Interpretation and shift functions of demonstrative pronouns

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1 Introduction

"Rudi Völler fordert von Trainer Heiko Herrlich, acht, neun Punkte bis Jahresende, der empfindet diesen

Auftrag als 'sehr ambitioniert'"

(Kölner Stadt-Anzeiger, 8/9 December 2018, p. 17)

The example cited above (Nägele, 2018) is a teaser headline found in a local German newspaper and can be translated as *Rudi Völler demands eight, nine points from coach Heiko Herrlich by the end of the year, he-DEM considers this order to be "very ambitious".* In this example, the German demonstrative pronoun *der* could either refer to Rudi Völler or Heiko Herrlich since both the demonstrative pronoun and the two potential referents have masculine gender. Gender information thus does not help to interpret the pronoun. Nevertheless, most readers will most likely have associated a referent with the pronoun before even encountering the rest of the sentence. How is this possible? In order to refer to a previously mentioned referent, German speakers can use different anaphoric pronouns. With respect to the above example, the speaker could also have used the personal pronoun *er* ('he') instead of the demonstrative pronoun *der*. However, speakers do not choose these forms randomly but rather select a particular pronoun whilst taking the current discourse status of the referents into account (e.g. Ariel, 1990; Gundel et al., 1993).

In a discourse, some referents are more central compared to others. It has been claimed that the main function of demonstratives such as *der* is to establish a joint focus of attention between the speaker/writer and the addressee (Diessel, 2006b) and, crucially, to direct the addressee's attention to an unexpected referent (Comrie, 1997). In the example above, the coach is generally considered less expected compared to the other referent, which is why the demonstrative pronoun *der* draws attention to the coach. In this thesis, the notion of prominence (Himmelmann & Primus, 2015; von Heusinger & Schumacher, 2019) will be used to describe the relation between different referents in a sentence or discourse. The notion of prominence is based on three assumptions that were first outlined by Himmelmann & Primus (2015) and subsequently elaborated on by von Heusinger & Schumacher (2019). While a detailed discussion of the notion of prominence is provided in Chapter 3, the key assumptions concerning reference management in discourse (as suggested by von Heusinger & Schumacher, 2019) are briefly summarised below. According to the notion of prominence,

- one referent 'stands out' (i.e. is more prominent) in comparison to other referents
- the prominence status of a referent can change in the unfolding discourse
- the prominent referent is a structural attractor

In this thesis, these three criteria provide the background against which two discourse functions of

different German demonstrative pronouns will be explored: the backward and forward functions. The first assumption will be related to the backward function of demonstrative pronouns. The backward function refers to the anaphoric use in which demonstratives pick up a referent that has been mentioned in previous discourse as illustrated in the above example. In contexts featuring referents with different prominence statuses (see the first criterion of prominence), it will be assumed that demonstrative pronouns refer to a less expected referent and thus direct attention away from the currently most prominent referent. While the example cited above features the demonstrative pronoun *der*, German also uses another demonstrative pronoun in everyday language, namely *dieser*. Since there are two different types of demonstrative pronouns in German (*der* vs *dieser*), it will be investigated to what extent they differ from each other. The first aim of this thesis is thus to investigate how participants interpret the two types of German demonstrative pronouns (*der* vs *dieser*) because a clear description of the difference between these two is lacking so far. Since demonstrative pronouns are associated with less prominent referents, how they are interpreted should also highlight the features that affect a referent's prominence status. The aim of the current research is thus not only to shed light on how two different German demonstrative pronouns are interpreted but also to reveal to what extent different features such as grammatical function, thematic role, and linear order affect a referent's prominence status in discourse.

The second assumption of prominence will be related to the forward function of demonstrative pronouns. The forward function is based on the idea that referential expressions can also indicate how the subsequent discourse will develop (see e.g. Gernsbacher & Shroyer, 1989; Quirk & Greenbaum, 1976; von Heusinger & Schumacher, 2019, who explored this aspect) and demonstrative pronouns have been claimed to enhance the prominence status of certain referents (e.g. Abraham, 2002). In this thesis, it will be assessed whether demonstrative pronouns not only refer to a less prominent referent but also promote the previously less prominent referent to a more important prominence status in upcoming discourse and thus change previous prominence relations between the referents (see second criterion of prominence). The second aim of this thesis is thus to investigate this shift function of German demonstrative pronouns since there is little empirical evidence so far regarding this aspect (with the exception of Schumacher et al., 2015).

The third assumption of prominence influenced the experimental design chosen to test this hypothesis; it is based on the idea that a prominent referent has a high probability of being mentioned again in the subsequent discourse because of its elevated status in comparison to other referents (von Heusinger & Schumacher, 2019). It will thus be measured how often the previously less prominent referent is mentioned in discourse after a demonstrative pronoun in order to gain information about its (possibly promoted) prominence status. The extent to which the two types of demonstrative pronouns (*der* vs *dieser*) differ with respect to their

shift potential will also be addressed. The third aim of this thesis is to determine the neural correlates of the backward and forward functions using event-related potentials (ERPs). ERPs are a very time-sensitive method that can also help to reveal subtle differences between *der* and *dieser* that may not be detectable with behavioural studies. There is little evidence concerning the on-line processing of demonstratives and the underlying processing mechanisms. While a previous study (Schumacher et al., 2015) tested *der*, in this thesis the processing of *dieser* will be investigated for the first time. Thus, the current research can contribute to the literature on anaphoric processing. The more detailed research questions concerning the three main research aims outlined above are presented below.

The first aim of this thesis is to explore the backward function by investigating how participants interpret *der* vs *dieser*. Previous studies were able to show that the demonstrative pronoun *der* is typically understood as referring to the grammatical object and proto-patient, irrespective of this referent's sentence position (e.g. Bosch et al., 2007; Schumacher et al., 2016). However, less is known about how participants interpret *dieser*. It has been suggested that *dieser* is typically interpreted as referring to the closest possible referent (Zifonun et al., 1997), but recent research could not confirm this suggestion (e.g. Özden, 2016; Patil et al., 2020). Therefore, the interpretive preferences for the two German demonstrative pronouns *der* and *dieser* will be contrasted. In particular, it will be assessed to what extent grammatical functions, thematic roles, and linear order influence the interpretation of the two types of German demonstrative pronouns. Following Dowty (1991) and Primus (1999), the current research distinguishes between different proto-roles: the proto-agent and the proto-patient. While the former is associated with volition, movement and sentience, the latter often corresponds to the stimulus or is more generally affected by an action. In a sentence continuation task, participants will receive an incomplete sentence with a masculine personal (*er*) or demonstrative pronoun (*der* or *dieser*) that can be interpreted as referring to one of two potential referents from a previous sentence (similar to the Rudi Völler example above). In the sentence continuation task, the prominence status of the potential referents for the pronouns will be manipulated. Both subject and proto-agent were found to be very prominent (e.g. Bouma & Hopp, 2007; Schumacher et al., 2016), which is why the demonstrative pronoun *der* is typically interpreted as referring to the less prominent object and patient – irrespective of this referent's sentence position (e.g. Bosch et al., 2007). Dative experiencer verbs in German make it possible to introduce one referent as the grammatical object and the other referent as the thematic proto-patient (as in *Im Hafen ist dem Urlauber der Segler aufgefallen;* 'At the harbour, the (male) tourist noticed the (male) sailor' where the tourist is the grammatical object and the sailor the thematic proto-patient). This experimental design (first introduced by Schumacher et al., 2015) thus allows a comparison and ranking of different factors that were shown to impact a referent's prominence status.

Previous studies (e.g. Schumacher et al., 2016, 2017) were able to show that the demonstrative pronoun *der* is typically interpreted as referring to the proto-patient in such contexts. However, previous research could not unequivocally show how participants would interpret *dieser* in such contexts (see Lange, 2016). Thus, the aim of the current research is to assess whether *dieser* is typically interpreted as referring to the last-mentioned referent (irrespective of its grammatical function and thematic role) or whether *dieser* is interpreted as referring to the thematic proto-patient and/or grammatical object. The sentence continuation task will shed light on how three different anaphoric pronouns (*er* vs *der* vs *dieser*) are interpreted in German and reveal to what extent different features such as grammatical function, thematic role and linear order affect a referent's prominence status. These questions will be explored in Chapter 3.

The second aim of this thesis relates to the forward function of demonstrative pronouns, by investigating the extent to which demonstrative pronouns promote a previously less prominent referent to a more important prominence status in upcoming discourse. While there are many findings regarding the backward function (at least with respect to the personal pronoun and the demonstrative pronoun *der*), the forward function (of any referential expression) has received very little attention so far. Demonstrative pronouns have been described as "THEMAWECHSLER" ('topic shifter(s)') (Abraham, 2002, p. 459 (original emphasis)). Thus, it will be assumed that demonstrative pronouns have a referential shift potential that can be measured empirically. Following Givón (1983), the frequency of mention is seen as a measure of importance or prominence. Participants' story continuations will thus be analysed to assess whether a potentially ambiguous demonstrative pronoun encourages participants to mention the previously less prominent referent more often in the subsequent discourse. One central question that will be addressed as part of this is to what extent the backward and forward functions are interrelated, whereby two options are available. Firstly, the forward function could be an intrinsic semantic feature of demonstrative pronouns. According to this account, demonstrative pronouns should inevitably encourage participants to mention the previously less prominent referent more often in their continuations. Continuations without such a shift after a demonstrative pronoun should be the exception and perceived as marked. Alternatively, the forward function could be a 'side effect' of the backward function. According to this account, once a demonstrative pronoun has been interpreted as referring to a less prominent referent, this referent has been established as the new centre of attention and, as a natural consequence, will very likely be kept as the centre of attention (i.e. remain prominent). This account predicts that the shift potential is not an intrinsic semantic feature, but can be modulated. Accordingly, when a demonstrative pronoun is interpreted as referring to a very prominent referent, there should be no changes in the prominence structure of the upcoming discourse.

