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Possessors in switch-reference

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Some languages with switch-reference use same-subject markers in structures where the internal possessor of one subject corefers with another subject, but the subjects do not corefer with each other. We analyse such patterns as a type of non-canonical switch-reference (Stirling 1993; de Sousa 2016) and show that languages differ in what types of possessive relations license same-subject marking. Languages that allow alienable possessive relations in switch-reference also allow inalienable relations to license same-subject marking, but not *vice versa*. In addition, alienable, but not inalienable possessive relations, must be morphosyntactically expressed when licensing same-subject marking. Adopting a modified version of Stirling's (1993) approach, we derive these implicational relations from anaphoric conditions licensing non-canonical switch-reference.

Keywords: Non-canonical switch-reference; Internal possession; Relational nouns; Part-whole relations

1 Introduction

Switch-reference (SR) is a grammatical system of tracking coreference relations among different clauses (Jacobsen 1967; Haiman & Munro 1983b; Foley & Van Valin 1984; Finer 1985; Roberts 1988; Stirling 1993; Roberts 1997; Longacre 2007; McKenzie 2012; Weisser 2012; van Gijn 2016). The morphosyntactic characterisation of canonical SR by Haiman & Munro (1983a: ix) describes it as an “inflectional category of the verb, which indicates whether or not its subject is identical with the subject of some other clause” (see van Gijn 2016 and de Sousa 2016 for recent discussions of how Haiman & Munro's definition has been challenged, and Weisser 2012 for discussion of non-inflectional SR morphology). Referring to the elements whose reference determines what type of SR marking is licit as *pivots*, the most straightforward case of SR involves subject pivots. Coreferential pivots require same-subject (SS) marking on the verbal form, while non-coreferential pivots require different-subject (DS) marking.

However, there is variation in both the choice of pivots and the possible relations between them. For the former, Stirling (1993) and McKenzie (2007; 2010; 2012) discuss cases in which SR tracks the identity of eventualities or what McKenzie calls “topic situations” rather than subjects (see also Weisser 2012, Keine 2013 and Section 4), and a few languages allow non-subject arguments to be SR pivots as well. Many languages can use both SS- and DS-marking in contexts that go beyond the simplest cases of coreference and disjoint reference of the two arguments (Foley & Van Valin 1984; Brendemoen & Csató 1987; Wilkins 1988; Stirling 1993; Bergelson & Kibrik 1995; Keine 2013; Comrie 1983; Nichols 1983; de Sousa 2016). Stirling (1993) mainly discusses two types of what she calls “unexpected” SS-marking. One type involves “referentially deficient” subjects in one clause, such as the subjects of weather predicates, which nevertheless trigger SS-marking.

In another type, also discussed by Comrie (1983), both clauses have referential subjects: their referents, however, are not strictly coreferential but stand in a certain type of inclusion relation to each other.

We will briefly comment on the latter case below, but the main focus of this paper is another type of non-canonical SR. In certain languages, SS-marking does not always indicate the coreferentiality of two subjects, but the coreferentiality of a subject and a *possessor* of a subject. In other words, it seems that the pivots in such configurations are not two subjects, but a subject and a possessor, even though otherwise the system of SR is strongly subject-oriented. This is therefore different from languages in which SS-markers do not even track the referential identity of two subjects in the first place.

It is important to emphasise that we exclude obvious cases of external possessors that take on an argument function from consideration. In some languages with SR, e.g. the Western Muskogean languages Chickasaw (Munro & Gordon 1982; Munro 1984; 1999; 2016) and Choctaw (Broadwell 1997; 2006; Tyler 2019), a possessor can act as a SR pivot, but this is only possible if it is external to the NP that contains the possessed noun. Since the external possessor assumes the subject role, its ability to license regular SS-marking does not qualify for a true instance of non-canonical SR. In contrast, in the languages discussed in this paper, there is no evidence that a possessor is externalised and promoted to subject or there is clear evidence against this. The internal status of possessors is supported by the grammatical marking associated with regular internal possessors in the language, standard constituency tests, and/or the fact that the possessor in question does not acquire other independent properties, for example the ability to control agreement on the main verb or participate in subject-related processes such as passivisation. We can therefore conclude that such possessors are regular internal possessors; they are not subjects in their respective clauses but they still seem to act as pivots in a SS-relation.

An example illustrating non-canonical SS-marking involving an internal possessor is shown in (1), from Tundra Nenets (Uralic; ° indicates a super-short [ə], Nikolaeva 2014: 14).¹

- (1) *Tundra Nenets* (Nikolaeva 2014: 380)
 [yarum-c°] ηəc'eki°-h ηāwa-da yes°m'a
 cry-SS.CVB child-GEN head-3SG.POSS start.hurting.3SG
 'When it cried, the child's head started hurting.'

In (1), it is the third person possessor *ηəc'eki°-h* 'child-GEN' of the main clause subject that corefers with the subject of the marked clause. There may be various ways of analyzing (1), but from the point of view of surface constituency at least, the possessor is not represented externally to the noun phrase to which the possessed noun belongs: it is an internal possessor marked with genitive case as is typical for internal possessors in this language (Nikolaeva 2014; Nikolaeva & Bárány 2019). So (1) clearly shows unusual switch-reference, since SS-marking is licensed in the absence of strict coreference between the heads of the subjects of the two clauses.

This paper has two main goals. The first is to provide a typological overview of the phenomenon of internal possessors acting as if they were SR pivots. To our knowledge, this has not yet been done in the previous literature. The languages we discuss in this paper reflect

¹ The data presented in this paper were obtained both from the existing literature and from data collected by the authors through elicitation with one native speaker of Udmurt and five native speakers of Turkish. When references to a source are not provided, the example comes from our own fieldwork. For data from the literature, we refer to the source of each example and preserve its original transcription but regularise and modify glosses so they correspond to the Leipzig Glossing Rules. In the discussion of Turkic data, capital letters refer to segments which are subject to morphophonological processes like harmony. In Turkish, *I* surfaces as [i], [u], [o], or [y], for example.

a relatively small, non-exhaustive sample we were able to compile based on the literature on SR in about 100 languages (see Nikolaeva, Bárány & Bond 2019 for further examples). In part, this is because the role of (internal) possessors is seldom mentioned in the descriptions of SR and is arguably easy to miss for the author in a description. It therefore remains unclear how much rarer this phenomenon is than SR not involving possessors, although it is clear that not all languages allow possessors to license SS-marking. As the relevant parameters of variation, we will consider (i) whether the morphosyntactic marking of possession is necessary to license SS-marking with possessors, and (ii) what kinds of possessive relations license SS-marking. We will argue that the morphosyntactic marking of possession can in fact be absent under certain conditions and that there is an implicational relation between the kinds of possessive meanings that play a role in SR: if a language allows an alienable possessive relation between two SR pivots (subjects, in our data), it also allows a part-whole possessive relation, for example with body parts.

The second goal is to relate the two parameters of variation and the languages exhibiting them to each other. We argue that part-whole relations between pivots can license SS-marking in all relevant languages since the relation between a part and a whole is salient both pragmatically, as well as in its semantic and syntactic representation. It is essentially the part-whole semantics contributed by the possessed noun itself that ensures that non-canonical SR is possible. Alienable possession, involving ownership for example, makes it more difficult to relate two entities to each other without morphosyntactic marking of possession, therefore in languages in which alienable possession licenses SS-marking, the morphosyntactic coding of possession is required. We will model this by adopting a modified version of Stirling's (1993) approach to SR and propose that possessive relations between pivots are possible types of anaphoric conditions on SS-markers.

The rest of this paper is structured as follows. Section 2 explains our basic assumptions about possessives and SR. In Section 3 we discuss cross-linguistic variation among internal possessors interacting with SR and propose typological generalisations. Section 4 proposes an analysis that captures this variation and briefly discusses potential alternative analyses. Section 5 concludes the paper and positions our proposal relative to existing analyses of SR. We suggest that our proposal is to some degree compatible with analyses that rely on an agreement mechanism between (parts of) clauses, but that it seems incompatible with approaches that assume SS-marking to indicate that syntactically, there is a single shared subject between two or more clauses.

2 Theoretical preliminaries

In this section, we discuss the theoretical background for both possession and SR on which we build our proposal in Section 4.

2.1 Possession

We take possession to be a relation between a possessor and a possessed noun, the latter of which heads a possessive noun phrase. This relation can be, for example, a part-whole, a kinship, an ownership or a control relation, but it can also express much looser association (see e.g. Seiler 1983: 4; Heine 1997: 3–10, 33–40; Partee 1997; Partee & Borschev 2003; Herslund & Baron 2001: 1–4; Nikolaeva & Spencer 2013; Myler 2016: 3–4; Ortmann 2018).

Many theories split possessives into two types which correlate with the traditional distinction between inalienable and alienable possession. Ortmann (2018) refers to these as “semantic” and “pragmatic” possession, while Barker (1995: 50) uses “lexical” and “extrinsic” possession. The difference between the two types depends on the semantic nature of the possessed noun and is reflected in the distinction between relational and non-relational nouns (Löbner 1985; 2011; Barker 1995; 2011; Vikner & Jensen 2002; Ortmann 2018).

Relational nouns differ from non-relational nouns in that the former take an additional individual argument that stands in a certain relation with the noun's referent, so their semantics presupposes the existence of another individual and the unique type of relation involved (Löbner 2011). For example, if one is a mother, one must be the mother of some individual. This can be expressed in the argument structure of the possessed noun, e.g. $\lambda y.\lambda x.\text{mother}(x, y)$, where the variable y ranges over possible possessors, i.e. 'somebody's mother'.

As is well known, the opposition between alienable and inalienable possession cannot be given a universal semantic definition since languages exhibit a remarkable variety in what they code as alienable or inalienable (see e.g. Nichols 1988; Chappell & McGregor 1996b; Heine 1997: 10–16, 180–183; Nichols & Bickel 2013; Nikolaeva & Spencer 2013: 216; Ortmann 2018: 120–121). While body parts, for example, generally behave like inalienable parts, this is not always the case (Chappell & McGregor 1996a: 8–9). However, we are not aware of a language in which the class of relational nouns would not include any nouns that denote a part in a part-whole relation, and König (2001: 977) and Ortmann (2018: 113) suggest that part-whole relations are among the most typical inalienable relations. In this paper we will mainly focus on such relations as representatives of inalienable possession. One reason for this is empirical: in all languages in our sample that allow possessors in inalienable relations to participate in SR, these relations always include part-whole, but not necessarily kinship relations, for example. As discussed below, we suspect that this has to do with a particular property of part-whole relations.

We will model relational nouns that stand in a part-whole relation with an individual by including a two-place relation PART-OF in their lexical semantics which takes the possessor and the possessed noun as its arguments. The PART-OF relation itself is what Pustejovsky (1995: 99–100) and Vikner & Jensen (2002: 198–199) call a “constitutive” attribute of a lexical item, i.e. information about an object and what it forms a part of. As such, PART-OF can be seen as a semantic primitive that is part of the lexical representation of certain lexical items, in particular relational nouns. Barker (1995: 66) mentions that body part expressions are “prototypical” cases of relational nouns expressing PART-OF relations, but they are not the only ones; inherent characteristics such as shape are other examples.

