Creation Constructions and Frames

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The aim of the paper is to investigate the interaction of lexical, grammatical and extra-grammatical resources in the interpretation of arguments denoting or presupposing conventional consequences in three related German constructions, the simple creation construction, the *zu*-construction and the *aus*-construction.

The direct object *Blatt* ('sheet') in (1a) is interpreted (by default) as the entity undergoing the folding process (i.e. as the affected entity), whereas *Flugzeug* ('plane') is (again by default) interpreted as the entity resulting from the folding process (i.e. the effected entity). In contrast, the direct object of *erzeugen* ('produce') in (1f) can only be interpreted as the effected entity, not as the affected entity. We propose to account for this alternation by postulating the so-called simple creation construction. Semantically this construction contributes the formula $actor(e,x)$ & $result(e,z)$, that is it introduces an argument which is created as a result of the event described by the verb. Syntactically, this construction requires that x be realized as the subject and y as the direct object (in a transitive clause). The semantic contribution of *falten* ('to fold') is $fold_1(e)=x$ & $fold_2(e)=y$, that is x is the person folding and y is the entity undergoing the folding process in the folding event e. The arguments licensed by the simple creation construction are not required to be the result of some transformation process like e.g. folding, rolling, baking, kneading etc. (these verbs thus display what Levin,1993,57 calls the material/product alternation, cf. (1a) and (1b)). As (1c-e) show, the resulting argument can also be (part of) a conventional fact whose (coming into) existence depends on the existence of conventions and institutions: throwing a ball into a goal constitutes under certain conditions the conventional fact of scoring a goal; under certain circumstances running 100 meters constitutes the conventional fact of running a world record; the outcome of the last presidential elections in the US constitutes the conventional/institutional fact of Obama being the president of the US. We conclude that the semantic contribution of this construction must be sufficiently abstract to allow for arguments involving conventional consequences, and therefore cannot be reducible to the notion of incremental theme, Krifka (1998). Given that the semantic composition of verb and simple creation construction results in the formula $fold_1(e)=x$ & $fold_2(e)=y$ & $actor(e,x)$ & $result(e,z)$, leaving the relation between y and z unspecified, this raises the question of how we bridge the interpretational gap between the (relational) semantic role $result(e,z)$ contributed by the simple creation construction, and the (functional) semantic role $fold_2(e)=y$ contributed by the verb *falten* ('to fold'). Why is the plane interpreted as consisting of a folded sheet of paper? Why is the castle interpreted as consisting of shoveled sand? We argue that this gap is bridged (and thus the relation between y and z is specified) by abductive inference over world knowledge: a good/plausible explanation for a plane being involved in a folding event is that as a result of folding a sheet of paper it changes shape into a plane. So if the knowledge represented by the (universally quantified) formula $fold_2(e)=y$ & $change.shape(e,y,z)$ $\rightarrow result(e,z)$ is part of our knowledge about (or conceptualization of) folding events, and we know that $result(e,z)$, then by abductive inference we can add $fold_2(e)=y$ & $change.shape(e,y,z)$ to the semantic representation, thus specifying the relation between the affected entity y and the effected entity z. We compare this analysis with the

proposal made in Boas (2011), where different lexical units for the same verb (*assemble*) are assumed, with each lexical unit evoking different frames.

The semantic contribution of the *zu*-construction, illustrated in (2), can roughly be paraphrased as follows: as a result of an actor *x* V-ing an entity *y*, *y* becomes *z*, symbolically ***actor(e,x) & result(e,become(y,z))***. This correctly rules out e.g. (2-c) and (2-d) – the ball cannot be conceived as (literally) becoming a goal, and similarly 100 meters cannot be conceived as (literally) becoming a world record. On the other hand this semantic contribution of the *zu*-construction allows for verbs like (2-e), since Obama can be conceived as becoming president. The syntax of the *zu*-construction requires the affected entity to be the realized as direct object, and thus rules out the occurrence of verbs like *erzeugen* 'create' (2-f), which requires the effected entity to be realized as direct object (in a transitive clause). The *aus*-construction reverses the syntactic realization, requiring that the effected entity be realized as direct object, with the affected entity being realized as an *aus*-PP. The semantic contribution of the *aus*-construction di ers from the semantics of the *zu*-construction in that it requires that as a result of *x* V-ing y, *y* inherently (or physically) changes to *z*, represented by the formula *actor(e,x) & result(e,inherent.change(y,z))*. This correctly predicts that verbs involving a change of status like *wählen, degradieren, befördern* ('elect, degrade, promote') cannot occur in this construction (3d-e).

We assume that semantic composition consists in the identification of the referents introduced by NPs with the participants involved in the states of a airs described by predicates, with both referents and participants being represented by means of free variables. That is, composition is not done by type-driven functional application, but by identifying variables. The contribution of the grammatical resources to the identification of free variables is captured by (i) associating with each free variable the morphosyntactic information relevant for its identification, and (ii) requiring that variables can be identified if they are associated with matching information, as proposed in Kracht (2002). The contribution of extragrammatical resources to the identification of free variables is modeled in terms of abductive reasoning based on encyclopedic knowledge.

(1) a. ein Blatt / ein Flugzeug falten
         a sheet / a plane fold
     b. Tabak / eine Zigarre rollen
         the tobacco / a cigar roll
     c. einen Ball / ein Tor werfen
         a ball / a goal throw
     d. 100 Meter / einen Weltrekord laufen
         100 meters / a world record run
     e. Obama / den Präsidenten wählen
         Obama / the president elect
     f. Kohle / Strom erzeugen
         coal / electricity produce

(2) a. das Blatt zu einem Fugzeug falten
         the sheet into a plane fold
     b. Tabak zu einer Zigarre rollen
         tobacco into a cigar roll

        c.   *den Ball zu einem Tor werfen
                  the ball into a goal throw

        d.   *100 Meter zu einem Weltrekord laufen
                  100 meters into a world record run

        e.   Obama zum Präsidenten wählen
                  Obama into the president elect

        f.   *Kohle zu Strom erzeugen
                  coal into electricity produce

(3)   a.   aus dem Blatt ein Flugzeug falten
                  out of the sheet a plane fold

        b.   aus Tabak eine Zigarre rollen
                  out of tobacco a cigar roll

        c.   *aus dem Ball ein Tor werfen
                  out of the ball a goal throw

        d.   *aus 100 Metern einen Weltrekord laufen
                  out of 100 meters a world record run

        e.   *aus Obama einen/den Präsidenten wählen
                  out of Obama a/the president elect

        f.   aus Kohle Strom erzeugen
                  out of coal electricity produce

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