Switched Control and other 'uncontrolled' cases of obligatory control

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1 Introduction

Lexical Functional Grammar (LFG) and Head-Driven Phrase Structure Grammar (HPSG) both treat obligatory control in terms of equalities of the signs representing the controller and the controllee. In LFG control is seen either as functional control, that is the sharing of an f-structure (Bresnan (1982), or as obligatory anaphoric control, that is as a semantic relation only (Darlrymple 2001). In HPSG control resides in sharing of indices whose scope can range from referential pointers to parts of SYNSEMs. We will discuss some of the relevant mechanisms of the two frameworks in connection with the analysis of a regular pattern of 'control switch' in German and Norwegian. For English, Radford (1985:381) discusses an example with an object-control verb which receives a subject-control interpretation. While *John pleaded with me to go* means that I should go, *John pleaded with me to be allowed to go* states that I should allow John to go. Also in the case of an unlikely interpretations, a default object-control pattern may be overridden by a subject-control interpretation such as in the case of *He asked his boss to have an afternoon off* (Mair 1990). These cases of switched control seem marginal for English (Mair 1990: 94), but not so in German and Norwegian, where modal verbs are used widely and systematically in embedded infinitives (see also Stiebels (2015)). When in construction with so-called *suasive* verbs of communication such as *promise/persuade,* this leads to switch control, which we will discuss in the following within the formal architectures of LFG and HPSG.

2 Modal infinitival complements of 'suasive' verbs of communication

The pattern we are interested in arises with German and Norwegian verbs of communication that express wishes, desires, commitments or judgements, such as an*flehen, überreden, versprechen, bitten* and *beschuldigen* ('beseech', 'persuade', 'promise', 'accuse', 'beg'). [1] We will call verbs in this group *suasive verbs of communication.*[2] When these verbs select a modal infinitival construction as their complement, a complex verbal chain is formed, and an apparent switch of control is triggered.[3] For example, the transitive verb *anflehen* induces object control, cf. (1a):

(1a)   Er fleht mich an zu kommen   '*He beseeched me to come'*

In combination with the modal verb *dürfen* and deontic *können,* object control switches to subject control:

(1b) Er fleht mich an kommen zu dürfen   *'He beseeches me to be allowed to come'*

For Norwegian, a similar pattern is observed. In (2a) the logical subject of *komme* is 'me'; in (2b), when combined with *få* in its modal use as part of the infinitive,[4] object control changes to subject control:

(2a) Han ba meg om å komme   *He asked me to come'*

(2b) Han ba meg om å få komme   *'He asked me to be allowed to come'*

The German verb *versprechen* is a subject control verb, but in combination with *dürfen* and deontic *können* the construction receives an object control interpretation:

(3a) Ich verspreche ihm zu kommen   *'I promise him to come.'*

(3b) Ich verspreche ihm kommen zu dürfen *'I promise him to be allowed to come.'*

In Norwegian, the verb *love* shows a similar pattern: in (4a) the logical subject of *komme* is 'I', in (4b) it is 'he':

(4a) Jeg lovet ham å komme   '*I promised him to come'*

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[1] Norwegian translation: *bønnfalle, overtale, love, be, anklage/beskylde.* Verbs expressing orders such as German *befehlen* ('order', Norwegian *befale, beordre*) do not fall in this class.
[2] Following Mair 1990.
[3] The phenomena have been well known in the respective linguistic communities. We refer to Polinsky (2013) for a list of references. LFG and HPSG do not seem to offer an analysis of the patterns in question, although control plays an important role in both frameworks (Kiss (1995) and Dalrymple (1999), next to other authors) .We also consulted for both languages corresponding online grammars: For LFG http://clarino.uib.no/iness/xle-web (accessed 10.02.16), and for HPSG http://gg.delph-in.net/logon and http://regdili.hf.ntnu.no:8081/linguisticAce/parse (both accessed 10.02.16).
[4] This verb also has aspectual uses, as described, e.g., in Lødrup 1996; here we are focusing on its 'deontic' use.

