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# Participial relative clauses

*Petra Sleeman*

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## Summary

Relative clauses of which the predicate contains a present, past or passive participle can be used in a reduced form. Although it has been shown that participial relative clauses cannot always be considered to be non-complete variants of full relative clauses, they are generally called reduced relative clauses in the literature. Since they differ from full relative clauses in containing a non-finite predicate, they are also called non-finite relative clauses. Another type of non-finite relative clause is the infinitival relative clause. In English, in participial relative clauses the antecedent noun is interpreted as the subject of the predicate of the relative clause. Because of this restriction, the status of relative clause has been put into doubt for participial adnominal modifiers, especially, because in a language such as English, they can occur in pre-nominal position, whereas full relative clause cannot. While some linguists analyze both pre-nominal and post-nominal participles as verbal, others have argued that participles are essentially adjectival categories. In a third type of analysis, participles are divided into verbal and adjectival ones. This also holds for adnominal participles. Besides the relation to full relative clauses and the category of the participle, participial relative clauses raise a number of other interesting questions, which have been discussed in the literature. These questions concern the similarity or difference in interpretation of the pre-nominal and the post-nominal participial clause, restrictions on the type of verb used in past participial relative clauses, and similarities and differences between the syntax and semantics of participial clauses in English and other languages. Besides syntactic and semantic issues, participial relative clauses have raised other questions, such as their use in texts. Participial relative clauses have been studied from a diachronic and a stylistic point of view. It has been shown that the use of reduced forms such as participial relative clauses has increased over time and that because of their condensed form they are used more in academic styles than in colloquial speech. Nonetheless they have proven to be used already by very young children, although in second language acquisition they are used late, because their condensed form is associated to an academic style of writing. Since passive or past participles often have the same form as the past tense, sentences containing a subject noun modified by a post-nominal past or passive participle have been shown to be difficult to process, although certain factors may facilitate the processing of the sentence.

## Key words

participle, relative clause, reduced relative clause, past participle, passive participle, present participle, verb, adjective

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## 1. Relative clauses

Relative clauses are subordinate clause that function as modifiers of a noun and have an adjectival function. Typically, they contain a verb in a finite form and are introduced by a relative pronoun (such as *who*, *whom*, *which*, *whose* or *that* in English), which has a syntactic function (e.g. subject, object, genitive) in the subordinate clause. Finite relative clauses occur in a post-nominal position in English:

- (1) The houses *that were too expensive* have not been sold.

Relative clauses can be restrictive (defining) or nonrestrictive (non-defining). A restrictive relative clause limits the reference of the noun phrase it modifies. In (1) only some houses have not been sold, viz. those that were too expensive. A non-restrictive relative clause does not limit the reference of the noun phrase. It is preceded by a comma in a written text or a break in speech:

- (2) The houses, *which were too expensive*, have not been sold.

In (2), all houses under discussion were too expensive. The relative clause does not limit the reference of the noun phrase. The information it provides could be omitted, or could be provided in a proposition outside the noun phrase:

- (3) a. The houses have not been sold, because they were too expensive.  
b. Since they were too expensive, the houses have not been sold.  
c. The houses have not been sold. They were too expensive.

Relative clauses can also be non-finite propositions. The verb that they contain has an infinitival or a participial form:

- (4) a. The man *to fix the sink* was here this morning.  
b. Trains *arriving at this station* are always late.  
c. I like all books *published by this company*.

As observed by, e.g., Sadler & Arnold (1994), finite relative clauses cannot only be substituted by infinitival and participial clauses, but also by verb-less phrases, more specifically by PPs or APs, in general APs containing a complement:

- (5) a. the woman *in the hat*  
b. the candidates *suitable for the job*

## 2. Participial relative clauses

Participial relative clauses are relative clauses containing a present participle or a passive/past participle, but no relative pronoun and no finite verb. Present participles in English are *-ing* participles, passive/past participles are *-ed/-en* participles. The following examples are taken from Quirk, Greenbaum, Leech & Svartvik (1985: 1263):

- (6) a. The person *writing reports* is my colleague.  
b. The car *repaired by that mechanic* ...

In the examples (6a) and (6b) the participles occur in post-nominal position, just like full relative clauses in English. Participles can also function as pre-modifiers of the noun phrase. Quirk et al. (1985: 1326-1327) give the following examples:

- (7) a. He was frightened by an *approaching* train.  
b. a *retired* teacher

## 2.1 Correspondence to sentential relative clauses

Only post-nominal participial relative clauses can be replaced by a full relative clause. Just like full relative clauses, participial clauses may be restrictive or non-restrictive (Quirk et al. 1985: 1327):

- (8) a. The spy *carefully hiding in the bushes* kept watch on the house.  
b. The spy *carefully hidden in the bushes* kept watch on the house.
- (9) a. The spy, *carefully hiding in the bushes*, kept watch on the house.  
b. The spy, *carefully hidden in the bushes*, kept watch on the house.

In English, post-modifying *-ing* participles can only be replaced by full relative clauses in which the relative pronoun functions as the subject of the finite verb. In sentence (6a) the participial clause can be replaced by a sentential relative clause introduced by the subject pronoun *who*:

- (10) The person *who writes reports* is my colleague.

Quirk et al. (1985: 1263) notice that in English there is no non-finite participial clause that corresponds directly to the full relative clause in (11), in which the relative pronoun functions as the object of the subordinate clause:

- (11) Reports *that my colleague is writing* will be discussed tomorrow.

Post-modifying *-ed* participial clauses also correspond to full relative clauses introduced by a subject relative pronoun. The complex noun phrase in (6b) can be replaced by (12):

- (12) the car *that is repaired* by that mechanic ...

The participle in (6b) and (12) is a passive participle, which means that although the pronoun *that* in (12) is syntactically the subject of the relative clause, semantically it functions as the object of the participle. Therefore, the full relative clause in (11), which cannot be replaced by an *-ing* participial clause because the relative pronoun is the object of the participle, can be replaced by a passive participial clause:

- (13) Reports *written by my colleague* will be discussed tomorrow.

An *-ed* participle can also be a past participle instead of a passive participle. While passive participles are participial forms of transitive verbs, past participles in participial relative clauses are participial forms of unaccusative verbs, i.e. motional verbs or verbs expressing a change of state (Burzio, 1986). Again, the corresponding full relative clause contains a relative pronoun that functions as the syntactic subject of the subordinate clause:

- (14) a. The train *recently arrived at platform 1* is from York (Quirk et al. 1985: 1265)  
 b. The train which has arrived at platform 1 is from York.

Whereas the relative pronoun in the full relative clause corresponding to *-ing* and *-ed* participial relative clauses may only function as the syntactic subject of the clause, there are far less restrictions on the tense of the finite verbal form in the corresponding sentential relative clause. Quirk et al. (1985: 1263) observe that the *-ing* form in (6a) may be interpreted, according to the context, as all of the tensed forms in the relative clauses in (15):

- (15) a. The person who *will write* reports is my colleague.  
 b. The person who *will be writing* reports is my colleague.  
 c. The person who *writes* reports is my colleague.  
 d. The person who *is writing* reports is my colleague.  
 e. The person who *wrote* reports is my colleague.  
 f. The person who *was writing* reports is my colleague.

