

The above examples seem to confirm this prediction. In (1a), the predicative adjective *nespokojený* occurs in the nominative case, just as the matrix subject *Petr* does. That this is in fact case agreement, and not the nominative case assignment to the predicative adjective, is confirmed by the fact that, in (1b), the predicative adjective agrees with the genitive noun within the numeral phrase subject: this is a general fact about Czech that predicates agreeing with such numeral phrases occurring in the nominative or accusative case in fact agree with the genitive noun within such phrases.¹ According to standard assumptions, in both cases the predicative adjective actually agrees with the covert subject of the copula, which is raised to the matrix subject. Therefore, the covert subject bears the morphosyntactic specification of the matrix subject. In other words, the covert subject ‘transmits’ case value between the matrix subject and the predicative adjective. Similarly, in (1c), the subject of the infinitival verb *přijít* is structure-shared with the accusative object position and, hence, it locally agrees with the accusative adjective *střízlivého*.

On the other hand, in control construction (2), the subject of the lower infinitival verb is only co-indexed with the controlling dative complement, so it does not share its case value with that complement and, hence, the predicative adjective occurs in the nominative case. The example below confirms the fact that, in Czech, (non-raised) covert subjects of infinitival verbs probably bear the nominative case:

- (3) Být opilý znamená být hloupý. (Cz.)
 be-INF drunk-NOM means be-INF stupid-NOM
 ‘Being drunk means being stupid.’

So far the standard predictions of the control/raising dichotomy have been confirmed.

However, as soon as one looks at controllers other than dative complements, this clear control/raising dichotomy in case transmission breaks down. First of all, case transmission also occurs in cases of subject control, as in (4); this is especially clear in (4b), involving the ‘quirky’ agreement with a numeral phrase.

- (4) a. Petr se bál přijít neohlášený. (SC, Cz.)
 Petr-NOM feared come unannounced-NOM
 ‘Petr was afraid of arriving impromptu.’
 b. Pět poslanců se bálo být upřímných. (SC, Cz.)
 five-NOM MPs-GEN feared be frank-GEN
 ‘Five MPs were afraid to be frank.’

Moreover, in the case of control by accusative objects, the predicative adjective optionally agrees with the controller or occurs in the default nominative case.

- (5) Marie donutila Honzu chodit domů střízlivý / střízlivého. (OC, Cz.)
 Marie forced Honza-ACC go home sober-NOM sober-ACC
 ‘Marie forced Honza go home sober.’

To complicate matters even further, when the accusative controller is a numeral phrase, the predicative adjective agrees with it (i.e., occurs in the ‘quirky’ genitive case) obligatorily again.

- (6) Marie přiměla pět pacientů přijít svlečených / ??svlečení / ??svlečené. (OC, Cz.)
 Marie made five-ACC patients-GEN come undressed-GEN undressed-NOM undressed-ACC
 ‘Marie made five patients come undressed.’

Let us summarise the Czech data so far:

- in raising constructions, case transmission is predicted to take place obligatorily, and this prediction is confirmed by the data;
- in control constructions, case transmission is predicted not to take place at all and, hence, the predicative adjective is predicted to occur in the nominative case:
 - this prediction is true for dative object controllers: there is no case transmission in dative control constructions,
 - but for nominative subject controllers, this prediction is not fulfilled: here case transmission is obligatory,
 - finally, in accusative control constructions, case transmission is optional for NP controllers and it is obligatory for numeral controllers.

Similar facts regarding case transmission in control constructions have been discussed for a number of other languages, including Icelandic and Ancient Greek (cf. Hudson 1998, 2003 and references therein), Lithuanian (Timberlake 1988), Polish (Franks 1995, Przepiórkowski 1999a) and Russian (Franks 1995, Hudson 2003), but — to the best of our knowledge — no comprehensive and precise analysis has been proposed.² These languages vary in which control constructions force, allow or prohibit structure-sharing. For example, in Lithuanian, accusative controllers do not allow case transmission, while their genitive of negation counterparts do; on the other hand, in Polish, subject controllers force case transmission, while object controllers, including accusative controllers, prohibit it. It is clear then that any analysis of case transmission in control constructions will have to consist not only of general cross-linguistically valid principles, but will also have to contain parochial constraints.

¹This behaviour is observed in case of numerals such as *pět* ‘five’ and higher, but not in case of, e.g., the so-called paucal numerals.

²For example, Polish case transmission is discussed by Franks (1995), who considers various tentative P&P solutions and notes their drawbacks.

