Austinian situations and switch-reference
The role of context in reference-tracking

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Abstract

This paper argues that Austinian situations play a direct role in the phenomenon known as **switch-reference** (SR). SR typically indicates subject co-reference or disjointness across clauses, but many researchers have found enough counterexamples to claim that it instead marks the level of discourse coherence across clauses. This paper demonstrates that switch-reference involves both co-reference and discourse coherence, deriving that coherence by employing Austinian topic situations. In non-intensional contexts, switch-reference appears with coordination conjunctions, and indicates whether the topic situations of the conjoined clauses co-refer. If the topic situations co-refer, the clauses share greater coherence.

The argument relies on attested observations from a wide array of languages, novel observations and generalizations, as well as targeted semantic elicitation in the Kiowa language, an endangered language indigenous to the Great Plains of the United States. The elicitation tests two specific hypotheses that build the argument: First, that 'non-canonical' switch-reference is simply situation-tracking switch-reference, and second, that situation-tracking is required in non-intensional clauses, while being ruled out of intensional ones. The elicitation confirms these hypotheses and eliminates alternative approaches to using topic situations.

This account provides solid morphological evidence for the use of situation pronouns, and demonstrates the role of contextual restriction in reference-tracking systems. Topic situations are chosen by the speaker to fit the particular discourse context. They shape the assertion by restriction the breadth of its applicability to the world. Thus, switch-reference reflects the speaker's desire to indicate a shift or maintenance in the matter of discussion, while maintaining the straightforward reference-tracking function switch-reference has always been observed to have.

1 Introduction

1.1 Canonical switch-reference

The term **switch-reference** ('SR') describes morphemes associated with clause junctures that indicates the co-reference or disjointness of some prominent argument in each of the joined clauses. Typically, that argument is the subject. In (1), from the Choctaw language (a Muskogean language indigenous to the US), the suffix *-t* on the complement clause indicates that the subjects of the main and complement clause co-refer. This form of switch-reference is called 'same-subject' or SS marking.

(1) Pisachokma-ka-**t**   ikhána-h
     handsome-COMP-**SS** know-NONPAST
     'He$_1$ knows that he$_1$ is handsome'   (Broadwell 2006: 264)

In (2), a suffix realized as vowel nasalization indicates that the subjects of the main and complement clause are disjoint. This form is called 'different-subject' or DS marking.

(2) Pisachokma-k**ã̱**   ikhá̱na-h
     handsome-COMP:**DS** know-NONPAST
     'He₁ knows that he₂ is handsome'   (Broadwell 2006: 264)

Switch-reference became studied in detail after Jacobsen (1967) described its use in several American languages. It was soon discovered to be widespread in the Americas, Australia, and New Guinea.[1] It has also been found in Africa, Siberia, India, and the Caucasus.

The concept of switch-reference as indicating co-reference of subjects seems a straightforward one, but after over forty years of investigation, linguists still disagree about its intuitive meaning. Early research on SR focused on its role of disambiguation, especially in long strings of narrative where several clauses go by with no overt nouns or pronouns. Functionally-oriented linguists placed SR in a family of 'reference-tracking' devices (Haiman and Munro 1983; Foley and Van Valin 1984), along with logophors, pro-drop, etc. They suggested that SR's primary but not only function was to track subjects across a discourse by indicating co-reference between subjects. Meanwhile, generative linguists seized upon the co-reference relation itself, hypothesizing SR as a pronoun subject to a generalized binding theory (Finer 1984, 1985; Enç 1989) or as a complementizer transferring features that trigger co-reference between subjects (Watanabe 2000; Déchaine and Wiltschko 2002; Camacho 2010).

1.2 Non-canonical switch-reference

Ultimately, the reference-tracking function of SR became less clear by the early 1980's, as linguists began documenting instances of SR marking clearly ignoring the subjects of the joined clauses. Dahlstrom (1982) finds such instances in Lakota (Siouan family, US). In (3), the SS-marking conjunction *na* is used despite different subjects.

(3) čhã ota ileya-pi   **na**   el ixpeya-pi **na**   hečhel xuɣnaɣe
     wood much make:burn-PL and:SS on place-PL **and:SS** thus   burn up
     'they set fire to a lot of wood and they placed him on it and he burned up. (∼ "was in a burned-up state")'   (Dahlstrom 1982: 73)

In (4), DS conjunction *yũkhã* appears despite no change in subject.

(4) a. khoškalaka nũp kholakičhiya-pi **na**   lila thekičhixila-pi
         young man two friend-RCP-PL **and:SS** very love-RCP-PL
         'Two young men were friends with each other and loved each other very much.'
     b. **yũkhã**   heniyos nũphila zuya iyaya-pi
         and:DS those   two only to war set off-PL
         'One day, those two set off to war.'   (*ibid.*)

This 'non-canonical' switch-reference has formed the focal point of most research on SR since the mid-1980's, because it re-opens the question of the nature and function

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[1]Surveys of switch-reference systems have been published for each of these regions. North America: Jacobsen (1983); McKenzie (2015); Australia: Austin (1981), New Guinea: Roberts (1997).

of switch-reference. What is its role in (3)? How does that role relate to its 'canonical' subject-tracking role? Dahlstrom suggests that SR's function is not subject reference-tracking at all, but a marker signaling continuity or discontinuity from one part of a discourse to the next. Subject identity merely contributes to that continuity while subject disjointness contributes to discontinuity.

This notion of continuity (or cohesion), contributed to by subject identity, appears in many accounts, and suggests a role for the context in the interpretation of switch-reference. Besides Dahlstrom, Haiman (1983); Roberts (1988); Rising (1992); Watkins (1993); Mithun (1993); Lungstrum (1995); Torres (2011) and Martin (2011) all situate switch-reference within broader notions of discourse or thematic cohesion. I believe these proposals are all intuitively on the right track, but none have developed an account of how the meaning of switch-reference leads to these notions.

Some cohesion accounts have been more explicit. Ariel (1990) tries to derive SR from a broader set of accessibility relations. Stirling (1993) offers an account of switch-reference as expressing a sort of semantic agreement between Davidsonian events, based on subject identity, location identity, and shared actuality. Pustet (2013) proposes that Lakota clause linkers express discourse cohesion along four parameters: Subject co-reference (canonical SR), contrast, temporal cohesion, and probability/expectation. The latter two approaches will be discussed in more detail in sections 5.2 and 6.1.

1.3 The goal of this paper

The convergence of these generalizations strongly suggests that an investigation of the semantics of switch-reference ought to lead to a unifying derivation. Apart from Stirling, though, none of these accounts of switch-reference non-canonical SR attempts to explain how these various functions connect to the semantics.[2]

In this paper, I will derive the functions of SR from the meanings of independently-motivated elements of semantics, and show that apart from semantic type, there is no significant distinction between the relations expressed by 'canonical' and 'non-canonical' switch-reference. They both express identity or disjointness. Specifically, I propose two hypotheses. First, in the 'non-canonical' cases, switch-reference is indicating co-reference or disjointness of the Austinian topic situations of the joined clauses. Second, switch-reference tracks Austinian topic situations if and only if it conjoins clauses containing one. This proposal is summarized in Table 1.

structure:	coordination	intensional subordination
target:	topic situation	subject (entity)
SS	$s_a = s_a$	$x_c = x_c$
DS	$s_a \neq s_b$	$x_c \neq x_d$

Table 1: Summary of findings : SR distribution

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[2] Keine (2013) claims that switch-reference is actually an instance of high or low coordination. DS occurs in constituents larger than vP; SS occurs elsewhere. This proposal does have a straightforward connection to the semantics, but suffers from empirical inadequacy. The account predicts the impossibility of very well-attested cross-linguistic facts, among which the following will be discussed in this paper: Clear widespread use of subordination with SR, the context-variability of SR, or the free use of SR with conjoined questions or other constituents widely accepted to be larger than his account supposes. As a result, this account will not be addressed further here.

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In sections 3 and 4, I confirm these hypotheses using context-based targeted elicitation to ensure the right semantics (Bochnak and Matthewson 2015). Once we confirm the use of situations in switch-reference, we can rely on what is already known about the nature of situations to derive the observed effects of discourse cohesion, along the lines of similar effects noted in the semantic literature. There is no need to posit a language-internal family of cohesion relations; rather, it emerges from the ordinary denotations of situations and switch-reference, along with well-established pragmatic mechanisms.

2 Uses of non-canonical switch-reference

Descriptive linguists have observed non-canonical switch-reference (NCSR) in a large number of languages. Strikingly, their accounts converge on a limited number of uses for it. Non-canonical DS marking is typically used to signal some kind of change in 'scene', while non-canonical DS marking highlights the continuity or coherence of the joined clauses.

2.1 Uses of non-canonical DS marking

Roberts (1988) finds non-canonical DS marking in Amele (Gum family, Papua New Guinea), and finds it to indicate temporal shift, shift in location, shift in actuality, and discourse structure boundary. Most of his generalizations are supported by finds elsewhere in the literature.

2.1.1 Temporal shift

A common use of non-canonical DS is to indicate that a significant period of time has passed. In (5), the subjects co-refer but DS marker *-co-* signals a lapse of time.

(5) Eu 1977 jagel November na odo-**co**-b cul-ig-en
    that 1977 month N.   in do-**DS**-3s leave-1pD-3s-REMOTEPAST
    'That was in November 1977 that he₁ did that and then he₁ left it for us.'
                                                        (Roberts 1988: 61)

How long the lapse lasted is not clear. This sentence comes from a narrative, and Roberts does not provide further context to clarify just how long had passed. However, he captures the temporal shift in the translation, with the English adverbial *then*. Another example of this translation effect can be seen in (4), where 'one day' is added to the translation.

Another clear example comes from Lakota (Siouan, US), where the speaker is comparing the past to the present.

(6) héhą́ni   yukhé **yųkhą́** lehą́l hená waníce
    at that time exist   **and:DS** now those lack
    'Those things existed back then, and they are gone now.' (Pustet 2013: 160)

2.1.2 Spatial shift

A bit less commonly attested are cases of spatial shift marked by non-canonical DS. Roberts provides another Amele example:

(7) Age ceta guldo-**co**-bil l-i   bahim na tac-ein
     3P yam carry-**DS**-3P go-SS floor   on fill-3P-REMOTEPAST
     'They carried the yams on their shoulders and filled up the yam store' ([Roberts 1988](): 61)

In [(8)](), from a story in the Kiowa language (Kiowa-Tanoan, U.S.), DS marking is used to signal change in a hunt's direction, despite subject identity.

(8) a. Óp   á−à̰l$\underset{\sim}{e}$̀
         there 3PA:3SO−chase−PFV
         'They$_1$ chased it over there'
     b. **nègáu**   óp jáu=chò   á−à̰l$\underset{\sim}{e}$̀
         and:DS:then there like this=instead 3PA:3SO−chase−PFV
         'And then they$_1$ chased it this way.'   ([Palmer, Jr. 2003]())

Non-canonical DS can also indicate the arrival at a new location, as in this example from the Nêlêmwa language of New Caledonia.

(9) . . . hla tu   kuut bwa on **na**   hla axi bon   . . .
     . . . 3P go.down stand on   sand **and:DS** 3P see seagull . . .
     'They go down to the beach and then they see the seagull.'   ([Bril 2004](): 521)

2.1.3 Scene shift in narrative

A common use of non-canonical SR, especially in narrative, is to indicate paragraph or minor episode breaks. In contrast, major episode breaks typically involve clearer indications like a lack of sentence connective, or the use of overt DPs and adverbials. For example, in (10), from Chickasaw (Muskogean, Oklahoma), the subjects of a) and b) are identical, but the clauses are linked across a sentence boundary by DS-marking conjunction *hihmã*.[3]

(10) a. hattak professorat-akõ   hoyo-t   aaittanaha
         man   professor-TOPIC:ACC look.for−SS church
         isht-ohõna-ttook.
         INST−arrive−DISTPT
         He brought those professors to church.
     b. **Hihmã** [$_{CP}$ anna'−kot   itt-im−anompohõli−l−a'chi−kã]
         and:DS [$_{CP}$ I-TOPIC:NOM RECIPR−3D−talk-1SA-FUT-COMP:DS
         am-ahanchi-ttook
         1SD−say-DISTPT
         'Doing that, he told me to talk with them.'   [Payne (1980](): 112)

While non-canonical SR commonly marks scene shifts at the boundary between sections of the narrative, it also does so at a smaller level. In [(11)](), from Mandan (Siouan, U.S.), the mythical Coyote has fallen. Afterwards, he picks himself up and begins his journey. Every sentence has the same subject (Coyote), but DS marking between the first two clauses indicates a shift in the story between the fall and the getting up.

