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Participial Phrases in English to Finnish Machine Translation

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Abstract

Finnish language is peculiar in that it often uses participial phrase constructions instead of *when* and *while* initial subordinate clauses. Such clauses could be translated also using corresponding Finnish structures. However, such translation is often less fluent, and there is motivation to convert English subordinate clauses into Finnish participial phrase constructions. This report discusses problems and solutions related to this process.

Key Words: *machine translation, participial phrases, constraint grammar.*

1 Introduction

The tendency to use participial phrase structures in Finnish constitutes a major problem in English to Finnish machine translation. When English uses subordinate clauses or prepositional phrases, Finnish tends to use participial phrase structures instead. Alternatively, Finnish can also use corresponding English ctructures, but the translation is often not satisfactory, and at least it is not the optimal translation method. Therefore, there is motivation to convert such structures into participial structures. The conversion process involves complex modifications in the verb, and in some cases reordering entire clauses. Below we discuss these conversion problems and show how they can be solved.

2 Details of the conversion process

The translation of temporal or conditional subordinate clauses into participial phrases starts in the phase of semantic disambiguation (1).

(1)
```
"<When>"
      "when" { milloin } %ADVL CAPINIT ADV WH
      "when" { kun } %ADVL CAPINIT ADV WH
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
      "when" { jolloin } %ADVL CAPINIT ADV WH
      "when" { mikä Np13 FRONT :2 } %ADVL CAPINIT ADV WH
      "when" { PROP-CAND } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D O-PAR } %-FMAINV V ING
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG
```

```
"<,>"
      "," { , }
      "," { NOGLOSS }
"<he>"
      "he" { hän Np9 FRONT OUT } HUM MALE %SUBJ PRON PERS NOM SG3
      "he" { hänen } HUM MALE %SUBJ PRON PERS NOM SG3
      "he" { NOGLOSS } HUM MALE %SUBJ PRON PERS NOM SG3
      "he" { itse N8 FRONT } HUM MALE %SUBJ PRON PERS NOM SG3
"<lights>"
      "light" { sytyttää V53-C FRONT TRV } %+FMAINV V PRES SG3
      "light" { valaista V66 O-PAR } %+FMAINV V PRES SG3
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N SG
      "lamp" { lamppu N1-B } %OBJ DEF N SG
```

Because we are going to translate using the participial phrase structure, we must select the interpretation NOGLOSS for the word when. For the comma we must select NOGLOSS, because Finnish does not use a comma after participial phrases. For other words, the default gloss is valid. The disambiguated result is in (2).

(2)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D O-PAR } %-FMAINV V ING
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG
"<,>"
      "," { , }
"<he>"
      "he" { hän Np9 FRONT OUT } HUM MALE %SUBJ PRON PERS NOM SG3
"<lights>"
      "light" { sytyttää V53-C FRONT TRV } %+FMAINV V PRES SG3
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N SG
```

The rule for the word *when* is in (3).

(3)

```
SELECT ("when" NOGLOSS) (1 ING);
```

This rule is very short, and actually it should have more constraints to be linguistically motivated. However, this works, because a gerund after *when* cannot have other meanings.

The comma after the participial phrase will be removed using the rule (4).

(4)

```
SELECT ("," NOGLOSS) (*-3 ("when") OR ("while") OR ("in") BARRIER
CLB LINK 1 ING);
```

Explanation: Select the interpretation NOGLOSS for the comma. Beyond the third word to the left there should be the word *when*, *while* or *in*, and the next word from it to the right should be a verb in gerund form.

Note that the rule handles all those cases, where the English structure begins with the word *when*, *while* or *in*.

Next we add required inflection tags (5).

(5)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG @2INF-INE
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { , }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS NOM SG3
@NOM
"<lights>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES SG3 SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N SG SG @ACC
```

We pay particular attention to the verb *read*, which has the tag @2INF-INE.
This tag was added using the rule in (6).