While in (6a) the location in time of the participial relative clause depends on the context, the tense to be attributed to the *-ing* clause may also depend on the tense of the main clause, especially if the noun phrase is object (Quirk et al., 1985: 1264):

- (16) a. Do you know the man talking to my sister? [‘who is talking to my sister’]  
 b. Did you know the man talking to my sister? [‘who was talking to my sister’]

Not only with respect to tense, but also with respect to aspect, *-ing* participial relative clauses are neutralized forms. Progressive aspect or perfective aspect cannot be overtly expressed (Quirk et al., 1985: 1264):

- (17) a. \*the man *being working* behind the desk  
 b. \*?The man *having won* the race is my brother.

As for *-ed* post-nominal participial relative clauses, the interpretation of the participial form also depends on the tense of the finite clause or on the context. The complex noun phrase in (6b) may be interpreted as in (18) according to Quirk et al. (1985: 1264):

- (18) a. the car that will be repaired by that mechanic ...  
 b. the car that is (being) repaired by that mechanic ...  
 c. the car that was (being) repaired by that mechanic ...

With regard to the expression of aspect, *-ed* participial relative clauses differ from *-ing* participial relative clauses. Although, just as in *-ing* clauses, perfective aspect cannot be expressed in *-ed* participial relative clauses, progressive aspect can be expressed (Quirk et al., 1985: 1265):

- (19) a. ?\*The food *having been eaten* was meant for tomorrow.  
 b. The food *being eaten* was meant for tomorrow.

## 2.2 Reduced relative clauses?

Just like Chomsky (1957, 1965), Ross (1972) derived participial relative clauses, such as (20a), from full relative clauses, as in (20b), by means of a rule that he called WHIZ Deletion. (20a) results from the deletion of the relative pronoun and the auxiliary ‘be’, as in (20b):

- (20) a. Men *sharpening knives* were leering at us.  
 b. Men who were sharpening knives were leering at us.

Ross derived the participial clause in (21a) from (21b) by means of a rule called “Stuff-ing”. The subject of the full relative clause (21b) is deleted and *-ing* is added to the predicate of the relative clause:

- (21) a. Men *sharpening knives* leer at us.  
 b. Men who sharpen knives leer at us.

Williams (1975) observed that full relative clauses do not always have a corresponding reduced, participial, version.

- (22) a. The person who was probably playing the music you heard used to be my roommate.  
 b. \*The person *probably playing the music you heard* used to be my roommate.

In Thompson’s (2001) view, the difference in grammaticality between (22 a and b) can be explained if it is assumed that reduced relative clauses are Aspect Phrases, missing a Modality Phrase. This shows that the reduction is more subtle than predicted by Ross’ transformational rules.

Although Quirk et al. (1985: 1263) notice the correspondence between participial and full relative clauses in several cases, they also state that “it must be emphasized that *-ing* forms in post-modifying clauses should not be seen as abbreviated progressive forms in relative clauses”. In (15) it was shown that the participial *-ing* form in (6a) can be replaced by full relative clauses containing all kinds of aspects and tenses. Progressive forms in full relative clauses, as in (15d), can, and even often do, correspond to *-ing* participial clauses. However, the participial post-modifier in (23a) cannot be replaced by (23b), but only by (23c), the reason being that stative verbs cannot be used in the progressive form in full relative clauses. This suggests that post-modifying *-ing* participles are not simply reduced forms of full relative clauses:

- (23) a. He is talking to a girl *resembling Joan*.  
 b. \*He is talking to a girl who is resembling Joan.  
 c. He is talking to a girl who resembles Joan.

The notion “reduced relative clause” is used by various linguists to indicate, e.g., participial relative clauses (a.o. Kayne, 1994; Sag, 1997). The notion has, however, been criticized, because there is not always a correspondence between a participial modifier and a full relative clause.

Whereas Quirk et al. show that there is not always an aspectual full version of an *-ing* participle, Hudson (1973) shows that there is not always a temporal full version either. Hudson shows that (24a) only corresponds to (24b) but not to (24c):

- (24) a. Books *published since 1950* are mostly paperbacks.  
b. Books that have been published since 1950 are mostly paperbacks.  
c. Books that are/were published since 1950 are mostly paperbacks.

According to Hudson, this also holds for (25). (25) can only be replaced by (26a or b), but not by (26c or d):

- (25) The people *living here* are dead.
- (26) a. The people who are living here are dead.  
b. The people who live here are dead.  
c. The people who were living here are dead.  
d. The people who lived here are dead.

Hudson argues that the tense in full relative clauses can only be interpreted “deictically”, i.e. relative to moment of speaking, as in (26a,b) or in (26c,d). Reduced relative clauses, as in (25), on the other hand, can be interpreted both “deictically”, as in (26a and b), and “derivatively”, i.e. relative to the tense of the matrix verb, again as in (26a and b), see also Thompson (2001). In both cases, there is a contradiction between “living” and “dead”. The interpretations in (26c and d) are not available.

Other cases which show that the notion “reduced relative clause” is infelicitous, are discussed under the heading “restrictions” below.

### 2.3 Verbs or adjectives?

Participles are ambiguous categories: they are verbal forms and can function as verbs (27a and c), but they may also function as adjectives (27b and d):

- (27) a. a male lion *lying in the grass*  
b. an *interesting* book  
c. the book *recently read by John*  
d. the *very astonished* man

Since participles are verbal forms, in some analyses they are always analyzed as verbs. Chomsky (1957, 1965) analyzed participles as transformationally derived from full relative clauses.

In other analyses, participles are always adjectives. One such analysis has been proposed by Freidin (1975). Freidin discusses the relation between the active and passive verb construction. He proposes to analyze the active verb as a verb and the participial form in the passive construction (with a *by*-phrase) as an adjective. Freidin supports his analysis by showing that participles can occur in adnominal positions. Emonds (2011) uses the inflection on participles in, e.g., Romance languages as an argument in favour of the claim that participles are basically adjectival.

Arguments for either of these analyses are diachronically motivated. Sustaining a basically adjectival analysis of verbal participles, Emonds (2006: fn. 4) states that “when the

Latin synthetic passives were lost (Romance languages typically show no reflexes of them), Latin analytic perfect passives formed with the copula plus an adjectival passive participle acquired a second use in Romance, that of a verbal passive, thereby filling the morphological gaps.” Beekes (1990: 126, apud Elffers, de Haan & Schermer, 2012), however, argues that, since Indo-European had few or no subclauses, participles had verbal usages already in the earliest stages of Indo-European. The development of a periphrastic perfect with the auxiliary ‘to have’, as in Latin, took place already in Hittite, according to Beekes, showing that the past participle already had verbal valency at an early stage. This means that the participle could be viewed as a verbal form with adjectival usages.

Wasow (1977) argued that some participles are derived in Syntax, whereas others are derived in the Lexicon. Wasow distinguished adjectival (passive) participles on the basis of their distributional properties. Adjectival participles can be the complement of the verbs *seem*, *become* and *remain*. This criterion identifies *astonished* in (27d) as adjectival and *recently read* in (27c) as verbal:

- (28) a. This man seems very astonished.  
 b. \*The book remains recently read by John.

Furthermore, only adjectival passives can be used in pre-nominal position, as in (27d). Therefore Wasow analyzed verbal passives as true verbs, occupying verbal slots in syntactic structures, occurring with verbal complements and verbal modifiers such as the *by*-phrase or the time adverbial in (27c), and combining with the inflectional suffix in Syntax. Wasow assumed that category change (e.g. from verb to adjective) could only take place in the Lexicon, but not in Syntax. Therefore, adjectival passives were derived in the Lexicon in his analysis. This analysis was adopted by, e.g., Bresnan (1982, 1995), Levin & Rappaport (1986) and Meltzer-Asscher (2010). Lieber (1980) proposes that, in the Lexicon, adjectival passives are formed from verbal passives by means of zero affixation.