Following Barker (1995), Vikner & Jensen (2002) and Ortmann (2018), and using an example from Myler (2016: 51), a “part” relational noun like *beard* can be represented as shown in (2) (simplified). In this representation, the noun takes two individual arguments, x , the noun itself, and y , the individual that x belongs to. x is specified as being a (body) part of y .

$$(2) \quad \textit{beard}: \lambda y.\lambda x.\text{beard}(x) \wedge \text{BODY-PART-OF}(x, y)$$

Other types of relational nouns, like kinship terms, are represented similarly, but they differ in what relation they are lexically specified to express. Ortmann (2018: 118–119) represents the kinship term *mother* as in (3), referring to the unique individual x (represented by ι) such that it is a female parent of y (see also Barker 1995: 50–52), where the expression PARENT in (3) expresses the relation between the referent of *mother* and the presupposed individual (the child).

$$(3) \quad \textit{mother}: \lambda y.\iota x.\text{FEMALE}(x) \wedge \text{PARENT}(x, y)$$

In contrast to relational nouns, non-relational nouns simply refer to a property or individual and are not inherently specified to take an additional argument. They therefore require neither a possessor, nor a particular possessive relation. Nevertheless, it is obvious

that both relational and non-relational nouns can be used in possessive constructions. As discussed by Barker (1995; 2011), Vikner & Jensen (2002), Partee & Borschev (2003), Myler (2016), and Ortmann (2018), among many others, the difference is that while for relational nouns the possessive relation is generally specified by their lexical semantics, non-relational nouns have to be modified to be able to take a possessor argument. This modification can take place purely semantically, e.g. by shifting the semantic type of the noun such that it can take an additional argument that stands in some relation with the head noun (see Ortmann 2018: 136–139 for discussion of a few alternatives), or in interaction with syntax, e.g. by adding a syntactic head which introduces a possessor and a relation (see Myler 2016: 49–52 for such an approach). Either way, neither the additional argument nor the possessive relation are lexically required.

Again following Myler (2016) and Ortmann (2018), we assume that possessed non-relational nouns can be represented as in (4) (slightly changed from Myler 2016: 52; see also Ortmann 2018: 121). For Myler, POSS is a syntactic head that merges with a non-relational noun and introduces the possessive relation between a non-relational noun and its possessor. In (4), the relation is between two individuals x and y such that x is a book and x and y are in a POSS relation.

(4) *someone's book*: $\lambda y.\lambda x.\text{book}(x) \wedge \text{POSS}(y, x)$

This means that all possessives uniformly are expressions in which the possessor and the possessed noun are co-arguments in a two-place relation. The semantic nature of POSS, however, is different from the relations introduced by relational nouns. POSS roughly corresponds to what Barker (1995; 2011), Partee (1997), Partee & Borschev (2003), Ackerman & Nikolaeva (2013), and Nikolaeva & Spencer (2013) call R . These authors emphasise that, in contrast to relational nouns, the possessive predicate introduced by non-relational nouns is semantically underspecified. In the default case it is interpreted as (legal) ownership (see e.g. Barker 1995 and Storto 2005 for discussion of this point), but it is well known that many languages allow non-ownership readings, so that R can express a virtually infinite number of associative relations between two entities, subject to contextual factors. Thus, for non-relational nouns the possessive relation is determined by context and pragmatics to a much larger degree than for relational nouns, and conditions on the use of the possessive structure can be rather elusive. Whatever the precise factors might be, multiple interpretations are allowed because the intended relation is extrinsic to the lexical semantics of the possessed noun.

Another crucial difference is morphosyntactic. Unlike PART-OF, which is introduced lexically, POSS is not present unless introduced as part of a possessive construction, be it as a consequence of a type-shifting mechanism, the syntactic representation of possession or both. This difference in how the two relations are introduced correlates with the obligatory morphosyntactic expression of POSS relations, which will feature prominently in our analysis. We refer to this as “overt coding of possession”, by which we mean any kind of morphosyntactic coding in a possessive phrase that indicates the presence of a possessor in the phrase’s syntax and semantics. Most commonly, this can be the presence of a possessor DP, which can but need not be expressed with a case-marker, adposition, or linking element. Another common type of coding is a possessive affix on the possessed noun that, in many languages, reflects some of the formal features of the possessor, for example its person and number. Other affixes that indicate the presence of a possessive relation are markers of (in)alienable possession (e.g. in (18)). In the absence of any such element in a possessive phrase, the POSS relation is not present and a non-relational noun is generally not interpreted as possessed.

As for relational nouns, in many languages they are required to be morphosyntactically possessed just like non-relational nouns, that is, the possessor argument is required to be overtly expressed (Nichols & Bickel 2013). However, even if a PART-OF relation is not overtly coded as a possessive relation, the meaning of the possessed noun itself presupposes an implicit argument representing the possessor. Such implicit possessors are sometimes understood to corefer with a referent in the same structure even without overt morphosyntactic coding of possession, for example in French. In (5), the subject and the object, a body part, are interpreted to be in a possessive relation (see e.g. Koenig 1999; Guéron 2006: 591). This is not explicitly encoded, although there are analyses deriving examples like (5) by postulating a null element such as a trace or another variable inside the possessed phrase (see Guéron 2006 for an overview).

- (5) *French* (Guéron 2006: 591)
 Jean lève la main.
 Jean raises the hand
 ‘Jean raises his hand.’

We will suggest that certain SR constructions represent a similar phenomenon: in a number of languages, entities that refer to possessors in part-whole relations can participate in SR without explicit coding of possession, as in (5).

2.2 Switch-reference

Turning now to switch-reference, in canonical SR systems, SS-marking occurs when two clauses in a specific syntactic configuration have coreferential subjects. A schematic version of this is shown in (6). There are two clauses, a marked clause, which shows SS-marking and is indicated throughout with square brackets, and a controlling clause, which does not show SR marking.² In (6a), SS-marking appears when the subject of the marked clause and the subject of the controlling clause corefer, indicated by their identical indices. If the subjects have different referents, the verb in the marked clause shows DS-marking, as illustrated in (6b).

- (6) a. [SBJ_i ... V-SS] SBJ_i ... V
 b. [SBJ_i ... V-DS] SBJ_j ... V

The morphosyntactic expression of this distinction greatly varies across languages. One difference relevant for much of our data relates to the form of SR markers, which largely fall into two types. The first type is illustrated by (7) below, in which the verb in the marked clause has a dedicated SS-suffix. This is arguably the most discussed type of SR. Such systems often distinguish dedicated SS- and DS-markers indicating coreference and disjoint reference of two subjects, respectively (see e.g. de Sousa 2016: 58–60). The second type was illustrated by (1), in which SR is encoded by the use of a converb. Haspelmath (1995) defines converbs as “nonfinite verb form[s] whose main function is to mark adverbial subordination” (Haspelmath 1995: 3; see also V. P. Nedjalkov 1995; Ylikoski 2003; Weisser 2015) and mentions English or French gerunds as examples of converbs in Western European languages. While his definition does not refer to SR explicitly, Haspelmath (1995: 9–11) points out that converbs differ across languages in whether

² The terms “marked” and “controlled” are used by Haiman & Munro (1983a), among others; McKenzie (2012) prefers to use the terms “pivot clause” and “anti-pivot clause” for marked and controlling clauses, respectively, as well as “pivot” and “anti-pivot” for the phrase in each clause whose referent is relevant for the SR relation. We follow the former usage.

they allow or require overt subjects. This property correlates with restrictions on the reference of the converb's subject. Typically, converbs that have null subjects require these to corefer with the subject of the superordinate clause. In other words, they are generally same-subject converbs (SS-converbs). Converbs that require overt subjects, on the other hand, do not have such requirements (Haspelmath 1995: 10; see also V. P. Nedjalkov 1995), and can therefore be classified as different-subject converbs or converbs without coreference restrictions ("varying-subject" or VS-converbs in V. P. Nedjalkov 1995).

The connection between SR and the coreference requirements of converbs has long been noted in the literature, in particular but not only in studies on languages and language families that distinguish several forms of converbs, e.g. Turkic, Tungusic and Uralic (see e.g. Bergelson & Kibrik 1995; I. Nedjalkov 1995; Nevskaya 1998; Nikolaeva 1999; 2014; Weisser 2015; Matić 2016). We follow these authors in including converbs in our discussion of SR markers; support for this move comes from the patterns we identify in the following section, illustrating that possessive relations interact with SR in the same way across languages which use converbs to express SR and those that do not.

As is clear from the discussion so far, in this paper we are interested in instances of SR in which, descriptively speaking, the identity relation is not between (the heads of) two subjects (as in the canonical definition above), but between other elements, namely subjects and possessors of subjects, as well as in instances of SR in which the relation between (the heads of) two subjects is not one of identity but another relation. To model this, we adopt some of Stirling's (1993) assumptions about SR. Stirling argues that SR goes beyond what Haiman & Munro describe and tracks not just cross-clausal identity of subject pivots, but changes in agentivity, tense, place, event sequence and mood (see Stirling 1993: 152 for an overview). To capture this wide range of phenomena, Stirling (1993) develops an integrated account of the syntax and semantics of SR using Categorical Grammar and Discourse Representation Theory, a full description of which goes beyond the scope of this paper. In brief, she suggests that SR is the expression of a type of agreement between clauses. This agreement relation is between properties of clauses, which include the pivot, the spatial or temporal location and the event or state expressed by a clause (Stirling 1993: Section 5.3.3). If these features match, SS-marking is used, while DS-marking is used otherwise, subject to cross-linguistic variation.

In our representation of the variable relations found in SR, we follow Stirling's (1993) assumption that SS- and DS-markers introduce conditions on the semantic representations of SR constructions as part of their lexical specification. This paper only focuses on the choice of pivots and their relation to each other, as the other parameters do not seem to affect the role of possessors in SR. In our analysis, and the rest of this paper, the term "pivot" generally refers to subjects unless otherwise noted (e.g. in Kakataibo, where objects can act as pivots too), as we model the role of possessors in SR in terms of relations between subjects. We will discuss the reasons for adopting this approach in Section 4 where we introduce a mechanism for identifying referents of pivots which differs in part from Stirling's, but we follow her in how relations between pivots are represented. Stirling (1993: 212–215) models such relations using operators like "=" (identity), "≠" (non-identity), "∩" (intersection), "⊂" (proper subset of), etc. She calls these "anaphoric conditions" and suggests that they are introduced by the SS- and DS-markers in a given language (Stirling 1993: 211, 214). Each SR marker is therefore grammatically specified as being associated with particular types of semantic relations between pivots.

In Huichol (Uto-Aztecan), for example, SS-marking is used when the referent of the subject of the controlling clause is a member of the set of referents of the marked clause's subject, as shown in (7). In (8) from Jamul Tiipay (Hokan), in contrast, the superset is in the controlling clause.

- (7) *Huichol* (Comrie 1983: 26)
 [tame te-haata'azia-ka] 'eeki pe-petia.
 we 1PL.INCL-arrive-SS you 2SG-leave
 'When we_i (incl. you) arrived, you_j left.'
- (8) *Jamul Tiipay* (Miller 2001: 232)
 [oo w-i-ch] naam
 okay 3-say-SS go.away.PL
 '“Okay”, he said, and they [he and another] left.'

In (7), SS-marking is used even though the grammatical person of the subjects does not match; it is used because both subject referents include the referent of the second person singular subject 'eeki. This can be represented as $j \subset i$, meaning that the set of referents of the controlling clause's subject (j) is a proper subset of the set of referents of the marked clause's subject (i). Either of the anaphoric conditions $j = i$ (i.e. identity) and $j \subset i$ can license SS-marking in Huichol, while the conditions for Jamul Tiipay are $j = i$ and $j \supset i$.