(6)

```
MAP (@2INF-INE) TARGET ING (-1 ("while") OR ("whilst") OR ("when")
OR ("in")) (*2 SUBJ + HUM BARRIER CLB);
```

Explanation: Add to the verb in gerund form the tag @2INF-INE. The previous word should be *while*, *whilst*, *when* or *in*. Beyond the second word to the right there should be an animate subject. Do not scan beyond clause boundary.

Note that the rule covers all persons.

There may occur also cases, where the subject is non-numan. Those cases are rare and they require a separate rule with carefully defined constraints.

The verb *read* needs also a tag, which adds a possessive suffix. This is added in the next phase (7).

(7)

```
 "<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-INFL
"<book>"
```

```
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { , }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3 NOM
"<lights>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES  SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
```

The rule added to the verb *read* the tag @POS-INFL, which is then later converted into surface form. The rule for adding the tag is in (8).

(8)
```
MAP (@POS-INFL) TARGET V + (2INF-INE) (-1 ("while") OR ("whilst")
OR ("when") OR ("in")) (*2 SUBJ + SG OR SUBJ + PL BARRIER CLB);
```

Explanation: Add the tag @POS-INFL to the verb with the tag 2INF-INE. The next word to the left should be *while*, *whilst*, *when* or *in*. On the right beyond the second word there should be a subject in singular or plural. Do not scan beyond clause boundary.

Note that the rule covers only the third person in singular and plural, not other persons. Those require separate rules, because each person needs a separate possessive suffix. We will see examples below.

The production of the surface form for the verb *read* takes place in phases. First, we convert the verb inflection tag and add it to the verb (9).

(9)
```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk:ea+iessa :V58-D } %-FMAINV O-PAR V SG 2INF-INE
POS-INFL
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { , }
"<he>"
      "he" { h:än :Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3
NOM
"<lights>"
      "light" { sytytt:ää+aa :V53-C FRONT } %+FMAINV TRV V PRES SG
"<lamp>"
      "lamp" { valaisi:n+men :N33 } %OBJ DEF N SG ACC
```

In the next phase we convert the possessive suffix into surface form and join it to the verb (10).

(10)
```
"<When>"
```

```
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk+iessa=an } %-FMAINV O-PAR V SG 2INF-INE
"<book>"
      "book" { kirj+aa } %OBJ DEF N SG PAR
"<,>"
      "," { , }
"<he>"
      "he" { h:än FRONT } %SUBJ OUT HUM MALE PRON PERS SG3 NOM
"<lights>"
      "light" { sytytt+äa FRONT } %+FMAINV TRV V PRES SG
"<lamp>"
      "lamp" { valaisi+men } %OBJ DEF N SG ACC
```

The final translation is in (11).

(11)
Lukiessaan kirjaa hän sytyttää valaisimen.

When the subject is something else than the third person singular or plural, the possessive suffix of the verb changes. This is illustrated in (12), where the whole paradigm is shown.

(12)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-SG1
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<I>"
      "i" { minä Np5 } %SUBJ HUM OUT PRON PERS SG1 NOM
"<light>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES SG1
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-SG2
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<you>"
```

```
      "you" { sinä Np7 } %SUBJ HUM OUT PRON PERS SG2 NOM
"<light>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES SG2
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3 NOM
"<lights>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES  SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<reader>"
      "reader" { lukija N12 } %SUBJ HUM DEF N  SG NOM
"<lights>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES  SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-PL1
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<we>"
```