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[3][Payne (1980]()) analyzes *hihmã* and other pro-verbs synchronically as conjunctions, derived from pro-verbs. In this case, *hi* combined with DS-marked conjunction *hmã*, meaning 'when'. [Broadwell (2006](): 266) makes a similar conclusion about SR-marked pro-verbs in the closely related Choctaw language.

(11)   *kipxe-**ak** kira̧tE-rįˌ kasi:wįowąkoʔš   kirųwąʔkšis*
land-**DS** get up-SS was starting to travel Coyote
'Coyote landed, got up, and started traveling.'   (Mixco 1997: 248)

In (12), from the Crow language (Siouan, U.S.), DS marking signals a break between a search party's efforts and their return home.

(12)   chichíil-ak baatcháatt-aa-k   óolapi-ssuu-**m** daákaa-u-k
look for-SS outstanding-CAUSE-SS find-NEG.PL-**DS** go home-PL-DECL
'they searched for him long and hard, they didn't find him, they went home.'
(Graczyk 2007)

Other uses of SR in this regard have been discussed in more detail by Rising (1992), Watkins (1993), and Lungstrum (1995).

2.1.4 Conversation turn

Watkins (1993: 157-158) reports the use in Kiowa of DS marked conjunction *nɔ̀* to indicate a certain kind of contrastive link between two conversational partners. For instance, in dialogue from a narrative where the participants are negotiating; each tendered offer is set off by DS marking, even if the subjects are the same. The conjunction is translated with an adverbial like *Then,* or *Well,*.

(13)   a.   mɔːtʰõtsɔ́ːhĩː ∅−tɔ́ːnêː, "tʰɔ́ːdé é−kʰópˑ hâːbá t͡sʔángjá−tso a−dɔ́ː."
        Coyote said, "My leg hurts; I'm not fit to race'
   b.   nɔ̃ séndé ∅−tɔ́ːnêː, "**nɔ̃**_{DS} t͡sʔó: ɔnkɔ̂j gjàt−háʔpʰ̌ãjjɔː."
        *and Sende said, "**Well then**, I'll tie rocks about my ankles."*
   c.   "**nɔ̃**_{DS} háoj bát−aj?" ∅−tɔ́ːnê: mɔːtʰõtsɔ́ːhĩː
        *"**Then** how far shall we go?" said Coyote*
   d.   "**nɔ̃**_{DS} éːhɔː hégɔ́ bát−ai gɔ…"
        ***Well**, we'll start from here and…*

2.1.5 Change in actuality?

Roberts also claims that non-canonical DS indicates a shift in actuality, from realized to intended action, or *vice versa*. He gives Amele sentences like (14) to demonstrate this.

(14)   'Hina gaim heew-ig-a   eu mani-te-te-m   ija sab met-ig-en,'
You crab hold-1S-PAST that roast-1S:2S-DS I food peel-1S-FUT
do-n.   Odo-**co**-b sab met-en   ijom.
3S:3S-REMOTEPAST do-**DS**-3S food peel-3S-REMOTEPAST EMPH
"'You roast the crab that I caught for me while I peel the food," she told him. Then, alright, she really peeled the food."   (in Stirling (1993): 114))

While Roberts claims that SR here is signaling a change in actuality (i.e. in possible world), what seems to be happening is rather a particular kind of scene shift, from the statement of intended action, to the carrying out of that action. This is also exemplified in Supyìré (Niger-Congo, Cameroon), by the DS marking conjunction *kà* (15). These observations suggest that switch-reference is not sensitive to changes in actuality the way Roberts describes.

(15)   a.   Once Monkey said[4]

       b.   that he would look for and eat a pretty girl

       c.   **kà**$_{DS}$ he went and found a girl. . .   (Carlson 1987: 8)

2.1.6   Counter-expectation?

Both Dahlstrom (1982: 75) and Pustet (2013) remark that in Lakota, DS marked conjunction *yũk^{h}ã* can be used to link an unexpected event to that mentioned in the first clause. Indeed, the event in (16) is so unexpected that the conjunction is translated as 'but'.

(16)   ú−kte−šni   kéye **yũk^{h}ã**   hí

       come−FUT−NEG say   **but:DS** come

       'He said he wouldn't come, but (then) he came'.   (Pustet 2013: 157)

     That said, all but one of the examples they provide also have different subjects (so aren't strictly 'non-canonical'). The exception, (16), might be a scene shift along the lines of (14), from a speech act to a related action.

2.1.7   Lack of cohesion between events

Oftentimes, the exact reason for DS marking doesn't quite fit into these categories. For instance, in Central Pomo (Pomoan, U.S.), DS marker *li* can link events that 'retain their distinctness' (Mithun 1993: 132), as opposed to being part of the same event.

(17)   to: loq   masá:daw=**li** ʔqá:-č'=wiya

       1.PAT thing steal=**DS**   lose-REFL=EVID

       'I was robbed, and I just felt so lost.'   (Mithun 1993: 132)

Overall, findings of non-canonical DS marking in various languages indicate that SR in these cases is sensitive to various facets of the eventualities of the joined clauses apart from its nominal arguments.

2.2   Non-canonical SS marking

SS marking is used in many instances where subjects are disjoint. Accounts converge on the generalization that SR is indicating a kind of continuity across clauses or cohesion between the linked clauses' eventualities. We have already seen one instance in (3), where the placing of the man and the result were linked by SS. Dahlstrom proposes that SS is indicating continuity. As we look at non-canonical SS cross-linguistically, we get a sense of the kinds of continuity involved.

2.2.1   Zooming in

One observed use of non-canonical SS marking is to link two or more clauses after we have 'zoomed in' on a scene. In (18), the boy looks over at the campsite, and what he sees is described in a pair of clauses that are linked by SS marking. Meanwhile, the seeing and what was seen are linked by DS marking— a kind of scene shift.

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[4]The example is presented mostly in English as it was in the source.

(18) chiláakshe shikáakee-sh asall-ák   kuss-íkaa-lee-**m** ashé ah-ak
       morning   boy-DET   go_out.SS GOAL-look-!-**DS** lodge many-SS
       bilaxpáake chiwakálaa-**(a)k**   dahkú-m
       people   go_back_and_forth-**SS** continue-DS
       'in the morning the boy went out, he looked in the direction of [the old camp-
       site], and to his surprise, there were lots of lodges, and people going back and
       forth.   (Graczyk 2007: 415)

2.2.2 Coherent events

Oftentimes, SS marking links events reported as being linked together, even if the exact
nature of the link remains ineffable. For instance Mithun (1993) notes that (19), uttered
as part of a legal discussion, describes "a single event explaining the lack of documents,
even though their subjects were different."

(19) muːl ʔe   kʰe   pápil=ʔel s−ts'á−**ba**   čalél ʔaː
       that COP 1.OBL paper=the with.liquid−destroyed−**and:SS** just   1.AGT
       qów=mča−w=ʔkʰe č'ó−č=ya
       out=throw−P=FUT happen−SML=ESP
       'My papers got wet and I just had to throw them away.'   (Mithun 1993: 132)

2.2.3 Partitive subjects

In Kiowa, SS marking can be used if the quantified subject in the SR-marked clause is
part of the group introduced (though not referred to) by the subject of the first clause.

(20) <u>éʔtè</u> tʰõːts̑ép hágjá   á−kɔːl−eː   **gɔ**   <u>páː</u>
       many flood   sometime 3P:3S−cross−IMPF.EVID **and:SS** some
       á−őbà+hĩː+hèl
       3P−submerge+die.PF-EVID
       'Many were once crossing a flood and some drowned.'   (Watkins 1984: 159)

    This case should be held distinct from cases where SS links two clauses with ref-
erential subjects, where the subject of one clause wholly includes that of the other. In
any case, as Watkins (1993) and McKenzie (2012) demonstrate, Kiowa canonically
uses DS marking in such cases, so (20) is not canonical.

2.2.4 Part-whole subjects

Some of the uses of non-canonical SR that Stirling (1993) reports involve SS marking
linking two clauses, one whose subject is a physical part of the other clause's subject.
Stirling claims that SS is indicating the agent does not change across clauses, but this
may instead be related to the partitive use.

(21) Ija ta−taw−**ig**   [DP ija am−i   ] wal−do−i−a
       1S SIM−stand−**1s:SS**   I   eye−1S spin−3S−3S−TODAY.PAST
       'As I stood my eye(s) spun (= 'I became dizzy')   (Stirling 1993: 86)

2.2.5 Shared purpose

Watkins (1993) reports another use of non-canonical SS marking, this time in Kiowa. In ((22)), the two subjects are distinct individuals, but SS marking is grammatical and felicitous. However, Watkins's consultant's judgment does not involve anything involving an apparent scene as we might imagine it. Instead, he suggested that the two events were linked by a shared purpose.

(22) Kathryn gjæ−gúʔ   **gɔ**   Esther=al gjæ−gúʔ
      K.   3SA:3PO−write.PFV **and:SS** E.=too   3SA:3PO−write.PFV
      'Kathryn wrote a letter and Esther wrote one too.'   (Watkins 1993: 149)

2.3 Three additional facts

Besides cataloguing the various uses of non-canonical switch-reference, we can observe interesting effects that we must account for— context-dependency, ambiguity, and a configurational effect.

2.3.1 Context-dependency

Nearly all the attested uses of non-canonical SR are observed in collected texts, notably narratives. One interesting exception is Watkins's (1993) example, seen in (22), which arose in conversation. Watkins noticed it and asked about it, getting the judgment of a shared purpose. She then elicited a judgment about the same sentence, but with canonical DS marking (23). The speaker reported (in his own words) that it was grammatical, but would describe scenarios where the letter writing events were not connected. Watkins uses this example to demonstrate rather starkly that context is crucial for the application of switch-reference, at least some of the time.

(23) Kathryn gjæ−gúʔ   **nɔ**   Esther=al gjæ−gúʔ
      K.   3SA:3PO−write.PFV **and:DS** E.=too   3SA:3PO−write.PFV
      'Kathryn wrote a letter and Esther wrote one too.'   (Watkins 1993: 149)

2.3.2 Ambiguity

The context-dependency of switch-reference raises a very important question about the frequency of non-canonical SR. We 'diagnose' SR as non-canonical only when its value is unexpected given the subjects' identities. However, if SR depends on the context, then sentences with apparently canonical marking may actually involve non-canonical SR, indicating a scene continuity. For instance, out of the blue, (24) could be ambiguous between a canonical and non-canonical marking, because the subjects are identical. Perhaps the 'scene' is continuous, as well.

(24) zébà gjàt−zɔ́n   **gɔ̀**   gjàt−têm
      arrow 1SA:3PO−pull out.PFV **and:SS** 1SA:3PO−break in two.PFV
      'I pulled the arrows out and broke them.'   (field notes)

This fact raises the prospect that whatever phenomenon underlying non-canonical SR might be far more common than can be observed by even the minutest examination of texts and recordings. Coupled with the context-based distribution seen in (22) and (23), it plainly suggests that a full understanding of switch-reference in any given instance requires context-based elicitation with native speakers (cf. Matthewson (2004)).

2.3.3 Configuration

Cross-linguistically, switch-reference has been observed with all sorts of clause junctures, except disjunction. It is most commonly found with simple sentential coordination (as in (22)), embedded clauses of various types ((1) or (2)), and with clause-chaining (12).[5] However, non-canonical switch-reference has not been described as occurring in configurations that are clearly subordinating. An examination of the descriptive literature leads to a clear observation: Non-canonical switch-reference is found only with coordination or with clause-chains.

My fieldwork confirms this for Kiowa, which provides a rare case to test this observation, for it is one of a handful of languages with SR on more than one type of clause juncture. Namely, sentential coordination (22) and some intensional subordinators (meaning 'when' or 'if'). Out of the blue, speakers would often hesitate to accept non-canonical SR. Given a context, acceptance became much easier. On the other hand, with intensional subordination, speakers swiftly and routinely rejected non-canonical SR, with or without a context.

(25) a. zébà gjat−zón=**tsḗ:**   gjat−têm
          arrow 1SA:3PO−pull out.PFV=**when:SS** 1SA:3PO−break in two.PFV
          'When I pulled the arrows out, I broke them.'
      b. *zébà gjat−zón=**ḗ:**   gjat−têm
          arrow 1SA:3PO−pull out.PFV=**when:DS** 1SA:3PO−break in two.PFV

This elicitation is bolstered by the fact that in every other language that has SR in multiple configurations and has NCSR, the NCSR only appears on coordination (Pitjantjatjara, (Bowe 1990: 97)), coordinating conjunctions derived from pro-verbs (§2.1.3), or on clause chains (Choctaw, (Davies 1984: 125)). The cross-linguistic restriction on non-canonical SR in (intensional) subordinate clauses is a fact that must feature in any successful analysis of switch-reference.