Furthermore, it will be investigated whether – once a shift has been initiated by a demonstrative

pronoun – the promoted referent is realised in ways that reflect its enhanced prominence status. As indicated above, there is a relation between the referential form that is chosen to refer to a referent and the prominence status of the referent (e.g. Ariel, 1990; Gundel et al., 1993). It will thus be investigated if there is a correlation between the forms used to refer to a referent and whether or not the referent has been promoted. Previous studies have reported mixed findings regarding this correlation (Chiriacescu, 2011; Gernsbacher & Shroyer, 1989). Similar correlations have been proposed for grammatical functions and thematic roles and will also be investigated (e.g. Dowty, 1991; Eisenberg, 2013).

As indicated above, the difference between the two types of German demonstrative pronouns (*der* vs *dieser*) will also be assessed, and hence it will be investigated whether the two demonstrative pronouns increase references to the previously less prominent referent at different time points during story development. More specifically, it will be assessed whether one demonstrative pronoun only momentarily increases references to the previously less prominent referent while the other demonstrative pronoun increases references to the previously less prominent referent for a longer time. In a corpus study, Ahrenholz (2007) observed that *dieser* is used to single out one referent, while *der* is used to keep the focus of attention on a particular referent. This could indicate that *der* increases references to the previously less prominent referent for a longer time and this aspect will be investigated by looking at the number of consecutive sentences in which one referent is mentioned more often in comparison to the other referent in participants' story continuations.

The third aim of this thesis is to relate the backward and forward functions to more general language processing mechanisms and to determine the neural correlates of the backward and forward functions. Specifically, it will be proposed that the backward function serves to illustrate the mechanism of predictive processing while the forward function serves to illustrate the mechanism of mental model updating (as suggested by Schumacher et al., 2015). ERPs measure the brain's response to a particular stimulus. Language comprehenders constantly generate predictions about upcoming information (e.g. Goodman, 1970; Pickering & Garrod, 2007, 2013) and, among others, they predict which referent is going to be mentioned next (see e.g. Rosa & Arnold, 2017; Stevenson et al., 1994). These processes facilitate comprehension (Goodman, 1970; Pickering & Garrod, 2013). Thus, when a previously generated prediction is violated this should cause higher processing costs compared to when a prediction is met. Following previous research (e.g. Burkhardt, 2006; Kutas & Hillyard, 1980; Schumacher et al., 2015), it is expected that such violations should be reflected in a neural component called N400. Applying the notion of prominence, it will be assumed that readers expect the currently prominent referent to be mentioned again (see third criterion of prominence, von Heusinger & Schumacher, 2019). German demonstrative pronouns should thus evoke a higher N400 component compared to personal pronouns (as shown for *der* vs the personal pronoun by Schumacher et al., 2015). There

could be two reasons why demonstrative pronouns evoke a more pronounced N400 compared to personal pronouns, namely either because they refer to unexpected referents or because their referential form is more unexpected. However, these two aspects might be closely connected; their form could be more unexpected precisely because they refer to unexpected referents. Since these two aspects cannot be disentangled in the ERP experiment, it will simply be assumed that demonstrative pronouns evoke a more pronounced N400. Once a referential shift has been initiated and a previously less prominent referent has become more central, this change needs to be incorporated into the mental representation of the discourse which, among others, contains information about the prominence relations between the referents (von Heusinger & Schumacher, 2019). Previous studies could show that late positive neural components reflect costs related to mental model updating (e.g. Federmeier et al., 2010; Hung & Schumacher, 2012; Kuperberg et al., 2020). Since demonstrative pronouns have been described as "THEMAWECHSLER" ('topic shifter(s)') (Abraham, 2002, p. 459), they should evoke a more pronounced positive deflection compared to the personal pronoun (as shown for *der* vs the personal pronoun by Schumacher et al., 2015). As mentioned above, ERPs can help to reveal subtle differences that are not detectable in behavioural studies (e.g. McLaughlin et al., 2004; Sneed German et al., 2015). Thus, the question of how the two types of demonstrative pronouns differ from each other with respect to the two components presented above will also be addressed. Since previous research compared *der* to the personal pronoun, the central question is how *dieser* behaves in comparison to *der*.

To summarise, in this thesis the difference between the two types of German demonstrative pronouns will be explored with respect to the backward and forward functions. The investigation focuses on how these pronouns are interpreted concerning the previous discourse, and to what extent they influence prominence relations in the upcoming discourse. Finally, more subtle differences between these two pronouns will be investigated using ERPs and it will be argued that these two discourse functions serve to illustrate more general language processing mechanisms. Investigating these three aspects will also shed further light on how the three criteria of prominence can be used to explain different discourse phenomena.

The thesis is structured as follows: After a brief overview of demonstratives (in German) and their relation to attention-orienting in Chapter 2, the three subsequent chapters will address the main research goals that were outlined above. A sentence continuation task presented in Chapter 3 addresses the question of how the two types of German demonstrative pronouns are interpreted (backward function). Furthermore, the question of which features contribute to a referent's prominence status is explored in this chapter. While a story continuation task presented in Chapter 4 serves to assess the shift potential of demonstrative pronouns (forward function), an ERP experiment presented in Chapter 5 sheds light on more subtle differences between *der* and *dieser* and the neural correlates underlying the backward and forward functions.

2 Demonstratives

2.1 Different discourse uses of demonstratives

Demonstratives have been observed in all languages (Himmelmann, 1997). They can be used in linguistic contexts (as shown in the introduction, see the Rudi Völler example) or situational contexts (as illustrated in the following example). Demonstratives are generally classified as deictic expressions (e.g. Brugmann, 1904; Bühler, 1965). In order to interpret deictic expressions such as the demonstratives *this* or *that* in English or the demonstratives *der* and *dieser* in German, the addressee needs to take the context in which the expression was uttered into account (e.g. Brugmann, 1904; Bühler, 1965). For example, when someone says *Der da!* ('That one!') to single out one particular horse out of a herd of horses, one needs to pay attention to additional information (such as a pointing gesture) to understand which horse the person is referring to. Brugmann (1904, p. 5) describes demonstratives as "lautliche Fingerzeige, hörbare Winke" ('phonetic pointers, audible signs') that guide the addressee's attention to a particular referent. In the following, it will be shown that demonstratives serve to point to different kinds of referents both winthin and outside of texts.

In the following, demonstratives will be described with regard to their discourse functions (and not necessarily concerning their semantic properties such as distance features, see Fillmore, 1982) as suggested by Himmelmann (1996) and Diessel (2006b). Himmelmann (1996) describes four uses of demonstratives that have been attested for many languages and are thus considered to be universal: the situational use, the discourse deictic use, the recognitional use and the tracking use. In general, adnominal and pronominal demonstratives can occur in these functions. Pronominal demonstratives are used instead of a full noun phrase while adnominal demonstratives modify a noun (Diessel, 2006a). However, pronominal demonstratives are generally found less often than adnominal demonstratives and are frequently only allowed in particular contexts (Himmelmann, 1996) as will be illustrated further below. These four discourse functions can be differentiated as outlined in the following (based on Himmelmann, 1996).

When a demonstrative is used to refer to a referent that is part of the actual surroundings, this is referred to as situational use. According to Fillmore (1982, p. 48), demonstratives "come in paradigmatic sets that contrast with respect to degrees of distance from the speaker's body." In some languages, different distances can also be expressed starting from the addressee's body. Furthermore, how many degrees of distance demonstratives express differs from language to language. English differentiates between demonstratives referring to a proximal referent (*this*) and demonstratives referring to a non-proximal referent (*that*) while other languages may also have demonstratives to point to a medial referent (Fillmore, 1982). In German, additional particles are necessary to signal whether a referent is close or distant (the proximal *hier* vs the

distal *da*, Himmelmann, 1997) although Brugmann (1904) argues that the demonstratives *dieser* and *jener* are used to point to proximal or distal referents respectively. However, as *jener* is rarely used anymore, this opposition may no longer exist. According to Levinson (2004), the prototypical use of demonstratives in this way is accompanied by gestures, and the example cited above with the horse is an illustration of situational use (for more abstract examples of situational use, see Himmelmann, 1997).

The second use is referred to as the discourse deictic use in which a demonstrative is used to refer to a complete discourse segment. Himmelmann (1996) assumes that predominantly pronominal (and not adnominal) demonstratives occur in this use. An example would be a person telling a story about visiting a horse show and making reference to the whole story/event with a demonstrative (as in *This was lovely*).

The third use is the recognitional use in which a demonstrative pronoun is used to invoke a referent that is part of the shared knowledge among a group of people with a shared past (Himmelmann, 1996). One could think of a group of friends who went to school together and one of them is referring to a particular teacher (as in *Do you remember this teacher?*).

The final use is the anaphoric or tracking use, which will be the focus of the following chapter(s). A demonstrative occurs in anaphoric use, when it is used to refer to a referent that has been explicitly mentioned in previous discourse (Himmelmann, 1996). Languages make different forms available (such as personal or demonstrative pronouns) to refer to referents that were mentioned previously and different accounts attempt to explain the function of the different forms (see Himmelmann, 1996, for a brief overview). In the following chapters, it will be assumed that various anaphoric forms are used to refer to referents with different prominence statuses. In particular, it will be assumed that demonstrative pronouns refer to and guide attention to less prominent (or "expected", Comrie, 1997, p. 51) referents and thus enable the addressee to "keep track of what is happening to whom" (Himmelmann, 1996, p. 226).

What all these different uses of demonstratives have in common is that the demonstratives serve to establish a joint focus of attention which, according to Diessel (2006b), is the defining characteristic of demonstratives. The term joint attention describes a situation in which two or more discourse participants focus their attention on the same object whereby, crucially, the participants have to realise that everyone has the same object in their attentional focus at that precise moment (e.g. Eilan, 2005). This function of demonstratives to create a joint focus of attention is most obvious in the situational use, particularly when a demonstrative is used together with a pointing gesture (Diessel, 2006b). According to Diessel (2006b), this function of creating a joint focus of attention can also explain why demonstratives have been observed much earlier in first language acquisition compared to other function words as reported by Clark (1978). "The combination of demonstrative and deictic pointing creates a powerful tool that allows the child to make

reference to any entity in the surrounding situation without knowing the word for the referent" (Diessel, 2006b, p. 472). However, demonstratives are not only a "powerful tool" (Diessel, 2006b, p. 472) to direct attention to a physically present referent, but also to guide attention to a particular referent that has been mentioned in a text or conversation, for example when used anaphorically (Diessel, 2006b). This attention-guiding function makes demonstratives an important discourse-structuring device (Diessel, 2006b). In the following, the German system of demonstratives will be presented.