```
      "we" { me Np6 FRONT } %SUBJ OUT HUM PRON PERS PL1 NOM
"<light>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES PL1
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<they>"
      "they" { he Np10 FRONT } %SUBJ PRON PERS PL3 NOM
"<light>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES PL
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR V ING SG 2INF-INE
@POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<readers>"
      "reader" { lukija N12 } %SUBJ HUM DEF N PL NOM
"<light>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PRES PL
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
```

We see that the tag for guiding the inflection of the verb *read* is 2INF-INE in all cases, but the tag for possessive suffix varies according to person. The final translation is in (13).

(13)
1. Lukiessani kirjaa minä sytytän valaisimen.
2. Lukiessasi kirjaa sinä sytytät valaisimen.
3. Lukiessaan kirjaa hän sytyttää valaisimen.
4. Lukiessaan kirjaa lukija sytyttää valaisimen.
5. Lukiessamme kirjaa me sytytämme valaisimen.

6. Lukiessaan kirjaa he sytyttävät valaisimen.
7. Lukiessaan kirjaa lukijat sytyttävät valaisimen.

So far we have discussed the cases, where action takes place in present tense. Let us see, what happens, when the action is in past tense (14).

(14)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-SG1
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<I>"
      "i" { minä Np5 } %SUBJ HUM OUT PRON PERS SG1 NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST SG1
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-SG2
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<you>"
      "you" { sinä Np7 } %SUBJ HUM OUT PRON PERS SG2 NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST SG2
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
```

```
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3 NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<reader>"
      "reader" { lukija N12 } %SUBJ HUM DEF N  SG NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST SG
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-PL1
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<we>"
      "we" { me Np6 FRONT } %SUBJ OUT HUM PRON PERS PL1 NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST PL1
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
```

```
"<they>"
      "they" { he Np10 FRONT } %SUBJ OUT HUM PRON PERS PL3 NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST PL
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG 2INF-
INE @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<readers>"
      "reader" { lukija N12 } %SUBJ HUM DEF N PL NOM
"<lighted>"
      "light" { sytyttää V53-C FRONT } %+FMAINV TRV V PAST PL
"<lamp>"
      "lamp" { valaisin N33 } %OBJ DEF N  SG ACC
"<.>"
      "." { . }
```

We see that in all sentences the verb inflection tag is 2INF-INE, as it was in present tense sentences. Each sentence also gets its individual tag of the possessive suffix. The final translation is in (15).

(15)
1. Lukiessani kirjaa minä sytytin valaisimen.
2. Lukiessasi kirjaa sinä sytytit valaisimen.
3. Lukiessaan kirjaa hän sytytti valaisimen.
4. Lukiessaan kirjaa lukija sytytti valaisimen.
5. Lukiessamme kirjaa me sytytimme valaisimen.
6. Lukiessaan kirjaa he sytyttivät valaisimen.
7. Lukiessaan kirjaa lukijat sytyttivät valaisimen.

If the sentence is in passive, the participial structure also must be in passive (16).

(16)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG
@PASS-2INF-INE
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
```

```
"<,>"
      "," { NOGLOSS }
"<lamp>"
      "lamp" { valaisin N33 } %SUBJ DEF N NOM SG SG @ACC-N
"<is>"
      "be" { NOGLOSS } %+FAUXV O-LOC1 V PRES SG3 SG
"<lighted>"
      "light" { sytyttää V53-C FRONT } %-FMAINV TRV V EN SG @PASS-
PRES
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG
@PASS-2INF-INE
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { NOGLOSS }
"<lamp>"
      "lamp" { valaisin N33 } %SUBJ DEF N NOM SG SG @ACC-N
"<was>"
      "be" { NOGLOSS } %+FAUXV O-LOC1 V PAST SG
"<lighted>"
      "light" { sytyttää V53-C FRONT } %-FMAINV TRV V EN SG @PASS-
PAST
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG
@PASS-2INF-INE
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { NOGLOSS }
"<it>"
      "it" { NOGLOSS } %SUBJ PRON NOM SG3 @NOM
"<is>"
      "be" { olla V67b } %+FMAINV V-3INF-ILL O-LOC1 V PRES SG3 SG
"<important>"
      "important" { tärkeä N15 FRONT } %PCOMPL-S INDEF A ABS SG
@PAR
"<that>"
      "that" { , että } %CS CS
"<light>"
      "light" { valo N1 } %SUBJ DEF N NOM SG SG @NOM
"<is>"
      "be" { olla V67b } %+FMAINV V-3INF-ILL O-LOC1 V PRES SG3 SG
```