2.4 Toward a hypothesis

We have seen that non-canonical switch-reference, no matter where it is found, indicates a kind of continuity of scenes or spatiotemporal locations, or a shift between them. Given observations like these, several researchers have tried to determine a central function for switch-reference that is broader than mere co-reference. From this function, one might deduce a semantics for SR morphemes.

Instead, I approach the problem from the other direction. I will employ a heuristic outlined by McKenzie (2014): If we start with a working semantic framework, we can derive all the functions of any grammatical morpheme. This approach allows any hypothesis to rely upon independently discovered principles of semantics do the heavy lifting. The additional observations in section 2.3 point in that direction. Non-canonical SR only occurs when non-intensional clauses are joined. Its value (SS or DS) depends in part on the context. Furthermore, canonical SR is very plainly derived by relations of identity or disjointness, so it stands to reason that non-canonical SR employs the same relations, but with different objects.

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[5]Clause-chaining involves strings of defectively-inflected 'medial' clauses, which share a mood and tense with a fully inflected 'final' clause. However, as Roberts (1988) points out, sometimes negation in a medial clause can take scope over subsequent clauses, even the final one. Consequently, the actual hierarchical structure involved with clause chains may not correspond directly to the morphology used, the way coordination or subordination is linked with particular connectives.

Following this heuristic, if we can find a semantic object correlating to a 'scene', we may be able to derive all of the observations using ordinary relations of identity or disjointness between two of these objects' referents. We can rule out non-canonical SR from any configuration that lacks these objects. And if the objects' referents are determined by context, we can derive facts like context-dependency, find ways of resolving ambiguities, and even develop contexts to test with direct elicitation.

In the rest of this paper, I will argue that the semantic object correlating to a 'scene' is the Austinian topic situation. The use of situations has been well examined in the formal semantics literature, and switch-reference is another use of them. I will also demonstrate that switch-reference on a clause always tracks these topic situations when its clause contains one, and never when the clause doesn't. Finally, I will rule out alternative semantic objects like locations or Davidsonian events, and discuss some of the interesting consequences of this approach.

3 Non-canonical SR and Austinian topic situations

This section will propose and test the first hypothesis of this paper, that what we call 'non-canonical' switch-reference is like ordinary switch-reference, but tracking the clauses' Austinian topic situations, rather than their subjects.

(26)   **Hypothesis 1: Non-canonical SR tracks topic situations**
        A 'non-canonical' switch-reference morpheme at the juncture of two clauses indicates identity or disjointness of the topic situations of the two clauses.
    a.   Non-canonical DS marking indicates a disjointness relation between the clauses' topic situations.
    b.   Non-canonical SS marking indicates an identity relation between the clauses' topic situations.

3.1 Situation semantics

I assume a possibilistic situation semantics based on Kratzer (1989, 2007), where the ontology contains a set of objects called 'situations', each of which denotes a part of a possible world. Situations correspond to a wide variety of objects, including Davidsonian events, spatiotemporal locations, and individuals— the room you are in right now, the contents of your dog's stomach, the sack of Rome in 390 BC, Nelson Mandela, and so on. The set of situations also includes possible worlds, which are defined as situations forming part of no other situation. A consequence of this definition is that no situation is part of more than one possible world. A situation can also be formed by summing any two situations in the same world. Logic allows any two situations to be summed, but natural languages seem only to allow the use of sums that make some kind of sense (von Fintel 2005). Table 2 presents the ontology and type-driven intepretation I will employ in this paper.

The role of situations in natural language is to restrict the evaluation of the truth of an uttered proposition, effecting the sort of context-dependent truth proposed by Austin (1961).[6] Propositions in a situation semantics can be defined as properties of situations, i.e. the characteristic function of a set of situations. As a result, Austinian restriction emerges from ordinary functional application. If you say *It rained*, you are

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[6]The use of situations in contextual restriction was pioneered by Barwise and Perry (1983), but their formal characterization of situations differs significantly.

Table 2: Ontology and type-driven interpretation

set	object	semantic type
{ 1,0 }	set of truth-values	t
S	set of situations	s
W	set of possible worlds ($W \subset S$)	w
E	set of possible individuals ($E \subset S$)	e

(27)   **Recursive type rule:** For any two types σ and τ, there is a type $\langle \sigma, \tau \rangle$, mapping from D_σ to D_τ. There are no other types.

(28)   **Situation interpretation (pronoun rule):** For any index n and any assignment g:

$$[\![\, s_n \,]\!]^g = g(n) : s$$

(29)   **Situation summing:** For any situations s_1, s_2 and world w:

$$\text{If } s_1 \leq w \text{ and } s_2 \leq w, \exists s[\, s \leq w \wedge s = s_1 + s_2 \,]$$

(30)   **Situation mereology:** For any situations s_1, s_2:

$$s_1 \leq s_2 \text{ iff } s_1 + s_2 = s_2$$

(31)   **Persistence:** For any situations s_1, s_2:

$$\text{If } s_1 \leq s_2 \text{ and } s_1 \in p, \text{ then } s_2 \in p$$

not necessary asserting the proposition that it rained of the entire possible world, but of some part of it— some situation. If the situation in question corresponds to Montreal last Tuesday, the proposition is true or false based solely on what happened in Montreal last Tuesday. Likewise, if you assert the property of being a cat upon Garfield, only Garfield's properties matter for the truth-evaluation, not those of any other object.

To put it more precisely, situations are used in two basic ways to restrict interpretation: As topic situations or as resource situations. Topic situations are situation pronouns in the extended verbal projection that restrict the entire proposition through functional application. If the situation corresponding to Montreal last Tuesday is s_2:

(32)   a. $[\![\text{It rained}]\!] = \lambda s.$ it rained in s : $\langle s, t \rangle$
       b. $[\![\, s_2 \textit{ It rained} \,]\!]^g = [\lambda s.$ it rained in s $](g(2)) : t$
                        $= $ It rained in g(2) $=$ It rained in s_2

The topic situation restricts the truth-value judgment of this expression to s_1, i.e. Montreal last Tuesday; no other places or times matter. The topic situation is anaphoric, so the restriction is tied to the context without the need to posit any additional discourse structure.

Situation-based truth is held to exhibit **persistence**: If p holds of s, it also holds of any situation containing s. If s_2 is Montreal last Tuesday, and s_3 is Canada last Tuesday, then $s_2 \leq s_3$. By persistence, if it's true that it rained in Montreal last Tuesday, it's also true that it rained in Canada last Tuesday.

A resource situation is a situation pronoun inside a nominal expression that restricts the domain of the determiner. For instance, if you look into a classroom and say *Ev-*

eryone is so quiet!, you obviously don't intend for *everyone* to pick out every person on Earth. Instead, you refer to every person in some part of the possible world, namely that classroom at the present time. Resource situations will be discussed again in section 6.3. However, non-canonical switch-reference only interacts directly with topic situations, so the discussion will focus on those.

Essentially, Hypothesis 1 claims that non-canonical SS marking means that the two joined clauses are being asserted with respect to the same topic situation, while non-canonical DS marking means that the two joined clauses are being asserted with respect to distinct topic situations. This claim accounts for the uses of non-canonical switch-reference observed in the literature.

3.2 Applying Hypothesis 1

The following passage from a Lakota story (33) exemplifies the use of non-canonical DS marking. According to Hypothesis 1, the non-canonical DS-marked conjunction *yukʰa* signals a change in topic situation between the second and third clauses (see Table 3). This is interpreted as a scene shift, revealed by the English translation, which attempts to capture the sense of shift by adding the adverbial *later on*.

(33)   wakʰalapi blatke   na   wagli   **yukʰa**   čʰahapi ewaktuže poetušni
       coffee   1-drink and.SS 1-go home **and.DS** sugar   1-forget   buy-NEG
       'I had some coffee and went home.
       Later on I realized I had forgotten to buy sugar.'   (Dahlstrom 1982: 74)

SR	TS	subject	sentence
—	s_1	x_2	I_2 had some coffee
SS	s_1	x_2	I_2 went home
DS	s_3	x_2	I_2 had forgotten to buy sugar

Table 3: DS marking indicating scene shift

Non-canonical SS marking is well exemplified by (34), from the Mojave language (Hokan, California). This passage provides another example of the zoom-in effect seen in section 2.2.1. In this case, the three clauses with the scene being zoomed in on syntactically precede that of the seeing. The non-canonical SS marking indicates that each of the first three clauses is being asserted of the same situation. Table 4 lays out the relations at issue.

(34)   ko:-vch   hak wa:-**k** yasé'k han-dav-**k**   ha-k   wa-**m** nya ha:m
       pine-DEM there lie-**SS** shade   good-very-**SS** there-LOC lie-**DS** that see
       'There was a pine tree there and the shade was very good; the pine tree was there and she saw that at a distance.'   (Powskey et al. 1980: 65)

The apparent function of scene or thematic continuity is easily derived from the identity relation and pragmatics. The use of an SS-marked conjunction to link two clauses reflects an explicit choice by the speaker to assert the clauses' propositions of the same part of the evaluation world. However, DS marking *could* have been used grammatically, since each clause expresses a different event situation. If the speaker had asserted each clause over a topic situation reflecting its event, Hypothesis 1 predicts

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SR	TS	subject	sentence
—	s_4	x_1	There was a pine tree$_1$
SS	s_4	x_2	the shade$_2$ was very good
SS	s_4	x_1	the pine tree$_1$ was there
DS	s_5	x_3	she$_3$ saw that at a distance

Table 4: SS marking indicating scene continuity

DS marking. Thus, SS marking here highlights the identity of topic situations, and the listener can infer a sense of scene continuity.

3.3 The role of speaker choice in non-canonical SR

Pustet (2013) argues that situation identity does not suffice for switch-reference, because the kinds of cohesion described in section 2 aren't required for SS marking. For instance, SS marking can be used in Lakota despite long distances in time or space.

(35)   cha héhą ma-théca   **na**   hená tókheśkhe ąpétu lehą́l ı́śe táku
    so then 1S.PAT-young **and:SS** those somehow day   now just things
    o-máki-yake   ki hená wążı́gżi   wéskuye
    VS-1S.BEN-tell DEF those certain ones remember.1S.AG

    'Back then I was young, and now, these days, I somehow just remember certain details of what she told me.'   (Pustet 2013: 164)

However, once we take context-dependency into account, this objection dissipates. The context dependency is derived from the topic situation, not necessary from the event itself. The event's spatiotemporal location only matters via its relation to the spatiotemporal location of the topic time. Just as tense only indirectly describes event's times (via the topic situation), situation-based switch-reference only indirectly describes the event's spatiotemporal location, which only appears to matter for SR when it happens to match that of the topic situation.

    In (35), the event situations are those of being young (s_1) and of remembering (s_2). The time of s_1 is a long time ago. The time of s_2 is now. However, the topic situation needn't be s_1 and s_2. They might be something that contains both, s_3. The events would remain true via persistence. The time of s_3 is not indicated in any way, since the language lacks tense marking, so it is only recoverable from the context (which was not supplied). Given this reasoning, (35) is fully compatible with Hypothesis 1.

    Considering (33) again, we see it has DS marking, because the clauses' topic situations (s_1 and s_3) are distinct. However, the choice of s_1 and s_3 as topic situations are made by the speaker, presumably for purposes of conversational coherence. Thus, the hypothesis predicts that had the context led the speaker to use a situation containing s_1 and s_3 as the topic situation for both clauses, SS marking would have appeared. We cannot say that SS marking is completely impossible, because in every instance where DS marking appears, there is at least one situation that both topic situations are part of: the possible world. In that sense, the use of DS marking always reflects a choice made by the speaker, even if the marker itself is grammatically determined.

    The same consideration can be made for SS marking in (34). According to Hypothesis 1, DS marking could have been used if the speaker had employed topic situations

corresponding to the events themselves or distinct situations each event was a part of. Thus, the use of SS marking reflects a choice made by the speaker.

The role of context and speaker choice allows us to make sense out of non-canonical cases where the events are linked by shared purpose, as in (22) and (23) (repeated below in English for simplicity's sake). SS marking is used in contexts where the speaker is linking the events in some particularly meaningful way. This is one kind of discourse 'coherence' found throughout the literature on non-canonical SR.

(36)   Kathryn wrote a letter **and:SS** Esther wrote one too.
         → for a common purpose

(37)   Kathryn wrote a letter **and:DS** Esther wrote one too.
         → just describing things that happened

Hypothesis 1 derives this effect simply. There is a situation (s_3) of Kathryn writing a letter, and one of Esther writing a letter (s_6). SS marking is used when these are part of a larger situation, reflecting the shared purpose (s_1). We can say that the identical topic situation is or contains the sum of the two letter-writing situations, each of which is part of the topic situation. The topic situation itself reflects the 'shared purpose'.

