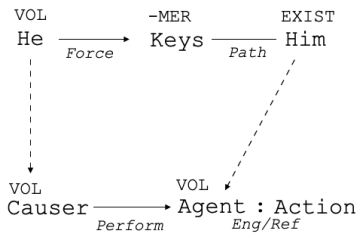

Figure 6.14: Mapping of a metaphorical Remove construal to the Inducive event structure.

obtaining [SBJ V OBJ] argument structure construction used with Transfer of Possession verbs (e.g., *He took the keys*) is not possible with Inducive verbs: **He blackmailed the keys*. The *keys* represent a physical object only in the Removal construal. In any other argument structure construction, *keys* refer to the Agent's action.

6.8 Attack verbs

The domain of Interpersonal Interactions also includes verbs that describe asymmetric events in which the action of one person affects another person, leading to a change of their mental or physical state (127). The event usually describes hostile interaction between two people. With some verbs, such as *attack* or *assault*, the interaction typically involves some form of physical altercation, and the victim of the attack undergoes physical harm (127a, 127b). However, physical harm is not necessarily evoked with all verbs in this semantic type. With verbs such as *abuse* or *bully*, the victim may be harmed emotionally (127c). In our analysis of Attack verbs, we do not specify what type of harm the victim undergoes. The force-dynamic analysis only represents that social interaction between two people takes place, and that the harmed individual undergoes some change as a result of this interaction.

(127) a. When he was disturbed, the intruder assaulted the home-owner with a heavy china ornament. (FrameNet)

b. Rioters attacked one man with pool cues, breaking his fingers and smashing his cheekbone. (FrameNet)

c. Her father verbally abused her mother. (FrameNet)

The fact that the interaction may include physical contact is not restricted to Attack verbs in the Interpersonal domain. As we noted for Inducive verbs, forcing someone to do something may also involve physical altercation. The same is true for Reciprocal verbs, such as *hug* or *kiss*, which also evoke physical contact between people. In both cases, we analyzed only the social aspect of the event. Our analysis of Attack verbs is therefore consistent with our analysis of other verbs in the Interpersonal Interactions domain.

The event structure evoked by Attack verbs is shown in Figure 6.15. The initiator of the social PERFORM relation is identified as a Causer and the endpoint as a Victim. The Victim is labeled as a property theme since it undergoes some type of change either in their mental state or physical condition. The analysis of the Victim as a property theme aligns with VerbNet's and FrameNet's analysis of these events. In VerbNet, the Victim, identified as a Patient role in the attack-60.1 class, undergoes harm. VerbNet uses the predicate HARM to describe this change. With bully-59.5 verbs, the Patient is analyzed as undergoing a change in their emotional state. In FrameNet, the frames associated with attack and abuse verbs describe events in which a hostile encounter causes physical damage or harm to a person.

Figure 6.15: Attack event structure.

Attack verbs can be found in the following VerbNet classes: attack-60.1, bully-59.5, and judgment-33.1. Verbs such as *abuse* or *assault* are in the judgment-33.1 class along with mental verbs such as *blame, judge* or *criticize*. We analyze verbs in the judgment-33.1 class as primarily evoking mental affective events in which the force-dynamic relation between the two entities is defined as mental AFFECT. However, a handful of verbs in this class require a volitional initiator and are not limited to mental causation. These verbs are thus analyzed as Attack verbs.

FrameNet includes Attack verbs in the Attacking and Abusing frames. Their Manipulate_into_doing frame includes verbs such as *bully*; however, the frame describes Inducive

causation in which the endpoint of the hostile encounter engages in an action. The Manipulate_into_doing frame therefore does not describe the Attack event structure; it only describe Inducive events.

6.9 Semantics of argument structure constructions with Attack verbs

Attack verbs generally occur in a transitive [SBJ V OBJ] argument structure construction in which the Causer is expressed as a subject and the Victim as a direct object. The constructional semantics describes a metaphorical change of state event in which the social PERFORM relation is metaphorically construed as physical FORCE (see section 6.9.1). Some Attack verbs may also occur in an Inducive construal in which the Agent's hostile behavior causes the Victim to engage in an action (see section 6.9.2).

6.9.1 Metaphorical Change of State construal

The transitive argument structure construction with Attack verbs (127) is analyzed as a metaphorical Change of State construal in which the endpoint undergoes property change by being attacked. We analyze the semantics of this construction as originating in the physical domain. This analysis is motivated by the fact that it is common for the PERFORM relation to be metaphorically construed as physical FORCE in other social domains, the theme is defined as undergoing property change in the verbal representation, and the syntactic expression of participants is the same in physical change of state events.

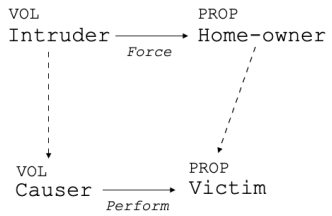

Figure 6.16: A mapping of a Change of State construal to the Attack event structure.

The constructional causal chain for the example *The intruder assaulted the home-owner*

and its mapping to the Attack event structure is shown in Figure 6.16. The *intruder* maps to the Causer and the *home-owner* to the Victim. As shown in Figure 6.16, the type of change that the Victim undergoes in the verbal representation corresponds to the theme type in the constructional causal chain in the physical source domain.

6.9.2 Inducive construal

Attack verbs, such as *bully*, can also occur in Inducive construals in which the Victim engages in an action as a result of the encounter (128). In (128a), the Agent is forced into coming by being bullied. In (128b), the subevent of the Victim is expressed as a nominal, *chairmanship*, which denotes a social role and duties that the Victim will have to assume. The analysis of the causal chain associated with the Inducive construal is the same as proposed for Inducive verbs.

(128) a. I bullied him into coming. (VerbNet)

b. I bullied John into the chairmanship. (VerbNet)

As shown in Figure 6.17, the Action is constructionally evoked and does not map to anything in the verbal representation. The subject participant maps to the Causer and the direct object participant maps to the Victim. The force-dynamic relation between the participants in the constructional causal chain is analyzed as social PERFORM. There is no parallel to be drawn to the physical domain. The Causer uses social illocutionary force to make the Victim do something. As a result, the participant that denotes the Victim in the causal chain is analyzed as a volitional [VOL] entity.

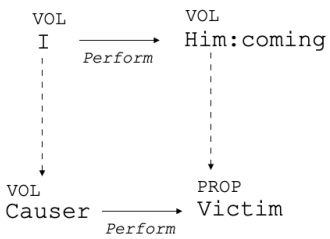

Figure 6.17: A mapping of an Inducive construal to the Attack event structure.

As we noted for Inducive events, the endpoint of the PERFORM relation is still understood to undergo change in their mental property by being pressured into doing something; however, this change is not represented in the constructional representation. Only the volitional engagement of the Victim in their subevent is represented in the causal chain. The mismatch between the labels assigned to participants in the causal chain and the verbal representation is therefore not a true mismatch. It results from the specification of only one label for each participant in the event structure.