2.2   Demonstratives in German

German makes three demonstrative paradigms available.   The first type comprises the nominative singular forms *der(M)/die(F)/das(N)*, the second type comprises the nominative singular forms *dieser(M)/diese(F)/dieses(N)* and the final type comprises the nominative singular forms *jener(M)/jene(F)/ jenes(N)*. These forms can occur in pronominal and adnominal use. However, demonstratives from the last paradigm (*jener/jene/jenes*) are rarely used anymore with the exception of highly stylised texts (as also noted by Himmelmann, 1997) and will thus not be considered in the following. Examples of the pronominal and adnominal use containing the masculine forms of the other two demonstratives (examples taken from the text continuation task that will be presented in Chapter 4) are illustrated below:[1]

(1) **Examples of pronominal use**

    a) *Im darauffolgenden Herbst ist **der** dann entlassen worden.*

       in.the following autumn is he-DEM then redundant made

       'In the following autumn, he was then made redundant.'

    b) *Als **dieser** vor ihm stand, …*

       when he-DEM in.front.of him stood, …

       'When he was standing in front of him, …'

(2) **Examples of adnominal use**

    a) ***Der Förster** musste sich also einen neuen Jäger suchen.*

       the ranger had himself so a new hunter to.search

       'The ranger thus had to look for a new hunter.'

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[1]In the following, the focus will be on the masculine forms of these demonstrative pronouns since the experimental designs that will be presented in the following chapters required the use of the masculine forms. The reasons for this will be described in more detail in Section 3.3.2.

b) ***Dieser Jäger*** *machte seinen Job besser.*

this hunter made his job better

'This hunter did a better job.'

The forms of the definite article in German (*der(M)/die(F)/das(N)*) are identical with the forms of demonstratives from the *der/die* paradigm. Diachronically, the definite article developed from adnominal demonstratives (see Diessel, 1999, for an overview). The noun phrase *der Förster* ('the ranger') in (2a) is thus more likely to be perceived as a definite noun phrase instead of a demonstrative noun phrase. However, the noun phrase *dieser Jäger* ('this hunter') in (2b) can be clearly identified as a demonstrative noun phrase (see also Zifonun et al., 1997).

One particular characteristic about German (and some other languages such as Dutch or Finnish, see e.g. Kaiser, 2005; Kaiser & Trueswell, 2004) is that demonstrative pronouns can be used anaphorically to refer to a human referent from previous discourse. Consider the English translation of the example used in the introduction *Rudi Völler demands eight, nine points from coach Heiko Herrlich by the end of the year* (Nägele, 2018) which introduced two masculine referents. In German, it is possible to use a demonstrative pronoun (such as *der* or *dieser*) to refer to one of these referents. In other languages such as English, however, it would not be possible to use a demonstrative pronoun to refer to one of these referents (**This was wearing a blue shirt*) as English demonstrative pronouns cannot be used to refer to human referents.

Since German demonstrative pronouns can be used to refer to human entities, the question arises concerning which of the two possible referents from the example above the two demonstrative pronouns *der* and *dieser* would typically refer to. As both referents in the above example have masculine gender, the pronouns could potentially refer to either referent. However, as outlined above, it has been argued that demonstratives direct attention to a particular referent. Assuming that it is only necessary to direct attention to a referent that is not already the centre of attention implies that demonstrative pronouns guide attention to a less "expected" referent (Comrie, 1997, p. 51). In contrast, it is assumed that reference to the most central (or prominent, see Section 3.1 for a definition of prominence) referent would be realised via a personal pronoun. In German, there is thus an opposition between anaphoric personal and demonstrative pronouns. For null-subject languages such as Italian, it has been claimed that there is a similar opposition between null pronouns and overt pronouns (see e.g. Carminati, 2002). The factors that affect a referent's prominence status will be discussed in detail in Section 3.2.

However, in German, there is not only an opposition between personal pronouns on the one hand and demonstrative pronouns on the other hand. Since there are two types of German demonstrative pronouns

(*der* vs *dieser*), it can be assumed that there is also a difference between different demonstrative pronouns. In the following, a brief overview of accounts attempting to explain the difference between the various German demonstrative pronouns is provided.

2.3   Difference between *der* and *dieser*

There have been very few attempts to systematically describe the difference between demonstratives from the *der/die* paradigm and demonstratives from the *dieser/diese* paradigm. Furthermore, there is no systematic differentiation between adnominal and pronominal demonstratives, which is why the characterisations of adnominal demonstratives will also be reviewed in the following. Ahrenholz (2007) looked at several German grammar books and concluded that most of them do not differentiate between different types of demonstratives. Among the grammatical works that address the difference between demonstratives from the *der/die* paradigm and demonstratives from the *dieser/diese* paradigm is the one by Zifonun et al. (1997). As mentioned above, demonstratives are often characterised in terms of their distance features. Following this tradition, Zifonun et al. (1997) assume that demonstratives from the *dieser/diese* paradigm refer to proximal referents (see also Brugmann, 1904; Hentschel & Weydt, 1990) while demonstratives from the *der/die* paradigm can refer to both proximal and distal referents. As indicated above, this is the reason why additional adverbs are necessary when demonstratives from the *der/die* paradigm are used to express distance relations as already mentioned above (Himmelmann, 1997). This characterisation refers to the situational use of demonstratives. However, Zifonun et al. (1997) claim that demonstrative pronouns from the *dieser/diese* paradigm can also only refer to close referents (i.e. those last-mentioned in previous discourse) when used anaphorically as illustrated by the following example in which *dieser* is coreferential with *Benz* (Zifonun et al., 1997, p. 558 (interlinear gloss and translation my own)):

(3) *Peter will einen Benz kaufen.*
     'Peter wants to buy a Benz.'

     Dieser soll aber nicht so teuer sein.
     he-DEM should not so expensive be
     'However, it shouldn't be too expensive.'

A similar constraint has not been proposed for demonstratives from the *der/die* paradigm, as shown in the following example in which *der* refers to the first-mentioned referent (Zifonun et al., 1997, p. 558):

(4) *Peter will einen Benz kaufen.*

'Peter wants to buy a Benz.'

Der hat wohl zuviel Geld.

he-DEM has apparently too.much money

'He apparently has too much money.'

Thus, one way to capture the difference between *der* and *dieser* is to assume that they express different distance features—both in situational and textual use.

Apart from this account, the difference between these two demonstrative pronouns has been attributed to a preference for different registers and modalities. Demonstrative pronouns from the *der/die* paradigm are often associated with more informal registers and spoken modalities (Hentschel & Weydt, 1990), while demonstrative pronouns from the *dieser/diese* paradigm are frequently associated with more formal registers and written modalities. While this distinction is in line with many native speakers' intuition, results from empirical studies do not necessarily support this claim. Patil et al. (2020) report that participants more frequently used *dieser* in formal written contexts compared to informal written contexts. However, corpus studies could show that both types of demonstrative pronouns occur in different registers and modalities. Ahrenholz (2007) found relatively numerous instances of anaphorically-used demonstrative pronouns from the *dieser/diese* paradigm in spoken interactions between lecturers and students in academic contexts. While these interactions may be considered more formal because of the university context, they illustrate that demonstratives from the *dieser/diese* paradigm do occur in spoken interactions. Futhermore, Weinert (2007) found demonstratives from the *der/die* paradigm in both informal conversations and formal academic consultations. In the formal context, even more demonstrative pronouns were used compared to the informal context. These two studies thus show that a preference for different registers and modalities is probably not the main factor explaining the difference between *der* and *dieser*. This is further in line with Weinrich (1993) who argues more generally that the difference between various pronouns should not be attributed to a preference for different registers alone. He points out that certain pronouns might be more common in certain contexts compared to others. However, according to Weinrich (1993), the communicative goal of the text type determines how often a particular pronoun occurs. Since academic and journalistic texts usually pursue one main topic, the use of demonstrative pronouns indicating a reference to a less expected referent is often simply not necessary. This might have contributed to the assumption that demonstrative pronouns from the *der/die* paradigm are informal because they do not often appear in written formal texts. However, in dialogues where interlocutors frequently change topics, they may be more necessary (Weinrich, 1993). Thus, it can be concluded that modality and register alone cannot explain the difference between

various pronouns.

Demonstratives from the *der/die* paradigm have not only been associated with informal registers, but also with impolite and derogative speech although this could also not be confirmed by empirical research (Weinert, 2007). Demonstrative pronouns are only perceived as impolite when they are used to talk about a person that is within earshot instead of directly addressing that person (for example, when a speaker uses *Die da!* 'This one!' to complain about someone standing directly next to him- or herself, Weinrich, 1993). It has also been claimed that demonstratives from the *dieser/diese* paradigm are used to express contempt and disdain, but examples from actual language use show that they do not necessarily have to express a negative attitude (Bisle-Müller, 1991). However, there are certainly examples in which these demonstrative pronouns are used to express a negative attitude towards a referent—conveyed via stress and intonation (Delisle, 1993). Delisle (1993) found examples where the speaker used demonstrative pronouns to emotionally distance him- or herself from the referent and to signal an opposition between the speaker and other discourse participants on the one hand and a particular referent on the other hand. Ahrenholz (2007) concludes that both types of demonstratives can have such negative connotations, but that the negative connotations certainly should not be considered as the defining feature of demonstratives. Furthermore, since both types of demonstrative pronouns have been associated with negative or impolite speech, this aspect also does not seem to explain the difference between the two.