2 Background assumptions

We assume the existence of the attributes ARG-ST, DEPS and VALENCE (Bouma *et al.* 2001), but — for clarity and other reasons inconsequential for the analysis presented here — we also assume that the values of these attributes have themselves two attributes, SUBJ and COMPS, whose values are lists of *synsems*. We also follow Avgustinova 2001 in assuming that diathesis takes place at the ARG-ST–DEPS interface. Moreover, DEPS is the locus of syntactic case assignment, as well as — at least in languages such as Czech and Polish — binding.

As to case assignment, we follow the general approach of Przepiórkowski (1999a) and we assume the structural/lexical case dichotomy and the following principles of structural case assignment (see Przepiórkowski 1999a for formalisation and discussion):

- (7) structural case is assigned at the level of DEPS of words;
- (8) in the case of raising, when an argument occurs at a number of DEPS of different verbs, case is assigned at the highest DEPS on which the argument occurs;
- (9) the following syntactic case assignment principles (among others) hold for Czech:
 - a. assign the nominative to structural (DEPS) subjects of (finite or infinitival) verbs;
 - b. assign the accusative to structural (DEPS) complements of verbs.

The crucial part of this approach is that, if an argument occurs on (is structure-shared between) a number of DEPS, its case is checked only on the highest of these. This way there is no case clash in, e.g., OR, where the lower subject is raised to the higher object position: it is assigned case according to its highest position, i.e., it receives the accusative case (cf. (9b)), and no attempt is made to assign the nominative case to its lower ‘copy’ (cf. (8)). On the other hand, in cases of object control, where only the INDEX value is structure-shared, the controller and the controlled unexpressed subject are two different arguments, so they are both assigned case: the object receives the accusative case (cf. (9b)), and the controlled subject receives the nominative case (cf. (9a)).

Further, we assume standard (Pollard and Sag 1994) lexical entries for control and raising verbs. However, unlike Pollard and Sag 1994, we cannot assume that unexpressed subjects of controlled complements are reflexive anaphors: in Czech, as in various other Slavic languages, reflexive anaphors are strictly subject-bound, while unexpressed subjects may be controlled by objects.

Finally, we adopt the usual assumptions about predicative constructions; in particular, we assume that adjectival and nominal predicates structure-share their unrealised subjects with the signs they predicate of, and that case agreement between a predicate and the modified sign consists in local agreement between the predicate and its unrealised subject.

3 An ‘accidental’ structure-sharing analysis

The analysis proposed here follows the insight of Hudson 1998, 2003 that the semantic difference between raising and control (raising verbs have one argument fewer than the corresponding control verbs) should be dissociated from the structural difference (the raised argument and the subject of the infinitival verb are the same element, while the controller and the subject of the infinitival verb are two different elements), contrary to P&P’s Theta criterion. Hudson proposes that, in fact, some control constructions in the semantic sense (not transparent to passivisation or sentential idioms) are actually raising constructions in the structural sense (what is structure-shared is not just the index but the whole structure). Interestingly, the possibility of such an analysis is already suggested in Pollard and Sag 1994, p. 140, fn. 40: “Note further that our theory does not prevent the possibility of SYNSEM sharing in equi constructions. Thus it is not surprising to learn, as Andrews (1982) reports, that some Icelandic speakers allow (optionally) case agreement in equi constructions”. That is, given the schematic lexical entry of a subject control verb in (10), such verbs are in principle ambiguous between a non-SS interpretation, in which $\boxed{3} \neq \boxed{4}$, and a SS interpretation, where $\boxed{3} = \boxed{4}$.

- (10) a subject control verb

$$\left[\begin{array}{l} \text{word} \\ \dots \text{ARG-ST} \\ \dots \text{CONT} \end{array} \left[\begin{array}{l} \text{SUBJ} \quad \langle \boxed{3} \text{NP} \boxed{1} \rangle \\ \text{COMPS} \quad \langle \text{VP} \left[\begin{array}{l} \dots \text{VAL} \mid \text{SUBJ} \langle \boxed{4} \boxed{1} \rangle \\ \dots \text{CONT} \boxed{2} \end{array} \right] \rangle \\ \mathbf{P}(\boxed{1}, \boxed{2}) \end{array} \right. \right]$$

In other words, assuming the approach to the structural case assignment presented in §2, either the controller and the controllee are two different arguments receiving case independently and, hence, not exhibiting case transmission, or they are ‘accidentally’ structure-shared, which makes the lower copy exempt from structural case assignment and induces case transmission. This means that Czech control by accusative NPs, with its optional case transmission, is really the expected case.