(4b) Jeg lovet ham å få komme   '*I promised him to be allowed to come'*

In contrast, *wollen,* as well as its Norwegian counterpart *ville* which have a volitional modal base, does not affect lexically determined control relations, a fact that we do not illustrate here.

3 'Control switch' – diagnosis

Control switch features two verbal predicates: the modal non-finite and the matrix one. We would like to treat modals with a deontic modal base such as f*å* , *dürfen* and *können* as three-place relations with a normative agent as first, an addressee as second, and an action as third argument.[5] The suasive verbs of the type *promise* have three semantic arguments (x y P) overtly realised, so that the sentence *He promises him to come* has roughly the semantic structure in (5), with x as the normative agent, y as the addressee, and P as the action being conducted by y:

(5)   PROMISE [x y [*y* come]]

In *He may come,* the normative agent, x, is not bound, but subject to arbitrary control. In control constructions of the type now being addressed, x is constructionally given by being co-referential with one of the arguments. To exemplify: *versprechen/love* ('promise') is a subject control verb with a Promiser subject and the semantic structure 'PROMISE(x y P(x)). In a sentence like (3b) (Ich verspreche ihm kommen zu dürfen *'I promise him to be allowed to come.'),* the normative agent introduced by d*ürfen* is bound to the first argument of *versprechen,* the *promiser* subject (instantiated in (5) as x). Thus we get the semantic pattern in (6b) for the switched pattern, as opposed to the 'normal' pattern in (6a) (in both schemata identical letters indicate referential identity, underlined letters indicate the bearer of the deontic control relation)

(6)   a.   PROMISE [*x* y [*x* come]]   *subject control*
       b.   PROMISE (x *y* [PERMIT (x *y* [*y* come]]   *object control*

The opposite pattern obtains for the *beseech* type of verbs (e.g.(1) and (2)):

(7)   a.   BESEECH [x *y* [*y* come]]   *object-control*
       b.   BESEECH (*x* y [PERMIT (y *x* [*x* come]]   *subject-control*

Suasive verbs describe communications about what we may call *negotiable situations*. Thematically the situation is instantiated by a promiser/persuader and an addressee, and the lexicalised control pattern encodes whether the promiser/persuader subject or the addressee object is under negotiaton as the agent of the situation under discussion. *Promise* type verbs feature the promiser as this prospective agent, while for the *beseech* type the adressee is construed as this agent. When the envisioned event comes into the scope of deontic considerations, a normative agent is introduced under whose regime the prospective agent of the embedded infinitive will have to act. Under obligatory control the normative agent is always bound to one of the expressed arguments, and in this way the switched control pattern is born. From a more formal linguistic point of view, the question is now how we can construct a semantics which allows us to express the patterns discussed.

4   Formal analysis in HPSG-style representation

Using an HPSG format, the constructions (3b) and (4b) can be represented as in Figure 1, with coindexation for referential identity. The semantics corresponding to the schematic display in (6b) is found under SEM (with ARG0 representing a situational index); the general format of representation as well as the basic representation of 'equi'-type control is standard, see for instance Pollard and Sag (1994) and Sag and Wasow (1999).