```
"<good>"
      "good" { hyvä N10 FRONT } %PCOMPL-S INDEF A ABS SG @NOM
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { lukea V58-D } %-FMAINV O-PAR HUM-ACT V ING SG
@PASS-2INF-INE
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { NOGLOSS }
"<it>"
      "it" { se Np11 FRONT } %SUBJ OUT PRON NOM SG3 @NOM
"<does>"
      "do" { NOGLOSS } %+FAUXV V PRES SG3 SG
"<not>"
      "not" { ei FRONT } %ADVL NEG-PART
"<matter>"
      "matter" { haitata V73-C } %-FMAINV O-PAR V INF SG @NEG-PRES
"<whether>"
      "whether" { KO } %CS CS
"<lamp>"
      "lamp" { valaisin N33 } %SUBJ DEF N NOM SG SG @NOM
"<is>"
      "be" { olla V67b } %+FMAINV BE TRV-N V-4INF-TRA O-LOC1 V
PRES SG3 SG
"<red>"
      "red" { punainen N38 } %PCOMPL-S NEN COL INDEF A ABS SG
@ACC-N
"<or>"
      "or" { vai } %CC CC
"<blue>"
      "blue" { sininen N38 FRONT } %OBJ NEN COL A ABS @ACC-N
"<.>"
      "." { . }
```

The tag @PASS-2INF-INE is converted to surface form and joined to the verb stem (17).

(17)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk:ea+ettaessa :V58-D } %-FMAINV O-PAR HUM-ACT V
SG PASS-2INF-INE
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<lamp>"
```

```
      "lamp" { valaisi:n+n :N33 } %SUBJ DEF N SG ACC-N
"<is>"
      "be" { NOGLOSS } %+FAUXV O-LOC1 V PRES SG
"<lighted>"
      "light" { sytytt:ää+etaan :V53-C FRONT } %-FMAINV TRV V SG
PASS-PRES
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk:ea+ettaessa :V58-D } %-FMAINV O-PAR HUM-ACT V
SG PASS-2INF-INE
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<lamp>"
      "lamp" { valaisi:n+n :N33 } %SUBJ DEF N SG ACC-N
"<was>"
      "be" { NOGLOSS } %+FAUXV O-LOC1 V PAST SG
"<lighted>"
      "light" { sytytt:ää+ettiin :V53-C FRONT } %-FMAINV TRV V SG
PASS-PAST
"<.>"
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk:ea+ettaessa :V58-D } %-FMAINV O-PAR HUM-ACT V
SG PASS-2INF-INE
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<it>"
      "it" { NOGLOSS } %SUBJ PRON SG3 NOM
"<is>"
      "be" { o:lla+n :V67b } %+FMAINV V-3INF-ILL O-LOC1 V PRES SG
"<important>"
      "important" { tärke:ä+ää :N15 FRONT } %PCOMPL-S INDEF A ABS
SG PAR
"<that>"
      "that" { , että } %CS CS
"<light>"
      "light" { val:o :N1 } %SUBJ DEF N SG NOM
"<is>"
      "be" { o:lla+n :V67b } %+FMAINV V-3INF-ILL O-LOC1 V PRES SG
"<good>"
      "good" { hyv:ä :N10 FRONT } %PCOMPL-S INDEF A ABS SG NOM
"<.>"
```

```
      "." { . }
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<reading>"
      "read" { luk:ea+ettaessa :V58-D } %-FMAINV O-PAR HUM-ACT V
SG PASS-2INF-INE
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<it>"
      "it" { s:e :Np11 FRONT } %SUBJ OUT PRON SG3 NOM
"<does>"
      "do" { NOGLOSS } %+FAUXV V PRES SG
"<not>"
      "not" { ei FRONT } %ADVL NEG-PART
"<matter>"
      "matter" { haita:ta+a :V73-C } %-FMAINV O-PAR V SG NEG-PRES
"<whether>"
      "whether" { KO } %CS CS
"<lamp>"
      "lamp" { valaisi:n :N33 } %SUBJ DEF N SG NOM
"<is>"
      "be" { o:lla+n :V67b } KO %+FMAINV TRV-N V-4INF-TRA O-LOC1 V
PRES SG
"<red>"
      "red" { punai:nen+nen :N38 } %PCOMPL-S NEN COL INDEF A ABS
SG ACC-N NOM
"<or>"
      "or" { vai } %CC CC
"<blue>"
      "blue" { sini:nen+nen :N38 FRONT } %OBJ NEN COL A ABS ACC-N
NOM
"<.>"
      "." { . }
```