Brekke (1988) also distinguished adjectival participles from verbal participles. He proposed the Experiencer Constraint, which states that only verbs that have an internal Experiencer Role, such as the psych verbs *fascinate*, *astonish*, *irritate*, or *interest*, can have adjectival present participles. On the basis of this criterion, *interesting* in (27b), but not *lying* in (27a) qualifies as an adjectival present participle. Wasow’s criteria could apply as well to distinguish the adjectival present participle from the verbal present participle. Other distributional criteria are mentioned by Fabb (1984) and Brekke (1988), see also Meltzer-Asscher (2010). The adverb-forming suffix *-ly* can only attach to adjectival present participles but not to verbal present participles:

- (29) a. interestingly, surprisingly  
 b. \*jumpingly, \*cryingly

Only adjectival present participles can be preceded by the adverb *so*:

- (30) a. This movie is so interesting.  
 b. \*This boy is so jumping.

The same holds for the adverb *very*.

Siegel (1973) uses *un*-prefixation as a criterion to distinguish adjectival forms. Both passive participles and present participles prefixed by *un*- are adjectival:

- (31) a. the book remained unopened.  
 b. an uninteresting book.

## 2.4 Gradience

Whereas in Wasow's and Brekke's analyses a two-way distinction verbal participles – adjectival participles is created, it has been shown in the literature that this dichotomy is too strong. Aarts (2007) shows that participles are not purely verbal or purely adjectival, but that they can be more verbal than adjectival or more adjectival than verbal. According to Wasow pre-nominal participles are adjectival. This is confirmed by Borer (1990). Not being an experiencer verb, *working* in (32) is defined by Brekke as a verbal participle. Aarts (2007), however, shows that the pre-nominal participle *working* in (32) has both verbal and adjectival properties:

- (32) She is a *working* mother.

The participle *working* in (32) is verbal because of its *-ing* ending and because it can be modified by a verbal modifier (*a hard working mother*), and adjectival because it occurs pre-nominally. However, it cannot be preceded by *not* (*\*a not working mother*) or be combined by complements (*\*a working for the government mother*). Conversely, *working* cannot be intensified (*\*a very working mother*) and it is not gradable either (*\*a more working mother*). It cannot occur in predicative position (*\*the mother seems working*). Aarts concludes that *working* has both verbal and adjectival properties, but is more verbal than adjectival.

Kratzer (1994) distinguishes two types of adjectival passive participles in German. On the one hand, there are the purely adjectival passive participles distinguished by Wasow. On the other hand, Kratzer distinguishes resultative adjectival passive participles, which express a state that is the result of an event. Expressing a state, they are adjectival, but they are also verbal, because they express the result of an event. An English example, taken from Embick (2004), is presented in (33):

- (33) The door remained opened.

For Kratzer there are therefore three types of participles: purely verbal, purely adjectival and resultative adjectival participles.

The distinction of three types of participles is also defended by Embick (2004) for English. Embick distinguishes eventive, stative and resultative participles. Embick presents several diagnostics used to distinguish statives and resultatives in English, such as the following:

- I. unlike pure statives, resultatives allow modification by manner (and other) adverbials (see also Kratzer, 1994):

- (34) a. The package remained carefully opened.  
 b. \*The package remained carefully open.

- II. statives, but not resultatives, can occur after verbs of creation, such as *build*, *create*, *make*:

- (35) a. This new ruler was built long.  
 b. \*This new ruler was built lengthened.

III. *Un*-prefixation is fully productive with resultatives, but not with statives (although there are some exceptions such as *unshaven* or *unhappy*):

- (36) a. unopened, unshrunk  
 b. \*unopen, \*unshrunken

Embick (2004) also presents several criteria used to differentiate resultatives and verbal passive participles, which have been mentioned already above. First, being adjectival, resultatives (but not verbal participles) can be used as a predicate with the copular verb *remain* (37). Second, verbal passive participles can combine with a *by*-phrase, whereas resultatives cannot (38-39). Third, with verbal passive participles *un*-prefixation is not productive (40):

- (37) The package remained carefully opened. (resultative)  
 (38) The door was opened by John. (verbal)  
 (39) \*The door remained opened by John. (resultative)  
 (40) \*The door has been unopened (by the children). (verbal)

Embick distinguishes the three types of participles also in adnominal position. Post-nominal participles in English are analyzed as being verbal (cf. Bolinger, 1967; Fabb, 1984; Sadler & Arnold, 1994):

- (41) the jewels *stolen* (verbal)

Just like Wasow, Embick assumes that all pre-nominal participles are adjectival. The participle in (42) is stative:

- (42) the *closed* door

An adnominal participle modified by a manner adverbial or prefixed by *un*- is resultative:

- (43) a. the *carefully opened* package  
 b. the *unopened* package

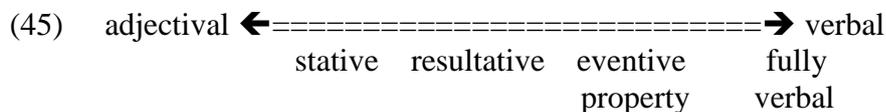
Contrary to Wasow, however, Embick claims that adjectival passives are derived in the syntactic component, just like verbal passives (see also Bruening, 2014).

De Vries (2002: 58) argues that the fact that in English participial modifiers of the noun are only allowed if the supposed relative pronoun is a subject (as discussed in §2.1, *Correspondence to sentential relative clauses*), makes a relative clause analysis suspect. This fact can be explained if pre-nominal participles in English are adjectival.

Just like Aarts (2007) for *working* in (32), Sleeman (2011) argues, however, that pre-nominal participles can be verbal, although they also have adjectival properties, such as their pre-nominal, adjectival position. That pre-nominal participles can be verbal is also supported by the combination with a temporal adverb such as *recently*, which indicates when an event took place:

- (44) the *recently opened* door

Whereas Kratzer and Embick distinguish two types of adjectival participles, stative and resultative, Sleeman identifies two types of verbal participles, purely verbal (post-nominal in English) and verbal with adjectival properties (pre-nominal in English). Sleeman represents the four types of participle on a scale:



Although Kratzer and Embick make their tripartite distinction only for passive participles, Sleeman argues that several types of present participles can also be distinguished: stative (such as the experiencer verbs discussed by Brekke), fully verbal (present participles in post-nominal position: *the woman walking on the grass*), verbal with adjectival properties (pre-nominal, such as *working* in Aarts' example (32)). Resultative present participles do not exist in English.