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[5] Following logical tradition, modal expressions of necessitities, possibilities and beliefs are often treated as modal *operators* taking scope over propositions. We have good reasons not to do so, as will become clear in this abstract.
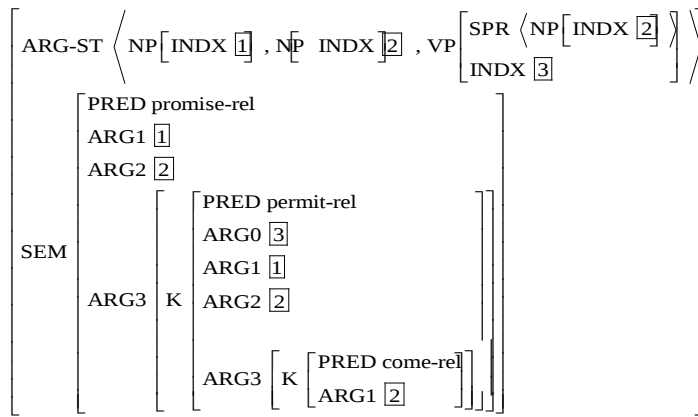
$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{1} \end{bmatrix}, \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix}, \text{VP}\begin{bmatrix} \text{SPR} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix} \right\rangle \\ \text{INDX} \boxed{3} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{PRED promise-rel} \\ \text{ARG1} \boxed{1} \\ \text{ARG2} \boxed{2} \\ \text{ARG3} \; \text{K} \begin{bmatrix} \text{PRED permit-rel} \\ \text{ARG0} \boxed{3} \\ \text{ARG1} \boxed{1} \\ \text{ARG2} \boxed{2} \\ \text{ARG3} \begin{bmatrix} \text{K} \begin{bmatrix} \text{PRED come-rel} \\ \text{ARG1} \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 1   HPSG representation of (3b) **Ich verspreche ihm kommen zu dürfen** '*I promise him to be allowed to come.*') and its Norwegian counterpart (4b) (for expository convenience using English lexical items in the semantics)

The contribution of *dürfen* per se is indicated in Figure 2 (the reentrancy symbol '1' deliberately left free):

$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix}, \text{VP}\begin{bmatrix} \text{SPR} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix} \right\rangle \\ \text{INDX} \boxed{3} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{PRED permit-rel} \\ \text{ARG1} \boxed{1} \\ \text{ARG2} \boxed{2} \\ \text{ARG3} \; \text{K} \begin{bmatrix} \text{ARG0} \boxed{3} \\ \text{ARG1} \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$
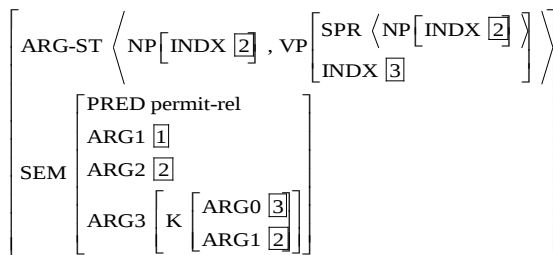
Figure 2 Lexical representation of *dürfen/få*

The combination between *dürfen* and *kommen* (forming *kommen zu dürfen*) will bind the index indicated as '2' in Figure 2 to the subject of *kommen*, whereas the index indicated as '1' remains uninstantiated syntactically. It gets instantiated only when *versprechen* combines with *kommen zu dürfen*, imposing its subject control pattern, resulting in the constellation shown in Figure 1. Notably, however, the ARG1 of *dürfen* which now gets bound is not the index associated with the *subject* of *dürfen*, but the index of the *permitter*. Thus, what here has to act as the lexical specification of *versprechen* is the structure in Figure 3, requiring identity between the two ARG1's under SEM , but lacking the specification of the downstairs syntax that this lexical specification would normally be assumed to carry; the latter is exhibited in Figure 4, which would wrongly identify the *one who is permitted* with the one who promises:
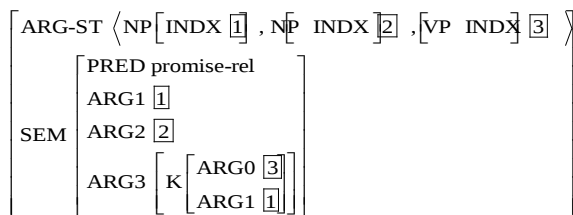
$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{1} \end{bmatrix}, \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix}, \text{VP}\begin{bmatrix} \text{INDX} \boxed{3} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{PRED promise-rel} \\ \text{ARG1} \boxed{1} \\ \text{ARG2} \boxed{2} \\ \text{ARG3} \begin{bmatrix} \text{K} \begin{bmatrix} \text{ARG0} \boxed{3} \\ \text{ARG1} \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 3 Lexical representation of *versprechen/love*