The final translation is in (18).

(18)
1. Luettaessa kirjaa valaisin sytytetään.
2. Luettaessa kirjaa valaisin sytytettiin.
3. Luettaessa kirjaa on tärkeää, että valo on hyvä.
4. Luettaessa kirjaa se ei haittaa onko valaisin punainen vai sininen.

Note that in passive sentences the participial verb does not get a possessive suffix, because the person is not known.

What about if the action expressed in the main clause happens only after the condition expressed by the subordinate clause is fulfilled? Consider the example in (19).

(19)

```
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<having>"
      "have" { olla V67b } %-FAUXV HAVE-PERF V ING SG ADD-POS
PASS-PERF-ADJ
"<read>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V EN SG @EN-
PERF
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS NOM SG3
@NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ
"<book>"
      "book" { kirja N9 } %OBJ DEF N SG SG @PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS NOM SG3
@NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG
"<.>"
      "." { . }
```

In both sentences the verb read has the inflection tag PASS-PERF-ADJ. Its realisation in verb is demonstrated in (20).

(20)

```
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<having>"
      "have" { o:lla+ltua :V67b } %-FAUXV V SG ADD-POS PASS-PERF-
ADJ POS-INFL
"<read>"
```

```
      "read" { luk:ea+enut :V58-D } %<P-FMAINV O-PAR HUM-ACT V EN-
PERF SG
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { h:än :Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3
NOM
"<went_to_sleep>"
      "go_to_sleep" { men:nä :V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG +i
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { luk:ea+ettua :V58-D } %<P-FMAINV O-PAR HUM-ACT V SG
ADD-POS PASS-PERF-ADJ POS-INFL
"<book>"
      "book" { kirj:a+aa :N9 } %OBJ DEF N SG PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { h:än :Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3
NOM
"<went_to_sleep>"
      "go_to_sleep" { men:nä :V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG +i
"<.>"
      "." { . }
```

The structure requires a possessive suffix. This is demonstrated in the final translation (21).

(21)
1. Oltuaan lukenut kirjaa hän meni nukkumaan.
2. Luettuaan kirjaa hän meni nukkumaan.

The whole paradigm of how the possessive suffix is implemented in various persons is demonstrated in (22).

(22)

```
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ @POS-SG1
```

```
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<I>"
      "i" { minä Np5 } %SUBJ HUM OUT PRON PERS SG1 NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG1
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<you>"
      "you" { NOGLOSS } %SUBJ HUM OUT PRON PERS NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG2
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<he>"
      "he" { hän Np9 FRONT } %SUBJ OUT HUM MALE PRON PERS SG3 NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST SG
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ @POS-PL1
```

```
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<we>"
      "we" { me Np6 FRONT } %SUBJ OUT HUM PRON PERS PL1 NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST PL1
"<.>"
      "." { . }
"<After>"
      "after" { NOGLOSS V-PASS-PERF-ADJ V-ADD-POS } %ADVL CAPINIT
PREP
"<reading>"
      "read" { lukea V58-D } %<P-FMAINV O-PAR HUM-ACT V ING SG
ADD-POS PASS-PERF-ADJ @POS-INFL
"<book>"
      "book" { kirja N9 } %OBJ DEF N  SG PAR
"<,>"
      "," { NOGLOSS }
"<they>"
      "they" { he Np10 FRONT } %SUBJ OUT HUM PRON PERS PL3 NOM
"<went_to_sleep>"
      "go_to_sleep" { mennä V67 FRONT nukkumaan } %+FMAINV MW V
PAST PL
"<.>"
      "." { . }
```

The translation is in (23).