## 2.5 Argument structure

Three types of participles on the scale (45) are realized in pre-nominal position in English, whereas only the fully verbal participles occur in post-nominal position, just like full, sentential, relative clauses. Sleeman (2011) claims that the different distribution relative to the noun is the consequence of a difference in argument structure of the participles. Just like the finite verb in full relative clauses, post-nominal participles have a complete argument structure. Sleeman adopts Kayne's (1994) raising analysis of relative clauses, which builds on Vergnaud (1974). In Kayne's analysis, the antecedent noun of the relative clause originates in the relative clause itself as an argument of the verb. In (46), the antecedent noun originates as the subject of the finite verb in the full relative clause. It raises to its antecedent position outside the relative clause. *That* is analyzed as a complementizer, i.e. as a subordinating conjunction, and not as a relative pronoun:

(46) the man that ~~man~~ bought the house

In the non-finite relative clause in (47), the antecedent noun originates as the object of the passive participle:

(47) the jewels *stolen* ~~jewels~~ by the thief

In Sleeman's analysis, participles can be defective, not having a complete argument structure, or lacking an argument structure. If there is no argument that can raise to the antecedent position, a post-nominal relative clause cannot be formed. As a consequence, the participial clause can only occur in pre-nominal position. In this analysis, participles are stored in the Lexicon with more than one argument structure: they are structurally ambiguous.

(48) the *stolen* jewels

A similar analysis has been proposed by Larson & Takahashi (2007), also referring to Larson's earlier work, and to Smith (1964) and Jacobs & Rosenbaum (1968), who derive (intersective) pre-nominal adjectives from relative clauses by reduction and movement. In

Larson & Takahashi's analysis the different position is not the consequence of a difference in argument structure of the participle, as in Sleeman's analysis. According to Larson & Takahashi the participle in (48) has moved from the post-nominal position to the pre-nominal position in order to get Case, which is abstract Case in English:

(49) the *stolen* jewels ~~stolen~~

Sleeman's analysis is reminiscent of Higginbotham's (1985) analysis of the distinction between pre-nominal and post-nominal participles. Higginbotham (1985) claimed that pre-nominal participles are attributes, whereas post-nominal participles are predicates. In his analysis attributes are related to the noun in another way than predicates. Whereas the noun satisfies the theta-role assigned by the predicate as an argument in syntax (theta-marking), the theta-roles in the lexical theta-grids of the noun and the attribute are associated to each other by means of theta-identification. A distinction between attributive and predicative modifiers of the noun is also made by Cinque (1994). While Cinque (1994) analyzes predicates as (reduced) relative clauses right-adjoined to the noun phrase, attributes are generated in the specifier position of functional projections of the noun.

In Cinque's (2010) analysis, however, all relative clauses, both participial and sentential, originate in a pre-nominal position. The post-nominal position of full relative clauses and certain participial clauses is the consequence of the raising of the noun to a position preceding the relative clause (for details, see Cinque, 2010):

- (50) a. the man *that bought the house* ~~man~~  
 b. the jewels *stolen by the thief* ~~jewels~~  
 c. the jewels *stolen* ~~jewels~~

In English, with heavier relative clauses, such as full relative clauses or reduced relative clauses containing a complement, the raising of the noun is compulsory, while the raising of the noun with bare relative clauses, such as those containing only a participle, is not. That is why in (50a and b) the post-nominal position of the relative clauses is the only possibility, whereas in (50c) it isn't. If the noun does not raise, (48) is the result.

## 2.6 Position and interpretation

Bolinger (1967) argued that, in English, post-nominal participles, as in (50c), have a stage-level interpretation, whereas pre-nominal participles, as in (48), have an individual-level interpretation. In (50c), the post-nominal participle *stolen* has a stage-level interpretation, because it expresses a temporary property, referring to an event that took place at an unspecified moment. In (48), the pre-nominal participle *stolen* has an individual-level interpretation, because the participle expresses an enduring property of the noun.

Sproat & Shih (1988) make a distinction between indirect modifiers of the noun, viz. post-nominal participles in English, on the one hand, and direct modifiers of the noun, viz. pre-nominal participles, on the other (see also Sadler & Arnold, 1994). Indirect modifiers correspond to Cinque's (1994) predicates, whereas direct modifiers correspond to his attributes. Indirect modifiers are reduced relative clauses, such as verbal participial clauses, and direct modifiers do not have a relative clause source. Building on Sproat & Shih (1988) and work by Larson (e.g., Larson, 1998; Larson & Marušič, 2004: 275), Cinque (2010) associates indirect and direct modifiers with different interpretations (see also Cinque, 2014). Furthermore Cinque shows that, in English, pre-nominal modifiers can be ambiguous:

whereas post-nominal modifiers are always indirect modifiers in English, pre-nominal modifiers can be direct or indirect modifiers:

(51) Determiner – Indirect Modifier – Direct Modifier – Noun – Indirect Modifier

In a pre-nominal position, *stolen* therefore does not only have an individual-level interpretation, but can also have a stage-level interpretation, just as in post-nominal position. Another interpretative difference is the restrictive versus non-restrictive reading. While indirect modifiers have a restrictive meaning, direct modifiers have a non-restrictive meaning. In (52a), the post-nominal participle is unambiguously an indirect modifier. This reduced relative clause can only have a restrictive interpretation:

- (52) a. Every person *blessed* was healed. (unambiguous)  
 b. ‘All the people were healed.’ (\*non-restrictive)  
 c. ‘All the people that were blessed were healed’ (restrictive)

In (53a), the pre-nominal participle is ambiguous in interpretation. It can be a direct modifier and have a non-restrictive interpretation, or it can be an indirect modifier and have a restrictive meaning:

- (53) a. Every *blessed* person was healed. (ambiguous)  
 b. ‘All the people were healed.’ (non-restrictive)  
 c. ‘All the people that were blessed were healed.’ (restrictive)

A third distinction is the intersective reading versus the non-intersective reading. While in (52a) the post-nominal participle *blessed* is intersective, in the non-restrictive reading in (53) the pre-nominal *blessed* is non-intersective. Although Larson (1998) suggests that the correlation between intersective semantics and noun-modifying syntax is absolute, Larson & Takahashi (2007) argue that this conclusion is too strong. They show that individual-level predicates can be fully intersective.

Cinque (2010) shows that, in pre-nominal position, indirect modifiers precede direct modifiers (see 51). This suggests that only the order in (54a) would be acceptable, but not the order in (54b):

- (54) a. Every *blessèd blessed* person was healed.  
 b. \*Every *blessed blessèd* person was healed.  
 c. ‘All the blessed people that were blessed were healed.’

## 2.7 Restrictions

Although Larson and Cinque assume that pre-nominal participles in English can have both an individual-level and a stage-level interpretation, Quirk et al. (1985: 1328) state, just like Bolinger (1967), that pre-nominal participles only have an individual-level interpretation. In this way Quirk et al. account for some unacceptable cases. According to them, only a few passive participles admit the permanent reference that will permit premodifying use. Whereas the stative verb in (55a) is acceptable, because it expresses a permanent or ongoing property, the participle of the dynamic verb in (55b) in pre-nominal position is ungrammatical:

- (55) a. The *wanted* man was last seen in Cambridge.  
(the man goes on being wanted by the police)  
b. \*The *found* purse was returned to its owner.  
(the purse was found at a particular moment)

Just like Bolinger, Quirk et al. observe that the use of the passive participle of the dynamic verb *lose* in pre-nominal position (the *lost* purse), is acceptable, in contrast to the participle *found* in (55b). The reason is, in Quirk et al.'s view, that "although a purse is no longer regarded as 'found' after it has been retrieved, a purse will be regarded as 'lost' throughout the period of its disappearance".