Languages differ with respect to which anaphoric conditions license SS-marking. Thus, anaphoric conditions make it possible to capture the cross-linguistic variety of relations which allow non-canonical SS- or DS-marking. We will suggest that the role of possessors in switch-reference can be captured along these lines as well. Concretely, in Section 4.1 we will propose that the relations PART-OF and POSS are anaphoric conditions on SS-markers in some languages.

3 Possessive relations and switch-reference

The contrast between inalienable possession expressed by phrases headed by relational nouns and alienable possession expressed by phrases headed by non-relational nouns plays an important role for the present paper because the two types behave differently in terms of whether they license SS-marking and with respect to the coding of possessive relations in such contexts. This section addresses the role of relational and non-relational nouns in SR. We pay attention primarily to two morphosyntactic contrasts: the presence vs. absence of any kind of morphosyntactic coding of possession on the one hand, and the contrast between two distinct overt coding strategies of possession on the other.

3.1 Part-whole relations in switch-reference

In some languages with SR systems, SS-marking can occur with non-identical subjects when they are in a part-whole relation. In our sample, languages that belong to this type are the California Uto-Aztecan languages Serrano, Luiseño, Cupeño, and Cahuilla (Hill 2016), the Uralic languages Northern Khanty and Eastern Khanty (Nikolaeva 1999; Filchenko 2010; Csepregi 2011), the Panoan languages Kakataibo (Zariquiey 2018) and Matses (Fleck 2003), the Tungusic language Evenki (I. Nedjalkov 1995), as well as a number of Turkic languages, such as Old Turkic (Erdal 2004), Shor (Nevskaya 1998), and varieties of Tuvan (Bergelson & Kibrik 1995; Mawkanuli 2005; Aydemir 2009), among others. They differ from the languages discussed in Section 3.2, which are less restricted in terms of what types of possessive relations can license SS-marking.

(9) illustrates an example from Cupeño, in which the main clause subject, literally 'their heart', triggers 3SG subject agreement on the main verb. The possessor of the subject, 'their', is expressed by a pronominal clitic hosted by the possessed noun and corefers with the subject of the marked clause. We are not aware of any evidence that the possessor is represented externally and acquires argument status. In all the relevant examples in Hill

(2016), ‘heart’ is overtly possessed, but Hill also notes that there is some (pragmatic) variation as to whether the SS- or the DS-marker is used in the marked clause, although it is not clear whether this is inter- or intra-speaker variation.

- (9) *Cupeño* (Hill 2005: 406–407; 2016: 129)
 Kunuk [havesh-pa-yka kwel-ax-anuk], pem-\$uun wey-pe-ya-qal
 only morning-in get.up-INTR-SS 3PL.POSS-heart think-3SG-INTR-IPFV.SG
 pem-’ami-pi.
 3SG-hunt-SUB.IRR
 ‘When they got up in the morning, they thought only to hunt.’

Hill’s (2016) examples involve combinations of possessors and body parts to express emotions, e.g. *their heart thinks* means ‘they think’ in (9). Such expressions seem to be lexically restricted (all relevant examples involve *heart*) but they formally pattern with the other languages discussed here. These so-called *psycho-collocations* (von Prince 2017) could represent a starting point for extending the use of possessive relation in SR to lexical items other than *heart* or similar elements used to express emotions.

Cupeño requires the overt coding of possessors that participate in SR while restricting the relation between two subjects to part-whole relations. There are also languages in which the overt coding of possession in part-whole relations between subjects is not obligatory. One language of this type is the Panoan language Kakataibo (Zariquiey 2018). Kakataibo has complex SR morphology which does not only track the identity of subjects, but some SR markers can also express identity of subjects and objects. We only focus on subjects here (but see more on Kakataibo in Section 4.2).

SR markers tracking subjects are restricted to body parts in non-canonical SR. Body part nouns exhibit special behaviour with respect to SR because they are “grammatically treated as the same argument” as the whole (Zariquiey 2018: 219). (10) shows that with the subject *bëru* ‘eye’, only the SS-marker *-xun* is grammatical. This is the marker of the simultaneous/previous SR relation, which usually indicates coreference of the intransitive or transitive subject (S/A) of the marked clause with the transitive subject (A) of the controlling clause. The simultaneous DS and (and different object) marker *-këbëtan* is ungrammatical in this context.

- (10) *Kakataibo* (Zariquiey 2018: 219–220)
 [Bëráma **bëru** upí ‘i-xun / *‘i-këbëtan] ka = na
 long.time.ago eye.ABS good be-S/A > A be-DS/A/P.SE.TR NAR = 1SG
 ‘a-akë-n ‘ë = n ‘a-akë-n bënën-kin = ishi ñu.
 do-REM.PST-1/2 1SG = A do-REM.PST-1/2 do.quickly-S/A > A.SE = only thing.ABS
 ‘A long time ago, when my eye was good, I used to do the things very fast.’

The contrast between (10) and (11) shows that it is the part-whole relation in (10) that licenses SS-marking, as the possessed noun *xubu* ‘house’ requires DS-marking in the same grammatical context.

- (11) *Kakataibo* (Zariquiey 2018: 220)
 [‘Ë = n **xubu** ‘aisama *‘i-xun / ‘i-këbëtan] ka = na bëtsi
 1SG = GEN house.ABS bad be-S/A > A be-DS/A/P.SE.TR NAR = 1SG other
 xubu ‘ë = n ‘a-akë-n.
 house.ABS 1SG = A do-REM.PST-1/2
 ‘When my house was bad, I made another one.’

In (10), the body part noun ‘eye’ is not morphosyntactically possessed, but overt possessors are found in other examples with the same possessed noun, e.g. ‘ $\ddot{e}=n$ (1SG = GEN) *bëru* (eye.ABS) ‘my eye’ (Zariquiey 2018: 221–222). All overt possessors, including pronominal possessors, must be expressed by prenominal genitives which provides evidence that the possessor is internal. Genitive possessors, including the possessors of body part nouns, are not normally omissible, so in this sense (10) differs from the regular possessive pattern. It is not clear from the available data whether the overt expression of the genitive possessor in (10) is optional or in fact prohibited, like in the French example in (5).

The languages mentioned here have in common that the subjects of the marked and the controlling clause do not corefer and that SS-marking is possible in the absence of strict coreference because of the part-whole relation between the two pivots. We can then think of the Cupeño SS-marker *-anuk* and the Kakataibo SS-marker *-xun* as requiring that their subject’s referent be either identical to or in a part-whole relation with the main clause’s subject.

In Mparntwe Arrernte (Pama-Nyungan), too, SS-marking is used when two SR pivots are in a part-whole relation. The language can, but need not, encode the possessor in a part-whole relation overtly, cf. (12), where ‘hand’ is syntactically possessed, and (13), where ‘nose’ is not. Note also that DS-marking is in fact ruled out in (13), independently of the order of the clauses (Wilkins 1988: 167).

- (12) *Mparntwe Arrernte* (Wilkins 1988: 167)
 [Ayenge lhe-me-le], iltye tyenhe knge.lhe-me.
 1SG.NOM go-NPST.PROG-SS hand 1SG.POSS move-NPST.PROG
 ‘My hand is swinging as I go along.’

- (13) *Mparntwe Arrernte* (Wilkins 1988: 166)
 Alhe irrke-ke [ayenge petye-me-le / (*-rlenge)].
 nose be itchy-PST.CMPL 1SG.NOM come-NPST-PROG-SS -DS
 ‘My nose itched as I was coming along.’

Wilkins (1988) points out that these data cannot be explained by the general optionality of encoding possession, since a phrase like *my nose itched* normally requires an overt possessor (Wilkins 1988: 167). In other words, the absence of a possessor in an example like (13) depends on SR. Mparntwe Arrernte is thus another language in which part-whole relations can license SS-marking without an overt possessor, while speakers have the option of adding one. In addition, the type of inalienable possessive relation between two pivots is crucial for determining whether SS-marking is possible: while part-whole relations are grammatical in such contexts, kinship relations are not (Wilkins 1988: 147).

The same pattern is found in Udmurt (Uralic). In (14a), the subject of the SS-converb in *-sa*, *kæt* ‘stomach’, refers to a body part of the main clause subject’s referent. Note that *Ivan* cannot be analysed as the possessor of the embedded subject because of its nominative case-marking. The part noun only optionally bears the possessive suffix indexing the subject of the controlling clause, unlike in regular possessive constructions where possession must be expressed by a possessive suffix or a possessive suffix in combination with a free-standing possessor. For instance, the meaning ‘his stomach’ cannot be expressed simply by *kæt* out of the blue, outside of a SR context. Conversely, in (14b), the null subject of the SS-converb corefers with the possessor of the main subject. This resembles the French example in (5) with the difference that the unmarked possessed noun is not a clausemate of the subject introducing the possessor’s referent. Note also that lexical possessors of subjects are in the genitive in Udmurt, indicating that they originate DP-internally and are not promoted to subject.

(14) *Udmurt*

- a. Ivan [kət(-iz) višj-sa] gurt-e bert-i-z.
 Ivan.NOM stomach-3SG.POSS hurt-SS.CVB home-ILL come.back-PRT-3SG
 ‘His stomach hurting, Ivan came back home.’
- b. [Ekti-sa] Ivan-len pjd-iz čigi-šk-i-z.
 dance-SS.CVB Ivan-GEN leg-3SG.POSS break-REFL-PRT-3SG
 ‘When he was dancing, Ivan’s leg broke.’, lit. ‘Dancing, Ivan’s leg broke.’

Apart from part-whole relations, *-sa* is a strict SS-converb, in that it does not allow disjoint subjects, (15a), other grammatical relations, e.g. a matrix object, (15b), or a possessor of the subject that is not in a part-whole relation to corefer with the subject of the converb, (15c).

(15) *Udmurt*

- a. *[Maša uža-sa] Petya parašk-i-z.
 Masha.NOM work-SS.CVB Petya cook-PRT-3SG
 intended: ‘When Maša was working, Petya cooked.’
- b. Petya Maša-ez čupa-z [gurt-e bertj-sa].
 Petya.NOM Masha-ACC kiss-PRT.3SG home-ILL come.back-SS.CVB
 ‘Petya_i kissed Masha_j when $\emptyset_{i/j}$ coming home.’
- c. *[paraški-sa] Petya-len tušti-jez uš-i-z.
 cook-SS.CVB Petya-GEN dish-3SG.POSS fall-PRT-3SG
 intended: ‘When Petya was cooking, his dish fell down.’

Thus, in Arrernte, Udmurt and (possibly) Kakataibo, the part-whole relation between two subjects can be expressed by the presence of an overt free or morphosyntactically bound possessor (i.e. a suffix), but this is not required. The optionality in the expression of possession can arguably be explained by the nature of the possessed nouns involved. It is the presupposed relation between the possessor and the possessed noun that makes it possible to semantically identify the referent of the pivot referring to the whole as the possessor of the pivot referring to the part even when the possessor is not overtly expressed. The fact that one pivot presupposes the existence of the other contributes to licensing SS-marking in these cases. In languages that allow zero-coded possession to license SS-marking, SR is therefore not fully syntactic in that it does not simply rely on indices or coreference but builds on the lexical semantics of the possessed noun acting as a pivot. As mentioned in Section 2.1, this referencing of an implicit possessor is found in other contexts as well and is therefore not unique to SR, but rather points to a general property of relational nouns, in particular those expressing part-whole relations.