6.10 Conclusion

This chapter focuses on the semantics of verbs that describe interpersonal interactions. Four distinct verb types are recognized: Reciprocal verbs, Collective verbs, Inducive verbs, and Attack verbs. Reciprocal verbs describe events in which two entities engage in the same action reciprocally, i.e., both event participants are initiators and endpoints of the same action. Collective verbs evoke events in which the event participants engage in the same action collectively, i.e., the participants are initiators of the same action but are not the endpoints of the action. With Inducive verbs, the participants have different roles in the event and the interaction is asymmetric. The initiator causes the endpoint to engage in an action. Attack verbs also evoke an asymmetric event structure; however, the endpoint doesn't engage in an action; the endpoint undergoes property change.

A class of verbs that necessitates further study comprises of defend verbs, such as *defend, protect*, or *guard*. On one hand, these verbs evoke evoke a symmetric reciprocal interaction in which the defender and the attacker engage in a hostile encounter reciprocally (e.g., *I defended them against the warriors*). On the other hand, there is a relation between the defender and the defendant which is asymmetric (*I defended them*). The defendant benefits from being defended in this relation. The defender and the defendant are always syntactically expressed, while the attacker may be syntactically covert. Defend verbs differ from Reciprocal verbs that denote hostile interactions, such as *battle* or *fight*, in other respects. Defend verbs

do not occur in a Collective construal in which the defender and the attacker are construed as a single entity engaging in a symmetric interaction. Only the defender is expressed as a subject. Additionally, the defendant is obligatorily evoked by the verbal semantics. Unlike beneficiaries with Reciprocal verbs, the defendant with defend verbs is expressed as a direct object rather than a benefactive *for*-oblique. The semantics of defend verbs thus doesn't neatly fit our analysis of Reciprocal verbs or other verb types that we have defined in this domain. A cross-linguistic study of defend verbs is needed to determine whether a distinct event type needs to be established for these verbs.

Chapter 7: Conceptual Relations verbs

7.1 Introduction

The domain of Conceptual Relations is a large semantic category that consists of various types of verbs that can be broadly defined as describing a relation between two (or more) entities that is conceptual in nature and has been established by a cognizer, i.e., a volitional entity with cognitive capacities. As shown in (129), a conceptual relation may exist between physical objects (129g), socially defined entities (129h), or mental (abstract) concepts (129i). In this chapter, we attempt to generalize over the many different types of conceptual relations evoked by verbs in this domain based on their shared force-dynamic event structures.

(129) a. Success requires hard work. (VerbNet)

b. This indicates it. (VerbNet)

c. The winter schedule differed from the spring schedule. (VerbNet)

d. Black symbolizes mourning. (VerbNet)

e. A bear symbolizes strength in some cultures. (FrameNet)

f. Blue and grey match. (VerbNet)

g. Peaches pair well with cream. (VerbNet)

h. This course satisfies the foreign language requirement. (VerbNet)

i. This topic relates to our previous discussion. (VerbNet)

Linguistic analyses of these verbs are extremely sparse. Although the events are es-

sentially mental because they presuppose that the conceptual relation is established by a cognizer and cognitive reasoning is a mental activity; this category of verbs has not been included in discussions of other mental (or experiential) verbs (Collier et al. 1982, Ameka 1990, Pesetsky 1995, Filip 1996, Dirven 1997, Osmond 1997, Maratsos et al. 2000, Harkins and Wierzbicka 2001, Klein and Kutscher 2002, Bickel 2004, Verhoeven 2007, Levin and Grafmiller 2013). Conceptual Relations verbs are different from prototypical mental verbs in that they don't always evoke the cognizer as an obligatory participant in the event structure. Often times, the cognizer is only implied by the larger semantic frame associated with these verbs.

Additionally, the syntactic realization of the cognizer when it is overtly expressed is different from other mental verbs when it is not evoked lexically, as is the case with verbs such as *match* or *differ*. Unlike affective experiential verbs such as *amuse* or *frighten* (*The clown amused/frightened her*), the cognizer is not expressed as a direct object with Conceptual Relations verbs. It is also different from attending or stative experiential verbs such as *look at* or *fear* which express the experiencer as a subject (*She looked at/feared the clown*). A constructionally specified cognizer with Conceptual Relations verbs that do not lexically evoke this participant tends to be expressed as an *according to*-phrase or *to*-phrase (e.g., *Blue and grey match according to most people* or *To me, this topic relates to our previous discussion*). In these contexts, the cognizer is understood to take on a role of an 'evaluator' whose opinion expresses a conceptual relation between entities. Conceptual Relations verbs that do not lexically evoke the cognizer are thus semantically and syntactically different from other verbs in the mental domain.

Conceptual Relations verbs that do evoke a cognizer in their lexical semantics such as *distinguish* or *differentiate* are also different from other mental verbs. Although they evoke a mental entity in their event structure, they are different in that they don't evoke a stimulus. The entities that are linked together by a conceptual relation do not function as a stimulus. Unlike the stimulus with stative experiential verbs which provokes a mental reaction from the

experiencer (e.g., *He feared the dog*), the cognizer with Conceptual Relations verbs directs their mental activity towards the evaluated entities. The engagement of the cognizer in these events is similar to an agent in Attending events who directs their attention to a target (e.g., *He looked at the dog*); however, with Conceptual Relations verbs, the cognizer's mental activity requires a more involved mental process in which the cognizer compares or in some other way evaluates an attribute, feature, or some other parameter by which a conceptual relation between entities is established. This type of a mental relation was termed JUDGE by Croft et al. (2018). As an initiator of the event, the cognizer is expressed as a subject (e.g., *He distinguished one from the other*); however, the argument structure constructions associated with Conceptual Relations verbs is also different from Attending verbs as the causal chain includes three participants, rather than just two.

Verbs in the Conceptual Relations domain vary based on what type of a conceptual link between entities is highlighted. In English, there are at least six different groups of verbs that can be defined as representing broad categories of conceptual relations. These categories include verbs that evoke 1) a similarity relation which presupposes a comparative evaluation in which entities are described as similar or different from each other, e.g., *vary, differ* or *resemble* (129c), 2) a compatibility relation in which entities are judged to be compatible or not compatible, e.g., *harmonize, conflict* or *match* (129f, 129g), 3) a representation relation in which one entity represents another by appealing to a certain characteristic of the represented entity or cultural beliefs about that entity, e.g., *symbolize* or *represent* (129d), 4) an evidence relation in which one entity serves as evidence for the other, e.g., *indicate, reveal* or *contradict* (129b), 5) a requirement relation which signals a necessary condition by which entities are linked together, e.g., *require* or *necessitate* (129a), and 6) a satisfy relation in which an entity meets a standard defined with respect to another entity, e.g., *satisfy* or *surpass* (129h). There are also more general verbs such as *relate* which may be used to describe a cognitive relation between two entities without specifying anything particular about the relation (129i). The feature that connects the entities is usually inferable from context with these verbs.