Quirk et al. notice, however, that there are exceptions to the general rule, which suggest that the semantic and aspectual factors are more complicated than they indicate. For instance, one does not normally say (56a), although a sum of money can go on being needed, and (56b) is acceptable, even though a car is stolen at a moment of time:

- (56) a. ?the *needed* money  
b. the *stolen* car

Furthermore, although pre-nominal passive participles of dynamic verbs are generally not acceptable (57), their use becomes grammatical when they are modified by adverbs, as in (58):

- (57) a. \*a *sold* car  
b. \*the *mentioned* article  
c. \*a *built* house  
d. \*a *described* man
- (58) a. a *recently sold* car  
b. the *above-mentioned* article  
c. a *well-built* house  
d. a *carefully described* man

Besides present and passive participles, past participles can also be used as adnominal modifiers of the noun. These participles are the past participial forms of unaccusative verbs: motional verbs or verbs expressing a change of state. Quirk et al. (1985: 1265) notice, however, that there are also restrictions on the use of past participles in adnominal position. As for postmodification, Quirk et al. judge the reduced clause in (59b) degraded:

- (59) a. The train which has arrived at platform 1 is from York.  
b. ?\*The train *arrived at platform 1* is from York.

They observe that the acceptability of the past participle in post-nominal position increases when the *-ed* participle is preceded by certain adverbs:

- (60) a. The train *recently arrived at platform 1* is from York.  
b. A man *just gone to India* told me about it.  
c. A man *just come from the meeting* told me about it.

The same holds for pre-modifying past participles. Quirk et al. (1985: 1327) observe that active, i.e. past, participles are rarely used in pre-modification:

- (61) a. the immigrant *who has arrived*  
 b. \*the *arrived* immigrant

Quirk et al. enumerate some exceptions:

- (62) a. the *vanished* treasure  
 b. *reduced/fallen/increased* prices  
 c. *risen* costs (in the technical language of economics)

As in the case of post-modification, Quirk et al. notice that pre-modification by past participles is somewhat more common when an active participle is modified by an adverb:

- (63) a. \*an *arrived* plane  
 b. a *recently arrived* plane
- (64) a. the *newly-arrived* immigrant  
 b. our *recently-departed* friend  
 c. ?a *recently arisen* problem

With the bare participle *born* pre-modification is possible in a non-literal meaning. In the literal interpretation, an adverb has to be added:

- (65) a. a *born* musician ('a natural musician')  
 b. a *newly-born* baby

Restrictions on modification of the noun by passive and past participles in English are discussed by both Bolinger (1967) and Ackerman & Goldberg (1996).

Bolinger discusses pairs of close variants in which either the participle or the noun differs:

- (66) a. \**rung* bells  
 b. *dented* bells
- (67) a. \*a *scratched* head  
 b. a *scratched* surface

As observed above, according to Bolinger, pre-nominal participles express individual-level properties, i.e. permanent, enduring, or sufficiently characterizing properties. This is the case when the verbal event "leaves a mark on something". This explains, e.g., the contrast between (66a and b). In (66b) there is a permanent result, whereas this is not the case in (66a). For a similar account, see Bresnan (1995), and McIntyre (2013). As Bolinger also notices himself, examples such as (68a,b), as discussed above, and (68c,d) are problematic for his account:

- (68) a. *lost* jewels  
 b. \**found* jewels  
 c. *deposited* money  
 d. \**withdrawn* money

Ackerman & Goldberg discuss close variants in which the difference resides in the presence or the absence of an adverb:

- (69) a. \*a *paid* physician  
 b. a *well-paid* physician
- (70) a. \*the *built* house  
 b. the *recently built* house

Ackerman & Goldberg argue that the participle must be sufficiently informative. (69a) is unacceptable because the information *paid* is implied by the semantic frame of the noun *physician*. If the adverb *well* is added, the participle becomes sufficiently informative. The same kind of explanation is provided for near-synonymous pairs in which the participle slightly differs:

- (71) a. \*a *told* secret  
 b. a *disclosed* secret
- (72) a. \*a *taken* item  
 b. a *stolen* secret
- (73) a. \**given* funds  
 b. *donated/sacrificed* funds
- (74) a. \*a *changed* design  
 b. an *altered* design

In these pairs only the more specific, i.e. more informative, verb is preferred. However, as noticed by Elffers, de Haan & Schermer (2012), *scratched* does not belong to the semantic frame of head and is thus sufficiently informative, but the combination in (67a) is still unacceptable.

Elffers et al. reinterpret Bolinger's and Ackerman & Goldberg's observation as "relevance" and "reconstructability". In western cultures, the distinction of *scratched heads* is not culturally relevant. The addition of lexical material can make the content deficit disappear and can make the modification by the participle relevant within a specific and temporally limited scenario. This explains, according to Elffers et al., why (69b) and (70b) are more acceptable than (69a) and (70a).

The unacceptability of the a-examples in (71-74) is, in Elffers et al.'s view, due to a lack of reconstructability. The participle gives insufficient guidance to the correct interpretation.

It has to be noticed that the status and internal structure of the participial modifiers is not identical in the examples discussed in this section. As discussed in §2.4, according to Embick (2004) post-nominal participles are always eventive, whereas pre-nominal participles are either stative adjectives or resultative adjectives. Stative adjectival participles are the result of lexicalization (see §2.3) and are often derived from psych-verbs (*surprising*, *astonished*). As stated by Embick, participles prefixed by *un* are always resultative (see §2.4). According to Sleeman (2011), participles that form hyphenated compounds introduced by adverbs such as *newly* or *well* are also resultative. In both authors' view, resultative participles may also be bare. Departing from Embick, Sleeman (2011) claims that pre-nominal participles can also be eventive, and that this is the case for, e.g., participles modified by the adverb *recently* in English (see §2.4). Along such a line of analysis, restrictions on the use of post-nominal or pre-nominal participles might be due to the fact that a stative or resultative use of a bare participle is not available or that a resultative or eventive reading has to be highlighted by the modification by an adverb.

### 3. Cross-linguistic differences

In English, participial relative clauses can be formed with present participles, passive participles and unaccusative past participles. Transitive active verbs are not allowed. In, e.g., Bulgarian, however, transitive active verbs can be used in past participial clauses (Iatridou, Anagnostopoulou & Izvorski, 2000):

- (75) *Zaposnah se sas žena-ta napisala knigata.*  
met-REFL with woman-the written-PF book-the  
'I met the woman who has written the book.'

This shows that the properties of the English participial relative clauses are not always shared by other languages. In this section English will be compared to other languages on some of the points discussed above: the structure of the participial relative clause in §3.1 and the position of the participial relative clause in §3.2.

#### 3.1 Structure

Whereas Ross' WHIZ Deletion rule states that participial relative clauses are underlyingly clausal, it has been argued on the basis of some other languages than English that participial relative clauses are rather nominal instead. The motivation comes from Hebrew and Arabic, in which the participial relative clause is introduced by an overt determiner (Siloni, 1995). This is illustrated by the following example from Hebrew:

- (76) *'ish ha-kore 'iton ba-rexov hu meragel*  
man the-reading newspaper in+the street is spy  
'A man reading a newspaper in the street is a spy.'

Although the participial phrase is introduced by *ha* 'the' and can therefore not be analyzed as a finite relative clause introduced by a relative pronoun/complementizer, a distinction that is motivated by several other criteria, Siloni analyzes *ha* as a complementizer-like determiner, relating the participial clause to the head noun as a modifier. Siloni claims that the choice between a (complementizer-like) determiner and a relative pronoun/complementizer introducing the participial clause is determined by the absence versus presence of tense.