Given this principled ambiguity which is the result of the possibility of ‘accidental’ structure-sharing, instead of facing the problem of wrong predictions (apparently unexpected possibility of case transmission in some control constructions), we face the problem of overgeneration: the theory predicts that case transmission is always optional in control constructions, while — as discussed in §1 — it is forbidden in the case of dative controllers and obligatory in the case of control by subjects or accusative numeral objects. That is, we need language-specific principles constraining the space of possibilities:

(11) Subject Control with SS (Czech)

a. *Whenever the subject of X is co-indexed with the subject of a VP complement of X, the two subjects are the same element.*

$$b. \left[\begin{array}{l} \text{word} \\ \dots \text{ARG-ST} \left[\begin{array}{l} \text{SUBJ} \langle \boxed{1}_{\boxed{0}} \rangle \\ \text{COMPS} \langle \text{VP} [\dots \text{VAL} \mid \text{SUBJ} \langle \boxed{2}_{\boxed{0}} \rangle] \rangle \end{array} \right] \end{array} \right] \rightarrow \boxed{1} = \boxed{2}$$

(12) Dative Object Control without SS (Czech)

a. *Whenever a dative NP complement of X is co-indexed with the subject of a VP complement of X, the NP and the VP’s subject are different elements.*

$$b. \left[\begin{array}{l} \text{word} \\ \dots \text{ARG-ST} \mid \text{COMPS} \left\langle \begin{array}{l} \boxed{1}\text{NP}_{\boxed{0}} [\dots \text{CASE } \textit{dat}], \\ \text{VP} [\dots \text{VAL} \mid \text{SUBJ} \langle \boxed{2}_{\boxed{0}} \rangle] \end{array} \right\rangle \end{array} \right] \rightarrow \boxed{1} \neq \boxed{2}$$

(13) Accusative Numeral Object Control with SS (Czech)

a. *Whenever an accusative numeral complement of X is co-indexed with the subject of a VP complement of X, the NP and the VP’s subject are the same element.*

$$b. \left[\begin{array}{l} \text{word} \\ \dots \text{ARG-ST} \mid \text{COMPS} \left\langle \begin{array}{l} \boxed{1}\text{NUMP}_{\boxed{0}} [\dots \text{CASE } \textit{acc}], \\ \text{VP} [\dots \text{VAL} \mid \text{SUBJ} \langle \boxed{2}_{\boxed{0}} \rangle] \end{array} \right\rangle \end{array} \right] \rightarrow \boxed{1} = \boxed{2}$$

Should principles such as (11a)–(13a) be formulated at the level of ARG-ST, as in (11b)–(13b) above, or at the level of DEPS? Let us consider passive forms of object control verbs, where the underlying (ARG-ST) object controller is realised as a surface (DEPS) subject. If principles (11a)–(13a) referred to surface subjects and complements, then such a promoted controller would be affected by the Subject Control principle (11a), otherwise, if they referred to ‘deep’ subjects and complements, such a controller would be affected by the Object Control principles (12a)–(13a). Thus, it should be easy to verify whether principles (11a)–(13a) should be stated at the level of ARG-ST or DEPS.

Unfortunately, in Czech, both formalisations of these principles make the same correct predictions, namely, that the predicative adjective seems to agree with its controller. To make this clear, let us consider (14), to be compared with (5).

- (14) Honza byl donucen chodit domů střízlivý / *střízlivého. (OC, Cz., passive)
 Honza-NOM was forced go home sober-NOM sober-ACC
 ‘Honza was forced to go home sober.’

Assuming a DEPS-based formalisation of (11a)–(13a), the nominative controller *Honza* is subject to principle (11a), which requires structure-sharing of the controller and the unrealised subject of *chodit*, so the unrealised subject of *chodit* is predicted to bear nominative case. This unrealised subject is structure-shared with the unrealised subject of the predicate *střízlivý* and, hence, the predicate is correctly predicted to occur in the nominative case. On the other hand, assuming the ARG-ST-based formalisation (11b)–(13b), none of these principles affect (14) (at the level of ARG-ST, the controller is not a subject, nor is it a dative or accusative numeral complement), so the controller may be optionally structure-shared with the controlled subject. In the case of structure-sharing, the predicative adjective is predicted to occur in the nominative by the reasoning above. In case there is no structure sharing, the unrealised subject of *chodit* is assigned the nominative case via (9a), which leads to the correct prediction that the predicate should occur in the nominative case. Similar reasoning may be carried out for numeral controllers in passive forms of object control constructions.