(38) s_1 = topic situation of both clauses in (22)/(36)
         a. s_3 = Kathryn's letter-writing event
         b. s_6 = Esther's letter-writing event
         c. $s_3 \leq s_1 \wedge s_6 \leq s_1$
         d. $s_1 = s_3 + s_6$
         e. s_1 Kathryn wrote a letter and.SS s_1 Esther wrote one, too

Hypothesis 1 easily explains every attested instance of non-canonical SR, but to consider it to hold, we must also test it to rule out uses we predict it not to have. If it does hold, one consequence makes its analysis more difficult: The use of NCSR becomes to a certain extent unpredictable, because it depends on the speaker's choice of topic situation. That choice depends on the context and the speaker's intention of indicating coherence or discontinuity. That said, the cross-linguistic observations show that NCSR tends to appear in the same kinds of contexts. We therefore expect this tendency to result from factors that are not language-specific. Since an account of NCSR based on topic situations can be intuitively summarized as "indicating whether or not you're talking about the same anaphoric part of the world," we can suspect that the choice of topic situation is subject to the same semantic and pragmatic features that shape the use of other anaphors. Employing these features, we should thus be able to develop contexts to test this hypothesis.

3.4   Testing Hypothesis 1

Testing this hypothesis will rely on its prediction that non-canonical switch-reference is sensitive to effects of topic situations on contextual restriction, notably with truth-conditions, discourse coherence, and lifetime effects. We will rely on context-based elicitations to undertake the testing.

The elicitations for this study involved four native speakers of the Kiowa language, mostly working separately. Some of the elicitations were made at the Kiowa Tribal Complex in Carnegie, a small town on the windswept plains of southwestern Oklahoma. Others were made at the homes of speakers, in the nearby town of Mountain

View. One session was conducted by phone.

3.4.1 Truth-conditional effects

Topic situations contextually restrict the truth conditions of an uttered sentence. If switch-reference tracks topic situations, we should see effects of this contextual restriction.

By hypothesis, we assume that DS marking at the juncture of two clauses signals distinct topic situations for each clause. We should therefore be able to force DS marking by ensuring disjoint topic situations. We can ensure situation disjointness the same way we do in other pronouns that are morphologically identical. It suffices to ascribe to them two incompatible properties. To ensure that DS marking arises from topic situations and not subjects, we make the latter identical.

The best way to produce incompatible truth-conditions is with contradiction. However, examples with conjoined contradictions were rejected by my consultants, no matter the value of switch-reference (39). Conjoined contradictions are generally pragmatically odd, even to semanticists, and that fact seems to have overridden any other speaker judgment.

(39)   a.   #Travis ế−bɔ̂ː   **nɔ̃**   Travis hɔ̃n ế−bɔ̂-mɔ̃̂ː
            T.   3SA:1SO−see.PFV **and:DS** T.   not 3SA:1SO−see.-NEG
            'Travis saw me and Travis didn't see me.'
       b.   #Travis ế−bɔ̂ː **gɔ** Travis hɔ̃n ế−bɔ̂-mɔ̃̂

Another way to force DS marking is to describe situations where a unique event of a certain type takes place. The situations are logically compatible, but the uniqueness of the events within them render them distinct, even if one is a part of the other. The test involves a context, followed by a translation+judgment task. The speaker produces a translation with one value of SR, then judges a sentence with the other value against the same context. Given the context below, we predict (40) to show DS marking, and it obligatorily does. Speakers translated the stimulus with DS marking (40a), and rejected SS marking (40b), confirming the hypothesis for DS marking.

Context:
You are teaching a class about Kiowa culture. Each time, you make one type of food. Yesterday it was frybread, today it was boiled meat. I haven't been in your class, so I ask you what you've been making to eat.

(40)   'Yesterday we (excl.) made frybread and today we made boiled meat.'
       a.   kʰíːdèl   kʼɔ́eː-tɔ   ét−ɔ̃́ːm-ế ː   **nɔ̃**
            yesterday frybread-INV 1PXA:3IO−eat.PFV **and:DS**
            éː−hɔ́ː−de+kʰi   kí+sɔ̃n   é−ɔ̃ːm-ẽ ː
            here−DEF−NOM+day meat+boil 1PXA:3SO−eat.PFV
       b.   #kʰíːdèl kʼɔ́eː-tɔ ét−ɔ̃́ːm-ế ː **gɔ** éː−hɔ́ː−de+kʰi kí+sɔ̃n é−ɔ̃ːm-ẽ ː

To confirm the hypothesis with SS marking, we need to ensure that the topic situation is identical across clauses. This assurance is difficult to gain, without morphological evidence besides switch-reference. However, situations are represented by pronouns, so their judgment should be no more difficult than one requiring co-reference between overt pronouns. Thus, I relied on ordinary properties of anaphora and pragmatics to create contexts making it clear that both clauses are using the same topic situation.

The translation+judgment task in (41) confirms the hypothesis: Only SS marking is predicted, and only SS marking is allowed.

Context:
A group of men were seated in a circle. One at a time, the men would stand up and tell a story or a joke. If two got up at the same time, one would sit back down; it is rude for two men to speak at the same time.

(41) a. jí:-de   én−kʰɔ:lé+hâ: **gɔ** új-de
          two-NOM 3SA:RO−together+get up.PFV **and:SS** that-BAS
          ẽm−ôj:+sɔ:-gjæ
          3SA:RO−again+sit down-PFV
          'Two men stood up together, and one of them sat back down.'
      b. #jí:-de én−kʰɔ:lé+hâ: **nɔ̃** új-de ẽm−ôj:+sɔ:-gjæ

We can consider Hypothesis 1 confirmed: Non-canonical switch-reference tracks topic situations. As predicted, we see truth-conditional effects. To further confirm the hypothesis, we ought to see sensitivity to coherence effects and lifetime effects as well.

3.4.2 Coherence effects

Topic situations play an important role in maintaining coherence throughout a discourse. The role arises from anaphora. If the participants in a discourse are not in accord about which situation is being used as a topic situation, incoherence can result, especially if the situations have incompatible properties. In (42), speaker A asks about a picnic on a sunny day (s_1). Speaker B thinks the question was about a different event, where it rained (s_2). As a result, the discourse breaks down, even though all the assertions are true. This breakdown is the simple result of the ambiguity of pronouns.

(42) A: s_1 [Did you have fun?]
      B: # s_2 [No, it rained the whole time]
      A: Wait a sec, s_1 it didn't rain!

Recordings of texts and conversations found no examples of these effects, but we can expect that dearth to arise when relying on captured 'naturalistic' data. Were we to record countless hours, we might stumble across a handful of examples. Instead, we can reliably use speaker intuition to determine whether clauses are about the same situation or about different ones.

For instance, the context for (43a) strongly suggests a common topic situation. Given that context, speakers offered a translation with SS, as predicted. When given the DS version for judgment, they rejected it. One speaker, however, added the comment, "Then it's like you're talking about two different parties."

Context:
You are talking with your friend about a get-together last weekend. Everyone was supposed to bring something for everyone to eat or drink. You can't remember who it was who brought the coffee and the tea. You know it was two different people, but can't remember exactly who.

(43) a. hâ:têl   tsói   ∅−bɔ́:   **gɔ** hâ:têl
          person\WH coffee 3SA:3SO−bring.PFV **and:SS** person\WH
          tsói+gul   ∅−bɔ́:?
          coffee+red 3SA:3SO−bring.PF

'Who brought coffee, and who brought tea?'

b. #hâːtêl tsói ∅−bɔ́ː **nɔ̃** hâːtêl tsói+gul ∅−bɔ́ː?

Another example of a context effect occurs in (44). This involves a technique I call a 'lead-in' sentence: The speaker is offered a sentence that stands in for a context (44a). This sentence leads us in to the judgment or translation task. In (44b), speakers translate the target sentence with SS marking, and judge DS marking to be infelicitous (44c).

(44) a. új-de   k'jǽhĩː tsêː-gɔ   ɔ́−ôj:
          that-BAS man   horse-INV 3IS:3SD−be plentiful
          'That man has a lot of horses...'

      b. páː á−sɔ́j   **gɔ**   páː á−sɔ́jbé
          some 3P−be fast **and:SS** some 3P−be slow
          'some of them are fast, some of them are slow'

      c. #páː á−sɔ́j **nɔ̃** páː ʔá− sɔ́jbé

Clearly, the subjects of the two clauses in (44b) are not identical. However, the clauses must be judged against the same topic situation. Otherwise, the reference of the DPs would be unclear, and the follow-up would be incoherent with the set-up clause. One speaker's comment sums up this notion quite succinctly. DS marking is like "You've switched to talk about someone else's horses." Another speaker commented that with DS marking, "It's like you're suddenly talking about horses in general, not the one this man has." That is, both clauses might be true, but since they aren't about the same topic situation, the SS marking would not felicitous in such a context.

3.4.3 Lifetime effects

A third effect we expect to see is the so-called 'lifetime effect'— the implicature of death or no longer existing that arises from past tense use with long-term or individual-level predicates.

(45) a. lifetime effect: *John was from New Jersey, Alayne was a veteran*
      b. no lifetime effect: *John was hungry, Alayne was at sea*

Translating Musan (1997a,b) into situations, the implicature arises because the topic situation of the each expression in (45a) corresponds to a part of the world lasting until the subject's death, while those in (45b) refer to a smaller situation. The implicature can be cancelled if the topic situation is clearly smaller:

(46) no effect: *Ian introduced me to his friends yesterday. John was from New Jersey, and Alayne was from New York*

Hypothesis 1 predicts that switch-reference can be sensitive to these effects. However, Kiowa lacks tense marking, so in simple clauses we don't see any morphological effects.

(47) John kɔ́j+k'i   ∅−dɔ́ː
      J.   Kiowa+man 3S−be
      'John is/was a Kiowa.'

However, if non-canonical switch-reference tracks topic situations, and lifetime effects arise from topic situations that correspond to some individual's (remaining) lifespan, then we should see lifetime effects *across* clauses. Notably, we predict DS marking if the subjects are distinct, since each has their own lifespan. This is, in effect, a particular form of incompatible property. In (48), the subjects are two historical figures: Big Tree (d. 1929), a prominent Kiowa chief, and Sequoyah (d. 1840), a Cherokee famous for developing a syllabary for his language. The fact of their deaths is well known to the consultants. As predicted, DS marking is required if we conjoin two sentences with lifespan-spanning predicates.

(48) a. ádàuiéʔtè kɔ́j+kʔi   ∅−dɔ́ː **nɔ̃**   Sequoyah áː+dòm+kʔi
          Big Tree   Kiowa+man 3s−be **and:DS** Sequoyah tree+under+man
          ∅−dɔ́ː
          3s−be
          'Big Tree was a Kiowa and Sequoyah was a Cherokee'
     b. #ádàuiéʔtè kɔ́j+kʔi ∅−dɔ́ː **gɔ** Sequoyah áː+dòm+kʔi ∅−dɔ́ː

Given a context and a translation task, we obtain the same result with two subjects who are not historical figures.

Context:
One day, you're talking to a friend about your old acquaintances from school, John and Tom. They both passed away a few years ago. John was a Kiowa, and Tom was a Comanche, but your friend doesn't know that. She asks you what nation they were from, so you inform her:

(49) a. John kɔ́j+kʔi   ∅−dɔ́ː **nɔ̃**   Tom kjáj+kʔi   ∅−dɔ́ː
          John Kiowa+man 3s−be **and:DS** Tom enemy+man 3s−be
          'John was a Kiowa, and Tom was a Comanche.'
     b. #John kɔ́j+kʔi ∅−dɔ́ː **gɔ** Tom kjáj+kʔi ∅−dɔ́ː

Like we saw with tense, the lifetime effect can be cancelled if the context makes it clear that the topic situation is smaller than a lifespan. (50) is much like (49); the names were changed to prevent mixing the scenarios. The context, where you meet a friend's friends, sets up a topic situation for the conjoined clauses that corresponds to the lunch where you met them. This topic situation does not correspond to their lifetimes, so it can be shared by both clauses. The translation task involved a past-tense English clause. Given the hypothesis, we predict SS marking to be possible, and it is.

Context:
Yesterday, you had lunch with a friend, who introduced you to her friends, Bill and Hank. Over the course of conversation, you learned that Bill is Kiowa and Hank is Comanche. You ended the lunch and went home. Later that day, you are talking to your spouse about your lunch, and you mention that you met your friend's friends. You say:

(50) a. kʰídêl   á−kóm−dè   nèn−kʔɔ́ːtéː.
          yesterday 3.POSS−friend−3.POSS 1SA:2DO−meet.PFV
          'Yesterday, I met her friends.'
     b. Bill kɔ́j+kʔi   ∅−dɔ́ː **gɔ**   Hank kjáj+kʔi   ∅−dɔ́ː
          Bill Kiowa+man 3s−be **and:SS** Hank enemy+man 3s−be
          'Bill was a Kiowa, and Hank was a Comanche.'