Siloni shows that, apart from the presence of a (complementizer-like) determiner, French present participles (but not passive or past participles) in reduced relative clauses behave like Hebrew modifying participial phrases. That is why she claims that the analysis that she proposes for Hebrew (and Standard Arabic, Gulf Arabic and Classical Greek) can be applied to languages such as French, English and Italian as well, but that in these languages participial reduced relatives are introduced by a covert determiner instead of a lexically realized one. Just like Siloni, Alcázar Estela (2007) argues that in French, English and in other Romance languages passive/past participial relative clauses should be analyzed in a different way than present participles, the latter having a more extended structure.

Hazout (2001) claims that in spite of being introduced by a homophone of the determiner, participial modifiers in Hebrew (and Standard Arabic) are adjectival in nature, mixing with verbal properties of the participle. Like adjectival modifiers they agree in gender, number and case with the head noun. Another argument in favour of the adjectival nature of participial reduced relative clauses is the compatibility of the participle in Arabic with an

adjectival negation marker. Verbal properties of the participle are, e.g., the licensing of objects, but also the licensing of subjects in Standard Arabic.

Just like Siloni (1995), Doron & Reintges (2006) assume that the participial modifier is nominal, although they analyze the introducing element such as *ha* in Hebrew, as an emphatic marker and not as a determiner. In Doron & Reintges' analysis the participial modifier also contains verbal structure, which allows participial relative clauses in, e.g., Classical Greek and Russian, to contain overt tense or aspect markers. An example is provided by Russian:

- (77) *ljudi [ čita-vš-ie žurnal-y ] ničego ne zameti-l-i*  
 people.P read.IMPF-PTCP.PAST-P magazine-ACC.P nothing NEG notice.IMPF-PAST-P  
 'The people who were reading magazines noticed nothing.' (Comrie, 1985: 62)

Doron & Reintges (2006) claim that, in participial relative clauses, tense/aspect can only be expressed in languages in which the tense/aspect marker can be detached from the person feature.

Besides languages in which tense/aspect can be expressed on the participle, Doron & Reintges also distinguish languages in which a non-subject can be relativized. Whereas in, e.g., English, Hebrew and Classical Greek participial clauses only the subject can be relativized, in languages such as Arabic, Older Egyptian and Turkish other arguments can also be relativized, which means that the subject can be overtly expressed. According to Doron & Reintges the possibility to express the subject does not depend on the overt expression of tense/aspect. Whereas in Older Egyptian, Turkish, some Dravidian languages and in the Bantu language Makhuwa tense/aspect can be expressed on the participle and non-subjects can be relativized (see Doron & Reintges and references therein), in Arabic a non-subject can be relativized although tense/aspect is not expressed on the participle. To do this, Arabic makes use of a resumptive clitic, =*hā* 'her' in the following example:

- (78) *ʔal-marʔat-u [ l-jālis-u zawj-u=hā ]*  
 the-woman.FS-NOM the-sitting.PTCP.MS-NOM husband.MS-NOM-POSS.3FS  
 'the woman whose husband is sitting' (Badawi, Carter & Gully, 2004:115)

Doron & Reintges show that in Turkish the subject takes a genitive/possessive form instead of a nominative form (see also Krause, 2001).

In Doron & Reintges' analysis, the subject-containing participial relative clause has the most elaborate structure, followed by participial relative clauses (tensed or non-tensed) in which only the subject can be relativized. Lexicalized participles have the least amount of structure. However, there is no dependency relation between these structural properties. A participial relative clause can have a subject without expressing tense. Furthermore, although, these structural properties are not overtly expressed in English, this does not mean that English participial relative clauses do not contain them. English participial relative clauses might also be nominal, even though the determiner is not overtly expressed, or bear a tense marker, although not visible.

The structural properties discussed in this section show that participial relative clauses may be less reduced than has been assumed in the literature (see Alcázar Estela, 2007 for a similar distinction between three types of structures, based, a.o., on the analysis of English, Romance and Basque). As stated by Belikova (2008) this means that also in this respect the notion "reduced relative clause" is a misnomer (cf. §2.2). Although it cannot be introduced by a relative pronoun, it can, however, be introduced by a homophone of the determiner/emphatic marker in some languages. In Belikova's (2008) view, the fact that

participial relative clauses often appear in an (apparently) reduced structural form, has to do with their nominal character, not allowing, e.g., a relative pronoun/complementizer.

### **3.2 Position**

In English, participial relative clauses occur both in post-nominal and in pre-nominal position. In post-nominal position, participial clauses can occur bare (79a), accompanied by a modifier (79b), or followed by a complement (79c):

- (79) a. the jewels *stolen*  
 b. the book *sent recently*  
 c. the book *sent by John*

Cinque (2010) shows that, among the Germanic languages, German differs from English, because in German post-nominal participles are not allowed:

- (80) \**Er ist ein Student [sein Studium seit langem hassend(er)]*  
 he is a student his study for a long time hating

The same holds for Dutch. Although Sleeman (2011) judges (81) marginally acceptable, with bare participles the post-nominal position is completely ungrammatical:

- (81) ?*De mensen zittend op de grond eten rijst.*  
 the people sitting on the ground eat rice  
 ‘The people sitting on the ground are eating rice’  
 (82) \**het kind huilend*  
 the child crying

Lundquist (2008: 208-209) points out that post-nominal participles in Swedish are also marginally acceptable or ungrammatical:

- (83) a. ??*en man drickande en öl satt i ena hörnet*  
 a man drink.INF.DEF a beer sat in one corner.DEF  
 ‘A man drinking a beer sat in a corner.’ (activity/accomplishment)  
 b. \**Kvinnan dansande med Johan är min syster.*  
 woman.DEF dance.INF. NDE with Johan is my sister  
 ‘The woman dancing with John is my sister’ (activity)

Lundquist observes, however, that there is a group of present participles that differs from other present participles in Swedish in that they easily occur as post-nominal modifiers, assigning structural case to their complement. Lundquist labels this group “prepositional” participles, since they denote a stative, often spatial relation between two objects, in a way similar to prepositions:

- (84) a. *en bild föreställande en man och en kvinna*  
 a picture depict.INF.NDE a man and a woman  
 ‘A picture depicting a man and a woman’  
 b. *en utbildning motsvarande en doktorsexamen*  
 an education correspond.INF.NDE a doctor.exam  
 ‘An education corresponding to a Phd’

In pre-nominal position, participial clauses in English can be bare (85a) or preceded by a modifier (85b). They cannot, however, be followed by a complement (85c and d):

- (85) a. the *stolen* jewels  
 b. the *recently sent* book  
 c. \*the *sent by John* book  
 d. \*the *sent to John* book

The ungrammaticality of (85c,d) has been attributed to Emonds' (1976) Right Recursion Constraint on left branches. In pre-nominal position, adjectives or participles cannot be followed by any material:

- (86) \*the *sent recently* book

English being an SVO language, (87) is not acceptable either instead of (85c,d):

- (87) a. \*the *by John sent* book  
 b. \*the *to John sent* book

In Germanic SOV languages, however, noun phrases such as (87) are acceptable. The following examples are taken from the SOV languages Dutch (Sleeman, 2011) and German (Rapp, 2001):

- (88) a. *de door Jan geopende brief*  
 the by John opened letter  
 'the letter opened by John'  
 b. *de aan hen verkochte producten*  
 the to them sold products  
 'the products sold to them'
- (89) a. *der von Maria geschobene Wagen*  
 the by Maria pushed cart  
 'the cart pushed by Maria'  
 b. *der zum Bahnhof begleitete Junge*  
 the to-the station accompanied boy  
 'the boy accompanied to the station'

Although Swedish is an SVO language, just like English, pre-nominal participles can be preceded by complements:

- (90) *det av skog omgivna huset*  
 de of forest surrounded.DE house.DEF  
 'the house surrounded by a forest' (Lundquist 2008: 164)

The Right Recursion Constraint applies to English, Swedish and to other Germanic languages, but not to, e.g., Bulgarian. Laskova (2006) shows that in Bulgarian pre-nominal participles can be followed by a complement or can be followed by an adverbial. Laskova uses these data in favour of an analysis of pre-nominal participles as verbal.