For example in (129i), one can infer that the content of the discussion matches the topic. These various groups of verbs describe quite different conceptual relations between entities; however, these differences do not appear to be relevant to the force-dynamic description of their event structures. As we will discuss below, the semantic analysis is primarily guided by one parameter: whether the relation between entities is conceptualized as symmetric or asymmetric.

Conceptual relations may be construed as symmetric or asymmetric. In symmetric relations, the entities are conceptualized as sharing the same roles in the event and the conceptual relation can be said to hold equally between them (129c, 129f). In (129c), the differing relation holds between the winter schedule and the spring schedule equally regardless of which entity is syntactically realized as the subject. In fact, the grammatical realization of the participants could be reversed and the statement would still be true: *The spring schedule differed from the winter schedule.* With asymmetric verbs, the conceptual relation is established from one entity to another and their roles in the event differ. For example in (129a), the requirement relation holds only when success is understood to be a prerequisite for hard work, which is the result. With asymmetric verbs, the participants' roles cannot be reversed. Switching their ordering in the causal chain would result in a false statement: hard work does not require success. Consequently, we distinguish symmetric verbs from asymmetric verbs in our event structure representations. The semantics of events with symmetric and asymmetric verbs has syntactic consequences. We discuss the semantics of argument structure constructions associated with verbs in the Conceptual Relations domain in sections 7.4 and 7.7.

To describe the event structures evoked by Conceptual Relations verbs, we use the following mental-domain force-dynamic relations: ASSOCIATE, RELATE and JUDGE. ASSOCIATE indicates a symmetric relation between entities. RELATE is used to indicate an asymmetric relation. In causative event structures in which an agentive initiator is lexically evoked, these two conceptual relations are preceded by a JUDGE relation which describes the agent's

cognitive reasoning (see sections 7.4 and 7.7). We distinguish five distinct verb types in this domain: Associate (section 7.2) and Differentiate verbs (section 7.3), which evoke a symmetric relation between entities, and Relate (section 7.5) and Base verbs (section 7.6), which evoke an asymmetric relation between entities. Differentiate and Base verbs obligatorily evoke the cognizer who establishes the conceptual relation between entities.

7.2 Associate verbs

Associate verbs evoke an event structure in which the conceptual relation defined between entities is conceptualized as symmetric. As shown in (130), verbs that describe comparative events in which entities are judged to be similar or different frequently evoke this event structure. It is understood that if one entity differs from another entity, the differing relation is true for both entities. English does not have many verbs that describe a similarity relation, such as *resemble* or *mimic* (130e); and VerbNet does not have a class for them. Instead, English often uses complex predicates expressed by the copula verb *be* + an adjective (e.g., *be similar, be alike*), to describe a similarity relation between entities. As we argue in section 7.2.1, resemble and mimic verbs evoke a symmetric event structure though they are semantically and syntactically somewhat different from other Associate verbs. Verbs that describe a correlation relation, such as *coincide* in (130d) also evoke a symmetric relation between entities (or the entities' subevents). In this example, the verb describes an event in which two events take place on the same day; his birthday and the Marathon coincide.

(130) a. Peaches pair well with cream. (VerbNet)

b. This flyer and that flyer differ. (VerbNet)

c. The winter schedule differed from the spring schedule. (VerbNet)

d. His birthday coincided with him running the Boston Marathon. (VerbNet)

e. This sponge superficially resembles a living bath sponge [...]. (FrameNet)

f. My personality matches his quite well.

The symmetric nature of the conceptual relations evoked by Associate verbs is evidenced by the syntactic realization of their arguments. With Associate verbs, the participants can be syntactically expressed as a single argument in a Collective construal, i.e., a plural or conjoined plural subject (130b). In this construal, both participants are construed as initiators of the event. Associate verbs can also occur in an Associate construal, when one entity is realized as a subject and the other entity as an oblique argument (130a, 130c, 130d). Some Associate verbs, such as resemble or match verbs, occur in a transitive argument structure construction (130e, 130f). Though a transitive construction generally describes an asymmetric relation between participants, we argue that with Associate verbs the semantics of the construction is symmetric (see section 7.4.1).

The event structure evoked by Associate verbs is shown in Figure 7.1. The relation between Entity 1 and Entity 2 is defined as ASSOCIATE. The ASSOCIATE relation describes a conceptual relation that is not directional; it is symmetric and both Entities are engaged in the same relation equally. The Entities are labeled as EXIST since they don't undergo any change in the event. Although the Associate relation can hold between volitional participants, as in the example *We match together*, the similarity relation between participants is not established based on their volitional engagement in the event. Instead, the conceptual relation is determined by evaluating some characteristic or feature of their personalities.

Figure 7.1: Associate Event Structure.

Associate verbs can be found in the following VerbNet classes: harmonize-22.6, differ-23.4, and correlate-86.1. VerbNet also includes certain Associate verbs such as *associate* or *compare* in the amalgamate-22.2 class, which mostly consists of physical domain verbs. The physical verbs in this class describe symmetric events and many of these verbs, such as *link, tie,* or *connect*, can be used metaphorically to express Associate events.

FrameNet frames with Associate verbs include Similarity, Cognitive_connection, and

Compatibility. The Similarity frame includes verbs that describe a differing as well as a similarity relation.

7.2.1 Resemble verbs

Verbs such as *resemble* and *mimic* describe a similarity relation between entities; however, unlike their semantic counterparts, *differ* or *vary*, they are syntactically different. Resemble verbs imply that the similarity relation is reciprocal, i.e., resembling means that two entities share some physical or behavioral feature(s); however, the semantics of these verbs appears to favor asymmetric construals in which one entity is judged to be similar to another entity. Resemble verbs do not occur in symmetric argument structure constructions in which the compared entities are expressed as a plural subject, as shown in (131a). A reflexive 'each other' argument structure construction must be used for these verbs to yield a symmetric construal (131b). As such, resemble verbs are not 'natural reciprocals' like *differ* or *vary* which evoke symmetric events lexically, and a simple [SBJ.PL V] intransitive argument structure construction with these verbs yields a symmetric construal (130b). With resemble verbs, a symmetric construal has to be derived constructionally. Their syntactic behavior thus also differs from complex predicates, such as *be/look similar*, which evoke a symmetric similarity relation and can occur in the symmetric intransitive construction (131c). Given their semantics, resemble verbs are frequently found in an asymmetric transitive argument structure construction (131d).

(131) a. *They/she and her mother resembled.

b. They resembled each other.

c. They/she and her mother were/looked similar.

d. She resembled her mother.

The examples in (131) show that resemble verbs are syntactically different from other Associate verbs. However, they are syntactically also different from Relate verbs which evoke

an asymmetric event structure. With Relate verbs, the entities have different roles in the conceptual relation and therefore cannot occur in symmetric construals under any condition (e.g., **Black and mourning symbolize each other*).