In addition, it has been suggested that demonstratives from the *dieser/diese* paradigm are more specific (Weinrich, 1993). Ahrenholz (2007) describes a situation in which *dieser* is used that could illustrate the stronger specificity associated with *dieser* (Kommunikation in der Hochschule, D06-DE0, Z. 425, as cited in Ahrenholz, 2007, p. 187 (interlinear gloss and translation my own)):

(5) *und dann kommt noch eine oder zwei fragen*
     and then comes more one or two questions-F
     'and then there are one or two more questions'
     wovon ich mir eine aussuchen kann
     of.which I myself one-F choose can
     'of which I can choose one'
     und ' diese is dann nochma auf den text bezogen[2]
     and this-F is then again to the text referred
     'and this one refers to the text'

---

[2]" ' " indicates that the following syllable is stressed (Ahrenholz, 2007, p. 172).

In this example, two possible exam questions are introduced. However, as the discourse unfolds, those two possible exam questions are narrowed down to one, whereby the demonstrative pronoun *dieser* is used to specify which one of the two exam questions is talked about. While *dieser* is thus used to select one among several possible referents (as in *dies und das nicht* 'this and not that', Ahrenholz, 2007, p. 236), *der* might be used to maintain a centre of attention (Ahrenholz, 2007). Similarly, it has been argued that demonstratives from the *dieser/diese* paradigm are used to contrast one referent with another referent (Bisle-Müller, 1991). For example, when a speaker asks someone to pass *diesen Kugelschreiber* ('this pen'), it implies that another pen is explicitly not meant (Bisle-Müller, 1991).

Furthermore, Ahrenholz (2007) uses different terminologies in order to distinguish between demonstratives from the *der/die* paradigm and demonstratives from the *dieser/diese* paradigm. While he refers to the former as d-pronouns, he refers to the latter as *dies*-demonstratives. This differentiation may reflect the (morphological) fact that demonstratives from the *der/die* paradigm only consist of a word stem (which varies depending on the gender, case, and number of the referent) while demonstratives from the *dieser/diese* paradigm consist of a stem and additional suffixes that carry the gender, number and case information. Demonstratives from the *dieser/diese* paradigm may thus be considered as (morphologically) more complex. There are also differences regarding the preferred syntactic position that different demonstratives typically inhabit. While demonstrative pronouns from the *der/die* paradigm typically occur in the German pre-field (i.e. before the inflected verb, see Ahrenholz, 2007; Delisle, 1993; Weinert, 2007), demonstrative pronouns from the *dieser/diese* paradigm typically occur in the German middle field (i.e. after the inflected verb, Ahrenholz, 2007). Another way to capture the difference is thus to define the preferred syntactic positions and related information-structural aspects.

There have also been attempts to define the characteristics of the referents that *der* and *dieser* refer to when used anaphorically. Since this will be the focus of the next chapter, only a brief overview will be provided here. Most empirical research has focused on the demonstrative pronoun *der* (in comparison to the personal pronoun). These studies were able to show that *der* is typically interpreted as referring to the grammatical object, thematic proto-patient and non-topic from the previous sentence (e.g. Bosch et al., 2007; Bosch & Umbach, 2007; Hinterwimmer, 2015; Schumacher et al., 2016). In most sentences, the grammatical object is also the thematic proto-patient. However, when one argument is realised as an object and another argument is realised as a patient, participants appear to prefer the patient as the referent for *der* (Schumacher et al., 2016), whereby the linear order of the referents did not affect the interpretation of *der* in any of these studies. Only a few studies have started to investigate how participants interpret *dieser*, but the previously suggested preference for the most proximal referent (Zifonun et al., 1997) could not be

confirmed (Lange, 2016; Özden, 2016; Patil et al., 2020).

Finally, some researchers focused on the functions of different demonstratives within larger discourse contexts. Since the role of the two types of demonstratives within larger discourse contexts will be investigated in Chapter 4, this aspect is only briefly addressed here. For example, Abraham (2002, p. 459) describes both demonstrative pronouns as "THEMAWECHSLER" ('topic shifter(s)'). Weinrich (1993) differentiates between the two types of demonstratives and, according to him, demonstratives from the *dieser/diese* paradigm (at least when used adnominally) function as "Aufmerksamkeits- und Warnsignale" ('attention and warning signals') (Weinrich, 1993, p. 441) that prepare the addressee for an unusual reference (for example when a synonym is used instead of the original term). Demonstratives from the *der/die* paradigm (when used as anaphoric pronouns) refer to rhematic (i.e. "auffällige" 'conspicuous') information from previous discourse (Weinrich, 1993, p. 373) which is in contrast to personal pronouns that refer to thematic and inconspicuous information. He thus describes both types of demonstratives in a similar way and thereby indicates that both appear to signal a conspicuous or unexpected reference.

This literature review indicates that despite previous attempts to capture the difference between the two types of German demonstratives from various angles, a clear and systematic description of the difference between the two is still lacking present (as also noted by Himmelmann, 1997). In the following chapters, the difference between the two German demonstrative pronouns *der* and *dieser* will thus be investigated with respect to two discourse functions. Firstly, the investigation will examine which referents from previous discourse are chosen for the two types of German demonstrative pronouns (backward function). In particular, it will be assessed to what extent grammatical functions, thematic roles, and linear order influence the interpretation of the two demonstrative pronouns. Secondly, it will be investigated to what extent the two types of demonstrative pronouns are understood as a signal to promote a previously less prominent referent to a more important prominence status in the subsequent discourse (forward function). Finally, the real-time processing of these pronouns will be explored to shed further light on the differences between *der* and *dieser* and to relate the backward and forward functions to more general language processing mechanisms.

3 How demonstrative pronouns are interpreted with respect to previous discourse (backward function)

3.1 Introduction

As outlined in the previous chapter, German makes two types of demonstrative pronouns (*der* vs *dieser*) available that can be used anaphorically to refer to animate referents. The main question that is addressed in this chapter is how these two types of demonstrative pronouns differ from each other (and the personal pronoun) in their anaphoric use. This question will be explored through the framework of prominence, whereby prominence is a general organisational principle that is applied to a variety of linguistic phenomena (Himmelmann & Primus, 2015). It is based on three assumptions that were first outlined in Himmelmann & Primus (2015) and are summarised below:

- one unit 'stands out' (i.e. is more prominent) in comparison to other units of the same type
- the prominence status of a unit can change over time
- the prominent unit is a structural attractor

These criteria can be used to explain different aspects of reference management in discourse (as suggested by von Heusinger & Schumacher, 2019), whereby the first criterion is particularly relevant to the current research question of how different types of anaphoric pronouns are typically interpreted in German. When applied to reference management, the second and third criteria refer to how certain contextual factors can change current prominence relations and the way in which the current discourse may develop going forward (von Heusinger & Schumacher, 2019). These aspects will be explored in more detail in the following chapter.

For now, the first criterion will be elaborated in more detail. In a sentence with different referents, one is more prominent compared to the other referents. Hence, different referents in a sentence are 'units of the same type' and the prominence status of a particular referent is calculated in comparison to the other referents in that sentence (von Heusinger & Schumacher, 2019). It has been claimed that different anaphoric forms prefer referents with varied prominence statuses. More specifically, it has been argued that demonstrative pronouns are typically not interpreted as referring to the most prominent (or "expected", Comrie, 1997, p. 51) referent. Several linguistic factors such as grammatical or thematic roles have been discussed that may contribute to a referent's prominence status. However, it is still unclear which factors are the most important and how the different factors interact. Investigating how participants interpret different

anaphoric pronouns in German will thus not only provide a better understanding of the German pronominal system but also shed light on different factors contributing to a referent's prominence status in discourse.

In the first part of this chapter, the literature on pronoun interpretation in German (and some other languages to provide a cross-linguistic perspective where possible) will be reviewed. Most studies so far have focused on the personal pronoun and the demonstrative pronoun *der*. There are only a few studies and accounts that have specifically focused on the other type of demonstrative pronoun (*dieser*), which will finally be reviewed. Summarising these studies will also serve to provide an overview of different prominence-lending cues that have been discussed in the literature.

In the second part of this chapter, a text continuation task will be presented that investigates how German native speakers interpret three kinds of anaphoric pronouns in German (the personal pronoun vs two types of demonstrative pronouns). The participants were presented with an incomplete sentence pair. The first sentence introduced two masculine referents and varied concerning the word order (canonical vs non-canonical) and the verb type (active accusative vs dative experiencer). The second sentence was incomplete but contained a masculine pronoun that could refer to either referent due to its grammatical gender. These manipulations of the first context sentence make it possible to investigate which prominence-lending cues are most important for pronoun interpretation. More specifically, the factors of grammatical function, thematic role, and linear order will be compared. Furthermore, it will be investigated whether all three pronouns are sensitive to the same factors or whether there are differences between the three pronouns. It has been claimed that the demonstrative pronoun *dieser* is typically used to refer to the last-mentioned referent (Zifonun et al., 1997) while the other two pronouns appear to be less sensitive to the linear order of their preferred referents (e.g. Bosch et al., 2007; Schumacher et al., 2016). In the following, previously obtained results will be summarised.

3.2 Factors affecting pronoun interpretation in German

3.2.1 Prominence hierarchies

As described above, it is generally assumed that there is a relation between referential forms and the prominence status of their referents. In the following, two accounts will be summarised that illustrate this relation in a very generalised way. Ariel (1990, p. 69) explains that "the choice of a referring expression is dependent on the Accessibility status the mental representation of the referent is assumed to have for the addressee at the current stage of the discourse." According to this view, the addressee can interpret a referential form such as a personal or demonstrative pronoun because the speaker has chosen it by considering the status it

has in the mental representation of the addressee. For Ariel (1990, p. 71), accessibility is "related to specific memory statuses" that different referents have in the mental representation of the discourse. The speaker thus chooses a referential expression according to the status the referent has in memory, whereby some referents are easy to access, while others are more difficult to access (e.g. because there are competitors or the referent has been mentioned a while back). Crucially, lexically more complex referential expressions are very informative and they thus help the addressee to identify the intended referent when there is more ambiguity for example. However, lexically less complex referential expressions are sufficient when the referents are "highly accessible" and thus easy to identify. Underlying these assumptions are economic considerations that make sense from a processing point of view: Only as much information is provided as is necessary to identify the referent since additional information would result in an unnecessarily high processing load (Ariel, 1990). The assumptions underlying Ariel's (1990) accessibility hierarchy are universal. However, languages may differ concerning which referential expressions they make available (Ariel, 1990) and a proposal regarding German will be presented below.