- (91) *zashtitoloto sestra si momche*  
 defended-the sister his boy  
 ‘the boy who defended his sister’
- (92) *Natocheniat vnimatelno nozh se postavia varhu...*  
 grinded-the carefully knife should be placed upon the...  
 ‘the carefully grinded knife should be placed upon the...’

In Romance, participial relative clauses only occur in post-nominal position. Cinque (2010) argues that whereas in English indirect modifiers, i.e. reduced relative clauses, occur in pre-nominal and in post-nominal position, in Italian they can only be used post-nominally, as in (95a):

English:

- (93) Determiner – Indirect Modifier – Direct Modifier – Noun – Indirect Modifier

Italian:

- (94) Determiner – Direct Modifier – Noun – Direct Modifier – Indirect Modifier

- (95) a. *i sostenitori di Gianni convocati recentemente* (Cinque, 2010: 81)  
 ‘the supporters of Gianni summoned recently’  
 b. *\*le recentemente arrivate lettere* (Cinque, 2010: 70)  
 the recently arrived letters

In (94) and (95a) the noun (phrase) has raised over the modifier(s) (cf. §2.5).

#### 4. Register

Participial relative clauses are often considered to be a reduced form of sentential relative clauses, lacking a relative pronoun and a finite form. Since it has been claimed in the literature that academic writing is structurally more elaborate than speech, shown by longer and more complex sentences, and also more explicit than speech (e.g. Hughes, 1996), it might be expected that in academic writing more relative clauses are used than in speech, and that in academic writing less participial relative clauses are used than in speech. However, Biber & Gray (2010) argue that both academic writing and speech are structurally complex, but that in some ways conversation is more structurally elaborated than academic writing: finite dependent clauses are much more common in conversation than in academic writing. Academic writing is much more compressed. Non-clausal, i.e. phrasal, modifiers are much more frequent in academic writing. Therefore Biber & Gray conclude that academic writing is much more condensed and implicit than speech.

As for the register of academic writing, Gray (2015) investigated the use of finite and non-finite relative clauses in the humanities, social sciences and the hard sciences. Gray (2015: 126) shows that finite clauses are more frequent in the humanities, slightly less frequent in the social sciences and least frequent in the hard sciences. Non-finite relative clauses show the opposite trend: they are generally increasing in frequency when we move from soft to hard disciplines.

Hundt, Denison & Schneider (2012) demonstrate that the use of post-modifying *-ing* and *-ed* clauses in academic writings increases over time: from the 1700s until the 1900s Hundt et al. counted a steadily increasing number of post-modifying *-ing* and *-ed* clauses per million words in academic texts. In the 1900s their number is higher in American scientific

texts than in British texts, whereas in the previous centuries it is the reverse. Hundt et al. observed that, compared to relative clauses, the frequency of participial post-modifying relative clauses in scientific texts (British and American texts combined) from the 1700s until the 1900s augments, while the frequency of full relative clauses in scientific texts decreases in that period. This is in line with the diachronic compression in syntactic complexity within the noun phrase noticed by Biber & Clark (2002).

## 5. Acquisition

McKee, McDaniel & Snedeker (1998) studied the use of relative clauses in English by American children aged 2;2-3;10. They found that 15% of the elicited relative clause attempts were reduced relative clauses.

Diessel (2004) reports the results of his study on the L1 acquisition of full relative clauses and participial relative clauses in English by four children aged 2 – 5 years. Diessel observed that relative clauses are infrequent in child speech. He counted 305 finite relative clauses and 95 participial clauses.

Diessel points out that among the ten first relative clauses produced by each child 80% is a relative clause attached to the predicate nominal of a copular clause. Of the data covering the whole period of investigation, 50% is of this type:

- (96) Here's a tiger that's gonna scare him. (Nina 3;1)  
 (97) It's something that you eat. (Adam 4;0)

Relative clauses that attach to a noun in subject position are very rare. The use of a *wh*-word is also very rare. In the early data, the gap in the relative clause fulfills the function of subject. The verb used in the relative clause is predominantly intransitive in early child speech.

Among the participial relative clauses, 87,5% is attached to the predicate nominal of a copular clause or the verb *look at*:

- (98) That's the horse *sleeping in a cradle, their bed*. (Peter 2;8)  
 (99) Dere's was a kitty *walking by*. (Sarah 4;3)  
 (100) Look at the doggy *standing on the shelf*. (Nina 3;0)

The children do not produce participial relative clauses attached to a noun in subject position. Diessel notices that past participial relative clauses are relatively rare in his data; their occurrence is restricted to a few highly routinized forms (e.g. *a doggy named Skipper*).

Diessel explains his findings by means of the notion of complexity. He states that presentational sentences consisting of a copular verb and a predicate nominal containing a relative clause could be replaced by simple sentences:

- (101) A tiger is gonna scare him.  
 (102) A kitty was walking by.

The early child data mainly consist of this type of presentational sentences. The percentage of complex sentences containing a relative clause attached to an object or to an isolated noun increases when the child grows older. This also holds for the use of transitive verbs and object gaps.

That complexity plays an important role in L1 acquisition is also suggested by Biber, Gray & Poonpon (2011). The scholars propose a developmental progression index of noun

phrase complexity based on a comparison between conversation and academic writing in research articles. They found that conversation is more complex with regard to clausal subordination, but that academic writing has a higher degree of noun phrase complexity. In their developmental stages of noun phrase complexity stage 2 contains attributive adjectives, and stage 3 contains relative clauses. Non-finite *-ing* and *-ed* clauses are classified in stage 3.

Not only L1 learners have to learn to make their academic writings nominally complex instead of clausally complex, this has also to be learned by L2 learners. Parkinson & Musgrave (2014) investigated the academic writings of a group of MA students, L2 learners of English, and of a group of students enrolled in an English for Academic Purposes (EAP) Programme, preparing the students to enter MA programmes. Their findings support Biber et al.'s (2011) developmental scale. The Master students produced significantly less pre-nominal adjectives and participial premodifiers than the EAP students, their percentages approaching those reported by Biber, Johansson, Leech, Conrad & Finegan (1999) and Biber & Gray (2010) based on their analysis of research publications. The MA-students used significantly more *-ed* participial post-modifiers than the EAP-students, the percentage coming close to the percentage of *-ed* clauses in research publications. The number of *-ing* participle clauses per 1000 words in the writings of the MA-students was also comparable to the number of these clauses occurring in research publications. Although the EAP produced a lower percentage of post-modifying *-ing* clauses than the MA students, the difference was not significant ( $p = 0,069$ ). Similarly, Granger (1997) found a significant underuse of participle clauses in the academic writing of advanced French-, Dutch- and Swedish-speaking learners of English.