The lifetime effect emerges in switch-reference marking, even though Kiowa lacks the tense marking it usually emerges with.

3.5 Summarizing Hypothesis 1

Non-canonical switch-reference indicates the identity or disjointness of the joined clauses' topic situations. The value of identity or disjointness depends on two key factors: First, the referent of each situation, which depends on the speaker's choice of topic situation. Second, the relationship between the chosen situation of each joined clause.

In this section, we have successfully tested Hypothesis 1 using the semantic and pragmatic effects we predict to see if switch-reference is based on topic situations. Switch-reference shows sensitivity to truth-conditions, coherence, and lifetime effects. In cases where one value (SS or DS) was predicted to be ruled out, it was.

We have confirmed Hypothesis 1, but it only covers instances where the value of SR doesn't match the value expected if it tracks subjects. Now, we can turn our attention to another important question: Canonicity. When does switch-reference track topic subjects, and when does it track situations?

4 Restrictions on the target of switch-reference

The distribution of non-canonical switch-reference is well-explained if it tracks topic situations at least some of the time. But a full account would predict exactly when SR tracks them, so we proceed to that task. Non-canonical SR is obvious when SR's value differs from that expected with subject-tracking SR. However, the ambiguity in section 2.3.2 hints that situation-tracking SR is probably not limited to those cases. This probability leads us to ask the central question of this section: Can speakers freely decide SR's type of target?

4.1 A second hypothesis

Up to this point, we have focused on the felicity conditions of non-canonical SR. But we should also employ independently gained knowledge about the clauses the SR-marked conjunction is joining. It was observed in 2.3.3 that non-canonical SR does not appear with intensional clauses. Intensional clauses denote propositions; i.e. properties of situations, and do not contain topic situation pronouns. We can therefore propose that SR does not track topic situation pronouns in clauses that lack them.

That answers part of our question. But what about matrix clauses linked by co-ordination? It is with coordination that we find the ambiguity in 2.3.2. If we are to determine the target of SR, we should rely on elicitations with disambiguating contexts. While testing Hypothesis 1, we saw several of these contexts.

Interestingly, a striking pattern emerges from those examples: In every case of switch-reference with coordination where a context is provided, SR has the expected value for situation-tracking, and the value for subject-tracking is rejected. All these clauses had a topic situation pronoun. Thus, we hypothesize that this connection is no accident. If an SR-marked clause has a topic situation, SR always tracks that situation instead of the subject.

Linking this hypothesis with the prediction that SR does not track topic situations in intensional clauses, we form a single biconditional to account for SR's target selection:

(51) **Hypothesis 2: Switch-reference Target Selection**
      Switch-reference tracks topic situations if and only if the SR-marked clause
      contains a topic situation pronoun.

In essence, the target of switch-reference is determined by the syntactic configuration
it appears with.[7] If we assume that coordination involves complementation of the sec-
ond conjunct by a specific conjoining head (Munn 1993; Johannessen 1998), we see
a coordination structure in (52), where SR targets topic situations. In (53) we see a
subordination structure, where subjects are targeted.

(52)   [s_1 x_3 VP [and-DS$_\alpha$ [s_2 x_4 VP]]]
       DS : $s_1 \neq s_2$

(53)   [s_1 [x_3 VP [when-DS$_\alpha$ [x_4 VP]]]]
       DS : $x_3 \neq x_4$

Hypothesis 2 is a biconditional, so it requires testing two separate propositions. In both
cases, reduction arguments work best, so the first step is to rule out situation-tracking
in clauses without topic situations, while the second is to rule out subject-tracking in
clauses with topic situations.

4.2   Testing Hypothesis 2 with intensional subordination

We will first test Hypothesis 2 with (intensional) subordination. Hypothesis 2 is com-
patible with the observation that canonical SR always tracks subjects.[8] That is, if Hy-
pothesis 1 is correct, switch-reference only tracks either subjects or topic situations.
We know that switch-reference *can* track subjects in subordination configurations ((1),
e.g.), so we only need to demonstrate that it *must* do so, by ruling out situation-tracking.
If Hypothesis 1 is correct, then Hypothesis 2 is easily falsified with an example of non-
canonical SR marking in a subordinate clause. However, such examples have not been
attested in the literature. Testing found none either. Speakers conducting context-free
translation and judgment tasks only accepted canonical values for SR with subordi-
nation (25). Another pair of examples is provided in (54) and (55), where speakers
swiftly and strongly refused non-canonical SR with subordination.

(54)   *Bill ∅−tsა́n   [Sam gjà−hóː+aiː−gu=**tsę̄ː**]
        B   3S−arrive.PFV   S   3SA:3PO−travel+start off−IMPF=when:SS
        'Bill arrived when Sam was leaving'

(55)   *Bill èm−hâː   [ę́−bǫ́ː=**ę̄ː**]
        B   3S−arrive.PFV   3SA:1SD−see.PFV=when:DS
        'Bill₁ stood up when he₁ saw me'

    These facts strongly suggest that this part of Hypothesis 2 is correct, but to confirm
them, we need to test with contexts. Since the tests are ruling out propositions, we will

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[7]Note that it is not necessarily determined by the connective itself, but the nature of the clause being
connected. The connective determines the nature of the clause. Also, I set aside clause chains in this section,
since their syntax and semantics are not well understood.

[8]In this paper, I will not discuss possible exceptions to subject-tracking in Choctaw double-nominative
constructions (Broadwell 1997) or Seri passives (Farrell et al. 1991). In both instances, these can be explained
if switch-reference tracks the highest DP argument. See McKenzie (2012: 98-101) for more elaboration.
Since generative accounts define subject more or less along the lines of 'highest DP argument', the distinction
of 'subject' becomes rather theory-based. In any case, the distinction is not crucial to this discussion, so I
will continue to use the term 'subject'.

employ reduction arguments.

Test 1: Rule out non-canonical SS marking with subordination If non-canonical SS marking can occur with subordination, we should find instances of SS marking where the joined clauses' topic situations are identical, while their subjects are disjoint.

However, the nature of intensional clauses renders this impossible, since the intensional connective binds the embedded clause's situation argument (56). The clauses' topic situation arguments cannot be identical, but must be related, perhaps by a matching function (Rothstein 1995). So we can at least create a context where the situations are tightly related enough that we might imagine can lead to an SS marking.

(56)   *When it rains, I get wet.*

    a.   ⟦*it rains*⟧ = λs. rain(s)

    b.   ⟦(56)⟧ = λs. $\forall s'$[rain(s') & $s' \leq s \rightarrow \exists s''$[M($s'$)($s''$) & get.wet(I)($s''$)]]

In (57) the context tightly links the situations in each clause, and the subjects are not identical. In Kiowa, subject-tracking SR would provide DS marking, so situation-tracking SR would result in SS marking. Speakers all refused SS marking (58), and opted for DS marking (57).

> **Context:**
> *A group of men were seated in a circle. One at a time, the men would stand up and tell a story or a joke. Imagine these men have a rule where if two men stand up, one has to sit down. A friend has asked you about this rule, and you are explaining it to her.*

(57)   jíː-de   én−kʰɔːlé+hâː-tɔː=**ẽː**   hágjǽ

        two-NOM 3DA:RO−together+get up.PFV-MOD=**when:DS** time\INDEF

        ẽm−ôjː+sɔː-tɔː

        3SA:RO−again+sit down.PFV-MOD

        'If two men stand up, one has to sit back down.'

(58)   #jíː-de én−kʰɔːlé+hâː-tɔː=**tsẽː** hágjǽ ẽm−ôjː+sɔː-tɔː

        'If two men stand up (SS), one has to sit back down.'

The kind of context that would provide non-canonical subordinate SS marking only allows DS marking, so we can conclusively rule it out.

Test 2: Rule out non-canonical DS marking with subordination Let's assume for argument's sake that SR with subordinating connectives can track topic situations. That is, non-canonical DS marking can occur with subordination. If that assumption holds, we should find instances of DS marking where the joined clauses' topic situations are disjoint, while their subjects are identical.

In any instance we examine for this test, the topic situation arguments will be disjoint. Nevertheless, SS marking is required, as (59) demonstrates. We can conclusively rule out non-canonical DS marking with subordination.

(59)   a.   Travis Carnegie-kjæ ∅−tˀɔ́ː=**tsẽː**   hɔ́n énédɔːko-kjæ

          T.   C.-in   3S−stay**=when:SS** not Anadarko-in

          ∅−dɔ́ː-m̂ɔ̃ː

          3S−be−NEG

          'When Travis stays in Carnegie, he isn't in Anadarko.'

b. #Travis Carnegie-kjæ ∅−tˀɔ́ː=ē: hɔ́n énédɔːko-kjæ ∅−dɔ́ː-mɔ̂ː
'When Travis stays in Carnegie (DS), he isn't in Anadarko.'

Having ruled out any form of non-canonical switch-reference with intensional subordination, we have confirmed half of Hypothesis 2. Confirming the other half, about coordination, will confirm the Hypothesis in full.

4.3 Testing Hypothesis 2 for coordination

Hypothesis 2 claims that SR always and only tracks topic situations with coordinated clauses. That is, coordinating SR never tracks subjects. To confirm this, we must show the possibility of situation-tracking, and rule out subject-tracking. This paper has provided ample evidence of the possibility of situation-tracking, so only the second task remains.

The simplest way to rule out subject-tracking is by a reduction argument. So let's assume a contrary hypothesis:

(60) **Hypothesis X:**
      Switch-reference on coordinating conjunctions can track subjects.

If Hypothesis X holds, we should find two sorts of examples. First, we should find SS on coordination with co-referent subjects and different topic situations. Second, we should find DS on coordination with disjoint subjects and identical topic situations.

Test 1: Rule out canonical SS marking with coordination   For the first sort, Hypothesis X predicts that with co-referent subjects and different topic situations, SS marking is allowed. As it turns out we have actually run this test already, since we used examples of this sort to test Hypothesis 1 (40). There, we found that DS marking is obligatory in such cases, and SS marking is infelicitous. Consequently, Hypothesis X does not hold for SS marking.

To reinforce the point, I present another example. In (61), the subjects co-refer. The speaker is discussing distinct situations (the events yesterday, and the events today). Hypothesis X predicts SS marking is allowed, but speakers given this context rejected SS marking, only allowing DS marking.

Context:
Your friend sees a group of young men at a fair, but doesn't recognize them. She asks you what they have been doing in the events.

(61) a. kʰídêl   tóguː-dɔ   ét−gɯ́n-hêl   **nɔ̃**
          yesterday young man-INV 3IA:RO−dance.PFV-EVID **and:DS**
          ḗːhɔːdekʰi ét−dɔ́+pˀaj-de-hel
          today   3IA:RO−sing+fight-PF-EVID
          'The young men danced yesterday, and they sang today.'
      b. #kʰídêl tóguː-dɔ ét−gɯ́n-hêl **gɔ**SS ḗːhɔːdekʰi ét−dɔ́+pˀaj-de-hel

Test 2: Rule out canonical DS marking with coordination   Hypothesis X predicts that with disjoint subjects and identical topic situations, DS marking is allowed. We have already tested these as well (44b). There, we found that SS marking is obligatory in such cases. DS marking is infelicitous. Hypothesis X does not hold for DS marking.

To reinforce the point, I present one more example, where subjects are clearly distinct, but the topic situation is identical (and can be linked to the subjects' resource situations). Hypothesis X predicts DS marking is possible, but SS marking is required.

Context:
You went to a powwow recently. Your friend was supposed to come with you, but couldn't make it. The next day, you're on the phone with your friend, talking about the powwow, and she asks you what people were doing.

(62) a. yɔ́kɔ́j−gú   ém̃−gṹn   **gɔ**   tógúː-dɔː
          young woman−INV 3PA:RO−dance.PFV **and:SS** young man−INV
          ém̃−dɔ́ː+pˀaːj−guː
          3PA:RO−sing+fight−PFV

          'The young women danced and the young men sang.'
      b. #yɔ́kɔ́j−gú ém̃−gṹn **nɔ̃**_{DS} tógúː-dɔː ém̃−dɔ́ː+pˀaːj−guː

We have ruled out any form of canonical switch-reference with coordination, thereby confirming the second half of Hypothesis 2. Having already confirmed the first half, we can now conclude that Hypothesis 2 holds: Switch-reference with coordination only tracks topic situations, and switch-reference with intensional subordination only tracks subjects.