Gundel et al. (1993) propose a similar account according to which "different determiners and pronominal forms conventionally signal different cognitive statuses (information about location in memory and attention state)" (Gundel et al., 1993, p. 274). The authors differentiate between six cognitive statuses that are associated with different referential forms. For example, the cognitive status of "type identifiable" ranges on the lower end of the scale. It refers to the use of an indefinite description in which the addressee is merely expected to recall a representation or conceptualization of, for example, a tree. On the higher end of the scale are the statuses of "activated" (where a particular referent needs to be accessed from short-term memory and pronominal forms such as stressed personal pronouns or demonstrative pronouns may be used) and "in focus" (where the referent that is in short-term memory and also the current centre of attention needs to be accessed). Additionally, there are other in-between stages which are not relevant to the current discussion. The relation between referential expressions and cognitive statuses has been attested for different languages such as Mandarin, Chinese, Japanese, Russian, and Spanish. Crucially, while not every language necessarily differentiates between all six statuses, phonetically more complex forms correlate with lower statuses in all languages. A corpus study revealed that personal pronouns were associated with a referent in focus in the investigated languages while demonstrative pronouns were associated with referents that were not in focus.

Based on the accounts by Ariel (1990) and Gundel et al. (1993), hierarchies have specifically been proposed for German. The following hierarchy is adapted from Ahrenholz (2007, p. 243) and Ellert (2011, p. 27) where the expressions to the left signal the highest prominence status of the referents:

(6) zero pronouns > un/stressed personal pronouns > demonstrative pronouns (*der*) > definite noun

phrases

The hierarchy in (6) shows that un/stressed personal pronouns have more prominent referents than demonstrative pronouns. As Gundel et al.'s (1993) account revealed, both personal and demonstrative pronouns refer to referents that are at least activated, i.e. in short- or long-term memory. However, personal pronouns refer to referents that are also in focus, i.e. the current centre of attention. While the referents of (German) demonstrative pronouns are thus also in short-term memory, they are (crucially) *not* the current centre of attention, which is why they are further to the right on the above scale. However, the hierarchy in (6) only lists one type of demonstrative pronoun (*der*) since little is known about the characteristics of the other type of German demonstrative pronoun (*dieser*). One important research goal is thus to determine to what extent *dieser* differs from *der*. The main question is whether *dieser* is sensitive to prominence considerations at all, or if its interpretation is guided by other factors. Evidence from Finnish suggests that different factors or sets of factors could be responsible for the interpretation of different pronominal forms (Kaiser & Trueswell, 2008). In line with this, Zifonun et al. (1997) proposed that *dieser* simply refers to the last-mentioned referent which would not support a prominence account (as linear order does not appear to be the major factor contributing to a referent's prominence status, e.g. Bosch et al., 2007; Schumacher et al., 2016).

Various terminologies have been used to date to describe the relation between different referential expressions and the status of their preferred referents in the mental representation of the speaker and addressee. From now on, the term prominence will be used following Himmelmann & Primus (2015) and von Heusinger & Schumacher (2019). In contrast to the notions of salience and accessibility, the notion of prominence is more dynamic and the relation between referential forms and preferred referents is less "fixed" and "pre-defined" (von Heusinger & Schumacher, 2019, p. 122f.). According to von Heusinger & Schumacher (2019), the accounts by Ariel (1990) and Gundel et al. (1993) nicely illustrate the general relation between referential forms and the status of their referents. However, the authors stress that the relation between the referential form and cognitive status always depends on the current discourse context and that it can be modulated by several factors such as other referents (so-called "competitors") in a given sentence. Thus, going forward the status of referents will be described by referring to the notion of prominence.

Before presenting a sentence completion task that addresses this question, I will summarise previous studies that have investigated how the three German pronouns (*er* vs *der* vs *dieser*) are interpreted. This summary also provides an overview of the different prominence-lending factors that have been discussed so far.

3.2.2 Interpretation of the personal pronoun

Most studies investigating pronoun interpretation in German have contrasted the demonstrative pronoun *der* with the personal pronoun *er*. However, there are a few studies that specifically investigated how participants interpret personal pronouns in German, which will be summarised in this section. Especially earlier studies focused on the grammatical function of the referents as an important factor for pronoun interpretation. The personal pronoun was often interpreted as referring to the grammatical subject, which led to the conclusion that subjecthood must be an important prominence-lending cue. However, the subject preference of personal pronouns could also be modulated in some experiments as will be shown below.

Bouma & Hopp (2007) investigated how participants interpreted the personal pronoun in two experiments. In the first experiment, the authors created experimental conditions in which both potential referents for the personal pronoun appeared in the German middle field (i.e. after the inflected verb) and varied the order of the two referents, whereby the referents either appeared in embedded or main clauses. In a second experiment, the authors created conditions where one referent was topicalised (via fronting) and thus appeared in the German pre-field (i.e. before the inflected verb). A potentially ambiguous personal pronoun was presented as part of the subsequent sentence in both experiments. The analysis of how the participants understood the potentially ambiguous personal pronoun revealed that the participants interpreted the personal pronoun as referring to the subject.

However, Colonna et al. (2012) were able to modulate this subject preference. In an offline-task, participants were presented with complex sentences consisting of a main clause with two referents of the same gender and a subordinate clause with a subject pronoun. Due to its grammatical gender, the pronoun in the subordinate clause could potentially refer to either referent from the main clause. The syntactic position of the referents in the main clause was varied. In one condition, the two referents were mentioned in the unmarked subject-verb-object (SVO) order, while in another condition, the object was topicalised as illustrated below (Colonna et al., 2012, p. 5):

(7) *Was Peter betrifft, Hans hat ihn geohrfeigt, als er jung war.*
    'As for Peter, Hans slapped him when he was young.'

When the grammatical object of a sentence was topicalised as in the previous example, the pronoun was more often interpreted as referring to the object (in 56.2%) compared to unmarked sentences. However, the percentage of choosing the object as referent was still relatively low. Thus, while topicalisation makes the grammatical object more prominent, subjects may still be considered the better candidates, as the authors

conclude.

There is another experiment in which the subject preference for personal pronouns could be attenuated by the previous context (Burmester et al., 2018). When non-canonical (i.e. object-verb-subject (OVS)) sentences were preceded by a linguistic context that highlighted the object, there were fewer subject interpretations for the personal pronoun. For the experimental task, three referents appeared on a screen. One referent was highlighted using a linguistic cue that consisted of a question appearing on screen which singled out one referent as an aboutness topic. Then, a sentence was shown in which the previously highlighted referent appeared sentence-initially (as subject or object). Finally, a sentence with an ambiguous personal pronoun appeared. When the object was previously singled out as an aboutness topic, there was a lower number of subject interpretations compared to neutral conditions (where no referent was highlighted) in OVS contexts. Generally, a higher number of subject interpretations was registered for SVO contexts compared to OVS contexts (in neutral conditions and those with a linguistic cue), which suggests that word order also has an impact on pronoun interpretation.

Furthermore, the previously summarised study by Bouma & Hopp (2007) investigated subject personal pronouns. Experiments that also included object personal pronouns were able to confirm structural parallelism as an important factor and object pronouns were associated with the grammatical object from previous discourse. For instance, Streb et al. (1999) report that participants needed less time to answer comprehension questions and were more accurate when the anaphor (a personal pronoun or full name) occurred in an identical sentence position and identical syntactic role as the referent. Furthermore, a less pronounced negative deflection was registered in an ERP experiment for parallel anaphors and referents compared to anaphors whose referent occupied a different sentence position and syntactic role in the previous sentence. The degree of the amplitude can be regarded as a reflection of processing costs. The authors thus conclude that anaphors with referents in parallel positions and with identical grammatical functions are easier to process.

Secondly, Sauermann & Gagarina (2017) present similar results for German from a visual world eye-tracking study in which the items consisted of sentence pairs and the first sentence introduced two referents. It varied with respect to its word order (SVO vs OVS) and the second sentence contained a subject or object personal pronoun in sentence-initial position (*er* vs *ihn*). Subject pronouns were interpreted as referring to the previous subject and object pronouns were interpreted as referring to the previous object—irrespective of the word order. Hence, these results were observed even when the referent occurred in a different syntactic position; for example, a first-mentioned subject pronoun was interpreted as referring to the subject from the previous clause even when the subject was the second-mentioned referent. There is also evidence from

English language use that supports this finding. Chambers & Smyth (1998) report that when two successive utterances were structurally identical, personal pronouns were interpreted as referring to the referent with the same grammatical role.

To summarise, these studies show that grammatical functions appear to be an important factor regarding pronoun interpretation. However, the influence of grammatical function can be attenuated by contextual factors. This observation becomes even clearer when considering studies that compared the personal pronoun to the demonstrative pronoun *der* as will be shown in the following section.

3.2.3   Interpretation of the demonstrative pronoun *der*

Corpus studies can provide a useful overview of the distribution of personal and demonstrative pronouns and, among others, appear to confirm the importance of grammatical functions for pronoun interpretation. Bosch et al. (2003) analysed occurrences of demonstrative pronouns from the *der/die* paradigm and personal pronouns (except neuter forms) in a corpus of newspaper articles comprising 350,000 words. When the referent was mentioned in the preceding sentence, personal pronouns most commonly referred to arguments with the nominative case while demonstrative pronouns generally referred to arguments with non-nominative cases. These results can now be interpreted in different ways. For instance, Bosch et al. (2003) presume a correlation between case and topichood since nominative arguments often correlate with the current topic. They thus propose that personal pronouns are used to refer to topics and provide additional data to support their hypothesis. When a demonstrative pronoun was found in the corpora, it referred to a referent in the same or previous sentence in the majority of cases whereas personal pronouns, on the other hand, referred to referents that were mentioned at an earlier point in the discourse more often than demonstrative pronouns. Since topics (whereby the authors probably mean discourse topics (see Prince, 1992) although no clear definition is provided) are mentioned throughout newspaper articles, this seems to corroborate their assumption. As demonstrative pronouns refer to referents without topic status, there is less distance between them and their referents. There is also another way to interpret the results (as further explored in Bosch et al., 2007). Since the argument with the nominative case is often the subject in German, these results can also indicate the importance of grammatical function for pronoun interpretation. Finally, these results have further been interpreted as evidence of the complementary hypothesis according to which German personal and demonstrative pronouns display the exact opposite pattern (Bosch et al., 2003; for English unstressed and stressed personal pronouns see Kameyama, 1999).