Fortunately, the question posed above can be answered on the basis of Polish (P.) data. In Polish, in active voice, there is obligatory case transmission in subject control constructions, but it is impossible in all object control constructions, including control by an accusative object, i.e., Polish seems to require two parochial principles: (11a) and a version of (12a) generalised to controllers bearing any case, not just dative. Moreover, when there is no case transmission, the

predicative adjective occurs in the instrumental case, which could suggest that subjects of infinitival verbs are assigned the instrumental.³

If the principles for Polish were formalised at the level of DEPS, they would enforce case transmission also when the object controller is promoted to the subject position, i.e., the predicative adjective should occur in nominative case. On the other hand, if these principles were stated at the level of ARG-ST, as above, they would predict that there is no case transmission, so the adjective should occur in the instrumental. Polish facts confirm the analysis in terms of ARG-ST:

- (15) a. Janek uczył synka być grzecznym / *grzecznego. (OC, P., active)
 Janek taught son-ACC be-INF polite-INS polite-ACC
 ‘Janek taught his sonny to be polite.’
- b. Synek był uczony być grzecznym / *grzeczny. (OC, P., passive)
 son-NOM was taught be-INF polite-INS polite-NOM
 ‘The sonny was taught to be polite.’

4 Conclusions

The account of case transmission in control constructions proposed here consists in 1) the observation that, given the possibility of ‘accidental structure-sharing’, the standard analysis of control (minus the assumption that controllees are anaphors) interacts with the approach to grammatical case assignment proposed in Przepiórkowski 1999a in an interesting way in that it predicts optional case transmission in all control constructions, 2) constraining this optionality where appropriate via simple language-specific principles. It turns out that those principles, although they refer to syntactic arguments, must be stated at a level ‘deeper’ than DEPS, i.e., at the level of ARG-ST; this provides an additional argument for the DEPS/ARG-ST distinction.

It should be noted that this type of analysis cannot be easily carried over to theories, such as various versions of Principles and Parameters, which assume widely different structures for raising and control constructions. The fact that the standard HPSG assumptions make the account of the troublesome cross-linguistic case transmission data so trivial reflects, in our opinion, the essential correctness of the basic set of HPSG assumptions.

References

- Avgustinova, T. (2001). Arguments, grammatical relations, and diathetic paradigm. In D. Flickinger and A. Kathol, editors, *Proceedings of the 7th International Conference on Head-Driven Phrase Structure Grammar*, pages 23–42. CSLI Publications, Stanford, CA.
- Bouma, G., Malouf, R., and Sag, I. A. (2001). Satisfying constraints on extraction and adjunction. *Natural Language and Linguistic Theory*, **19**(1), 1–65.
- Franks, S. (1995). *Parameters of Slavic Morphosyntax*. Oxford University Press, New York.
- Hornstein, N. (1999). Movement and control. *Linguistic Inquiry*, **30**, 69–96.
- Hudson, R. (1998). Functional control with and without structure-sharing. In A. Siewierska and J. J. Song, editors, *Case, Typology and Grammar*, volume 38 of *Typological Studies in Language*, pages 151–169. Benjamins, Amsterdam.
- Hudson, R. (2003). Case agreement, PRO and structure sharing. *Research in Language*, **1**. Forthcoming.
- Manning, C. D., Sag, I. A., and Iida, M. (1999). The lexical integrity of Japanese causatives. In R. D. Levine and G. Green, editors, *Studies in Contemporary Phrase Structure Grammar*, pages 39–79. Cambridge University Press, Cambridge.
- Meurers, W. D. (1995). Towards a semantics for lexical rules as used in HPSG. In *Proceedings of ESSLLI7 Conference on Formal Grammar*, Barcelona, Spain. Universidad Politecnica de Catalunya. Also published in A. Copestake and D. Nicholls (eds.), *Proceedings of the ACQUILEX II Workshop on the Formalisation and Use of Lexical Rules*, 1995, Cambridge.
- Pollard, C. and Sag, I. A. (1994). *Head-driven Phrase Structure Grammar*. Chicago University Press / CSLI Publications, Chicago, IL.
- Przepiórkowski, A. (1999a). *Case Assignment and the Complement-Adjunct Dichotomy: A Non-Configurational Constraint-Based Approach*. Ph. D. dissertation, Universität Tübingen.
- Przepiórkowski, A. (1999b). On case assignment and ‘adjuncts as complements’. In G. Webelhuth, J.-P. Koenig, and A. Kathol, editors, *Lexical and Constructional Aspects of Linguistic Explanation*, pages 231–245. CSLI Publications, Stanford, CA.
- Timberlake, A. (1988). Case agreement in Lithuanian. In M. Barlow and C. A. Ferguson, editors, *Agreement in Natural Language: Approaches, Theories, Descriptions*, pages 181–199. CSLI Publications, Stanford, CA.

³A different analysis, also compatible with current considerations, is proposed in Przepiórkowski 1999a.