$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{1} \end{bmatrix}, \text{NP}\begin{bmatrix} \text{INDX} \boxed{2} \end{bmatrix}, \text{VP}\begin{bmatrix} \text{SPR} \left\langle \text{NP}\begin{bmatrix} \text{INDX} \boxed{1} \end{bmatrix} \right\rangle \\ \text{INDX} \boxed{3} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{PRED promise-rel} \\ \text{ARG1} \boxed{1} \\ \text{ARG2} \boxed{2} \\ \text{ARG3} \begin{bmatrix} \text{K} \begin{bmatrix} \text{ARG0} \boxed{3} \\ \text{ARG1} \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$
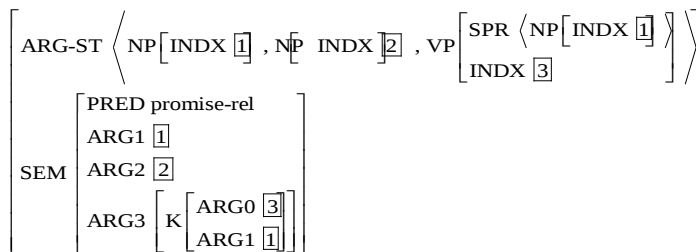
Figure 4 Lexical representation of *versprechen/love* with 'intruding' SPR specification.

An immediate consequence of the analysis is that such specification of SPR in the VP chosen should be generally absent from the control specification of *versprechen/love* (and perhaps *promise*), the 'subject-to-subject'-binding relying instead on the circumstance that 'subjects' in nearly all cases are associated with the 'first argument' (ARG1). A straight test of such a position is what happens when the infinitival complement is in passive, as in (8); by our judg-

ment, the control relations are here open – they could either attach to the understood subject of the passive, or to the understood agent, as our analysis would predict:

(8)   a.   Ich verspreche ihm gelobt zu werden   ('*I promise him to be praised.*')
        b.   Jeg lover ham å bli roset

Analogous reasoning, and interpretation of relevant downstairs passivized constructions, apply to the 'object control' structures.

5   Formal analysis in LFG-style representation

In LFG obligatory control is captured by means of lexically induced functional control equations. *Versprechen* has next to the meaning we are interested here an epistemic reading with an upstairs non-thematic-subject, the corresponding f-structure is Figure 5a, we here are interested in the equi construction for which we assume obligatory anaphoric control, which is coindexation for referential identity, shown in Figure 5b.
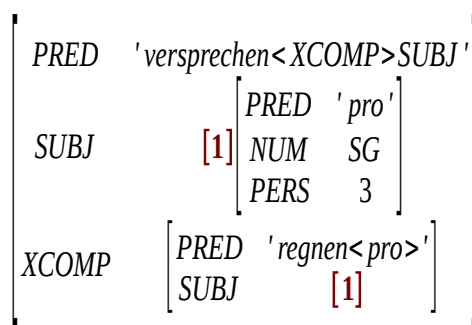
$$
\begin{bmatrix}
PRED & 'versprechen\!<\!XCOMP\!>\!SUBJ\,' \\
SUBJ & [1]\begin{bmatrix} PRED & 'pro' \\ NUM & SG \\ PERS & 3 \end{bmatrix} \\
XCOMP & \begin{bmatrix} PRED & 'regnen\!<\!pro\!>' \\ SUBJ & [1] \end{bmatrix}
\end{bmatrix}
\qquad
\begin{bmatrix}
PRED & 'versprechen\!<\!SUBJ,OBJ,COMP\!>' \\
SUBJ & \begin{bmatrix} PRED & [1]'pro' \\ NUM & SG \\ PERS & 3 \end{bmatrix} \\
OBJ & \begin{bmatrix} PRED & 'pro' \\ NUM & SG \\ PERS & 3 \\ CASE & DAT \end{bmatrix} \\
COMP & \begin{bmatrix} PRED & 'kommen\!<\!SUBJ\!>' \\ SUBJ & [1]'pro' \end{bmatrix}
\end{bmatrix}
$$