(23)
1. Luettuani kirjaa minä menin nukkumaan.
2. Luettuasi kirjaa menit nukkumaan.
3. Luettuaan kirjaa hän meni nukkumaan.
4. Luettuamme kirjaa me menimme nukkumaan.
5. Luettuaan kirjaa he menivät nukkumaan.

In the examples above the subordinate clause has preceded the main vlause. The clauses can also be in the reverse order (24).

(24)

```
"<Isis>"
      "isis" { Isis N1b FRONT } %A> NOPROP CAPINIT N NOM  SG
"<fighters>"
      "fighter" { taistelija N12 } %SUBJ HUM MIL N PL NOM
"<used>"
      "use" { käyttää V53-C FRONT } %+FMAINV O-PAR V-3INF-ILL V
PAST PL
"<civilians>"
```

```
      "civilian" { siviili N6 FRONT } %OBJ OUT INDEF N  PL PAR
"<as>"
      "as" { NOGLOSS M-ESS } %ADVL PREP
"<human_shields>"
      "human_shield" { ihmiskilpi N7-E FRONT } %<P MW N PL ESS
"<while>"
      "while" { NOGLOSS V-2INF-INE } %ADVL ADV WH
"<retreating>"
      "retreat" { perääntyä V52-J FRONT } %-FMAINV V ING PL 2INF-
INE @POS-INFL
"<in>"
      "in" { NOGLOSS M-INE } %ADVL PREP
"<Syria>"
      "syria" { Syyria N12 } %<P ACE IN NOPROP CAP N SG SG INE
"<.>"
      "." { . }
"<While>"
      "while" { NOGLOSS V-2INF-INE } %ADVL CAPINIT ADV WH
"<retreating>"
      "retreat" { perääntyä V52-J FRONT } %-FMAINV V ING SG 2INF-
INE @POS-INFL
"<in>"
      "in" { NOGLOSS M-INE } %ADVL PREP
"<Syria>"
      "syria" { Syyria N12 } %<P ACE IN NOPROP CAP N SG SG INE
"<,>"
      "," { NOGLOSS }
"<Isis>"
      "isis" { Isis N1b FRONT } %A> NOPROP CAP N  SG GEN
"<fighters>"
      "fighter" { taistelija N12 } %SUBJ HUM MIL N PL NOM
"<used>"
      "use" { käyttää V53-C FRONT } %+FMAINV O-PAR V-3INF-ILL V
PAST PL
"<civilians>"
      "civilian" { siviili N6 FRONT } %OBJ OUT INDEF N  PL PAR
"<as>"
      "as" { NOGLOSS M-ESS } %ADVL PREP
"<human_shields>"
      "human_shield" { ihmiskilpi N7-E FRONT } %<P MW N PL ESS
"<.>"
      "." { . }
```

The sentences above have precisily the same content, but the clause order is different. However, this does not affect the way how translation is carried out (25).

(25)
1. Isis taistelijat käyttivät siviilejä ihmiskilpinä perääntyessään Syyriassa.
2. Perääntyessään Syyriassa Isisin taistelijat käyttivät siviilejä ihmiskilpinä.

The sentence can have two such structures, which require the use of a participial phrase structure in translation to Finnish (26).