This hypothesis is supported by the following piece of evidence. In (12) and (13), the part-whole relation is between body parts and the body. Similar data are found in part-whole relations involving inanimates as well, as shown in (16). According to Wilkins (1988), SS-marking indicates that *ure* ‘fire’ is understood to be a part of *alepe* ‘firestick’; DS-marking is also possible in this case, however, as in (16b) in which Wilkins (1988: 167) characterises *ure* ‘fire’ an “individual agent”.

(16) *Mparntwe Arrernte* (Wilkins 1988: 167)

- a. Alepe kweke.me.kweke-irre-me, [ure ampe-me-le].
 firestick little by little-INCH-NPST.PROG fire burn-NPST.PROG-SS
 ‘The firestick is becoming smaller **as it burns.**’
- b. Alepe kweke.me.kweke-irre-me, [ure ampe-rlenge].
 firestick little by little-INCH-NPST.PROG fire burn-DS
 ‘The firestick is becoming smaller **as the fire burns.**’

Examples (12) and (13) involve relational nouns and therefore lexically specified part-whole relations; they only allow for SS-marking. The part-whole relation in (16), however, is not lexically specified but presumably a matter of interpretation in context. These examples seem to indicate that while *ure* ‘fire’ is not an inherently relational noun, it can be construed as such in (16). Wilkins (1988: 167) describes this as the speaker having a “choice of expressing two perspectives on the same event”.

It is not unusual for languages with inalienability oppositions to construe what is arguably the same nominal either as relational or non-relational because a “possessive” relation may be determined contextually rather than lexically, see e.g. Jackson & Jackson (1999: 27–28) on Tuvaluan or Koptjevskaja-Tamm (2003: 705–706) on Khinalug. We take this to mean that in such languages non-relational nouns can sometimes be pragmatically coerced to be interpreted as relational, arguably through so-called bridging (Irmer 2011; see also Section 4.2). This can account for the lack of morphosyntactic coding of possession in the SR relations in (16). While this kind of pragmatic enrichment appears to be language-specific, for Arrernte, Wilkins (1988: 167–168) also suggests that the use of SS-marking in (16) crucially relies on construing one of the subjects as a part of the other: this is much easier with *fire* and *firestick* than with animate possessors and their inanimate possessed nouns in ownership relations, for example. In other words, (16a) is only grammatical with SS-marking because two non-relational nouns are construed to be in a part-whole relation. This type contrasts with the languages discussed in Section 3.2, which allow non-relational nouns in regular ownership relations to license SS-marking, without the pragmatic, perspective-taking interpretation found in Arrernte.

To conclude this section, we referred to SS-marking in which two subjects in a part-whole relation act as SR pivots as one of the “non-canonical” instances of SR in Section 1. This is because in the canonical case, SS-marking requires strict coreference between subjects. While coreference is conceived of less strictly in the context of part-whole relations, such constructions do exhibit a prototypical property of SS-marking: the pivots are subjects in their respective clauses. In Section 4.1, we will account for this in terms of anaphoric conditions introduced by SS-markers in contexts of identity or part-whole relations between the two referents. These conditions do not account for languages which allow relations other than part-whole to license SS-marking, to which we turn now.

3.2 *Alienable possessive relations in switch-reference*

Unlike in the languages discussed in Section 3.1, in the languages discussed in the present section there does not seem to be any clear semantic restriction on the type of possessive relation that holds between the two subject pivots: the use of non-relational nouns is also grammatical in such contexts. We can identify a morphosyntactic restriction on such constructions, however, namely that coding possession overtly is obligatory. Languages that belong to this type are Jamul Tiipay (Hokan), Turkish and Bashkir (Turkic), as well as Tundra Nenets (Uralic), Kolyma Yukaghir and Tundra Yukaghir (Yukaghiric) which we discuss in Section 3.3.

In Jamul Tiipay (Miller 2001), two referentially non-identical pivots can license SS-marking when one of them is a relational noun like *nta’chany* ‘older sister’ and the other corresponds semantically to its possessor. In (17) the possessor *nyaap* is optional, but the possessive relation is nevertheless encoded, because for kinship terms, first person singular possessors are marked with a zero prefix while other possessive affixes in the paradigm are non-zero (Miller 2001: 146). While this is a matter of analysis, we follow Miller in assuming that the possessive relation is morphosyntactically represented in these cases since the null form stands in paradigmatic opposition to possessive forms representing other person and number combinations whose markers are phonologically realised. We thus consider Jamul Tiipay a

language with obligatory coding of possession in SR. The possessor has unmarked “absolute case”, like other internal possessors (Miller 2001: 151–152); the element *naynaa-ch* is a verb that is “being reanalyzed as an invariant morpheme” meaning *self* (Miller 2001: 323).

- (17) *Jamul Tiipay* (Miller 2001: 323)
 (nyaap) nta'chany w-aam-pes [naynaa-ch maaw]
 1SG.ABSL 1SG.POSS.older.sister 3-go away-ADVER do.oneself-SS not.do
 ‘My older sister left but I myself didn’t.’

Alienable possessive relations are encoded differently. For example, the prefix *nye-*, which Miller (2001) glosses as a marker of alienable possession, is used on the possessed noun *famiil* ‘family’, being a non-relational noun in this language. The morphosyntactic coding of possession is obligatory in (18).

- (18) *Jamul Tiipay* (Miller 2001: 322)
 Linda nye-famiil Kaamp-lly nyewaayk-pes [naynaa-ch chpa-ch]
 Linda ALIEN-family Campo-INE live-ADVER do.oneself-SS exit-SS
 ‘Linda’s family lives in Campo, but she (herself) got out.’

Thus both alienable and inalienable possessive relations between pivots license SS-marking in this language.

Bashkir and Turkish have cognate converbs ending in *-p* and *-(y)A* which are attested in the Turkic languages since Old Turkic (Johanson 1995; Erdal 2004). These converbs head adverbial clauses, but in some cases the semantic relation between the converbial and the main clause is similar to coordination (see e.g. Kornfilt 1997: 391; Lewis 2000: 179; Göksel & Kerslake 2005: 439 for Turkish; Say 2019 for Bashkir). Semantically, the two converbs differ in how they relate the event expressed by the converbial clause to the event expressed by the matrix clause, for example in terms of temporal antecedence or simultaneity.

In Turkish, the two converbs take the form *-(y)Ip* and *-(y)A*. Both are generally described as showing a SS-restriction (Brendemoen & Csató 1987; Kornfilt 1997: 391; Göksel & Kerslake 2005: 406, 439–440; Göksel & Öztürk 2019), but Johanson (1992; 1995: 318, 332) mentions that SS-requirements are not absolute and are often determined by “pragmatic inference” such that possessors or wholes in part-whole relations can act as pivots. A typical case of *-(y)Ip* indicating same-subject reference is shown in (19). In (19a), the subject of the converbial clause must corefer with the subject of the matrix clause. (19b), with two disjoint overt subjects, is ungrammatical.

- (19) *Turkish* (Kornfilt 1997: 391)
 a. [Hasan iş-in-i bit-ir-ip] ev-in-e git-ti.
 Hasan work-3.POSS-ACC end-CAUS-SS.CVB house-3.POSS-DAT go-PST.3
 ‘Hasan finished his work and went home.’
 b. *[Hasan iş-in-i bit-ir-ip] Ali ev-in-e
 Hasan work-3.POSS-ACC end-CAUS-SS.CVB Ali house-3.POSS-DAT
 git-ti.
 go-PST.3
 intended: ‘Hasan finished his work and Ali went home.’

Kornfilt (1997: 391) suggests that *-(y)Ip* is a “verbal conjunction marker” that coordinates VPs. Fokkens, Poulson & Bender (2009) and Keine (2013) also analyse *-(y)Ip* as a marker of VP coordination. On Keine’s (2013) approach to SR, coordinating VPs entails

that both must have the same subject which is generated in a higher SpecvP projection. An approach along these lines can explain why both the clause with *-(y)Ip* and the matrix clause share their tense, aspect, mood (TAM) features (Fokkens, Poulson & Bender 2009).

There is, however, evidence that appears to be incompatible with a VP coordination analysis of *-(y)Ip*. First, while the two clauses share TAM features, the *-(y)Ip*-clause can have independent polarity, as shown in (20) (see also Göksel & Öztürk 2019: 176–179).

- (20) *Turkish* (Göksel & Kerslake 2005: 439)
 Bu hava-da [ev-de otur-ma-yıp] yürüyüş-e çık-malı-yız.
 this weather-LOC house-LOC sit-NEG-SS.CVB walk-DAT leave-DEB-1PL
 ‘In this weather we must not stay indoors but go out for a walk.’

Second, both the *-(y)Ip*-clause and the matrix clause can have overt subjects, which is unexpected if the *-(y)Ip*-clause is merely a VP without a subject position. In (21a), exceptionally, the overt subjects of the converbial and the matrix clause are disjoint, while in (21b), they are in a part-whole relation.

- (21) *Turkish*
 a. Göksel & Kerslake (2005: 440)
 [Tam o saat-te Semra iş-i bırak-ıp] Ahmet
 exactly that time-LOC Semra work-ACC leave-SS.CVB Ahmet
 işbaşı yap-ıyor.
 clocking.on do-IPFV.3
 ‘At exactly that time Semra leaves work and Ahmet goes on duty.’
 b. Brendemoen & Csató (1987: 125)
 [Bu kitap yüz sayfa ol-up] fiyat-ı iki lira-dir.
 this book 100 pages be-SS.CVB price-3.POSS two lira-COP
 ‘This book contains 100 pages and its price is two lira.’

Göksel & Öztürk (2019) discuss additional examples which involve overt subjects in the converbial clause. These structures consist of a body part noun in the converbial clause whose referent is in a part-whole relation with the subject referent of the superordinate clause. The resulting patterns are idiomatic psycho-collocations, resembling the Cupeño data discussed in Section 3.1.

Based on (20) and (21), we analyse *-(y)Ip* clauses as converbial clauses, i.e. non-finite adverbial subordination. This is compatible with an extraction test discussed by Keine (2013), who shows that the object of the matrix clause can be questioned in the presence of an *-(y)Ip*-clause, but not with the coordinator *ve* which coordinates TPs. This is in fact one of the tests for identifying converbial clauses as opposed to (high) coordination discussed by Weisser (2015) and Göksel & Öztürk (2019).

- (22) *Turkish* (Keine 2013: 815; orthography and glosses adapted)
 a. ??Ahmet mağaza-ya git-ti ve ne al-dı?
 Ahmet store-DAT go-PST.3 and what buy-PST.3
 b. Ahmet mağaza-ya gid-ip ne al-dı?
 Ahmet store-DAT go-SS.CVB what buy-PST.3
 ‘What did Ahmet go to the store and buy?’

If *-(y)Ip* is a converb, (21a) nevertheless seems problematic for the assumption that it is a SS-converb as the two clauses have two clearly non-coreferential subjects. Göksel &

Kerslake (2005) characterise (21a) as “rather unusual”, implying with the rest of the literature that same-subject interpretations are the norm. One of our consultants was also surprised about (21a). We return to (21a) and similar examples below.

Crucially, whatever the status of (21a), it seems that it is impossible for the null subject of an *-(y)Ip*-clause to have fully disjoint reference with the subject of the matrix clause. This is illustrated by (23), with a context that favours disjoint reference between the subjects. Our consultants confirmed that the null subject of the converbial clause can only corefer with the subject of the matrix clause, the speaker. Thus the sentence cannot mean ‘She came home and I started cooking’.