Despite their syntactic differences, we include resemble verbs with Associate verbs. This analysis is based on their semantics which implies that two entities share some physical or behavioral features and the conceptual relation is thus symmetric. At the same time, they are semantically different in that the verb semantically foregrounds one entity as an initiator of the conceptual relation. Other resemblance verbs such as *mimic* or *take after* (which are in the same Similarity frame in FrameNet) are a good case in point. Mimicking someone doesn't imply that the mimicked entity engages in the same action. Similarly, taking after someone is usually understood as a directional relation only when an offspring takes after their parent. The asymmetric construal observed with resemble verbs is thus clearly motivated by their semantics. Additionally, the use of the transitive argument structure construction is not specific to resemblance verbs, it can also used with some match verbs (130f). In section 7.4.1, we present cross-linguistic evidence to argue that the use of the transitive construction with resemble and match verbs does not warrant a force-dynamic analysis that treats the relation between participants as asymmetric.

7.3 Differentiate verbs

Differentiate verbs describe events in which a cognizer establishes a symmetric conceptual relation between entities. The cognizer engages in a mental activity by which two entities are distinguished from each other or established as similar. VerbNet does not have a class for the latter type of event. As shown in (132), the cognizer is syntactically realized as a subject since it semantically functions as the initiator of the event. The event may be construed as symmetric when the compared entities are syntactically realized as a single argument (132b, 132c). The event may also be construed as less symmetric when one of the entities is realized as an oblique argument (132d). The example in (132a) also exemplifies a less

symmetric construal but only one entity is overtly expressed in the syntax. With Differentiate verbs, the feature or characteristic that allows the cognizer to establish a conceptual relation between entities may be overtly expressed as the subject (132a) or an antecedent *by*-oblique. The feature syntactically behaves like an instrument participant and is analyzed as such in the constructional causal chain. We do not represent the feature as a participant in the lexical event structure since it is not obligatorily evoked by lexical semantics.

(132) a. Cultural differences distinguished Babylon. (VerbNet)

b. We told them apart by their spots. (VerbNet)

c. The Chinese differentiate between two types of faces. (VerbNet)

d. They distinguished her from her twin sister. (VerbNet)

The event structure associated with Differentiate verbs includes three participants: a Cognizer, Entity 1, and Entity 2. As shown in Figure 7.2, Differentiate verbs evoke a causative Associate event structure in which the initiator is semantically restricted to a volitional cognizer. The mental activity of the Cognizer that leads to the symmetric ASSOCIATE relation between Entity 1 and Entity 2 is defined as JUDGE. The Cognizer has to employ cognitive reasoning in the event.

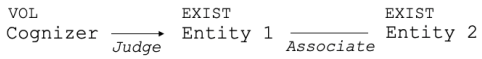

Figure 7.2: Differentiate Event Structure.

There is only one class in VerbNet that consists of Differentiate verbs: distinguish-23.5. In FrameNet, Differentiate verbs can be found in the Differentiation frame.

7.4 Semantics of argument structure constructions with Associate and Differentiate verbs

We discuss the semantics of Associate and Differentiate verbs in the same section because these verbs occur in the same construals. Since the ASSOCIATE relation describes a symmetric

event, Associate and Differentiate verbs frequently occur in Associate (7.4.1) and Collective construals (section 7.4.2) depending on whether the compared entities are syntactically expressed as two distinct arguments or a single argument, respectively.

7.4.1 Associate construal

Associate verbs can occur in an Associate construal in which Entity 2 is syntactically expressed as a *with*-phrase or a *from*-phrase. The syntactic realization of Entity 2 in this construal is lexically determined. Verbs that describe a similarity or correlation relation use the *with*-phrase (133a, 133b) and verbs that describe a differing relation use the *from*-phrase (133c, 133d).

(133) a. Peaches pair well with cream. (VerbNet)

b. His birthday coincided with him running the Boston Marathon. (VerbNet)

c. The winter schedule differed from the spring schedule. (VerbNet)

d. They distinguished her from her twin sister. (VerbNet)

A causal chain associated with the example in (133c) and its mapping to the Associate event structure is shown in Figure 7.3. There is a direct mapping from the constructional representation to the verbal representation. Winter schedule maps to Entity 1 since it is expressed as a subject and summer schedule maps to Entity 2 since it is expressed as an oblique argument. Both entities are labeled EXIST because they don't undergo any change when a cognizer establishes a conceptual relation between them.

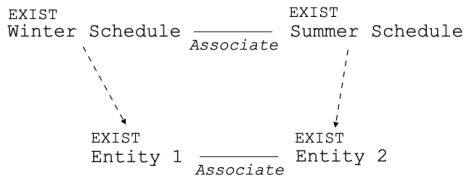

Figure 7.3: A mapping of an Associate causal chain to the Associate event structure.

With resemble verbs, a transitive argument structure construction may be used for the

Associate construal. The transitive construction can also be used with the verb *match* (e.g., *She matched her sister*). With some verbs, such as *match*, it is also possible to use the more prototypical symmetric construction in which the compared entity is expressed as a *with*-phrase. However, this is not true for *resemble* or *mimic*.

Cross-linguistic evidence shows that the expression of participants with Associate verbs can be quite variable depending on whether the event is construed as more or less symmetric. However, as we demonstrate using examples from Czech in (134), the grammatical coding of participants in Associate events is consistently different from participants in Relate events which are construed as clearly asymmetric.

(134) a. Podobal se svému otci.
Resembled REF his father.DAT
'He resembled his father.'

b. Je podobný svému otci.
Is similar his father.DAT
'He looks similar to his dad.'

c. Sladila si svoje oblečení se sestrou.
Match REF her clothes with sister.INSTR
'She made her clothes match her sister's.' (Lit. She matched her clothes with sister.)

d. Černá symbolizuje smutek.
Black symbolize mourning.ACC
'Black symbolizes mourning.'

The examples in (134) show that Czech uses various argument structure constructions with Associate verbs, similarly to English. However, some syntactic distinctions that are made in English are not made in Czech. For example, in English the syntactic realization of participants with resemble verbs is different from semantically similar predicates such as 'be similar' (134a, 134b); however, this is not the case in Czech. Czech uses the same dative case marking on Entity 2 in these examples. In both English and Czech, the use of the *with*-phrase is common for symmetric events.

The Czech examples also show that Associate events use different argument structure constructions when compared to asymmetric Relate events, which is not transparent in English which uses the same transitive construction with some Associate verbs. In Czech, the transitive construction with Associate verbs marks the direct object dative while with Relate verbs, the direct object is marked accusative (134d). We interpret this evidence as pointing to two distinct analyses of the transitive construction in English depending on the semantics of the verb. With Associate verbs, the relation between the entities is analyzed as symmetric ASSOCIATE and with Relate verbs, the relation is analyzed as asymmetric RELATE.