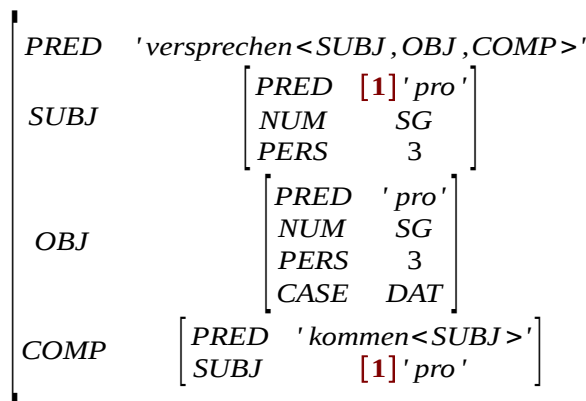Figure 5a Functional control [6]   Figure 5b Obligatory anaphoric control
Figure 5 Representation of *'Es verspricht zu regnen.'* (5a) and   *'Ich verspreche ihm zu kommen.'* (5b)

In the LFG literature, the discussion of control is in many cases confined to the discussion of f-structure, but semantic approaches using linear logic, also covering control, are available (Dalrymple 1999, Asudeh 2005, next to others).
In order to formalise switched control, we need an explicit semantic representation. Working within feature semantics, we follow Fenstad et al. 1985, and Halvorsen and Kaplan (1995), and assume a structure which allows us to flexibly relate co-reference and shared-argument configurations.[7] Halvorsen and Kaplan formalise their approach by the composition of mappings, with an attribute-value type s-structure σ and a reversed f-function Φ^{-1} . This is what we will use to describe switch control as outlined in section 2.
Suasive verbs denote communications negotiating possible situations. Control constructions containing a suasive matrix verb and a modal infinitive, instantiating the to be negotiated event, contain normative premises. The construction as such requires that one of the arguments of the matrix verb is the deontic controller. For the construction at hand, deonticity is computed on top of the lexically encoded control relations. This leads to the observed switched control pattern. In order to capture this configuration, we would like to introduce a conditioned functional control equation which allows us to introduce semantic constraints when required by a deontic infinitial complement. This can be done in the lexicon using semantic equations as shown for *verspechen*/promise in (9). If the if-then constraint is not met, a standard subject control (Fig 5b) results.

(9) **versprechen**
       * PRED <SUBJ, OBJ, COMP >
         (M* SUBJ)=(M* COMP SUBJ)
            if M* COMP MOD = deontic **then**
                (σM* ARG1) = σ (M* ARG3 ARG1) and
                (σM* ARG2) = σ (M* ARG3 ARG2) and
                (σM* ARG3 ARG1) = σ'⁻ (M* SUBJ PRED) and
                (σM* ARG3 ARG3 AGR1) = σ'⁻ (M* COMP COMP SUBJ PRED)
                                = σ'⁻ (M* COMP SUBJ PRED)
                                = σ'⁻ ((M* OBJ PRED)

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[6] The English Iness XLE web grammar (http://clarino.uib.no/iness/xle-web, accessed 08.02.16) suggests for the verb *promise* functional control.

[7] We believe a similar account to what we suggest here can be build in glue semantics.