Portele & Bader (2016) also analysed the occurrence of *er* and *der* in written German texts. Similar to the previous corpus study, they report that referents of the demonstrative pronoun *der* were slightly

more frequently found in the previous sentence than referents of the personal pronoun. Furthermore, the referent of *der* was often only referred to once in the previous discourse. The grammatical function could be confirmed as an important factor guiding pronoun choice: When the referent was part of the previous sentence, the personal pronoun mostly referred to the subject and the demonstrative pronoun *der* generally referred to the object. In addition, the authors summarise the following characteristics that referents of the demonstrative pronoun *der* often display: *der* frequently refers to newly-introduced objects that are mentioned clause-finally and that are realised as full descriptions such as proper names and in/definite noun phrases. In contrast, the personal pronoun *er* often refers to given subjects. Finally, *der* was observed slightly more often compared to *er* when the preceding sentence contained at least two candidates that were possible referents and both pronouns were most frequently used for human referents (with slightly higher values for the personal pronoun).

The first psycholinguistic experiment that directly compared *er* and *der* was conducted by Bosch et al. (2007) and it also highlights the importance of grammatical function. For the experiment, short discourse contexts were constructed. These consisted of a headline, a context sentence with two referents (which was presented in SVO or OVS word order) and a sentence containing the demonstrative pronoun *der* or the personal pronoun *er*. Importantly, although the pronouns could potentially be interpreted as referring to either referent due to their grammatical gender, the content of the sentence containing the pronoun guided the pronoun interpretation towards one of the two potential referents. In some cases, the content was also neutral or ambiguous so that the pronoun could potentially refer to either referent. This discourse segment was then followed by a final sentence in which participants had to fill in the referent that they thought the previous sentence with the pronoun referred to. In addition, it was measured (via reading times) how long participants needed to process the sentence with the pronoun. When the content of the sentence suggested a reference to the previous subject, longer reading times were measured for the demonstrative pronoun *der* compared to the personal pronoun (for both word order variations). Regarding the results of the completion task, the interpretations were clearly guided by plausibility. Only one effect emerged: When the sentence was more likely to refer to the subject from the previous sentence, participants nevertheless more frequently chose the object when the sentence contained *der* compared to when it contained *er*. Furthermore, in neutral or ambiguous contexts, *der* was interpreted as referring to the object when the previous sentence was preset in the canonical SVO word order. Both effects were also visible but attenuated following the non-canonical OVS word order. To summarise, in this experiment, the demonstrative pronoun *der* was strongly associated with the (second-mentioned) grammatical object from the previous sentence whereas, in contrast, the interpretations of the personal pronoun did not reveal a strong pattern.

There is additional evidence from Dutch that grammatical function appears to be an important factor influencing pronoun interpretation. For instance, Kaiser & Trueswell (2004) focused on the masculine personal pronoun *hij* and the masculine demonstrative pronoun *die*. They designed a sentence completion task with an incomplete sentence pair. The first sentence contained two referents with masculine gender while the second sentence that had to be completed contained one of the two pronouns mentioned above. The participants completed the sentence in a way that suggests that they understood the personal pronoun as referring to the subject from the previous sentence and the demonstrative pronoun as referring to the object and a visual world eye-tracking study confirmed these patterns. The eye movements revealed that the personal pronoun was understood as referring to the subject (although the participants initially focused on the object) and the masculine demonstrative pronoun as referring to the object. These psycholinguistic studies investigating pronoun resolution thus appear to suggest that the grammatical function is an important factor. However, subsequent studies tried to break down the factors that influence pronoun interpretation in more detail.

Bosch & Umbach (2007) reconsidered the results from the previous experimental study (Bosch et al., 2007) that was summarised above. They point out that the two pronouns may not be exactly complementary and that grammatical function may be less important for pronoun interpretation than initially assumed. Regarding the question of how complementary the two pronouns are, the authors highlight the fact that the demonstrative pronoun showed more robust patterns in the previous experiments. Regarding the question of how important grammatical function is, the authors mention that in the completion task, when the sentence containing the pronoun suggested a reference to the previous subject, the participants nevertheless chose the object as a referent for the demonstrative pronoun *der*, albeit mainly in SVO contexts, whereas in OVS contexts this effect was less pronounced. Thus, word order manipulations modulated the preferences. Furthermore, the authors present a new example where the demonstrative pronoun picks up the grammatical subject from the previous sentence, which is indicated by the subscripted characters (adapted from Bosch & Umbach, 2007, p. 48 (interlinear gloss my own)):

(8) *Woher Karl das weiß? Peter$_k$ hat es ihm gesagt. Der$_k$ war gerade hier.*
   how Karl that knows? Peter$_k$ has it him told. he-DEM$_k$ was just here
   'How does Karl know? Peter$_k$ told him. He$_k$ has just been here.'

In example (8), the subject and demonstrative pronoun are coreferential. Bosch & Umbach (2007) thus propose a modified approach which states that demonstrative pronouns typically do not refer back to discourse topics (which are defined as "discourse-old" according to Prince, 1992). While there is often

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an overlap between topicality and subjecthood in German, there are exceptions as the previous example illustrates. Therefore, a new hypothesis was formulated according to which demonstrative pronouns typically pick up referents that have been introduced as new discourse entities, while personal pronouns typically pick up discourse topics (i.e. discourse-old or "the most expectable referents", Bosch & Umbach, 2007, p. 50). Related to this, Hinterwimmer (2015) remarks that the demonstrative pronoun *der* cannot be associated with the most recent aboutness topic (instead of the discourse topic as suggested by Bosch & Umbach, 2007). He defines the aboutness topic as the referent who the sentence is about (based on Reinhart, 1982).

However, some examples do not support the hypothesis that demonstrative pronouns avoid the discourse or aboutness topic and Hinterwimmer & Bosch (2016) provide examples in which the demonstrative pronoun *der* refers to the aboutness topic of the previous sentence. They thus argue that demonstrative pronouns from the *der/die* paradigm typically do not refer back to the referent whose perspective the sentence with the demonstrative pronoun represents. To illustrate this, they contrast the following examples (adapted from Hinterwimmer & Bosch, 2016, p. 21 (interlinear gloss my own)):

(9) *Als Peter$_i$ abends nach Hause kam, war die Wohnung wieder in einem fürchterlichen Zustand.*
'When Peter$_i$ came home in the evening, the flat was in a terrible state again.'

  a) **Der$_i$ hatte doch gestern erst aufgeräumt.*
    *he-DEM$_i$ had after.all yesterday only tidied.up
    '*He$_i$ had only tidied up yesterday, after all.'

  b) *Der$_i$ kann sich einfach nicht gegen seinen Mitbewohner durchsetzen.*
    he-DEM$_i$ can himself simply not against his flatmate stand.his.ground
    'He$_i$ is simply unable to stand his ground against his flatmate.'

The authors explain that in (9b) the demonstrative pronoun is acceptable because the speaker offers his or her view on why the flat is in a terrible state. Continuation (9a), however, is told from Peter's perspective and the demonstrative pronoun is thus not acceptable. In cases of rather neutral descriptions of events, the aboutness topic is often judged as the referent whose perspective a sentence represents, which aligns with the author's hypothesis that was formulated earlier (Hinterwimmer, 2015).

Schumacher et al. (2016) propose another factor that may guide pronoun resolution in German. The current research is based on this experimental design, which will therefore be explained in more detail. Three experiments are reported. As part of the first experiment, participants were presented with sentence pairs. In the first sentence, two masculine noun phrases were mentioned that differed with respect to their thematic

roles. One set of items contained active accusative verbs (for an example, see 10) where one argument is the grammatical subject and thematic proto-agent while the other argument is the grammatical object and thematic proto-patient. The authors follow accounts of proto-roles (see Dowty, 1991; Primus, 1999). According to these, proto-agents are associated with volition, movement, and sentience. Proto-patients often correspond to the stimulus or are affected by the action carried out by the agent (a more detailed description of thematic roles can be found in Section 3.3). The other set of items contained dative experiencer verbs (for an example, see 11). This verb class consists of a few verbs where one argument is the grammatical object and thematic proto-agent while the other argument is the grammatical subject and thematic proto-patient. When previous research discussed grammatical functions as an important factor, the argument that was the grammatical subject (or object) corresponded to the argument that was the thematic proto-agent (or proto-patient). Dative experiencer verbs make it possible to investigate the importance of both factors separately. For example, it can be examined whether the personal pronoun is interpreted as referring to the subject or proto-agent (as both are realised as two different arguments).

(10) Example of an item with an active accusative verb (adapted from Schumacher et al., 2016, p. 125)

Der Feuerwehrmann will den Jungen retten, weil das Haus brennt. Aber er/der ist zu aufgeregt.

the-NOM fire-fighter wants the-ACC boy to.rescue, because the house is on.fire. but he-PERS/he-DEM is too nervous

'The fire fighter wants to rescue the boy because the house is on fire. But he is too nervous.'

(11) Example of an item with a dative experiencer verb (adapted from Schumacher et al., 2016, p. 126)

Dem Zuschauer ist der Terrorist aufgefallen, und zwar nahe der Absperrung. Aber er/der will eigentlich nur die Feier sehen.

the-DAT spectator is the-NOM terrorist noticed, in fact next to the barrier. but he-PERS/he-DEM wants actually only the ceremony watch

'The spectator has noticed the terrorist, in fact, next to the barrier. But he actually only wants to watch the ceremony.'