(26)

```
"<When>"
      "when" { NOGLOSS } %ADVL CAPINIT ADV WH
"<looking_for>"
      "look_for" { etsiä V61 FRONT } %-FMAINV O-PAR MW V ING SG
2INF-INE @POS-PL1
"<similar>"
      "similar" { samankaltainen N38 } %A> NEN INDEF A ABS SG @GEN
"<Prime Minister's>"
      "prime minister" { pääministeri N6 FRONT } %A> HUM TITLE
NOPROP NOCAP INDEF N  SG GEN
"<speech>"
      "speech" { puhe N48 } %<P DEF N INDEF  SG PAR
"<,>"
      "," { NOGLOSS }
"<we>"
      "we" { me Np6 FRONT } %SUBJ OUT HUM PRON PERS PL1 GEN
"<have_to>"
      "have_to" { täytyä V52-F } %+FMAINV S-GEN MW V PRES SG
"<go_back_to>"
      "go_back_to" { mennä V67 FRONT aina vuoteen } ADV MW
"<1932>"
      "1932" { 1932 } %<P NUM CARD YEAR
"<,>"
      "," { NOGLOSS }
"<when>"
      "when" { kun } %ADVL ADV WH
"<Pehr>"
      "pehr" { Pehr N1b } %A> CAP PROPNAME Heur N  SG NOM
"<Evind>"
      "evind" { Evind N1b } %A> CAP PROPNAME Heur N  SG NOM
"<Svinhufvud>"
      "svinhufvud" { Svinhufvud N1b } %SUBJ CAP PROPNAME Heur N
SG NOM
"<,>"
      "," { , }
"<while>"
      "while" { NOGLOSS V-2INF-INE } %ADVL ADV WH
"<being>"
      "be" { olla V67b } %-FMAINV V-3INF-ILL O-LOC1 V ING SG 2INF-
INE @POS-INFL
"<Prime Minister>"
      "prime minister" { pääministeri N6 FRONT } %SUBJ HUM TITLE
NOPROP NOCAP DEF N  SG NOM
"<,>"
      "," { NOGLOSS }
"<gave>"
      "give" { pitää V53-F FRONT } %+FMAINV TRV V PAST SG
```

```
"<famous>"
      "famous" { kuuluisa N10 } %A> INDEF A ABS SG @ACC
"<broadcasted>"
      "broadcasted" { lähetetty N1-C FRONT } %A> TY A ABS SG @ACC
"<speech>"
      "speech" { puhe N48 } %OBJ INDEF N  SG ACC
"<that>"
      "that" { , joka Np13 } %SUBJ <Rel> PRON SG NOM
"<meant>"
      "mean" { tarkoittaa V53-C } %+FMAINV O-PAR V PAST SG
"<beginning>"
      "beginning" { alku N1-D } %OBJ DEF N N-ING  SG PAR
"<of>"
      "of" { NOGLOSS M-GEN } %<NOM-OF PREP
"<end>"
      "end" { loppu N1-B } %<P DEF N  SG GEN
"<for>"
      "for" { M-ALL } %ADVL POST PREP
"<Mäntsälä>"
      "mäntsälä" { *mäntsälä N10 FRONT } %A> ACE IN CAP Heur N SG
SG GEN
"<rebellion>"
      "rebellion" { kapina N12 } %<P N  SG ALL
"<.>"
      "." { . }
```

Note that the possessive suffix in participial verb structures is different. The translation is in (27).

(27)
Etsiessämme samankaltaisen pääministerin puhetta meidän täytyy mennä aina vuoteen 1932 kun Pehr Evind Svinhufvud, ollessaan pääministeri piti kuuluisan lähetetyn puheen, joka tarkoitti lopun alkua Mäntsälän kapinalle.

The structure *similar Prime Minister's speech* is ambiguous, because it is not clear whether it should be analysed as *((similar Prime Minister's) speech)* or as *((similar (Prime Minister's speech))*. In the translation, the former is implemented, although the latter would be more appropriate.

3 Conclusion

We have demonstrated above that it is possible to translate certain subordinate clauses of English using participial phrase structures in Finnish. It is not simple to get correct forms in Finnish, but with a carefully constructed rule system it is possible. Yet there are cases, where the conversion can be omitted without losing fluency.