Success? Not quite. We can conclude that switch-reference with coordination ignores subjects, but not yet conclude that it only tracks topic situations. Section 3 demonstrated that a topic situation account is highly compatible with the facts of non-canonical switch-reference. However, we need to rule out possible alternatives to situations before concluding that Hypothesis 2 truly holds.

5   Ruling out alternatives

Put together, Hypotheses 1 and 2 claim that switch-reference tracks topic situations if it is found with coordination, and does not track subjects. One prediction made by these hypotheses is that other semantic objects are not sufficient for explaining the use of non-canonical switch-reference.

5.1   Spatiotemporal location

Situations often correspond to spatiotemporal locations. As we saw in (32), a situation can refer to Montreal last Tuesday. However, a situation is simply a part of a possible world, so they are not limited to objects we might perceive as spatiotemporal locations.

The effect is straightforward with situations used as topic situations. For instance, you could imagine asserting *My brother sat on the couch the whole time*. This sentence could be describing a situation involving several smaller events of sitting on the couch, which took place at different times and places. For instance, imagine that you asked him to help pack your moving truck in Arizona. Instead, he sat on the couch and wouldn't help. One week later, as you unpacked in Florida, he showed up, but also sat on the couch and refused to help.

These moving events, and the concurrent couch-sittings, are obviously spatially discontiguous. However, one might claim they are in fact temporally contiguous, because the parts are linked by the week in between, thus forming a contiguous time span.

However, *My brother sat on the couch the whole time* could also describe a scenario where the brother did not sit on a couch in the meantime. In fact, it is still felicitous if the brother went hiking in the woods during the week, and never even saw a couch, much less sat on one. In such a context, if we include the whole week, the proposition asserted is no longer true. The intervening week must therefore be excluded from consideration, which means that topic situations can contain temporally discontiguous parts.

(63)   **Context:** My brother sat on the couch while we packed in Arizona, and while we unpacked in Florida, but not at any time in between.

    a.   My brother sat on the couch the whole time.
        (TS = packing and unpacking) → TRUE
    b.   My brother sat on the couch the whole time.
        (TS = packing, unpacking, and the time between) → FALSE

We see spatiotemporal discontinuity at work with resource situations as well. Take the expression *the winner*. Following standard situation based accounts, the resource situation restricts the domain in which the referent is uniquely described. So $[\![$*the winner (s_a)*$]\!]$ = $\iota x[$ winner$(x)(s_a)$]. This resource situation need not be spatiotemporally contiguous. To take a real-life example: In February 2007, a soccer match between Sevilla and Real Betis of Spain was halted when a Betis fan threw a bottle that hit the Sevilla coach in the head, rendering him unconscious. The last thirty minutes were re-scheduled for March, and eventually took place— after both teams played other matches. Also, it wasn't held in the original stadium, but in the distant city of Getafe. No one scored in the second part of the match, but Sevilla was leading after the first part. Therefore, Sevilla can be and has been rightfully called *the winner* in s, where s is this non-contiguous match. Now imagine they used the same ball in both parts of the match, and this ball later disappeared. When talking about the match one day, you could easily say *The game ball (in s) disappeared (in s')*.

In short, a situation need not refer to a spatiotemporal location with spatiotemporally contiguous parts, no matter how it is used in a sentence. If Hypotheses 1 and 2 are correct, this observation should be reflected in the distribution of non-canonical switch-reference. Context-based elicitation should reveal this reflection.

As we saw in section 2, the literature provides many examples of NCSR involving spatiotemporal locations, or situations (like zooming in) that could be construed as such. However, only one example was discussed where space and time do not seem to be at issue: (22), repeated here.

(64)   Kathryn gjæ−gúʔ   **gɔ**   Esther=al gjæ−gúʔ
       K.   3SA:3PO−write.PFV **and:SS** E.=too   3SA:3PO−write.PFV
       'Kathryn wrote a letter and Esther wrote one too.'   (Watkins 1993: 148)

As reported by Watkins's consultant, the letter-writings took place in different locales at different times, so it would not be correct to say that there is a spatiotemporally contiguous part of the world shared by the two events. Instead, Watkins reports her consultant's impression that shared purpose is what links these two letter-writings together. The non-canonical SS-marking could be used when the letters were "written for the same reason, to the same person, at about the same time." She has more recently confirmed (p.c.) that her consultant affirmed the key property in this instance was "shared purpose."

What kind of purpose? One of my consultants suggested a scenario where they

were both writing to the Governor to pardon a prisoner.[9] So I created contexts where switch-reference ignores space or time.

The example in (64) only rules out spatiotemporal contiguity if we happen to know that Kathryn and Esther weren't near each other. The speaker did know this, but there was no context provided beforehand for us to be certain. In (65), I provide such a context. Despite clear spatial and temporal discontinuities, a shared purpose allows SS marking. This example shows that contiguity is not necessary for SS marking, and it is not sufficient for DS marking.

> **Context:**
> *Bill is in prison for a crime he didn't commit. His supporters are sure that he is innocent, and have started a campaign to convince the governor to pardon him. As part of this campaign, last week Kathryn wrote a letter to the governor from her home in Tulsa, asking him to grant a pardon. Yesterday, Esther wrote a letter to the governor from her home in Lawton. Today, the chairman of the campaign wants to know what actions have been taken to get Bill pardoned.*

(65)   a.   Kathryn gjæ−gúʔ   **gɔ**   Esther=al gjæ−gúʔ
            K.   3SA:3PO−write.PFV **and:SS** E.=too   3SA:3PO−write.PFV
            'Kathryn wrote a letter and Esther wrote one too.'
   b.   #Kathryn gjæ−gúʔ **nɔ̃**$_{DS}$ Esther=al gjæ−gúʔ

The following example involves a context where the letters are written to different people. It controls for the common addressee in (64).

> **Context:**
> *What if you are the governor, and Kathryn wrote her letter to you, and Esther wrote one to your advisor Tom?*

(66)   Kathryn jǽ−gúʔ   **gɔ**   Esther=al Tom
      K.   3SA:3PO:1SD−write.PFV **and.SS** E   T
      gjæ−gúʔ
      ANYA:3PO:3PD− write.PFV
      'Kathryn wrote me a letter and Esther wrote one to Tom.'

This finding is not compatible with an account where switch-reference tracks spatiotemporal locations, but it does reflect an account where switch-reference tracks situations, which *include* spatiotemporal locations.

5.2   Davidsonian events

Another alternative object is the Davidsonian event. An account of SR based on events would be compatible with much of the data in section 1. However, as we will see, we can rule events out by critically examining a well-worked out proposal employing them as the target of switch-reference.

Stirling's (1993) account of switch-reference is based largely on the Amele language of New Guinea, and relies on events. She rightly points out that SS marking cannot express co-reference between two clause's Davidsonian events, since each is

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[9]The chief executive of a US state is called a *governor*. Governors have the power to pardon prisoners convicted by the state's courts, the way the President does for prisoners convicted by federal courts.

existentially quantified over by an operator somewhat low in the clause. Thus, an event-based switch-reference cannot be based on reference alone. Instead, Stirling argues that switch-reference expresses the presence or absence of 'agreement' between each clause's Davidsonian event argument. In that sense, her account fits among the 'coherence-based' accounts mentioned in Section 1.

However, her account still employs reference, only in an indirect way. Each event brings with it a 'structured eventuality index' (SEI). The SEI contains the event's index, an aspectual sort (e = event, etc.), and three 'parameters' that will play a role in switch-reference: The 'protagonist' (the agent in her account), the spatiotemporal location, and the actuality— whether the event is in the actual world or not. If two events have co-referent agents and locations, and share a value of actuality, then they 'agree', and SS marking is used (67). If any of the parameters does not match, then DS marking is used (68).

(67) uqa jo   l-i-**me**-i   sigin qee o-l
      3s   house go-Pred-**SS**-3s knife NEG get-3s.NEG.PST
      'He went to the house and didn't get the knife.'   (Roberts 1988: 112)

he went	$= [1, \text{e}, \underline{\langle x_1, l_1, actual \rangle}]$
he didn't get the knife	$= [2, \text{e}, \underline{\langle x_1, l_1, actual \rangle}]$
$\langle x_1, l_1, actual \rangle = \langle x_1, l_1, actual \rangle$	$\rightarrow$ SS

(68) uqa ho-**co**-b   sab je-i-a
      He come-**DS**-3s food eat-3s-TODAY.PST
      'He$_1$ came and he$_3$ ate the food.'   (Stirling 1993: 207)

he came	$= [1, \text{e}, \underline{\langle x_1, l_1, actual \rangle}]$
he ate the food	$= [2, \text{e}, \underline{\langle x_3, l_1, actual \rangle}]$
$\langle x_1, l_1, actual \rangle \neq \langle x_3, l_1, actual \rangle$	$\rightarrow$ DS

This approach effectively bundles together co-reference values, in a way that derives much of the observed data, especially for Amele. However, it is not clear what role the SEI plays in the semantics, except as an account of switch-reference. More crucially, it encounters empirical problems that preclude our accepting it as an account.

Stirling's 'bundling' approach makes two strong predictions. First, that non-canonical SS marking cannot occur. SS marking would require identical subjects, so we should never see examples like (18)-(22), or any of the other examples of non-canonical SS in this paper.

Indeed, despite this prediction, Stirling (p. 85-87) does describe non-canonical SS marking in Amele. However, it only occurs in this language with particular subject types: If the 'subject' is an object-marked experiencer topic (69), an inalienably possessed body part (70), or non-agentive and inanimate (71).

(69) ija co-cob-**ig**   cucui-te-i-a
      I   SIM-walk-1s.**SS** fear-1sO-3s-TODAYPST
      'As I walked, I was afraid.'

(70) ija ta-taw-**ig**   ija am-i   wal-do-i-a
      I   SIM-stand-1s.**SS** I eye-1s spin-3sO-3s-TODAYPST
      'As I stood, my eye(s) spun (= I became dizzy)'

(71) m-i   he-du-**me**-i   ceta wal me-ce-b   …
      put-Pred finish-3sO-**SS**-3s yam ripe become-DS-3s …
      'He finished doing that and then since those yams were ripe...'

Based on this distribution, Stirling argues that SR is sensitive to agentivity in Amele. That is, in each of these cases, the agent hasn't changed. However, it requires holding counter-intuitive assumptions; for instance, that *he* is the agent of *those yams were ripe*. If there were ample reason to hold such assumptions, we would. However, SR is not sensitive to agentivity cross-linguistically— not even in ergative languages of Australia (Austin 1981). It also cannot be extended to cases like our letter-writing example (64), where SS appears despite clearly distinct agents.

If we adopt a situations-based account, these examples have much simpler explanations: They all involve parts of a larger situation under discussion. We would still need to explain why non-canonical SS only appears in such environments in Amele, but not just yet. The methodology of this paper suggests that we cannot actually be sure that its distribution is limited in this way, without context-based elicitation to rule out other scenarios.

The second mistaken prediction of Stirling's account is that SS marking cannot appear when the events occur in two distinct spatiotemporal locations. When discussing location identity, we will need to incorporate some element of vagueness to permit the use of SS markers with morphemes indicating sequence. For instance, the SS marker in (67) also encodes a sequential relation between the two times. However, the two events are in an immediate sequence, so can be plausibly construed as being at the same time. We have seen, however, several examples (such as (64)) of SS marking being used even with great distances in time and space.

These faulty predictions are inescapable in a bundling approach, and a bundling approach is the best way to incorporate Davidsonian events into a theory of switch-reference. Consequently, we should not consider events.

5.3 Pragmatic enrichment

One objection to the use of situation variables (or any variable) for contextual restriction is made by Recanati, who argues (Recanati 2002, 2007) for a process of pragmatic enrichment in place of situation or location variables. He claims that only a few predicates have location arguments— those like *arrive*, which require that the speaker know the location of the event. All other predicates, like *rain* or *dance*, can still be restricted in a different way. If contextual restriction is conducted by pragmatic enrichment instead of situation variables, then switch-reference cannot be linked to topic situations.

But if we consider some of Recanati's examples, we find that the argument against using situations is not strong. In (72), it is clear that B's response is restricted by *the ball*, but how so? Recanati argues that the location is added pragmatically to the truth-conditions of the phrase, by a location function within the scope of the event quantifier:

(72) A: Was John present at the ball?
      B: Yes, he danced all night.

(73) $\exists e \, \exists t$ PAST (t) & TIME (t, e) & DANCING (e) & AGENT (John, e) &
      ALL-NIGHT (e) & LOCATION $(the - ball, e)$

However, his argument against the use of situation variables rests on two problematic assumptions. First, the location of an event is either an argument of the predicate or is

supplied via pragmatic enrichment. Second, the linguistically expressed location must be associated with the predicate.