The word order of the first context sentence was varied while the second sentence contained either the masculine personal pronoun or the demonstrative pronoun *der*. Both pronouns could potentially refer to either referent due to their masculine gender. The remaining part of the sentence was formulated in a neutral way and participants were instructed to indicate which referent from the first context sentence the pronoun referred to. The results revealed that the personal pronoun was associated with the proto-agent (which is the object in contexts with dative experiencer verbs) while the demonstrative pronoun *der* was associated with

the proto-patient. However, in the context of dative experiencer verbs and the non-canonical word order, no preferences could be observed for any pronoun.

Secondly, a sentence completion task was designed. The same material was used but the second sentence was discontinued after the pronoun and the auxiliary. Participants were then asked to continue the incomplete sentence. The results are similar to those from the previous task. Finally, in another sentence completion task, the experiment was replicated without the sentence-initial connector (*aber*). For the accusative context, the same results were reported. For the dative experiencer context, the participants did not show any interpretive preferences when the second sentence contained the personal pronoun. However, in contexts without the connector and the demonstrative pronoun *der*, a preference for the patient also emerged in non-canonical contexts. These results support previous reseach that observed more robust interpretive preferences for the demonstrative pronoun *der*.

Schumacher et al. (2017) were able to confirm the importance of thematic roles for pronoun interpretation in a visual world eye-tracking study that used similar items to those described in the previous experiments. Regarding the accusative contexts, the same pattern emerged as in the previous experiment and, again, stronger effects were reported for *der*. When the first sentence was presented in the non-canonical word order, participants' eye movements focused on the respective referent later when the second sentence contained the personal pronoun compared to when it contained the demonstrative pronoun. Regarding the context with dative experiencer verbs, in canonical contexts *er* was interpreted as referring to the proto-agent and *der* was interpreted as referring to the proto-patient. In non-canonical contexts, the preferences were less clear (particularly for the personal pronoun) and emerged much later after the onset of the pronouns. These results stress the importance of thematic roles but also illustrate that thematic roles alone cannot explain the resolution patterns.

Based on evidence from a visual world eye-tracking study, animacy has also been claimed to affect the interpretation of personal and demonstrative pronouns in German. Ellert (2011) investigated how participants interpreted the personal pronoun *er* and the demonstrative pronoun *der* following contexts with either two animate or two inanimate referents. Interestingly, when the previous sentence contained two inanimate referents, the interpretive preferences for the personal pronoun for the first-mentioned referent emerged at a later time point compared to when the previous sentence contained two animate referents. The interpretation of personal pronouns was thus influenced by animacy. In contrast, the interpretation of demonstrative pronouns was not influenced by the animacy of the referents.

Finally, the question of whether *er* and *der* show opposite patterns needs to be addressed. Some of the previously mentioned results already suggest that personal and demonstrative pronouns may not

necessarily behave in a complementary fashion, since participants showed clearer interpretive preferences for the demonstrative pronoun *der* (e.g. Bosch et al., 2007; Schumacher et al., 2016, 2017). Kaiser (2005) provides further evidence for this assumption based on Finnish pronominal forms. She compared the Finnish personal pronoun *hän* with the demonstrative pronoun *tämä*. Similarly to German demonstrative pronouns, the Finnish demonstrative pronoun can refer to human referents. In addition, Finnish is also a language with flexible word order. In canonical SVO sentences, the subject corresponds to a referent that has previously been introduced. In non-canonical OVS sentences, the object corresponds to a discourse-old referent while the subject corresponds to a referent that is mentioned for the first time. The results of a sentence completion task are reported, which included sentences with two referents and either SVO or OVS word order and a following sentence that was discontinued after a sentence-initial pronoun (either a personal or demonstrative pronoun). The continuations of the incomplete sentences revealed that the participants associated the personal pronoun with the subject from the previous clause (irrespective of the word order). The demonstrative pronoun was associated with the object when the first sentence was presented in the canonical SVO order. Although no clear preferences could be observed in OVS contexts, this experiment did not provide any context that justified the OVS word order variation.

Kaiser (2005) thus refers to another experiment in which short discourse contexts were introduced in order to license the word order variations. The argument appearing after the finite verb corresponded to discourse-new information in both word order variations. Similarly to the previous experiment, the personal pronoun was understood as referring to the subject. The demonstrative pronoun was understood as referring to the object when the previous sentence was presented in the canonical word order, which confirms the results of the previous experiment. When the previous sentence was presented in the non-canonical word order, it was understood as referring to the subject (i.e. a referent that was mentioned for the first time). This shows that the discourse status of the referents may be more important for interpreting demonstrative pronouns than their grammatical function.

In addition, the author presents results from another experiment which suggest that for the personal pronoun, the referential form of the previous referents is also a relevant factor. In OVS sentences, when the first-mentioned object was realised as a pronoun and the second-mentioned subject was realised as a full NP, the participants more frequently linked the personal pronoun to the pronoun (i.e. the object). These results thus show that many different factors may interact and that (Finnish) personal and demonstrative pronouns may not behave in a complementary fashion.

Kaiser & Trueswell (2008) present additional results from a visual world eye-tracking study which corroborate the previous findings. The personal pronoun was linked to the subject and the demonstrative

pronoun was linked to the second-mentioned referent in that study, whereby an overall association with the object could not be found for the demonstrative pronoun. In addition, results from a related offline task revealed similar tendencies (and here the demonstrative pronoun was associated with the object in non-canonical contexts in only 54% of cases).

Lastly, Patterson & Schumacher (2020) tested under which conditions prominence hierarchies are used for pronoun interpretation. In contrast to the previous studies, the authors included personal and demonstrative pronouns that clearly had to refer to one referent due to their gender marking. In a first eye-tracking experiment, it was manipulated to whom the pronoun referred so that in some cases a pronoun referred to a referent that it would usually not necessarily refer to (i.e. the proto-patient for the personal pronoun and the proto-agent for the demonstrative pronoun *der*, see Schumacher et al., 2016 above). While the participants read these sentences on a screen, their eye movements were monitored in order to measure their reading times for the pronouns. The analysis revealed that the participants needed longer to process the demonstrative pronoun *der* in all conditions. However, the manipulation of which referent the pronouns referred to yielded no effect. This means that the earlier reported interpretive preferences for the pronouns (namely to refer a personal pronoun to the proto-agent and a demonstrative pronoun to the proto-patient) were not visible in this experiment. The authors mention shallow processing as an explanation: Since the pronouns could clearly be interpreted as referring to one referent, there was no need to rank the referents according to their prominence statuses to resolve the pronouns.

To gather further evidence to support this assumption, a second experiment was conducted in which participants had to judge some of the items from the first experiment. The participants dispreferred items where the demonstrative pronoun referred to the proto-agent compared to sentences where the demonstrative pronoun referred to the proto-patient, which was reflected in lower rating scores for demonstrative pronouns associated with proto-agents. Patterson & Schumacher (2020) thus conclude that different interpretive preferences for the pronouns can be observed even when they are disambiguated, as long as participants have to look at the items more closely. This is further corroborated by a third eye-tracking experiment that is similar to the first one but where, among other changes, more comprehension questions specifically targeted the referent of the pronoun so that a deeper processing of the items was necessary. Here, the authors report that the reading times for the pronouns varied according to which referent the pronoun referred to in some conditions. Patterson & Schumacher (2020) thus conclude that prominence considerations may only come into play under conditions that require a deeper engagement with the items. Similarly to most previous studies, the pronouns under investigation were indeed ambiguous, and these results should offer insights into how prominence hierarchies are computed.

To summarise, studies that have explored how participants interpret personal pronouns and the German demonstrative pronoun *der* revealed a number of factors that are important for pronoun resolution. In particular, these studies confirmed that the initially-assumed importance of grammatical functions for pronoun interpretation may be more complex and additional factors such as topichood and agentivity have been discussed (which are often masked by grammatical functions). The next section will address the interpretation of the other type of demonstrative pronoun, namely *dieser*.

3.2.4   Interpretation of the demonstrative pronoun *dieser*

The other type of demonstrative pronoun in German (*dieser*) has received relatively little attention so far. However, there are a few studies that tried to identify the features of its preferred referents. Most of these studies investigated whether *dieser* is interpreted as referring to the last-mentioned referent from the preceding sentence. This is based on Zifonun et al. (1997) who proposed such a last-mention preference, which is illustrated by the following example (adapted from Zifonun et al., 1997, p. 558 (interlinear gloss and translation my own)):

(12) *Peter will einen Benz kaufen.*

'Peter wants to buy a Benz.'

   a) **Dieser hat wohl zuviel Geld.*

      *he-DEM has apparently too.much money

      '*He apparently has too much money.'

   b) *Dieser soll aber nicht so teuer sein.*

      he-DEM should not so expensive be

      'However, it shouldn't be too expensive.'

According to Zifonun et al. (1997), *dieser* is interpreted as referring to the most recent referent that has the same grammatical gender and number features. In this example, this would be the *Benz* (a German car). However, it is not a feasible referent, in this context, which becomes clear when considering the remaining part of continuation (12a). Therefore, *dieser* is not acceptable in this example as it cannot be used to refer to other referents. Continuation (12b) allows a last-mention interpretation and the use of *dieser* is therefore acceptable. While this example may be reasonable, the first empirical results could not confirm the proposed pattern as will be shown below.