## 6. Psychological research

Since *-ed* forms are ambiguous between participles and a past tense, their use may give rise to a so-called “garden path effect”. Reading or hearing a sentence such as (103) one may start interpreting *raced* as a past tense verb, part of the main clause. Reading or hearing the rest of the sentence one has to come back on this decision, finally interpreting *raced* as a passive participle, part of a reduced relative clause (Bever, 1970; Townsend & Bever, 2001; Lewis & Phillips, 2015):

(103) The horse *raced past the barn* fell.

(104) The horse that was *raced past the barn* fell.

The processing of reduced *-ed* clauses has been analyzed in experimental psycholinguistic research. It has, e.g., been investigated if the lexical choices (e.g., Stevenson & Merlo 1997), frequency (e.g., Trueswell, 1996; McKoon & Ratcliff, 2003), or the linguistic or situational context (e.g. Spivey-Knowlton, Trueswell & Tanenhaus, 1993) gives rise to a garden path effect. Juffs (1998; 2006) and Rah & Adone (2010), a.o., show that the “garden path effect” also holds for L2 learners of English and investigate the role of the L1, showing that it may have an effect on the sensitivity to garden path effects in L2 acquisition.

## 7. Critical analysis of the scholarship

Whereas a few decennia ago, participles were uniformly analyzed as being verbal, the distribution of adjectival passives besides verbal passives, Wasow (1977) paved the way for the recognition of participles as mixed categories that can be verbal or adjectival to various degrees (e.g., Kratzer, 1994; Embick, 2004; Aarts, 2007; Sleeman, 2011).

With respect to the position of participles an important distinction was made by Cinque (1994) between attributive and predicative modifiers, a distinction that was later changed into direct and indirect modification by Cinque (2010). Following Higginbotham (1985), Larson (1998) and Larson & Marušič (2004), Cinque correlates the distinction between direct and indirect modifiers with a difference in interpretation.

An important contribution to the analysis of the relationship between the participial relative clause and the noun was provided by Kayne (1994), who argued that the relationship is not mediated by an empty operator, but that the head noun itself originates as an argument within the relative clause (see also Bianchi, 1999).

With respect to the structure of the participial modifier, the analysis of languages such as Hebrew, Arabic and Older Egyptian have shown that the structure of participial modifiers may be less reduced than what has been assumed in the literature on the basis of English (Belikova, 2008). Furthermore it has been argued that some languages have more reduced structures than others (Doron & Reintges, 2006) and that passive/past participial relatives might have another structure than present participial relatives (Siloni, 1995; Alcázar Estela, 2007).

We have gained insight into the first and second language acquisition of participial clauses and into their use in academic and oral language throughout the years.

Technological developments have allowed insights into the mental processing of participial modifiers.

Although a considerable amount of progress has been made, this does not mean that our knowledge of participial modifiers is complete. In the first place, scholars do not always agree with respect to the analysis of participial modifiers, also depending on the theoretical framework they are working in. Kayne's (1994) noun raising analysis of relative clauses has been criticized by, e.g. Borsley (1997). Cinque's (2010) analysis of participles as indirect modifiers that can occur in English both in pre-nominal and post-nominal position without a difference in interpretation has been questioned by, e.g., Sleeman (2011). More research is also needed to investigate the restrictions on the use of participles in pre-nominal and post-nominal position (cf. MacIntyre, 2013).

There is no consensus either on the structure of participial reduced relative clauses. Are they nominal (e.g. Siloni, 1995) or adjectival (e.g. Hazout, 2001)? How reduced are they? Is there a difference between passive/past and present participial clauses?

More empirical data are needed to validate the claims that have been made in the literature about the acquisition of participial modifiers and the frequency of their use over time. More sophisticated experiments can validate and expand what the literature has learned us about the processing of participial relative clauses.

## **8. Further reading**

Participial relative clauses are discussed in traditional grammars of English, such as in the comprehensive grammars Quirk et al. (1985), Huddleston & Pullum (2002), and Biber et al. (1999). Seminal papers on the interpretation and category of participles are Bolinger (1967), Siegel (1973), Freidin (1975), Wasow (1977), Lieber (1980), Fabb (1984), Higginbotham (1985) and Brekke (1988). Participles in relation to other non-finite adnominal modifiers are analyzed by Sadler & Arnold (1994). Syntactic analyses within the generative framework are provided by Kayne (1994) and Cinque (2010). Doron & Reintges (2006) give a comprehensive overview of parametric differences between languages in the structure of participial modifiers. The interpretation of the pre-nominal participle as opposed to the meaning of the post-nominal participle is analyzed in Larson's work (e.g. Larson &

Takahashi, 2007) and in Cinque (2010; 2014). Restrictions on the use of past participles in adnominal position are accounted for by Bolinger (1967), Ackerman & Goldberg (1996) and MacIntyre (2013). The occurrence of participial relative clauses in different styles has been studied by Biber in numerous works (e.g., Biber et al., 1999). The L1 acquisition of participial clauses has been analyzed by Diessel (2004). For L2 acquisition Parkinson & Musgrave (2014) can be consulted. Seminal works on garden paths effects in processing of participial relative clauses are Bever (1970) and Townsend & Bever (2001).

An additional syntactic topic is, e.g., agreement participle with the head noun in, e.g., Romance languages. A seminal paper on this topic is Kayne (1989), who argues that agreement of passive participles in sentences containing a pre-nominal object in French takes place in another way than agreement with a subject. Agreement in participial relative clauses would be subject agreement. As for adnominal present participles, they do not agree in French, unlike adjectival participles (see, e.g., Helland, 2013).

Additional syntactic literature can also be found in, e.g., the volume edited by Van de Velde, Sleeman & Perridon (2014). In this volume, Struckmeier & Kremers analyze the structure of pre-nominal participial modifiers in German as close to full relative clauses. In the same volume, Niculescu analyzes a present participle in post-nominal position in Romanian having both verbal (no agreement) and adjectival (introduction by *cel*) properties, a rarely attested construction, as a mixed category. In another contribution to this volume, Sleeman argues on the basis of a corpus analysis that passive verbal participles in French, also in adnominal position, can be modified by degree adverbs that normally occur with adjectives.

Several papers in the volume edited and introduced by Arche, Fábregas & Marin (2014) show that adjectival passive participles in various languages may have verbal properties, such as the combination with *by*-phrases (e.g. Alexiadou, Gehrke & Schäfer; Gurer; Gehrke & Marco)

Besides typically developing children, children with language impairment have also been studied with respect to the acquisition of relative clauses. Hesketh (2006) shows that in a narrative task the production of reduced relative clauses by two groups of English speaking children with language impairment, aged 6-7 and 8-11, is very high: 72% and 53%, respectively. Reduced relative clauses are preferred above full relative clauses by the children in this task.

Translation of participial relative clauses is also a topic that is discussed in the literature, showing, e.g., that other languages than English may prefer alternative strategies. One such study is Cosme (2008), in which it is shown, on the basis of a corpus analysis, that in English adnominal present participle clauses are translated in 60% of the cases by alternative constructions in French, and in 84% of the cases in Dutch. Adnominal past participle clauses are rendered by equivalent constructions in 62% of the cases in French and in 49% of the cases in Dutch.

The study of new Englishes shows the amount of dialectal variation and ongoing changes in the use of participial relative clauses (e.g., Newbrook, 1998).

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