- (23) *Turkish*; Context: *The speaker is working from home, while her housemate spends the day away before returning home.*
 [Ev-e gel-ip] yemeğ-i pişir-me-ye başla-dı-m.
 house-DAT come-SS.CVB food-ACC cook-AN-DAT start-PST-1SG
 ‘I came home and started cooking.’

A consultant offered (24) with the converbial suffix *-(y)IncA* as an alternative to (23), which takes different subjects more readily (see e.g. Kornfilt 1997: 72, Göksel & Kerslake 2005: 123). Using the same context as in (23), our consultant still favoured coreference, but said a disjoint reading was also available.

- (24) *Turkish*
 [Ev-e gel-ince] yemeğ-i pişir-me-ye başla-dı-m.
 house-DAT come-CVB food-ACC cook-AN-DAT start-PST-1SG
 ‘When she/I came home, I started cooking.’

In addition, overt, disjoint subjects with *-(y)Ip* are ungrammatical here, even though the context could support the resulting interpretation. This is illustrated in (25) and (26). The presence of an overt subject (first person in (25), third person in (26)) appears to improve the examples a little, but our consultants judged all versions to be ungrammatical.

- (25) *Turkish*; Context: *The speaker is working from home, while her housemate, Nurhan, spends the day away before returning home.*
 *[Nurhan ev-e gel-ip] (ben) yemeğ-i pişir-me-ye başla-dı-m.
 Nurhan house-DAT come-SS.CVB 1SG.NOM food-ACC cook-AN-DAT start-PST-1SG
 intended: ‘When Nurhan came home, I started cooking.’
- (26) *Turkish*; Context: *Umut is working from home, while his/her housemate, Nurhan, spends the day away before returning home.*
 *[Nurhan ev-e gel-ip] Umut yemeğ-i pişir-me-ye başla-dı-m.
 Nurhan house-DAT come-SS.CVB Umut food-ACC cook-AN-DAT start-PST-1SG
 intended: ‘When Nurhan came home, Umut started cooking.’

We take the data in (23)–(26) to indicate that grammatical examples involving disjoint reference (and overt subjects) in *-(y)Ip*-clauses are outliers.

To avoid the possible confound with overt subjects in the converbial clause, we used null subjects when testing whether *-(y)Ip* and *-(y)A* in Turkish are licensed by possessive relations between the subject of the converbial clause and the subject of the matrix clause. Consider (27) and (28).

(27) *Turkish*

[Tüm gece koş-up] Selcen-'in ayakkabı-sı yıpran-dı.
 all night run-SS.CVB Selcen-GEN shoe-3.POSS wear.out-PST.3
 'Selcen ran all night long and her shoes wore out.', lit. 'Running all night long,
 Selcen's shoes wore out.

One of our consultants did not accept (27), preferring the converb in *-(y)A* in this context, but four did. This variation in judgements could indicate that *-(y)Ip* is more restricted in terms of which possessive relations license its use in SR. A different consultant did not accept the examples with a converb formed from the verb *olmak* 'to be' in (28), while the other four did. In (28a,b), the subject of the converbial clause corefers with the possessor of the main clause subject. The two examples illustrate kinship and ownership relations, respectively. In both cases, the main clause is structurally a negative existential, asserting that the possessed noun (the subject) does not exist (the presupposition present in the literal English translation is not present in the Turkish sentence). The possessor of the subject corefers with the subject of the converbial clause (independently of the order of the converbial clause and the matrix clause).

(28) *Turkish*

- a. [Çok genç ol-up] oğl#(-u) yok.
 very young be-SS.CVB son-3.POSS NEG
 'Being very young, s/he does not have a son.'
 lit., 'Being very young, his/her son does not exist.'
- b. [Çok genç ol-up] araba#(-sı) yok.
 very young be-SS.CVB car-3.POSS NEG
 'Being very young, s/he does not have a car.'
 lit., 'Being very young, his/her car does not exist.'

The status of *-(y)A* as a converb (or gerund) is uncontroversial in the literature on Turkish. Semantically, converbial clauses with *-(y)A* indicate the manner in which the event expressed by the main clause is happening (Göksel & Kerslake 2005: 406) as well as repeated or prolonged action (Kornfilt 1997: 392; Lewis 2000: 177), while syntactically, they are subordinate, like *-(y)Ip*-clauses. A typical example is shown in (29). The converb in *-(y)A* is generally repeated (*ağlaya ağlaya* in (29)); we assume that the reduplicated converb represents a single head.

(29) *Turkish* (Göksel & Kerslake 2005: 411)

Genç kadın [ağla-ya ağla-ya] hikaye-si-ni anlat-tı.
 young woman cry-SS.CVB cry-SS.CVB story-3.POSS-ACC tell-PST.3
 'The young woman told her story, weeping continually.'

(30a–c) illustrate different kinds of possessive relations between the subjects of the two clauses. In each case, the absence of the possessive suffix rules out a reading in which the possessor corefers with the converbial subject. For example, in (30a), the first person singular possessor of the main clause subject can only corefer with the subject of the converbial clause in the presence of the possessive suffix *-im*. In its absence, only *bilgisayar* 'computer' can control the embedded subject (indicated by #). Agreement on the finite verb can never be controlled by the possessor, but must be controlled by the possessed noun. The passivised (30a) and unaccusative (30b,c) predicates were chosen to allow a clearer difference in meaning between a human (the possessor) or an inanimate subject (the possessed noun) of the converbial clause.

(30) *Turkish*

- a. [Çalış-a çalış-a] bilgisayar#(-ım) boz-ul-du.
work-SS.CVB work-SS.CVB computer-1SG.POSS break-PASS-PST.3
'I was working and working and my computer broke.'
- b. [Yürü-ye yürü-ye] ayağ#(-ım) ağrı-dı.
walk-SS.CVB walk-SS.CVB foot-1SG.POSS hurt-PST.3
'I was walking and walking and my legs hurt.'
- c. [Yürü-ye yürü-ye] ayakkabı#(-m) yıpran-dı.
walk-SS.CVB walk-SS.CVB shoe-1SG.POSS wear.out-PST.3
'I was walking and walking and my shoes wore out.'

In sum, both *-(y)Ip* and *-(y)A* are licensed by alienable and inalienable possessive relations between their subject and the subject of the matrix clause, even though they are SS-converbs. For the possessor of the matrix subject's head to be interpreted as the subject of the converbial clause, however, possession must be overtly coded, either by a possessive suffix on the head or a possessive suffix and a free-standing possessor. Free-standing possessors retain their genitive case in the constructions we discuss here ("genitive-possessives" in Öztürk & Taylan's 2016 terminology) and they are never promoted to subject: for instance, they never control finite agreement on the verb and are never passivised (Göksel & Öztürk 2019). *-(y)Ip* and *-(y)A* are therefore sensitive to coreference relations of possessors of subjects in addition to just subjects alone.

The situation in Bashkir is similar. Say (2019) describes the converb in *-(V)p* as expressing "quasi-coordination" (see also Bergelson & Kibrik 1995): as in other Turkic languages, the semantic relation between the converbial clause and the main clause is underspecified and context-dependent, often similar in meaning to coordination. And as in Turkish, the Bashkir converb in *-(V)p* is a SS-converb (Say 2019). Say illustrates this with (31), where the subject of the converbial clause must corefer with the subject of the main clause, even though coreference between the converbial clause's object's possessor *Bulat* and the main clause subject would be more likely in this context. While it is not fully clear whether *kemder* 'someone' is in the converbial clause or the main clause, (31) cannot be interpreted to mean that *Bulat* is in hospital. This arguably shows that Johanson's (1995) characterisation of subject coreference in pragmatic terms cannot be true of Turkic in general.

(31) *Bashkir* (Say 2019: 207)

- kemder Bolat-təŋ tanaw-ə-n jemer-ep bolnica-la jat-a
someone Bulat-GEN nose-3.POSS-ACC destroy-SS.CVB hospital-LOC lie-IPFV
'Someone_i broke Bulat_j's nose and he_{i/j} is in hospital now.'

In spite of the SS-possessor of one of the subjects can corefer with the subject of the other clause, like in Turkish. In (32), the SS-converb is used to indicate coreference between the embedded subject *Bulat* and the possessor of the main clause subject. This converb would be illicit in the absence of the possessive suffix *-hə* on the main clause subject.

(32) *Bashkir* (Say 2019: 213)

- [Bolat tið bar-əp] mašina*(-hə) hən-də
Bulat fast go-SS.CVB car-3.POSS break-PST
'Bulat_i was driving fast and his_i car broke down.'

Crucially, Bashkir allows the use of the converb in *-(V)p* with several types of possessive relations, ranging from part-whole to alienable ownership relations, as in (32). In (33),

the subject of the main clause corefers with the possessor of the converbial clause's subject and the two subjects are in a part-whole relation.

- (33) *Bashkir* (Say 2019: 213)
 [olon*(-o) ser-ep] aγas qola-nə
 trunk-3.POSS rotten-SS.CVB tree fall-PST
 'When its_i trunk got rotten, the tree_i fell down.'

(34) is an interesting contrast to (31), since this example too involves two human subjects. In (34), however, the strict SS-reading can be overridden by an interpretation in which the possessor of the subject of the converbial clause corefers with the main subject.

- (34) *Bashkir* (Say 2019: 213)
 [Bolat-təŋ malaj-ə təw-əp] qəwan-əp böt-ä al-ma-j
 Bulat-GEN boy-3.POSS be born-SS.CVB rejoice.SS.CVB end-IPFV take-NEG-IPFV
 'Bulat_i's son has been born and he_i can't stop feeling happy.'

In (35), illustrating the converb in *-j* that is cognate with Turkish *-(y)A*, the null subject of the converbial clause corefers with the possessor of the main clause subject. Say (2019) points out that the use of this converb is nearly obsolete in spoken Bashkir, but it is documented in earlier literature. Again, we assume the converb to be reduplicated without additional structure.

- (35) *Bashkir* (Juldašev 1977: 158 cited in Say 2019: 219)
 [uqe-j uqe-j] baš*(-əm) awərt-əp böt-tö
 study-SS.CVB study-SS.CVB head-1SG.POSS ache-SS.CVB end-PST
 'I studied (and studied) and my head started to ache strongly.'

In all examples involving possessors, the overt expression of possessive marking is necessary for the possessor to corefer with the converbial clause's subject (Sergey Say, p.c.). Thus Bashkir, like Turkish, allows a variety of possessive relations to license SS-converbs as long as they are expressed overtly.

To conclude, the examples shown in this section indicate that in some languages alienable possessive relations can license SS-marking in addition to inalienable (part-whole) relations. It appears that whenever a language allows alienable possessive relations to participate in SR, the possessive relation must be overtly coded.

3.3 Alienable relations and specialised coding of possession

Whether we are dealing with alienable or inalienable possession, the coding of the possessor in SS-situations does not differ from standard possessive constructions in Jamul Tiipay, Turkish or Bashkir. In other words, possessors that can participate in SR are not coded in any special way, although there are distinct possessive constructions which to some degree correlate with the nature of the possessed noun, as Öztürk & Taylan (2016) discuss for Turkish, for instance. In contrast, in Tundra Nenets (Nikolaeva 2014; Nikolaeva & Bárány 2019), Kolyma Yukaghir (Maslova 2003: 79–80, 158–159, 296–300, 518–520), and Tundra Yukaghir (Endo 1999: 2; Maslova 2001: 44, (147)), as well as potentially Aleut (Bergsland & Dirks 1981; Golovko, Vaxtin & Asinovskij 2009) and West Greenlandic (Fortescue 1984; 1991), different strategies of coding possession exhibit different properties in SR constructions. These strategies do not express distinct possessive relations, but only one strategy allows possessors to participate in SR. Here, we only focus on Tundra Nenets, following Nikolaeva & Bárány (2019); Yukaghir seems to show similar patterns and Aleut seems partly similar too.