In sum, we don't consider the distinct realization of participants with various Associate verbs as evidence of distinct construals. Our semantic analysis of the transitive construction with resemble and match verbs is the same as our analysis of argument structure constructions in which Entity 2 is expressed as a *with-, to-* or *from*-oblique.

7.4.2 Collective construal

A conceptual relation between entities may be construed as a Collective event when both participants are syntactically realized as a plural or a conjoined plural argument (135). When participants are expressed as a single argument, the constructional causal chain does not include the ASSOCIATE relation. The event is force-dynamically non-relational in that the causal chain consists of a single participant which is not engaged in a causal relation with another entity. The Collective event may be initiated externally when a cognizer is overtly expressed (135c). As shown in (135c), the preposition *between* may precede the plural argument in causative construals with Differentiate verbs.

(135) a. This flyer and that flyer differ. (VerbNet)

b. They resembled each other. (VerbNet)

c. The Chinese differentiate between two types of faces. (VerbNet)

The causal chain associated with the example in (135c) and its mapping to the Differentiate event structure is shown in Figure 7.4. The causal chain includes two participants: the Chinese who initiate the event by engaging in a cognitive activity and the associated entities, i.e., *two different types of faces*. The mapping from the causal chain to the network shows that Entity 1 and Entity 2 are construed as a single participant in the constructional semantics.

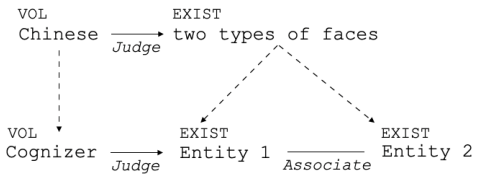

Figure 7.4: A mapping of a Collective causal chain to the Differentiate event structure.

7.5 Relate verbs

Many entities are linked by a conceptual relation that is asymmetric. Verbs that describe asymmetric relations include verbs of representation, such as *symbolize* in (136a), satisfy or exceed verbs in (136b) and (136e), or require verbs in which one entity has to be present or hold in order for the other entity to occur (136d). Evidence or indicate verbs (136e) also link entities by an asymmetric conceptual relation. Relate verbs are semantically quite different depending on the relation that they describe; however, they evoke the same force-dynamic event structure in that they connect two (or more) entities by an asymmetric relation that has been established by a cognizer. This relation is directional in that one entity is causally antecedent to another and the entailment of the conceptual relation cannot be reversed. For example with representation verbs such as *symbolize* in (136a), the color black represents mourning but mourning does not represent the color.

(136) a. Black symbolizes mourning. (VerbNet)

b. That course satisfied the foreign language requirement. (VerbNet)

c. Her performance exceeds our expectations. (VerbNet)

d. Success requires hard work. (VerbNet)

e. This indicates how she did it. (VerbNet)

The event structure evoked by Relate verbs is shown in Figure 7.5. The asymmetric relation between Entity 1 and Entity 2 is defined as RELATE. Similarly to ASSOCIATE, the relation is not causal and is therefore depicted as a line without an arrow. The asymmetric nature of the relation is reflected in the syntactic realization of participants with Relate verbs (see section 7.7). Both entities are labeled as EXIST; they don't undergo any change by being conceptually related. Human initiators are not volitionally engaged in Relate events. The conceptual relation is based on some characteristic or behavior that is associated with a volitional entity, such as one's performance in (136e) or hard work in (136d). Although the person volitionally acts when they are performing, the cognizer judges some aspect or feature of the performance that is relevant for establishing a conceptual relation with another entity. That is, the evaluated entity is not the person but their performance, which is not volitional.

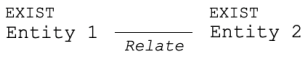

Figure 7.5: Relate Event Structure.

Relate verbs can be found in the following VerbNet classes: exceed-90, indicate-78, relate-86.2, representation-110.1, require-103, and satisfy-55.7. In section 7.5.1, we explain our motivations for analyzing indicate verbs as evoking the Relate event structure. We also discuss the semantics of satisfy verbs in a separate section to justify our analysis since it differs from VerbNet (section 7.5.2).

There are numerous FrameNet frames that contain Relate verbs. These frames include Evaluative_comparison, Satisfying, Have_as_requirement, Representing, Evidence, Surpassing, and Relating_concepts.

7.5.1 Indicate verbs

Indicate verbs such as *indicate* or *prove* describe asymmetric events in which a phenomenon or a fact lends validity to some claim or belief. The analysis of indicate verbs in VerbNet is a bit different from other Relate verbs in that VerbNet includes the cognizer in their inventory of semantic Roles associated with the indicate-78 class. The cognizer with verbs in this class can be syntactically expressed as a *to*-phrase (137a). VerbNet's analysis of indicate verbs would point to an event structure representation in which the cognizer is included as a participant. However, other verbs that describe an evidence relation between two entities, such as *evidence*, *contradict*, or *corroborate*, do not occur in this argument structure construction (137b). The cognizer is syntactically always covert with these verbs.

(137) a. Children's talk indicates to the gifted teacher the intellectual and perceptual level which each child has reached. (FrameNet)

b. These findings support a correlation between the presence of active inflammation and PEG absorption. (FrameNet)

c. The evidence, however, seems to contradict this. (FrameNet)

d. The results corroborate the role of these proteins in pheromone transport. (FrameNet)

VerbNet does not include verbs such as *evidence* or *support* in the indicate-78 class because of their distinct syntactic behavior; however, they are included in the same Evidence frame in FrameNet. In the Evidence frame, the cognizer is analyzed as a Non-Core Frame Element which means that it is not considered to be obligatorily evoked by the semantic frame associated with these verbs. Similarly to FrameNet, we consider verbs such as *indicate, prove, evidence,* or *support* to evoke the same event structure in which there is an asymmetric conceptual relation between some fact and a claim. Whether the cognizer can be syntactically expressed with some of these verbs does not determine whether these verbs evoke the same event structure or not.

In addition, the syntactic realization of the cognizer supports a joined analysis of these verbs. The cognizer is never construed as an initiator of the event. When it is syntactically expressed with indicate verbs, it is expressed as a subsequent *to*-oblique. This indicates that the cognizer is construed as subsequent to the main event and is therefore constructionally added, rather than evoked lexically. A lexically evoked cognizer would be much more likely expressed as a subject since it semantically functions as an initiator of the event. In examples in which it is expressed as a *to*-oblique, the constructional semantics describes a metaphorical communication event in which the cognizer is construed as an addressee. Entity 1, *children's talk*, informs the cognizer about a state of affairs, i.e., Entity 2 ,by there being a conceptual relation between Entity 1 and Entity 2. This metaphorical construal is clearly not evoked by the lexical semantics of indicate verbs and lends further support for the analysis of the cognizer not being included in the verbal event structure.