Recanati's first assumption is problematic in cases where there would be an argument and the kind of restriction seen in pragmatic enrichment. For instance, if the location argument of *arrive* is saturated by the place of arrival, and the point of arrival is specified, where does the restriction come into play? Here is another ballroom example:

(74)   A: Was John present at the ball?
          B: Yes, but he arrived at the back door— what a faux pas!

The location of arrival is the back door (of the building housing the ball), but *the ball* is still restricting the arrival just as much as it does in (72). Presumably, *the back door* would saturate the location argument of *arrive*, leaving no need for pragmatic enrichment. Otherwise, you could pragmatically enrich *at the ball* as well (You could say it overtly: *He arrived at the ball at the back door*). But what would stop infinite pragmatic enrichment?

We can also set aside Recanati's assumption that the location argument is directly associated with the predicate. Under the situation semantics assumed here, the location is encoded in the topic situation, which is not an argument of the predicate. This is not necessarily an argument against association with the predicate, but rather a reminder that we can get by without it. Since Recanati's first assumption is flawed, and the second is unnecessary, we should not employ the conclusions he draws from them.

Besides the case against situation variables in general, the pragmatic enrichment account cannot explain switch-reference facts. The context-dependency of non-canonical switch-reference suggests a role for contextual restriction in reference-tracking. However, a pragmatic enrichment approach cannot derive the configurational difference, since events in embedded clauses also have locations.

5.4   Summary of section

In this section, we have seen that the facts concerning non-canonical switch-reference cannot be adequately explained unless its target is an Austinian topic situation. Three kinds of alternatives have been presented, each with crucial problems. Spatiotemporal locations are not sufficient, because SS marking often links two events that are spatiotemporally discontiguous. Meanwhile, situations can have discontiguous parts. Davidsonian events cannot involve co-reference as the relation, but must rely on a "bundling" of co-reference relations. This bundling predicts the impossibility of non-canonical SS marking as we've seen it. Also, a reliance on events cannot explain the configurational difference. An approach that replaces the contextual restriction of topic situations with pragmatic addition of predicates is also insufficient. Not only does it not explain the configurational difference, it does not present any reasons to abandon topic situations.

6   Consequences and open questions

This paper offers two hypotheses: That 'non-canonical' switch-reference is actually situation-tracking switch-reference, and that switch-reference tracks topic situations whenever its clause has a situation pronoun. Under this account, the distribution of 'non-canonical' switch-reference depends on two factors: The speaker's choice of topic

situation for each of the joined clauses, and the identity relation between the chosen situations. Context-based elicitation confirmed the hypotheses, and further examination rules out alternatives to the use of topic situations.

6.1 Factors influencing speaker choice of topic situation

One of the key points in this paper is that speaker choice of topic situation contributes to the use of non-canonical switch-reference. This necessitates a role for contextual restriction in reference-tracking. It also opens a new area of research, trying to discover exactly what factors influence that choice. The attestations of non-canonical switch-reference suggest some factors, which can roughly be grouped together under a concept of 'coherence' or 'contiguity'. We've seen here that space, time, narrative scene shifts or lumpings, and shared purpose all play a role in individual instances. Yet, none play a determinative role on their own, and the result is an unpredictability in the use of non-canonical SR.

Some researchers have begun statistically analyzing corpora to discern a clearer pattern of factors behind coherence with switch-reference. Martin (2011: 355), in his grammar of the Muskogee (Creek) language, observes in a series of texts that 16% of DS uses were non-canonical, while 7% of SS uses were. His findings demonstrate how common non-canonical SR can be, but he does not explore the factors behind this distribution.

Pustet (2013) makes more progress in this regard. She examines a series of Lakota texts, followed with context-based fieldwork. She finds that switch-reference marker use can be largely determined based on four factors that promote or demote cohesion: Subject identity (which she calls 'switch-reference'), spatiotemporal identity (or immediate sequence), probability (given the course of events thereunto), and contrast (essentially, the contribution of *but*). DS marking is non-canonical 27.4% of the time, while SS marking is non-canonical 16.8% of the time.[10]

[Figure 1 here]

Despite her claim, Pustet's observations complement a situations-based account quite well. She suggests that these conjunctions are chosen based on cohesion, but does not specify a source of that cohesion. Here, I propose that situations provide it, via situation identity. The speaker's choice of topic situation determines which of the factors of cohesion are relevant. Facts like those in Figure 1 thus shed some light on the factors influencing speaker choice of topic situation.

Another factor that might play a role in speaker choice is genre. The corpora involved in statistical analyses of SR have consisted of narratives. Narratives have long been observed to have different discourse needs than conversation, and if SR reflects discourse needs via situation choice, we can expect different distributions of non-canonical SR. Studying conversations might find new kinds of factors at hand (like we saw in section 2.1.4). However, there is no known annotated corpus of conversations in a switch-reference language, and examples of extemporaneous speech or writing are rare. Watkins (1990) notes that conversations in Kiowa involve much less sentential coordination than narratives do, so switch-reference is already expected to be rarer. Nonetheless, we may find very interesting results, and these results may be a very useful way of investigating contextual restriction in detail.

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[10]The boldfaced numbers in Figure 1 represent figures that Pustet later determined to be statistically significant demonstrations of the relevance of that particular factor.

		yųkhą 'and (then), but (then)' Total: 405	*na* 'and' Total: 1,179	*cha* 'so, and (so)' Total: 729	*(k')éyaš* 'but' Total: 218
Switch-reference	[SS]	111 = 27.4%	**957 = 81.2%**	227 = 31.1%	74 = 34.0%
	[DS]	**280 = 69.1%**	198 = 16.8%	**483 = 66.3%**	**138 = 63.3%**
	Unclear cases	14 = 3.5%	24 = 2.0%	19 = 2.6%	6 = 2.7%
Probability	[+probability]	11 = 2.7%	9 = 0.8%	**289 = 39.6%**	0 = 0.0%
	[−probability]	**100 = 24.7%**	10 = 0.8%	0 = 0.0%	**144 = 66.1%**
	Unclear cases	294 = 72.6%	1,160 = 98.4%	440 = 60.4%	74 = 33.9%
Temporal cohesion	[+temporal cohesion]	332 = 82.0%	**1,137 = 96.4%**	605 = 83.0%	170 = 78.0%
	[−temporal cohesion]	**71 = 17.5%**	42 = 3.6%	**120 = 16.5%**	**48 = 22.0%**
	Unclear cases	2 = 0.5%	0 = 0.0%	4 = 0.5%	0 = 0.0%
Contrast	[+contrast]	16 = 3.9%	12 = 1.0%	13 = 1.8%	**186 = 85.3%**
	[−contrast]	**389 = 96.1%**	**1,167 = 99.0%**	**713 = 97.8%**	32 = 14.7%
	Unclear cases	0 = 0.0%	0 = 0.0%	3 = 0.4%	0 = 0.0%

Figure 1: Usage of SR in Lakota texts (Pustet 2013: 179)

6.2 Plans and apparent intensions

Section 5.1 pointed out that situations can contain the sums of disparate events, and that switch-reference can track such situations, notably for shared purpose. A related use from outside the switch-reference literature comes from Poesio (1993), who shows that unfulfilled plans are situations by using them as resource situations to restrict uniqueness operators in definite descriptions that refer to items identifiable only by their role in the plan.

In (75), speaker A refers to 'the truck', but doesn't need to know what truck it will be, or even whether it exists in the actual world (maybe it needs to be built first). Yet, it is referred to as unique, and carries the existential presupposition that comes with *the*, because it is unique in the plan.

(75) (Based on Poesio 1993:5)
A: We have to ship a ton of bananas from Los Angeles to Fresno by Tuesday, but our delivery people are on strike.
B: No problem. We'll get **a truck**, drive it to LA, load up a ton of bananas, and hurry up to Fresno.
A: Yeah, but who's gonna drive **the truck**?

When I asked one consultant about the letter-writing example (22)/(64) and the role of shared purpose, she offered her impression that it was like Kathryn and Esther were planning something. Then she offered an example (76a), with non-canonical SS marking, adding that it would be fine if you were making a plan. I asked a follow-up judgment about DS marking in that context. It would not be fine for that context, but would be fine if you're simply saying what's going to happen. Other consultants made similar judgments.

(76) a. a−t'ɔ́ᷛm+tsãn-t'ɔː **gigɔ́** nɔ́ᷛ+kõm
1S−first+arrive.PF-MOD **and:SS**:then me+friend
∅−jɔ́gúʔ+tsãn-t'ɔː **gigɔ́** á+tɔ̃ː+de
3S−second+arrive.PF-MOD **and:SS**:then his+male's.sister+his
∅−hõ̂ːn+tsãn-t'ɔː
3S−last+arrive.PF-MOD
'I'll get there first and then my friend will get there next and then his sister will get there last.'

b. #a−t'ɔ́ᷛm+tsãn-t'ɔː **nēgɔ́**_{DS} nɔ́ᷛ+kõm ∅−jɔ́gúʔ+tsãn-t'ɔː **nēgɔ́**_{DS} á+tɔ̃ː+de
∅−hõ̂ːn+tsãn-t'ɔː

A possible objection to analyzing (76a) with topic situations is that the predicates are the same (*modulo* incorporated adverbs). Since the conjuncts all involve the verb *tsɑ́ᷛn*, 'arrive,' (76a) might be evidence that switch-reference is sensitive to predicates. To verify that plans are crucial to switch-reference, I attempted to elicit examples like (77), where the events are of distinct predicates, and take place in different locations. SS marking was perfectly acceptable in a plan-making scenario, even with the contrastive use of the independent subject pronoun *ám* in the second clause.

(77) Carnegie-kjæ a−t'ɔ́ː-t'ɔː **gɔ** ấm Norman-ku mã−báː-t'ɔː
Carnegie-at 1S−stay.PF-MOD **and:SS** you Norman-to 2D−go.PF-MOD
'I will stay in Carnegie and you two will go to Norman.'

It is clear, then, that situations can include parts of a plan, so we can use them quite easily to account for these cases of switch-reference. And as Poesio points out, objects in such a plan might not yet exist, but they're still accessible.

Nonetheless, an objection arises out of the nature of situations. The objects in the planned situation don't exist in the actual world, but neither should the situation. Situations can link disparate parts of the same possible world, but cannot span worlds. A planned out situation isn't part of the actual world, but rather part of one of a quantified-over set of possible worlds.

Put another way, the situations linked by SS marking in (76) and (77) are all in the same possible world, but we don't know which world that is. We only know that whichever world it is, it's accessible from the actual world by modality. In that sense, then, we shouldn't be able to refer to it with an anaphoric topic situation, so switch-reference should not be able to relate the reference of the clauses' topic situations.

The same objection applies to Poesio's truck— the definite description gets us a unique truck, but we don't know which resource situation we're actually talking about. We can't appeal to a 'plan', because the situation itself only exists as part of an implicit modal supposition.

A solution to this objection emerges when we relate it to the problem of reference in modal subordination. As (Roberts 1989) describes, the interpretation of the DP *the birds* in (78b), along with the modal *will*, depends on the modal base introduced by the previous clause.

(78) a. If Edna forgets to fill the birdfeeder, she will feel very bad.
b. **The birds** will get hungry. (Roberts 1989: 689)

Roberts offers a dynamic account of the DP interpretation. But situations-based accounts provide a straightforward e-type solution to this kind of definite description. The DP contains a resource situation that is bound by the modal (79) (Heim 1990; Per-

cus 2000; Elbourne 2005; Kratzer 2007). As *will* is a modal, we need only make the uncontroversial supposition that the subject *the birds* is interpreted below the modal. For Poesio's example, *gonna* is the modal, but otherwise the interpretation process of the DP is the same, as the LF in (80) shows.

(79)
```
will
   λs
      the  s   birds   get hungry
```

(80)
```
who
   λx
      gonna
         λs
            x   drive   the  s   truck
```
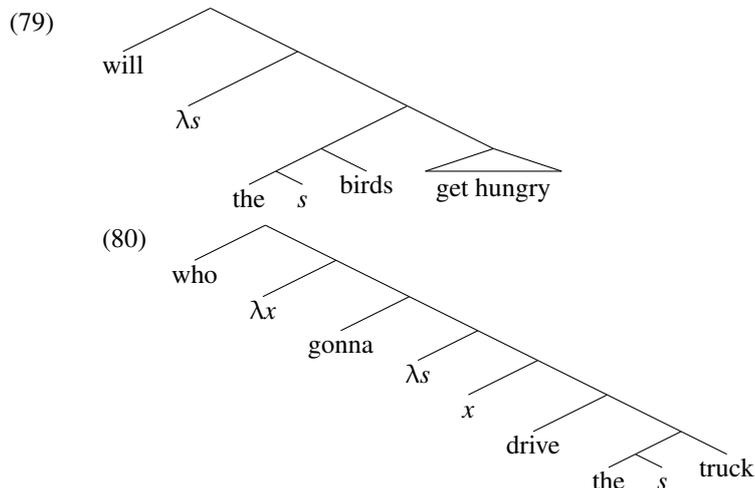
While this approach works for resource situations, it does not work for topic situations, even if we re-cast them as covert definite descriptions. Topic situations are outside the scope of the modal. If we put the topic situation beneath the modal, it would have to be bound by the modal, and then it would lose any use as a topic situation; any effects of contextual restriction would come from the modal base instead. Also, there would still need to be a topic situation above the modal to saturate the proposition, and switch-reference would track that instead, leaving us with the same problem. We can't use a situation corresponding to the modal base (i.e. a situation were every proposition in the modal base holds), because the modal itself is introducing them, and in any case, we still don't know which world we're talking about. Using a situation corresponding to the entire actual world seems too broad to provide the sense of tight coherence that speakers report. So what is going on?