In Tundra Nenets, there are at least two distinct noun-phrase internal positions for possessors. What can be called “high” possessors precede demonstratives and occupy a peripheral position in the possessive phrase, while “low” possessors follow demonstratives. Lexical possessors in either position are in the genitive, and high lexical possessors control possessive agreement on the possessed noun while low possessors do not. Semantically, there is no difference between high and low possessors. Both are illustrated in (36).

- (36) *Tundra Nenets* (Nikolaeva 2014: 143)
- a. t'uku° Wera-h ti / *te-da
 this Wera-GEN reindeer reindeer-3SG.POSS
 ‘this reindeer of Wera’s’
- b. Wera-h t'uku° te-da / *ti
 Wera-GEN this reindeer-3SG.POSS reindeer
 ‘this reindeer of Wera’s’

Standard constituency tests indicate that, in spite of their different positions, both high and low lexical possessors are part of the same phrase as the possessed noun (Nikolaeva & Bárány 2019: 230–232).

The so-called “modal” converb in $-(s'/c')^\circ$ acts as a SS-converb when the subject of the converbial clause is null but it can also host overt, disjoint subjects in some contexts, perhaps not unlike Turkish, although the conditions are unclear for Tundra Nenets as well (Nikolaeva & Bárány 2019). An example illustrating the SS-restriction is shown in (37). The main clause subject, but not the main clause object, can corefer with the null subject of the converbial clause (independently of the order of the converbial clause and the matrix clause).

- (37) *Tundra Nenets* (Nikolaeva & Bárány 2019: 238)
- [tol°-h t'ax°na ŋamt'o°] Wera Pet'a-m mənəqŋa
 table-GEN at sit-SS.CVB Wera Petya-ACC see.3SG
 ‘Wera_i saw Petya_j while $\emptyset_{i/j}$ sitting at the table.’

When the head of the subject of the main clause is a possessed noun it depends on the phrase-internal position of the possessor whether it can corefer with the subject of the converbial clause. With low possessors, coreference between the possessor and the converbial subject is impossible. In contrast, if the possessor is in the high position and triggers possessive agreement on the possessed noun, the use of the SS-converb is grammatical. This is illustrated in (38), where the possessor and the possessed noun are in an inalienable part-whole relation. Only the presence of the possessive suffix on $s'ey^\circ$ ‘heart’ allows the possessor to corefer with the embedded subject. The possessor of $s'ey^\circ$ is in the genitive (the 2SG marker on *Mos'eko* has an anchoring function and does not express possession).

- (38) *Tundra Nenets* (Labanauskas 1995: 40; Nikolaeva 2014: 380)
- [tərç'a-m mənə-c°] Mos'eko-nt° s'ey°*(-da) xəya
 such-ACC see-SS.CVB Moseko-GEN.2SG heart-3SG.POSS leave.3SG
 ‘After seeing them, Moseko got frightened.’, lit. ‘... Moseko’s heart went.’

Example (39) also demonstrates that only the high possessor can control coreference with the embedded subject, showing that coreference is correlated with a particular coding strategy. The low possessor of the main subject would give rise to a pragmatically odd reading in which it is *kniga* ‘book’ which corefers with the embedded subject, and therefore such an example would not be well-formed.

- (39) *Tundra Nenets* (Nikolaeva 2014: 380)
 [tol°-h t°ax°na ŋamt°o-°] ŋəc°eki°-h kniga#(-da) mən°tey°-q
 table-GEN at sit-SS.CVB child-GEN book-3SG.POSS fall-REFL.3SG
 ‘When the child_i was sitting at the table, his_i book fell.’

In this example, the POSS relation between the two pivots can be one of ownership or merely temporary control that the child has over the book, but whichever value it takes on, the two pivots are not in a part-whole relation. Thus Tundra Nenets grammaticalises the difference between possessors that can participate in SR and possessors that cannot by means of a structural position and agreement morphology. All lexical possessors in Tundra Nenets are in the genitive and therefore represent overtly coded possession, but only a subset participate in SR, namely genitive lexical possessors that are located in the left periphery of the possessive phrase and that control possessive agreement on the possessed noun. This is what we refer to as “specialised coding of possession”.

There are no obvious semantic restrictions on Tundra Nenets possessors that participate in SR. The behaviour of possessors in SR is fully determined by their syntactic properties. In this respect, Tundra Nenets differs from the other languages discussed so far. In the absence of syntactic evidence for distinct positions of or other syntactic differences between possessors in other languages, it appears that Tundra Nenets represents a distinct, syntactic type of non-canonical SR from Jamul Tiipay, Turkish and Bashkir, even though the same kinds of possessive relations license SS-markers in all these languages.

3.4 Interim summary

In the previous subsections, we stated conditions on the referential relation between two subject referents in a sentence with SR. The data discussed there established two generalisations about possession and switch-reference. First, languages differ in which types of possessive relations can license SS-marking. Based on our small sample, we can identify an implicational relationship such that if possessors in alienable possessive relations can be SR pivots, possessors in inalienable possessive relations must be able to be SR pivots too, but not *vice versa*.

(40) **ss-marking and possessive relations, generalisation 1**

If two referents of pivots in an alienable possessive relation license SS-marking in a given language, two referents of pivots in an inalienable possessive relation also license SS-marking in that language.

If inalienable possession is a canonical possessive relation, as proposed by Nikolaeva & Spencer (2013) within the framework of Canonical Typology (Brown & Chumakina 2013; Corbett 2015; Bond 2019), the generalisation in (40) can be thought of as an implicational relation on canonical and less canonical types of possession: if a language allows a less canonical possessive relation between two SR pivots to license SS-marking, it will also allow more canonical possessive relations to do so. Recall that we understand “inalienable” as “part-whole” in the context of SR. While all relational nouns in general do not exist independently of their possessors, part-whole relations differ from other relational nouns in that affect a part necessarily affects the whole as well (see e.g. Lamiroy & Delbecque 1998: 31). This close conceptual relation between the part and the whole presumably facilitates a link between part-whole relations and coreference in a way that does not hold for relations expressed by other types of relational nouns: it increases the likelihood that the referents of both the possessor and the possessed noun will participate in interconnected situations which can be expressed by SR structures.

The implicational relation in (40) has a morphosyntactic reflex, and the second parameter of variation concerns the morphosyntactic expression of possession. We can propose a second generalisation relating to the expression of possession and SS-marking (and leaving regular cases of SR aside).

- (41) **SS-marking and possessive relations, generalisation 2**
- a. If in a given language only referents of pivots in a part-whole relation license SS-marking, possession need not be expressed overtly in the possessive phrase.
 - b. If in a given language two referents of pivots in an alienable possessive relation license SS-marking, possession must be expressed overtly in the possessive phrase.

The generalisation in (41) suggests that there exist correlations between optional and obligatory expression of possession, on the one hand, and the ability of possessors to license SS-marking, on the other. In particular, the expression of possession can only be omitted on SR pivots in lexically specified relations, such as a part-whole relation. The morphosyntactic coding of possession as defined in Section 2.1 in SR relations is obligatory in languages where alienable possessive relations license SS-marking as well. Based on the data available to us, we suggest that (41) holds both cross-linguistically and for particular languages.

4 Analysis

As mentioned above, we follow Stirling (1993) in assuming that anaphoric conditions determine whether a SS-marker or a DS-marker is used in a given SR construction. In this section, we propose two additional anaphoric conditions that were not addressed by Stirling but are relevant for SR involving possession, namely PART-OF and POSS, and we discuss how to identify pivots, before addressing potential alternative analyses.

4.1 Anaphoric conditions and the identification of pivots

We first provide an analysis of the data surveyed in Section 3. We will illustrate our approach with (42), repeated from (14b), in which the subject of the converbial clause is an agent and the subject of the main clause is a theme.

- (42) *Udmurt*
 [Ektj-sa] Ivan-len pjd-iz čigi-śk-i-z.
 dance-SS.CVB Ivan-GEN leg-3SG.POSS break-REFL-PRT-3SG
 ‘When he was dancing, Ivan’s leg broke.’

Using anaphoric conditions to model this relation, a part-whole relation between two subjects can be accounted for by a relation PART-OF such that PART-OF(*i*, *j*) means that subject referent *i* (the matrix clause subject in (42)) is a part of subject referent *j* (the subject of the marked clause). Languages like Udmurt which allow SS-marking in part-whole relations can then be analysed as having an SS-marker that includes the condition PART-OF(*x*, *y*). The two possibilities, coreference and part-whole relations, are represented in (43) (cf. Stirling 1993: 214). For two subject referents SBJ₁ and SBJ₂, (43) indicates that markers of this type require the referents to either corefer, (43a), or to be in a part-whole relation with each other, (43b) (for simplicity, we only illustrate one direction of the part-whole relation).

- (43) Udmurt SS-converb in -sa, subject referents SBJ₁ and SBJ₂
- a. SBJ₁ = SBJ₂
 - b. PART-OF(SBJ₁, SBJ₂)

As discussed in Section 2.1, since relational nouns presuppose a particular type of relation and the existence of a possessor, they do not require expressing the possessive relation overtly in some constructions. This is particularly clear for part-whole relations, as the semantics of such relations identifies the part and the whole with respect to each other. For examples like (14a), where the possessor of *kə̆t* ‘stomach’ is not overtly expressed in the same phrase as the possessed noun, we assume that semantically introduced, inalienable possessors need not be represented syntactically as a null or empty category that figures in some analyses of the French data in (5). However, this assumption is largely theory-dependent and is not crucial for our account to work. Given that the PART-OF relation is introduced semantically (Section 2.1), whether or not null possessors are syntactically represented is secondary for us. It may turn out to be possible or indeed necessary to provide an analysis of Udmurt in which relational nouns do have syntactically represented possessors which nevertheless do not require morphosyntactically overt encoding. This will not change the nature of the anaphoric condition in (43); it is compatible with either option. On our account, (14a) follows from the semantic conditions associated with the converb marker itself in exactly the same way as (42) does, and the optionality of the overt possessor in (14a) is licensed by the SR construction itself.

We can also model the situation in the languages discussed in Section 3.2 using anaphoric conditions on SS-markers. For example, the Jamul Tiipay SS-marker *-ch* can be characterised as in (44), i.e. it requires the referent of its subject to either corefer with the main clause subject or be in a POSS relation with it (cf. (43)).

- (44) Jamul Tiipay SS-marker *-ch*, subject referents SBJ_1 and SBJ_2
- a. $SBJ_1 = SBJ_2$
 - b. $POSS(SBJ_1, SBJ_2)$

For an example like (18), the condition in (44b) specifies that *-ch* is grammatical because the referent of the subject of the marked clause (*Linda*) is the possessor of the main clause subject (*famiil* ‘family’).