7.5.2 Satisfy verbs

Satisfy verbs such as *satisfy, fulfill*, or *meet* describe events in which an entity meets (or does not meet) some standard. The relation between the required entity and the standard can be determined by an individual or a group of people who hold a certain social role/status, such as a school board, a committee, or a board of directors. For example in (138a), the satisfy relation was established by a school board. The conceptual relation is therefore a socially accepted link (and sometimes a formal agreement or policy) between two entities. Satisfy verbs are similar to requirement verbs in that one entity requires some condition to hold. However, with satisfy verbs, the ordering of the entity that denotes the requirement in the causal chain is reversed. In (138), the requirement, *a course*, is antecedent to the requiring entity, the policy. With requirement verbs, the requirement, e.g., *hard work* in the example *Success requires hard work*, is subsequent to the requiring entity, *success*.

(138) a. That course satisfied the foreign language requirement. (VerbNet)

b. I satisfied the foreign language requirement with German. (VerbNet)

Similarly to other Relate verbs, satisfy verbs do not occur in argument structure constructions in which the cognizer is overtly expressed. However, satisfy verbs can occur in causative construals with an external initiator. In causative construals, the initiator is not the same person as the cognizer. In (138b), the initiator is the person who obeys the requirement, not the person who established it. When *satisfy* is used in a causative construal, the verb primarily describes an event in which the initiator complies with a policy, though the semantics of the verb also evokes a conceptual relation between two entities.[1]

VerbNet analyzes the *course* in (138a) and *German* in (138b) as instruments. In their analysis, the agent uses the instrument to satisfy the requirement. VerbNet uses the predicates UTILIZE and SATISFY in their semantic analysis of the causative example in (138b). This analysis is different from require verbs in the require-103 class, which are analyzed with the predicate REQUIRE and the requirement is analyzed as a 'Precondition'.

Our analysis differs from VerbNet. We consider the verb *satisfy* to denote a conceptual relation between two entities. As such, *course* in these examples does not have a role of an instrument. Additionally, our analysis of satisfy and require verbs is the same though they perspectivize the event in different ways. Both types of verbs evoke an asymmetric RELATE relation between entities.

It is true that instruments are frequently expressed as an antecedent *with*-phrase; however, the syntactic expression of the participants in (138) has different semantic motivations. The requirement, i.e., the course, denotes Entity 1, and Entity 1 precedes Entity 2 in the Relate event structure. In non-causative construals, such as the example in (138a), the requirement, *course*, which denotes Entity 1 is expressed as a subject and the policy (Entity 2) as a direct object. Entity 1 thus precedes Entity 2 in the causal chain associated with the transitive argument structure construction. In causative construals in which the subject denotes an external initiator, the requirement has to be expressed as an antecedent oblique

[1] A similar syntactic alternation can be found with verbs of filling in the physical domain which can occur in construals in which either the figure or the ground is the theme participant and syntactically realized as a direct object (e.g., *Water filled the tank/He filled the tank with water*).

in order to precede the policy which is expressed as a direct object in the constructional causal chain.

7.6 Base verbs

Base verbs describe events in which the RELATE relation is externally initiated by a cognizer (139). The semantics of Base verbs warrants a distinct event structure from Relate verbs because they cannot occur in autonomous construals in which the verb is used to describe a conceptual relation between entities without including the cognizer as an argument in the syntax. They obligatorily evoke causative events similarly to Differentiate verbs. The verbs describe the cognitive activity of the cognizer that leads to a conceptual relation being established between entities. The event thus profiles the JUDGE relation initiated by the Cognizer, and the precise nature of the conceptual relation between Entities is only inferable from context. As shown in (139a), the agent establishes a conceptual relation between *information* and *plans*; however, what aspect of the information informs our plans is not lexically specified. This is different from Relate verbs in which the verb specifies the conceptual link between Entities.

(139) a. We based our plans on this information. (VerbNet)

b. They based their plans on him getting in on time. (VerbNet)

The event structure evoked by Base verbs is shown in Figure 7.6. The cognizer initiates a JUDGE relation that leads to two entities being related by a conceptual relation. The relation between Entity 1 and Entity 2 is analyzed as asymmetric since the Entities have different roles in the event. In (139a), the plans are based on some information but the information is not based on the plans. Though the relation between Entities is non-causal, Entity 1 has to precede Entity 2 in the event structure representation.

English has a limited inventory of Base verbs. VerbNet includes verbs that describe this type of event in their base-97.1 class. FrameNet does not have a frame for this type of event.

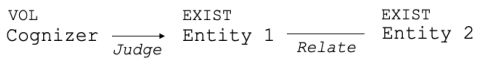

Figure 7.6: Base Event Structure.

They include verbs such as *establish* in their Intentionally_create frame; however, this frame includes mostly physical examples of creation, which is incompatible with the event structure evoked by Base verbs in the Conceptual Relations domain.

7.7 Semantics of argument structure constructions with Relate and Base verbs

Relate verbs usually occur in a transitive argument structure construction in which Entity 1 is realized as a subject and Entity 2 as a direct object. Base verbs use a causative argument structure construction in which Entity 1 is expressed as a direct object, and Entity 2 is syntactically realized as a subsequent oblique. In both constructions, Entity 1 precedes Entity 2 in the causal chain.

Either one of the Entities in Relate and Base events may describe an event or a proposition. Events can be syntactically realized as event nominals, e.g., *performance* in (136e) or *hard work* in (136d). The entity whose subevent is used to establish the conceptual relation may also be expressed, e.g., *him* in *him getting in on time* (139b). Propositions are usually expressed as sentential complements, e.g., *how she did it* (136e). Relate verbs don't occur in construals in which a cognizer is overtly expressed as an initiator of the causal chain. However, the cognizer may be expressed as a subsequent *to*-oblique (e.g., *To me, this evidence seems to contradict this*).

7.7.1 Relate construal

Relate and Base verbs always occur in Relate construals in which the relation between Entity 1 and Entity 2 is analyzed as RELATE. Base events also include an additional segment in the causal chain which describes a JUDGE relation initiated by a cognizer.

A causal chain for the example *The evidence, however, seems to contradict this* in (137c)

and its mapping to the Relate event structure is shown in Figure 7.7. There is a one-to-one mapping between the causal chain and the verbal representation. *Evidence* which is expressed as a subject maps to Entity 1 and *this* which is expressed as a direct object maps to Entity 2. Neither one of the Entities undergoes change in the event, and both are thus labeled EXIST.

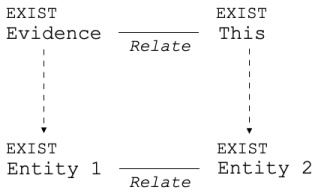

Figure 7.7: A mapping of a Relate causal chain to the Relate event structure.