One way around this problem would be to suggest an implicit modal above sentence level. This is the basic idea in a dynamic account, but I will maintain the 'static' semantics already taken here, and suggest an approach that relies on the fact that the plan and its formulation are real, even if the situations the plan describes are not.

Roberts (p. 718) describes modal subordination as the interpretation of a clause involving a modal operator tied to a set of contextually given propositions. What is a plan, in effect, but a set of propositions? Perhaps the topic situation of the shared clauses in (76a) is the situation in the actual world where the plan was formulated, not the intensional situation where the plan comes together. This actual formulation situation has content— a set of propositions— which can serve as the modal base.

Let's return to (76a) to exemplify this proposal. Assume that for any situation s that produces content, there is a function CONTENT(s) that returns the set of propositions consisting of that situation's content (81b).

(81)   a. s_9 = formulation of the plan expressed in (76a)

    b.   CONTENT(s_9) = { λs. I arrive first in s

                               λs. You arrive second in s

                               λs. Your sister arrives last in s }

Assume further that the conversational background of a modal is an argument of the modal (Hacquard 2010), and that the Kiowa morpheme indicating modality ($-t^{ʔ}ɔ:$) is interpreted with universal force.[11] In a case of modal subordination, the conversational background f is a set of contents (82a). Given a prejacent p, the modal returns the characteristic function of the set of situations such that the prejacent proposition is true in all worlds where every proposition in f applied to s holds.

(82)   a.   f = λs. CONTENT(s) : $\langle s, \langle\langle s, t\rangle, \langle s, t\rangle\rangle\rangle$

         b. $[\![-t^{ʔ}ɔ:]\!]$ = λf$_{\langle s, \langle st, st\rangle\rangle}$λp$_{st}$λs$_s$. ∀w[w ∈ ∩f(s) → w ∈ p]

In the case of (76a), the conversational background gets saturated by the situation argument variable of the modal. Since that situation is already part of the actual world, the modal worlds are now accessible to the actual world. The sentence ends up meaning: In all worlds where the plan comes together, I arrive first.

(83)   ∀w[w ∈ ∩⟨CONTENT(s_9)⟩ → I arrive first in w]
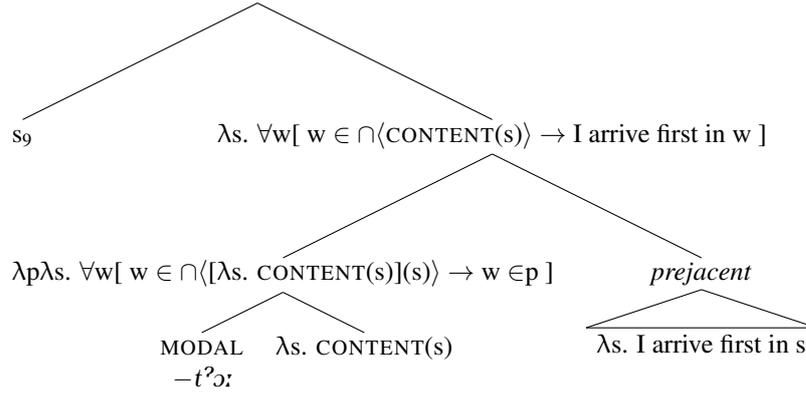
The same analysis applies to the other clauses in (76a), and since these are all asserted about the same topic situation, SS marking appears on the conjunction.

(84) s_9 ∘ λs. ∀w[w ∈ ∩⟨CONTENT(s)⟩ → I arrive first in w]

       and:SS s_9 ∘ λs. ∀w[w ∈ ∩⟨CONTENT(s)⟩ → You arrive second in w]

       and:SS s_9 ∘ λs. ∀w[w ∈ ∩⟨CONTENT(s)⟩ → Your sister arrives last in w]

Some situations have content. Given that content, we can account for the role of topic situations in contexts with unfulfilled plans, without sacrificing the basic notion of situation as part of a single possible world.

6.3   Subject-tracking and resource situations

One important consequence of these hypotheses is that in coordinating structures, 'canonical' switch-reference only appears to be tracking subjects. Imagining that English had SR marking, we'd get the following kind of situation for DS marking: SR

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[11]We will set aside the ordering source in this discussion, as it is not consequential.

actually tells us about the difference between s_1 and s_2, not Bill and Julie.

(85)   a. s_1 Bill came in **and:DS** s_2 Julie sat down.
       b. $s_1 \neq s_2$

Apparent subject-tracking is the rule, rather than the exception, so it requires explanation.I propose an explanation based on the observation topic situations are often tied to subjects through domain restriction. Apparent subject-tracking in switch-reference arises when two factors converge. First, the subject's resource situation is tied to the clause's topic situation, and second, the subject's resource situation is co-extensive with the DP.

Subjects, like any DP, contain a resource situation pronoun that restricts the interpretation of its determiner or quantifier. This pronoun can be anaphoric, or tied via binding to the clauses' topic situation.[12] Assuming that proper names are definite descriptions (Elbourne 2005), we get (86):

(86) s_1 [the unique Bill in s_1] came in **and:DS** s_2 [the unique Julie in s_2] sat down.

Now that the subject's resource situation is tied to the topic situation, we need to understand how we end up with different topic situations that seem to match the subject. We can explain this match if the DP's resource situation is coextensive with the DP's referent.

Individuals are situations (i.e., parts of a possible world), so for any individual (Julie, Bill) in world w, there is some situation in w corresponding to that individual. Thus, in (86), *Bill* denotes 'the unique individual named Bill in the Bill situation', and *Julie* denotes 'the unique individual named Julie in the Julie situation.' A co-extensive resource situation is the most informative domain restriction possible, and being anaphoric, it reinforces the presupposition of the definite determiner.

Coming back to switch-reference, we can see plainly that whenever the topic situations are identical to the subject's resource situations, we get switch-reference appearing to track the subjects. Non-canonical switch-reference, i.e. apparent non-tracking of subjects, occurs when the topic situation is not co-extensive with the subject via its resource situation.

With quantifiers, the use of the term 'co-extensive' is not quite accurate. However, the process linking resource situations to topic situations gives results intuitively similar to those of referential DPs. In the following discourse, the resource situation of the subject of B's response can be bound to the topic situation or anaphoric.

(87)   A: How was the party?
       B's response:
       a. (s_1) [Everyone (s_1) had a good time.]
       b. (s_2) [Everyone (s_1) had a good time.]

If (s_1) refers to the party, then everyone at the party had a good time (87a). But if s_1 is the part of world consisting of a group of people (Amanda, Beryl, and Charlie), then only those three people are asserted as having a good time (87b).[13]

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[12]Schwarz (2009) proposes a mechanism to effect this tying by an operator (Σ), based on an idea by Büring (2004), that binds the resource situation and calls for the topic situation. The exact mechanism need not concern us here.

[13]If we assume that the group of people forming s_1 form some kind of plural individual, then the quantifier *everyone (in s_1)* can be coextensive with it, as it denotes the set of properties applying to this individual.

By linking subjects to topic situations via resource situations, we provide a way of accounting for switch-reference with quantificational subjects. Quantified subjects do not refer, so switch-reference cannot be directly relating them by identity in coordinating structures. The hypotheses presented in this paper obviate this problem, since SR on coordination ignores subject reference. Instead, SR tracks the topic situations, which are often linked to the subjects' resource situations.

We've seen examples like this already, in (43a), (44), and (62). But we can also shed light on some examples of partitive usage found in the literature (§2.2.3). In (20), for instance, repeated as (88), the first clause's quantified subject introduces a set of people, and the second clause's quantified subject describes a subset of them. SS marking can't be indicating subject co-reference, since the subjects don't co-refer (or refer at all). Instead, it can be explained if the clauses have the same topic situation. Perhaps the subjects have the same resource situation as well.

(88)   a.   é̠ʔtè tʰɔ̃ːt͡sép hágjá   á−kɔːl−eː   **gɔ** páː
            many flood   sometime 3P:3S−cross−IMPF.EVID **and:SS** some
            á−ő̀bà+hĩː+hèl
            3P−submerge+die.PF-EVID
            'Many were once crossing a flood and some drowned.'   (Watkins
            1984: 159)
      b. s_1 many (in s_1) were once crossing a flood
      and:SS s_1 some (in s_1) drowned.

We also account for part-whole readings with referential DPs (§2.2.4). In (89), from a narrative, the subject 'White people' clearly does not co-refer with 'eyes', which is the nominative subject of the clause. SS marking indicates a shared topic situation. This situation may well be the White people themselves, as an instance of zooming in from the wider scene. If the resource situations are identical, we can easily pick out only those White people and only those eyes in the situation.

(89)   ɔːkʼôːbé tʼɔ́kʰɔj   è−sɔ́mde   **gɔ** táː−gɔ mîn
       circle   White people 3I−watch.IMPF **and:SS** eye.INV about to
       béʔ−kʰúːlya
       3DS:3ID−pop.IMPF
       'The White people stood all around watching and their eyes were about to pop out.'   (Parker McKenzie, ms.)

(90) s_1 [The White people (in s_1) stood around watching]
      and:SS s_1 [the eyes (in s_1) were about to pop out]

The role of resource situations in situation-tracking switch-reference is limited to instances where the subject's resource situation happens to match the topic situation. Frequency studies find this matching to be very frequent, because SR is usually canonical. However, not all instances of matching should be thought of as 'canonical' SR, for two reasons. First, as we've seen, SR is often ambiguous between subject-tracking and situation-tracking. Second, the fact that frequency studies are based on narratives may have an effect.

It has long been noted that SR at episode boundaries compares the two episodes (§2.1.3). However, within episodes, SR is almost completely canonical. That is, topic situations and subject resource situations match within episodes. We can get a sense of why when we consider some other features of SR languages, especially in North

America. Narratives in SR languages often involve long sequences of clauses joined by SR-marked conjunctions— usage of SR is far more frequent in narrative than in conversation. In North American languages, pro-drop is the general tendency, leaving narrative sequences sometimes longer than 20 clauses with no overt subjects at all, and third-person marking on verbs. Oftentimes, apparently canonical switch-reference is the only indication of who is doing what. This suggests that narrative episodes benefit from topic situations corresponding to subject protagonists, so that the attention flips from one subject to another, akin to the cinematic technique of shot/reverse shot.

6.4 Summary of consequences

This section explored three consequences of the account here, linking it to observations in the literature. The first consequence arises from speaker choice of topic situation— we ought to be able to use SR to investigate what factors influence choice of topic situation. Among these are elements of cohesion and the needs of the genre of speech. The second consequence concerns clauses whose topic situations are not part the actual world. I propose that the topic situation *is* part of the actual world; it's just not the situation that the linked clause's events are part of. Instead, it's the situation that led to the content that serves as the modal base for the joined clauses. The third consequence concerns the prevalence of apparent subject-tracking with coordination. It is explained if subject resource situations are often linked to topic situations, which could be very common, especially in narratives.

7   Conclusion

This paper argues that switch-reference with coordinating conjunctions indicates the co-reference or disjointness of the topic situations of the conjoined clauses, rather than their subjects. This proposal accounts for attested use of non-canonical SR more effectively than other approaches. Targeted elicitation confirmed every aspect of the proposal, and ruled out alternatives. Some of the major consequences were explored, and found to reveal interesting avenues for further research.

In a larger sense, switch-reference demonstrates a link between reference-tracking systems and the contextual restriction of clause interpretation. SR on coordinators has long been argued to express 'cohesion' rather than co-reference. However, topic situations allow us to derive cohesion using co-reference and speaker choice. Speaker choice of topic situation is affected by the way they frame the sentence in the conversation or narrative, so we may be able to employ switch-reference to gain insight on the factors that affect these choices, even in languages that lack tense marking or other morphology sensitive to topic situations.

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