The relations PART-OF and POSS are parallel to anaphoric conditions proposed in the literature (such as subset relations) in showing cross-linguistic variation in the directionality of the relation from the controlling into the marked clause or *vice versa* (Comrie 1983; Stirling 1993: 34–36). As mentioned above, the possessor can be located in either clause in Udmurt, and the same is true for Bashkir and arguably Kakataibo. This resembles Huichol (Uto-Aztecan; Comrie 1983: 27; see also (7) above) and Kobon (Trans New Guinea; Comrie 1983: 29), in which subset relations between pivots can license SS-marking independently of which pivot is in which clause. In contrast, in Tundra Nenets and in all of Miller’s (2001) relevant examples from Jamul Tiipay, a possessor involved in SR must be in the controlling clause. A similar asymmetry is found in Mparntwe Arrernte, where a subset relation between pivots is only licensed in one direction (Wilkins 1988: 164–165). These differences in symmetry can be represented by means of a single vs. multiple anaphoric conditions, say PART-OF(*i*, *j*) for asymmetric languages, or two conditions, i.e. PART-OF(*i*, *j*) and PART-OF(*j*, *i*) for symmetric languages, where *i* and *j* are the referents of the two clauses’ pivots. Treating PART-OF and POSS as anaphoric conditions captures this variation in the same manner as proposed in earlier work for other relations. Thus, even though SR can be described as an asymmetric phenomenon in some respects (McKenzie 2012: 48–49), it is a matter of cross-linguistic variation whether anaphoric conditions are necessarily interpreted as asymmetric or not, and possessive relations behave just like other anaphoric conditions in this respect.

We argued in Section 2.1 that identifying an individual associated with a non-relational noun is not straightforward when the possessor is not expressed. This is because

non-relational nouns need not be in a possessive relation in the first place, and therefore do not presuppose any relation with another individual that has a potential to participate in a SS-relation. In other words, POSS differs from PART-OF in that it is only introduced in a particular syntactic configuration, that is, in possessive constructions, and is not generally present in the absence of the coding of possession. This implies that, in contrast to (43b), the anaphoric condition in (44b) requires the overt morphosyntactic expression of possession on one of the subject pivots. It is needed to signal the presence of an additional referent that stands in a particular semantic relation with the referent of the possessed noun and can be associated with a SR pivot.

Now, Stirling's (1993) approach (mostly focussing on Amele) selects only agents of the respective clauses. This restriction is too strong for the data presented here, as it implies that only subjects with identical thematic roles can license SS-marking, in contrast to many of the examples discussed in previous sections which involve at least one theme argument as well, such as (13) and (14). To account for these data, it is therefore necessary for the anaphoric conditions to identify the subject referent of each clause independently of its thematic role. Rather than specifying a particular semantic role whose referent needs to be a pivot, the subject referents can be identified as the final arguments to combine with their respective predicate.

In our analysis, we adopt an idea from Wunderlich's (1997) Lexical Decomposition Grammar, where the highest thematic role assigned by a predicate bears the feature [-hr] (for "there is no higher role") independently of whether this is an agent, a theme or another role. Alternative means of identifying the relevant pivots could involve case (e.g. NOM/ABS or ERG arguments), an Agree relation between the SR marker and the pivots (like in Arregi & Hanink 2018 or Baker & Souza 2018), or, in frameworks which treat grammatical functions as primitives (such as LFG), reference to a particular grammatical relation directly. Such analyses could account for data in which the highest thematic role is not a subject (see e.g. Baker & Souza 2018), but for the data we discuss here, Wunderlich's approach suffices (see also Section 4.2). Abstracting away from irrelevant features, the two clauses can be represented as in (45), using a "Neo-Davidsonian" representation following Dowty (1989) and Parsons (1990).

- (45) a. $\exists e_1 [\text{DANCE}(e_1) \wedge \text{AGENT}(e_1) = i]$
 "There is a dancing event e_1 and the agent of e_1 is i ."
 b. $\exists e_2 [\text{BREAK}(e_2) \wedge \text{THEME}(e_2) = j \wedge \text{LEG}(j) \wedge \text{PART-OF}(j, i)]$
 "There is a breaking event e_2 and the theme of e_2 is j , a leg, which is a part of i ."

SS-markers and converbs can be thought of as combining two clauses and thus their events (again abstracting away from semantic details), following McKenzie (2012), Keine (2013), and Weisser (2015). Anaphoric conditions for Udmurt *-sa* can then be stated as in (46), where (46a) states that the referent of the highest thematic role in event e_1 is identical to the referent of the highest thematic role in event e_2 , and (46b) states that these two referents are in a possessive relation.

- (46) Anaphoric conditions for Udmurt *-sa* using Wunderlich's (1997) features
 a. $\text{TH}[-\text{hr}](e_1) = \text{TH}[-\text{hr}](e_2)$
 b. $\text{PART-OF}(\text{TH}[-\text{hr}](e_2), \text{TH}[-\text{hr}](e_1))$

(47) illustrates the combination of the two clauses in (45) with the anaphoric condition in (46b), with the contribution of the anaphoric condition underlined. For simplicity, we only show the contribution of one anaphoric condition; multiple conditions, as in (46),

would have to be represented by disjunction. One potential alternative to this solution, suggested by a reviewer, would be using a characterisation such as *the highest arguments of two events are both parts of a referent i*, since a whole is trivially part of itself as are its parts. However, while this could account for Udmurt and other languages where pivots are in a PART-OF relation, it would not trivially extend to POSS relations, so we prefer not to follow this route. (47) shows how the notation in (46b) identifies subject referents: each example in (47) is semantically identical. In (47a), the possessive relation contributed by the anaphoric condition is defined in terms of features of thematic roles and events. As shown in (47b), this corresponds to picking the agent role in e_1 and the theme in e_2 . (47c) replaces the specifications in terms of semantic roles with their referents.

- (47) a. $\exists e_1 \exists e_2 [\text{DANCE}(e_1) \wedge \text{AGENT}(e_1) = i \wedge \text{BREAK}(e_2) \wedge \text{THEME}(e_2) = j \wedge \text{LEG}(j) \wedge \text{PART-OF}(j, i) \wedge \underline{\text{PART-OF}(\text{TH}[-\text{hr}](e_2), \text{TH}[-\text{hr}](e_1))}] =$
 b. $\exists e_1 \exists e_2 [\text{DANCE}(e_1) \wedge \text{AGENT}(e_1) = i \wedge \text{BREAK}(e_2) \wedge \text{THEME}(e_2) = j \wedge \text{LEG}(j) \wedge \text{PART-OF}(j, i) \wedge \underline{\text{PART-OF}(\text{THEME}(e_2), \text{AGENT}(e_1))}] =$
 c. $\exists e_1 \exists e_2 [\text{DANCE}(e_1) \wedge \text{AGENT}(e_1) = i \wedge \text{BREAK}(e_2) \wedge \text{THEME}(e_2) = j \wedge \text{LEG}(j) \wedge \text{PART-OF}(j, i) \wedge \underline{\text{PART-OF}(j, i)}]$

The role of the anaphoric condition in (47b) is to add a restriction to the semantic representation of (42): the use of the SS-converb is only licit if the agent of e_1 is the possessor of the theme of e_2 , as is the case in (42).

This approach has an important consequence. In (47), there are two instances of PART-OF, one contributed by the possessed subject *pj'd-iz* ‘his/her leg’ and one by the anaphoric condition. The relations contributed by the possessed subject and the anaphoric condition need not match, however. (48a) illustrates a case in which the possessed subject refers to a body part, and the anaphoric condition contributes a POSS relation (underlined again). This is a coherent statement, since if x is a part of y , y can be thought of as possessing x — at least in languages in which possession of relational nouns is expressed identically to possession of non-relational nouns. As we take POSS to be semantically underspecified, we assume that its value, a part-whole relation in this instance, is provided by the relational noun in a default case (although this requirement can be overridden in certain pragmatically stretched situations).

- (48) a. $\text{PART-OF}(x, y) \wedge \underline{\text{POSS}(y, x)}$
 b. $\text{POSS}(x, y) \wedge \underline{\text{PART-OF}(y, x)}$

But (48b), where the anaphoric condition is specified as a PART-OF relation, leads to a contradiction: if the subject of the main clause in a SR construction is a non-relational possessed noun, but the anaphoric conditions in that language specify that subjects must be in part-whole relations to each other, (48b) is false, because for x to possess y , y need not be a part of x . The underlined condition in (48b) requires this, however.

Thus, our analysis in terms of anaphoric conditions and the semantic sketch shown here is in line with the data surveyed above and links the two cross-linguistic generalisations proposed in Section 3.4. It explains why languages with an anaphoric condition POSS can license both part-whole and alienable possessive relations in SR, while languages with an anaphoric condition PART-OF can only license part-whole relations in SR. This derives our first generalisation about SS-marking and possessive relations, stated in (40). Our second generalisation, (41), follows from the representation of possessive constructions and

anaphoric conditions: since POSS must be morphosyntactically expressed, languages that allow subjects in a POSS relation to license SS-marking must encode possession overtly.³

An anonymous reviewer suggests two potential alternatives to this account. The first one raises the question whether some of the patterns we discussed could be explained by reference to “topic situations” (McKenzie 2007; 2010; 2012): situations in this sense refer to part of a possible world and are used to model the idea that propositions are not true of the entire world, but only parts of it. Topic situations indicate “what part of the world an asserted proposition is true over” (McKenzie 2007: 4). McKenzie thus suggests that when two distinct events with disjoint subjects are linked by an SS-marker, this indicates that they are part of the same topic situation.

The Turkish example in (21a) does indeed seem problematic for our account, because it features an SS-converb and subjects with disjoint reference. McKenzie’s analysis of SR could potentially fare better in this respect: if *-(y)Ip* is used when the events expressed by the converbial clause and the matrix clause are part of the same situation, the grammaticality of (21a) could follow, as the two clauses appear to refer to related events. However, while we do not have an explanation for the grammaticality of (21a), there are nevertheless reasons to be sceptical about explaining *-(y)Ip* in terms of topic situations. As mentioned in Section 3.2, disjoint reference as in (21a) is rare and highly unusual and therefore should not be used as a baseline for assessing SR in Turkish. The conditions licensing the grammaticality of (21a) with disjoint overt subjects are not yet well understood, but disjoint reference of subjects in contexts that favour analysing two events as belonging to the same larger situation does not generally license *-(y)Ip* converbs. If SR were sensitive to topic situations, however, (21a), (25), (26) and similar examples should be more widespread and generally grammatical. What is more, if the converb in *-(y)Ip* were not sensitive to identity between subjects at all, one should be able to find null subjects in converbial clauses that do not corefer with the subject of the matrix clause. This is not possible, however, as example (23) showed. At least with null subjects, then, *-(y)Ip* is clearly a SS-converb, rather than a converb sensitive to topic situations, and for this reason, we used null subjects when testing the effects of possessive relations on SR in Turkish. This contrasts sharply with data from languages in which SR tracks topic or resource situations, as in many examples in McKenzie (2007; 2010; 2012).

For other languages, topic situations are less likely candidates in the first place, as fully disjoint subjects that are not in possessive relations do not seem to be possible with SS-markers at all in Udmurt, Bashkir, and the other languages we discussed (possibly apart from Tundra Nenets, but see Nikolaeva & Bárány 2019). We therefore conclude that the data surveyed in Section 3 are not sensitive to topic situations. The second potential alternative to our analysis will be discussed in the next section.

4.2 Possessors as pivots?

As is clear from (43) and (44), we formulate anaphoric conditions which license possessors in SR as relations between subject pivots. An alternative would be to formulate anaphoric conditions not as (non-identity) relations between subjects, but as identity relations between possessors (of subjects) directly. This would amount to treating possessors, rather than subjects, as pivots.