7.8 Conclusion

In this chapter, we discussed our analysis of verbs that describe various conceptual relations between entities. We distinguished between four types of verbs based on two parameters: 1) whether they evoke a symmetric or asymmetric relation and 2) whether they evoke a cognizer who initiates the event. Symmetric verb types include Associate and Differentiate verbs. Asymmetric verb types include Relate and Base verbs. Differentiate and Base verbs obligatorily evoke a cognizer in their event structure.

Our analysis of Conceptual Relations verbs does not include other mental verbs that evoke events which require cognitive reasoning initiated by a mental entity. For example, we did not cover events in which a cognizer establishes a relation between an entity and an attribute, such as register verbs, e.g., *weigh* or *amount to* in the examples *The package weighed ten pounds* and *The total amounted to $100.* Register verbs are listed in VerbNet's register-54.1 class. Unlike the event structure evoked by Conceptual Relations verbs in which the relation is established between two distinct entities, the entity and their attribute do not refer to two distinct participants in the event structure. The attribute specifies some feature (such as weight or price) or some other characteristic of an entity and is therefore not

considered to be a separate participant. As such, the relation between the entity and their attribute cannot be defined as 'conceptual' since both conceptual relations defined in this chapter (ASSOCIATE and RELATE) express a force-dynamic relation between two separate entities. When the attribute is syntactically realized as a distinct argument from the entity, as shown in the examples above, the relation between the entity and attribute is analyzed as ENGAGE.

There are other verbs that evoke mental events in which a cognizer establishes an ENGAGE relation between an entity and their attribute by engaging in mental reasoning. We do not cover the semantics of these verbs and events in this chapter either. These verbs include verbs of assessment (e.g., *analyze, assess* in the assessment-34.1 class), estimate verbs (e.g., *estimate, value* in the estimate-34.2 class), judgment verbs (e.g., *judge, condone* in the judgment-33.1 class), or classify verbs (e.g., *classify, categorize* in the classify-29.10 class). Unlike register verbs, these verb classes obligatorily evoke the cognizer in their event structure.

Chapter 8: Conclusion

8.1 Summary

This dissertation proposes a semantic analysis of verbs that denote social events, i.e., events in which participants interact with each other on a social level. The discussion focused on the semantics of verbs in the following domains: Social Role, Possession, Communication, Interpersonal Interactions, and Conceptual Relations. The semantic analysis is grounded in the theory of "force-dynamics" (Talmy 1988) and builds on research presented by Croft (1991, 1993, 1998, 2012) and his research team (Croft et al. 2016, 2017, 2018, Kalm et al. 2019, 2020). We elaborate on their decompositional analysis of events in the physical and mental domains by analyzing force-dynamic relations between event participants in the social domain.

A limited set of force-dynamic relations are proposed here to describe the causal structure of social events. PERFORM is used in various types of events in which a volitional agent initiates the causal chain. It describes a causal performative relation which presupposes the use of illocutionary force. CONTROL defines a non-causal relation between a possession and a possessor and is characteristic of events in the Possession domain. ASSOCIATE and RELATE describe non-causal conceptual relations between entities. ASSOCIATE signals a symmetric relation, and RELATE an asymmetric relation between entities. We also define an AFFILIATE relation which establishes a non-causal relation between an agent and a social institution. Lastly, we identify EXCHANGE and MUTUAL, which do not denote force-dynamic relations

per se and are not specific to social events. EXCHANGE denotes an equivalence relation between entities, and MUTUAL establishes that two entities that are syntactically expressed as separate arguments share the same role in an event.

We establish various 'verb types' in each of the broad semantic domains. Verb types are established based on their force-dynamic event structure. To define a verbal event structure, we consider which participants are obligatorily evoked by verbal semantics, the type of change that each participant undergoes in the event, and the force-dynamic relations between them. Verbal event structures within the larger domains frequently overlap. In particular, verb types typically share a 'core segment' in their representations in which the theme participants undergo the same type of change and engage in the same force-dynamic relation.

The force-dynamic description of event structure also includes a representation of constructional semantics. We use a two-tier representation in which verbal semantics is defined separately from constructional semantics. This type of representation allows us to clearly represent various syntactic construals commonly used with verbs in particular verb types, including metaphorical construals extended from the physical domain.

Our semantic analysis of social verbs and the argument structure constructions in which these verbs occur supports the hypothesis that grammatically relevant aspects of meaning are rooted in the force-dynamic structure of events and the causal interactions between participants. There is a clear correlation between the syntactic expression of participants in social events and their semantic role, which is defined with respect to their causal interactions in the event structure.

8.2 Future research

Despite our best efforts to cover social events in their entirety, we are still short on some analyses. In particular, this dissertation does not address verbs that describe events in which an entity engages in an action or event, such as succeed verbs in the succeed-74 class in VerbNet (e.g., *succeed, win*, *lose*). These verbs evoke agentive initiators and therefore

belong to the social domain. However, unlike other social verbs, they do not evoke events in which there is a social force-dynamic relation between two or more participants. Succeed verbs describe an event structure in which a participant engages in their subevent (140). In (140a), the subject *he* engages in the event of *climbing the mountain*. In (140b), the *game* stands for the agent's subevent: playing a game.

(140) a. He succeeded in climbing the mountain. (VerbNet)

b. He won/lost the game. (VerbNet)

Other verbs that lack description in this manuscript include various verbs that are associated with crime events, such as verbs of committing a crime (e.g., *commit*), prosecute verbs (e.g., *prosecute, arrest*), or verbs of punishment (e.g., *punish*) (141). Events that describe committing a crime (e.g., 141a) are not included in VerbNet. The analysis of these verbs would probably follow the analysis of succeed verbs in which the event evokes an agent who engages in their own subevent. In this case, the subevent of the criminal is their crime.

Prosecute verbs are in VerbNet's prosecute-33.2 class. They evoke events in which an entity is assigned an attribute based on their illegal action (141b). These verbs belong to the Social Role domain but do not fit into the existing verb types. They describe a causative event structure in which an individual is assigned an attribute. However, they also evoke a criminal action of the individual, which is their subevent. The semantics of these verbs needs to be investigated further.

The verb *punish* is classified as a prosecute verb in VerbNet because it occurs in the same syntactic alternations as *prosecute* or *arrest*. However, it is semantically somewhat different. In fact, *punish* is in a Rewards_ and_Punishment frame in FrameNet, which also includes verbs such as *discipline* or *reward*. In FrameNet's analysis, the verbs in this frame describe events in which an agent acts in response to someone else's action or belief (141c, 141d). Their description of the frame points to an analysis in which punish and reward verbs evoke a Response event structure. In this approach, the crime is the trigger and the criminal the triggering entity. However, the syntactic realization of participants

in these events is not exactly the same as other response events. The crime is always expressed as a separate argument (i.e., *for*-phrase) and the argument structure construction generally always includes the criminal. With Response verbs, the triggering entity may not be syntactically expressed (e.g., *He answered the call*). The syntactic evidence does not necessarily point to a different analysis; however, the semantics of punish and reward verbs requires further investigation.