If the conditional constraint is met, we, as a procedure, first tie up referential identity in two purely semantic constraints, and then add two inter-modular constraints that define the relation between the deontic semantics and its functional realisation. In f-structure the deontic controller is only realised once as the matrix subject while the matrix object is instantiated as the understood subject of the modal infintive (*kommen zu dürfen*). The combined f- and s-structure correspondence is shown in Figure 6: [8]

$$
\begin{bmatrix}
PRED & \quad 'versprechen\!<\!SUBJ,OBJ,COMP\!>' \\
SUBJ & \begin{bmatrix} PRED & [\mathbf{1}]'pro' \end{bmatrix} \\
OBJ & \begin{bmatrix} PRED & [\mathbf{2}]'pro' \\ CASE & DAT \end{bmatrix} \\
COMP & \begin{bmatrix} PRED & 'dürfen\!<\!SUBJ,COMP\!>' \\ SUBJ & [\mathbf{2}]'pro' \\ MOD & DEONTIC \\ COMP & \begin{bmatrix} PRED & 'kommen\!<\!SUBJ\!>' \\ SUBJ & [\mathbf{2}]'pro' \end{bmatrix} \end{bmatrix}
\end{bmatrix}
\quad \text{f-structure} \quad \sigma'^{-}
$$

$$
\begin{bmatrix}
REL & versprechen \\
ARG\,1 & [\mathbf{1}] \\
ARG\,2 & [\mathbf{2}] \\
ARG\,3 & \begin{bmatrix} REL & PERMIT \\ ARG\,1 & [\mathbf{1}] \\ ARG\,2 & [\mathbf{2}] \\ ARG\,3 & \begin{bmatrix} REL & kommen \\ ARG\,1 & [\mathbf{2}] \end{bmatrix} \end{bmatrix}
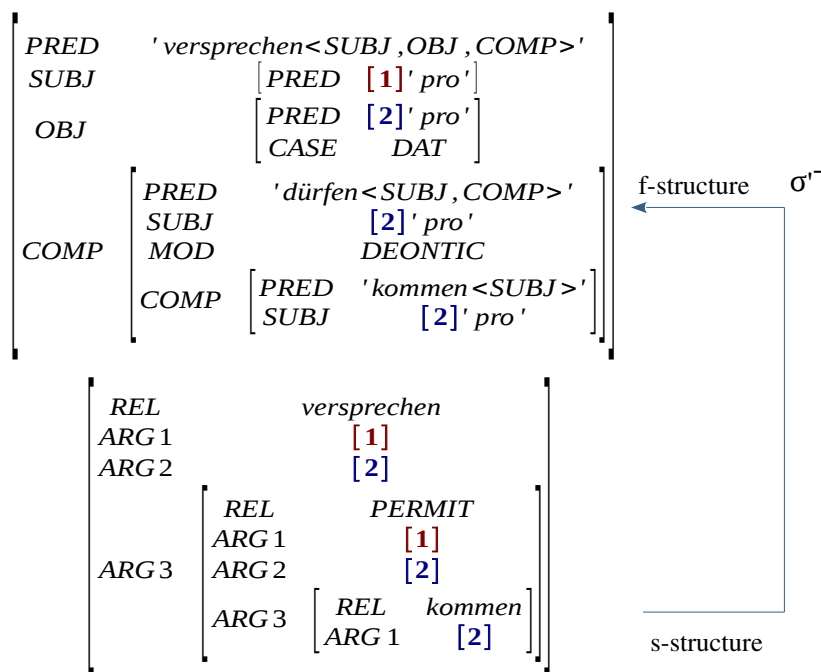\end{bmatrix}
\quad \text{s-structure}
$$

Figure 6 Control resolution in deontic nonfinite verb chains headed by suasive verbs of communication

6 Concluding remark

Relative to both frameworks, the articulation of a level of semantic representation is crucial, since one of the relations determining the control patterns observed is exposed only at this level. In the HPSG analysis, semantics is part of the SYNSEM format, but the analysis relies on a larger degree of underspecification of the specifier of the embedded infinitive than is commonly assumed.

In the LFG analysis, we make use of a design well within the bounds of a pronounced LFG architecture which allows us to state semantic constraints in the lexicon as well as in phrasal representations. Conditionals as stated in (9) for choice of relevant f-structure is what here corresponds to the underspecification mentioned in the HPSG analysis.

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[8] We use σ'^{-} for the inverse of Halvorsen's notation: $\sigma' = \sigma \circ \Phi^{-1}$