³ Two reviewers point out that an analysis of SR in terms of various anaphoric conditions could predict the existence of languages in which each anaphoric condition is expressed differently, lexicalising identity and intersection relations differently, for example. Our analysis of PART-OF and POSS as additional anaphoric conditions then predicts that there could also be languages with SR markers that are used exactly when two pivots are in a possessive relation. At present we are not aware of any such languages.

Unlike in the Amele example (49), the PART-OF relation in (50) does not involve intersecting sets, but the anaphoric condition in (51) parallels the one proposed by Stirling for Amele. The similarity between them lies in the fact that the reference of one pivot is not included into the reference of another pivot, but both are independently included into the reference of the same entity. It appears that, similar to inclusion, intersecting reference allows the SS-relation between pivots.

In sum, representing the relation between pivots as PART-OF captures the idea that the pivots can be neither identical nor fully referentially independent. It is more difficult to make a similar argument for POSS, although we suspect that here, too, the SS-relation is facilitated by a type of bridging reference. We leave further exploration of this issue for future research.

Our second argument against treating possessors as pivots directly maintains that an analysis in terms of possessor pivots requires additional analytical machinery to account for their syntax, and it is not immediately obvious to us whether and how this would work for the variety of cross-linguistic data. By stating the conditions under which SS-marking is licensed using anaphoric conditions between subjects, we can directly capture the relevant cross-linguistic differences, namely whether languages restrict SS-marking to part-whole relations or not. However, if SS-marking with possession is licensed by identity between a possessor of the pivot in one clause and the pivot of the other clause, restrictions on the types of possessive relations have to be stated separately and an independent account for the fact that SR can only access possessors and pivots but not other grammatical relations is necessary.

This is especially complex for languages such as Kakataibo, in which pivots are associated with different grammatical functions. We showed in Section 3.1 that in Kakataibo, identity between the possessor of a body part in one clause and the subject of another clause can license the sequential/simultaneous SS-marker *-xun*. In contrast, the sequential SR marker *-këx* requires the identity of a subject of one clause and the *object* of another clause in the canonical case. In non-canonical cases, *-këx* is licensed by all types of part-whole relations between a subject and object, including inherent parts such as the walls of a house, for instance (Zariquiey 2018: 221). So it seems that possessors in SR are “parasitic” on particular grammatical functions: in non-canonical situations, the use of SR markers tracking subjects non-canonically allows possessors *of subjects* to participate in SR, while the use of SR markers tracking objects non-canonically allows possessors *of objects* to do the same. This is expressed morphosyntactically in Kakataibo, because different types of SR markers are formally distinct from each other. In our analysis, each SR marker is associated with its own set of anaphoric conditions, and the system can also be adapted to select objects using Wunderlich’s feature [–lr] (“there is no higher role”) or another syntactic mechanism for identifying objects. In contrast, assuming possessors to be pivots directly makes it more difficult to explain why the SR markers licensed by possession are spelled out exactly like SR markers licensed by the argument that hosts the possessor.

It may well turn out that analyses of possessive constructions will reveal syntactic reasons that allow a relevant subset of possessors to be accessed by SR directly in some languages from our sample. In Section 3.3, we discussed one such language, Tundra Nenets, and showed that it requires a specialised possessive coding strategy for licensing a SS-relation when pivots have internal possessors. Nikolaeva & Bárány (2019) argue that the reason only some possessors in Tundra Nenets license SS-marking is that high, but not low possessors, can c-command out of the possessive phrase and control a PRO subject because they are adjoined and not fully contained in the possessive DP. Since the high and low positions do not correlate with any contrast in alienability, this predicts that possessors in

any kind of possessive relation should be able to corefer with the subject of the converbial clause, and this is correct for Tundra Nenets. In this analysis, the role of possessors in SR is sensitive to the structure of the possessive phrase independently of the type of possessive relation involved.

Since the anaphoric condition stated in (44b) would in principle account for the behaviour of high possessors in Tundra Nenets, the result of this syntactic analysis is ultimately compatible with the present account but it also captures the role of distinct positions of internal possessors. It is not clear whether and how anaphoric conditions can access this kind of syntactic information. However, at present we are not aware of any evidence for the specialised coding of possessors that participate in SR in the languages we addressed in Sections 3.1 and 3.2, including well-studied languages such as Turkish. We therefore do not believe that they are amenable to this kind of syntactic analysis. Moreover, even if it turns out that a syntactic account is possible for individual languages, deriving cross-linguistic restrictions on the types of possessive relations licensed in non-canonical SR in terms of syntax appears problematic.

Consider differences in the syntax of alienable and inalienable possession. For concreteness, we follow Myler's (2016) assumptions about the structures of possessive constructions (cf. Section 2.1; see also Nichols 1992: 117–123 Chappell & McGregor 1996a: 4–5; Heine 1997: 172–183). Myler suggests the following structures for inalienable and alienable possession, respectively.

- (52) Inalienable and alienable possessive relations (Myler 2016: 51–52)
- a. $[_{DP} \text{John}]_{D'} 's [_{nP} \text{John}]_n \sqrt{\text{beard}} n]]]] = \textit{John's beard}$
 - b. $[_{DP} \text{John}]_{D'} 's [_{PossP} \text{John}]_{Poss} [_{nP} \text{John}]_n \sqrt{\text{book}} n]]]]] = \textit{John's book}$

Both structures in (52) are DPs, but they differ in where the possessor is introduced. Myler suggests that for relational nouns such as *beard*, the possessor is introduced by the root itself — the base position of the possessor is thus the specifier of *nP* (*n* itself being a categorising element). In (52b), in contrast, the *nP* is modified by a Poss head which introduces the possessor, as *book* is a non-relational noun. These structures represent the intuition that the inalienable possessor is “closer” to the possessed noun than in the case of non-relational nouns. While Myler discusses English, we have no reason to believe that the outer structure of possessive constructions is different in the languages under the discussion here based on whether the possessed noun is relational or not, that is both types end up projecting NP or DP.

In order to derive the generalisation in (40) based on the syntax of possessive constructions, a syntactic operation would need to identify the possessors in (52), maybe by probing into the DPs and registering the different layers in the DP. In languages that only allow possessors of relational nouns to participate in SR, this operation would have to be able to identify possessors in Spec*nP* as pivots but not possessors in SpecPossP, while in languages that allow all types of possessors to participate in SR, the operation would have to access both Spec*nP* and SpecPossP. But it is highly unusual and unintuitive in terms of syntactic locality that a syntactic operation could access a more deeply embedded nominal category to the exclusion of a higher one (the opposite of what Tundra Nenets shows, for example), thus complicating a syntactic analysis of the implicational relation among non-canonical SR with possessives. On the other hand, the part of Stirling's (1993) proposal we adopted here is formulated semantically and therefore does not encounter this problem.

In sum, anaphoric conditions referring to grammatical functions as pivots, rather than possessors, allow for a straightforward analysis of generalisation (40) in Section 3.4 and account for the “parasitic” behaviour of possessors on grammatical functions.

5 Conclusions

This paper provided a typological overview of internal possessors which participate in non-canonical switch-reference and proposed an analysis of how possession interacts with SR in terms of both syntax and semantics. We modelled the interaction of possessors and SR using “anaphoric conditions”, following Stirling (1993). Anaphoric conditions link patterns of coreference and disjoint reference between nominals in the marked clause and the controlling clause in a SR configuration to the expression of SS- and DS-markers, which restrict the SR system itself by only allowing certain relations, for example part-whole relations, to license SS-marking. We proposed two anaphoric conditions, PART-OF and POSS, that were not considered by Stirling but are relevant for evaluating the role of possessors in SR, discussed how they account for cross-linguistic variation and its typological implications, and addressed potential alternatives.

By relating subject referents to each other using anaphoric conditions, our analysis has a crucial semantic component. It therefore differs from purely syntactic approaches to switch-reference in terms of coordination (Keine 2013) or control (Georgi 2012). It seems especially difficult to reconcile our proposal with these analyses. While they differ considerably, they crucially share the assumption that SS-markers are spelled out when there is a single subject in the structure as Clem (2018) notes. Georgi, adopting the movement theory of control (Hornstein 1999) assumes that this subject moves out of the marked clause to the matrix subject position. Keine (2013) proposes that SS-markers spell out the head that coordinates two VPs which lack their own subjects. In such structures, a single subject is introduced in a higher ν P projection and it is interpreted as the subject of both VPs. Neither of these approaches would straightforwardly predict SS-marking with distinct subjects where one of them is the possessor of the other.

Compared to Georgi (2012) or Keine (2013), our proposal potentially has more in common with analyses that assume binding and/or agreement relations between clauses (Finer 1985; Broadwell 1997; Watanabe 2000; Camacho 2010; Nonato 2014; Weisser 2015; Baker & Souza 2018; Arregi & Hanink 2018; see also Clem 2018). In these approaches, subject referents in each clause are indexed by functional heads and these values are compared either by binding or Agree relations in syntax. The similarity between the approach presented here and these more syntactic approaches thus lies in that disjoint reference or coreference of pivots must be evaluated at some level of representation. Arregi & Hanink (2018), for example, formulate morphological rules for Washo that insert the DS-marker when two pivots do not corefer, and the null SS-marker otherwise. Baker & Souza (2018) similarly rely on Agree relations between a high functional head in the matrix clause, C, and the two subjects to determine the spell-out of SR markers. In our approach, this evaluation takes place on a semantic level, rather than in syntax or morphology.

The analysis presented here differs from these approaches in requiring a more detailed comparison than identity of or inclusion relations among referents. We suggested (following Stirling 1993) that a wider range of relations between pivots license SS-markers including, crucially, possessive relations. These reference relations are not established through structural positions of pivots, but evaluated with respect to the semantic contribution of a particular SR marker. In most of the languages we discussed, there is simply no empirical evidence for an Agree relation or indeed morphological agreement between C and the pivots, as SS-converbs do not tend to show agreement. Nevertheless, it seems that our analysis is compatible with certain aspects of these analyses mentioned above.

On a final note, we argued that analysing non-canonical SR with possessors using anaphoric conditions can capture both the empirical facts of single languages and the cross-linguistic variation in a straightforward manner. We have stated our analysis and generalisations in

terms that can be empirically tested and that can be supported by examining a wider range of languages than presented here.

Abbreviations

1 = first person, 2 = second person, 3 = third person, A = agent-like argument of a canonical transitive verb, ABS = absolutive, ABSL = absolute case, ACC = accusative, ADVER = adversative, ALIEN = alienable, AN = action nominal, CAUS = causative, CMPL = completive aspect, COP = copula, CVB = converb, DAT = dative, DEB = debitive, DS = different subject, DU = dual, ERG = ergative, GEN = genitive, ILL = illative, INCH = inchoative, INCL = inclusive, INE = inessive, INTR = intransitive, IPFV = imperfective, IRR = irrealis, LOC = locative, NAR = narrative, NEG = negative, NOM = nominative, NPST = non-past, P = patient-like argument of a canonical transitive verb, PASS = passive, PL = plural, POSS = possessive, PRED = predicative, PROG = progressive, PRT = preterite, PST = past, REFL = reflexive, REM = remote, S = single argument of a canonical intransitive verb, SBJ = subject, SE = simultaneous dependent event, SG = singular, SR = switch-reference, SS = same subject, SUB = subordinator, TAM = tense, aspect, mood, TODPST = today past tense, TR = transitive, VS = varying subject.

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Competing Interests

The authors have no competing interests to declare.

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