(141) a. Dark Elf raiders have committed innumerable acts of piracy. (FrameNet)

b. They tried her for shoplifting as a juvenile. (VerbNet)

c. When the wizard returns, he punishes each sister for her curiosity. (FrameNet)

d. He rewarded her with a cool smile as they entered the pub, [...]. (FrameNet)

Events such as *kidnap* or *abduct* are analyzed in VerbNet as transfer of possession events and are put in the steal-10.5 class. However, neither one of these verbs necessarily evokes an original possessor, unlike other stealing verbs (e.g., *He stole the watch from his friend*). A person can be kidnapped without being taken from someone (though original location can always be specified, e.g., *He kidnapped the woman from her house*). Given their classification, the person who is kidnapped is analyzed as a 'Possession' participant. However, a hostile interpersonal interaction also takes place in the event, which is not reflected in the transfer-of-possession analysis. A closer analysis of these types of verbs is a subject of future research.

(142) a. I risked my job. (VerbNet)

b. I risked that I would get into trouble. (VerbNet)

c. Drivers risk a £50 fine for breaking the law. (FrameNet)

d. Journalists risk their lives for the truth in Yugoslav conflict. (FrameNet)

e. Children risk serious injury or death. (FrameNet)

Another category of events that is not addressed in this dissertation are verbs of *risking* (142). Although VerbNet has a risk-94 class for these verbs, their inventory of syntactic

frames and examples associated with these frames is quite limited. Risk events evoke a complex event structure. FrameNet defines four distinct core FEs: Protagonist, Action, Asset, and Bad_outcome. As Croft and Vigus (2018) argue, only the Protagonist and the Asset are distinct participants; i.e., refer to persons, places or things (Croft and Vigus 2018). In their analysis, the Action describes the Protagonist's subevent and the Bad_outcome describes the Asset's subevent. We leave it to further investigation to determine what type of force-dynamic relation is evoked between the Protagonist and the Asset. In some examples, the Asset also describes the Protagonist's subevent (142a, 142b, 142d). In (142c) the Asset *£50 fine* could also be analyzed as the Protagonist's subevent: *Drivers risk getting a £50 fine*. The Bad_outcome also describes the participant's subevent in (142e). In this analysis, the event structure evoked by risk verbs does not include a force-dynamic relation between participants, only ENGAGE relations between a Protagonist and his subevents. The subevents associated with Asset and Bad_outcome occur in a future irrealis mental space (Fauconnier 1994).

Lastly, we did not address the semantics of events that are domain-independent, such as verbs of existence (e.g., *occur, exist*) or general verbs of causation (e.g., *engender, limit, ensure, result*). Other domain-independent verbs that require further scrutiny include verbs of membership (e.g., *include, exclude*) or verbs that describe a part-whole relation (e.g., *comprise, make up*).

In some examples, the social event may be construed as initiated by a non-volitional entity, such as *cultural differences* in *Cultural differences distinguished Babylon* or *$100,000* in *$100,000 will pay for the house*. In the former example, the subject referent denotes the features that an agent uses to establish a conceptual relation between two entities. In the latter example, the money is the means by which an agent gains control over an object, i.e., the *house*. In both examples, the subject argument refers to a participant with an instrumental role. The syntactic realization of instruments as subjects is also common in the physical domain (e.g., *The knife cuts well*, *The rock broke the window*). In all of

these examples, the event is initiated by an instrument. Importantly, the agent who uses the instrument is not included in the causal chain since it is not syntactically expressed. In the physical domain, the instrument is analyzed as an initiator of the FORCE relation. However, in the social domain, the instrument cannot be analyzed as an initiator of the PERFORM relation since this relation is restricted to volitional entities. A different force-dynamic relation from the ones identified here may need to be defined in the social domain to account for causal chains associated with construals in which the initiator is an instrument.

8.3 Concluding Remarks

The analysis presented in this dissertation provides new insights into the semantics of social verbs and demonstrates that the overarching force-dynamic principles defined for physical domain events (Croft 2012) can be extended to events of social causation. There are clear advantages of this approach. First, participants' roles are defined with respect to their causal interactions with other participants. The semantic principles in which participants are analyzed as causally related to each other have proven to be predictive of argument realization in the social domain. Second, defining verbal semantics as evoking force-dynamic image schemas permits the generalization of event structure for various verb classes that are semantically similar. The force-dynamic image schemas have cross-domain parallels which allows researchers to draw meaningful correspondences between larger semantic classes in different domains, such as transfer of possession verbs in the social domain and mereological verbs in the physical domain.

This dissertation contributes to the linguistic community by providing a unified account of social verbs. However, the linguistic aspects of the proposed analysis also allow us to draw more general implications about how language use informs our understanding of reality and how we conceptualize events. A formalized representation of event structure that is based in the theory of force-dynamics allows us to establish such inferences. In particular, this representation permits the inferences of parallels between broad semantic domains, like the

physical and social domains, by defining changes that participants undergo in events (i.e., 'theme types') as domain-general features. Theme types can be used to formulate semantic motivations that lead to the use of constructional metaphors in the description of social events.

This study reveals that in many social events, entities are conceptualized as undergoing the same types of changes as entities in physical events. This evidence leads us to conclude that our conceptualization of events is built on four basic types of changes associated with the theme participant: 1) directed change in property, 2) directed change in location (which can be holistically or mereologically incremental), 3) undirected change that is associated with an internal process, and 4) directed change that results in creation. Clearly, these categories of change originate in our experience with the physical world. However, the semantic analysis reveals that events in the social world are conceptualized using the same set of categories. This evidence is supported syntactically by the use of constructional metaphors that are extended from the physical domain to the social domain. The careful examination of syntactic patterns associated with different semantic classes in the social domain thus shows that our conceptualization of social events is to a large extent motivated by our understanding of how events unfold in the physical world.

Indeed, our conceptualization of events in the social domain follows the same force-dynamic principles characteristic of physical events. Social entities are understood to causally interact with each other. The use of one's social role, power, or status to bring about change is metaphorically construed as physical FORCE. Non-causal interactions, such as the CONTROL relation in the Possession domain or the AFFILIATE relation in the Social Role domain, are interpreted as asymmetric and are metaphorically construed as describing a spatial PATH relation between two entities. The finding that construals with social events originate in an established parallel with physical events provides strong support for the analysis which uses the method of force-dynamics in domains other than the physical.

The two-tier representation of event structure which distinguishes between construc-

tional and verbal semantics provides the basis for drawing conclusions about the semantic correspondence between domains. The constructional analysis supplies information about constructional metaphors. The mapping of constructional causal chains to verbal representations reveals the underlying semantic motivations that license metaphorical extensions. This type of analysis cannot be easily replicated by other semantic models. It requires a highly structured formalized description of event structure in which constructional and verbal semantics are treated as distinct from each other.

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