Evidence against a last-mention account comes from a bachelor's thesis (Özden, 2016). A sentence completion task was used to compare the two types of German demonstrative pronouns (*der* vs *dieser*) and the personal pronoun (*er*). The items were based on those used for the sentence completion task in Schumacher et al. (2016) but only consisted of active accusative verbs (for an example, see 10). Following canonical and non-canonical contexts, both types of demonstrative pronouns were interpreted as referring to the proto-patient (i.e. the second-mentioned argument in canonical contexts and the first-mentioned argument in non-canonical contexts). These results thus do not support Zifonun et al.'s (1997) account. In both contexts, no clear pattern could be observed for the personal pronoun. Another bachelor's thesis (Lange, 2016) used the items with dative experiencer verbs from Schumacher et al. (2016) to compare the two types of demonstrative pronouns to the personal pronoun (for an example, see 11). Following the canonical order, all three pronouns (thus including the personal pronoun) were interpreted as referring to the proto-patient (i.e. the second-mentioned referent). However, stronger effects were registered for the two demonstrative pronouns (above 90%). Following the non-canonical word order, all three pronouns were also interpreted as referring to the patient (i.e. the first-mentioned referent). These results thus also contradict a last-mention account. Although it is surprising that the personal pronoun showed similar patterns to those of the demonstrative pronouns, the statistical analysis revealed that both types of demonstrative pronouns differed siginificantly from the personal pronoun. The overall pattern may thus be similar, but differences between the demonstrative pronouns on the one hand and the personal pronoun on the other hand become apparent on closer inspection. Especially in the canonical context, a stronger preference for the demonstrative pronouns to be referred to the proto-patient was registered.

Finally, Patil et al. (2020) explored how participants understood demonstrative pronouns from the *dieser/diese* paradigm. The authors employed a slightly different methodology from that used in the previously reported experiments. In their experiment, participants saw complex sentences consisting of a main clause and a complement clause. The main clause introduced two referents of different grammatical genders and the complement clause had a gap that participants had to fill with a subject pronoun. Different options were presented to them and the pronouns could only refer to one of the referents due to their grammatical gender marking. The authors wanted to investigate which pronoun the participants would choose depending on the characteristics of the only possible referent (namely whether it was the grammatical subject or object of the sentence). Furthermore, the sentences differed with respect to their register (informal vs formal). The authors observed that demonstratives from the *dieser/diese* paradigm were preferably chosen for objects in formal contexts.

Patil et al. (2020) report a second experiment in which the word order of the main clause was varied

(SVO vs OVS) and both referents in the main clause had masculine gender. This time, the complement clause already included a masculine (and thus ambiguous) demonstrative pronoun from the *dieser/diese* paradigm. A comprehension question followed that allowed the authors to conclude how the participants interpreted the pronouns. In contrast to the previous experiment, an additional context sentence was added at the beginning of the short discourse to justify the word order variations and only sentences with a formal register were used. Similarly to the previous two studies, the demonstratives from the *dieser/diese* paradigm were understood as referring to the object from the previous clause following both context variations. These results also contradict Zifonun et al.'s (1997) proposal although a less pronounced preference for the object was registered following the non-canonical word order. There may thus also be other factors that guide the resolution of *dieser*.

In addition, related findings from Ahrenholz (2007) could indicate that demonstratives from the *dieser/diese* paradigm do not have to refer to the last-mentioned referent. In a corpus study on spoken German, he found many occurrences of adnominal demonstratives from the *dieser/diese* paradigm that were used as discourse anadeixis where the referent was mentioned at an earlier point in discourse.

To summarise, the first empirical results suggest that the interpretation of *dieser* may be guided by the same prominence-lending cues that could be established for *der*, but further evidence is needed. All the accounts and studies that have been summarised so far (also those concerning the other pronouns) have not differentiated between the speaker's and addressee's perspective. A more complex account of pronoun interpretation that takes both the speaker's and addressee's views into account will thus be briefly reviewed in the following section.

3.2.5   Pronoun interpretation according to the Bayesian model

Most of the studies summarised above have investigated how participants interpret different types of pronouns. Based on this line of research, various features such as grammatical function, thematic roles, topichood and perspective were discussed that may be important for the resolution of different types of pronouns. Kehler & Rohde (2013; see also Kehler et al., 2008) further elaborated on the mental processes behind pronoun interpretation. The authors consider pronoun interpretation (and sentence processing more generally) as an interaction of (top-down) expectations about preceding discourse and actual linguistic (bottom-up) cues. Furthermore, their model takes both the speaker's side and the addressee's side into account. According to their model, the speaker must decide whether to use a pronoun for a particular referent. This decision is influenced by aspects relating to the information structure of the current discourse. The addressee, on the other hand, estimates which referent from the preceding discourse is most likely to be picked up again –

irrespective of any actual referential forms the addressee may encounter in the subsequent discourse. This calculation is based on the coherence relations between the current sentences. In addition, the addressee estimates how likely it is that the speaker makes use of a pronoun to refer to the referent that is considered most likely to be picked up again. Hence, the model considers expectations about the development of the subsequent discourse with respect to who is most likely to be picked up again (top-down expectations). These expectations are then modulated by the actual referential form the addressee encounters (bottom-up evidence). Predictions about which referent is most likely to be mentioned next can be derived from experimental conditions in which participants have to add a sentence to an existing one without any prompts (such as pronouns). This model is very interesting, and the relation between top-down expectations and bottom-up evidence will be focused on in the chapter on the ERP experiments (Chapter 5).

3.2.6 Summary

To summarise, in this section different factors were discussed that influence how participants interpret personal and demonstrative pronouns in German. The way in which participants understand these pronouns also offers insights into prominence relations as it has been argued that the personal pronoun and the demonstrative pronoun *der* refer to referents with specific prominence statuses. Both personal and demonstrative pronouns in German refer to referents that have been mentioned previously, i.e. are in short- or long-term memory (Gundel et al., 1993). However, the personal pronoun has been claimed to refer to referents that are more prominent. When there are several potential referents in a sentence, they are ranked according to their prominence statuses (see von Heusinger & Schumacher, 2019). Hence, in contexts with at least two potential referents, the demonstrative pronoun *der* is typically interpreted as referring to the less prominent one. However, the exact factors that influence pronoun interpretation, and thus the computation of prominence hierarchies, are still unclear. Furthermore, most research has focused on only one type of demonstrative pronoun (namely *der*) and there are only a few studies that focused on the other type of demonstrative pronoun in German (namely *dieser*).

Although many different factors have been proposed and the ranking of these factors needs to be further investigated, some general patterns can be summarised. In unmarked sentences, the personal pronoun is usually understood as referring to the (discourse/aboutness) topic, subject, proto-agent, and perspectival centre while the demonstrative pronoun *der* is usually understood as referring to the non-topic, object, and proto-patient (e.g. Bosch et al., 2007; Bosch & Umbach, 2007; Hinterwimmer & Bosch, 2016; Schumacher et al., 2016). In the first empirical studies, similar patterns could be observed for the demonstrative pronoun *dieser* with regard to grammatical functions (Özden, 2016; Patil et al., 2020), although open questions

remain, particularly concerning the influence of the thematic roles of the proto-agent and proto-patient (Lange, 2016). Importantly, most studies indicate that while the linear order of the referents is not the main factor guiding pronoun interpretation for any of these pronouns (contrary to what has been claimed for the demonstrative pronoun *dieser* by Zifonun et al., 1997), the linear order of the referents can modulate interpretive preferences (e.g. Bosch & Umbach, 2007; Burmester et al., 2018; Patil et al., 2020; Schumacher et al., 2016). In the following, an experiment will be presented that investigates how participants interpret the personal and two types of demonstrative pronouns. In particular, it will be determined to what extent the interpretation of *dieser* (and the other two pronouns) is guided by thematic roles.

3.3 The current research

In the following, an experiment will be presented in order to investigate how participants interpret different anaphoric pronouns in German. The main question is how the demonstrative pronoun *dieser* is interpreted in comparison with the other demonstrative pronoun *der* and the personal pronoun *er*. Previous research has mainly focused on the demonstrative pronoun *der* in comparison with *er* (e.g. Bosch et al., 2003; Hinterwimmer & Bosch, 2016). These studies report that *der* was interpreted as referring to the grammatical object (Bosch et al., 2007) or the thematic proto-patient when the grammatical object and thematic proto-patient were not aligned in the previous sentence (Schumacher et al., 2016). The patterns displayed by the personal pronoun were often less clear and more ambiguous or in favour of the grammatical subject/thematic proto-agent (Bosch et al., 2007; Schumacher et al., 2016). From a theoretical perspective, a last-mention preference has been suggested for *dieser* (Zifonun et al., 1997). However, the first empirical results could not confirm this account (Lange, 2016; Özden, 2016; Patil et al., 2020). In contexts with accusative verbs, *dieser* was understood as referring to the proto-patient irrespective of its sentence position. In other words, *dieser* was interpreted as referring to the proto-patient even following non-canonical contexts in which the proto-patient is the first-mentioned argument (Özden, 2016). In contexts with dative experiencer verbs, the same pattern was reported (Lange, 2016). However, the personal pronoun was also interpreted as referring to the proto-patient. This result for the personal pronoun clearly deviates from the results that other studies on pronoun resolution have reported (namely a preference for the proto-agent or no clear preferences, e.g. Schumacher et al., 2016). In the following, it will therefore be tested how participants understand all three pronouns (*er* vs *der* vs *dieser*) following active accusative and dative experiencer verbs (inspired by Schumacher et al., 2016). The remaining chapters will be based on the results of this experimental task. It is thus important to have reliable data on how participants interpret these three different pronouns in German.

A sentence continuation task was used to test how participants interpreted the pronouns. The par-

ticipants were presented with a sentence in canonical or non-canonical word order and an accusative or dative experiencer verb. Accusative and dative experiencer verbs differ with respect to the thematic roles they license. For the current research, the notion of thematic proto-roles will be applied (based on Dowty, 1991; Primus, 1999). The idea behind proto-roles is that arguments of verbs have certain proto-features. For the current purpose, the argument that performs a volitional action and intentionally or unintentionally causes an event is classified as a proto-agent (Dowty, 1991; Primus, 1999). Furthermore, the argument that is associated with sentience (i.e. the experiencer, Primus, 1999) is also classified as a proto-agent, while in the next chapter, the experiencer will be considered as a separate role since the analyses presented in the next chapter require a more detailed approach. However, for the current purpose the contrast between proto-agents and proto-patients is sufficient, and the latter is either the stimulus or affected by the action of another participant (Primus, 1999). In the following, it will be assumed that the proto-agent is more prominent compared to the proto-patient. This assumption is based on thematic hierarchies (Dowty, 1991; Fillmore, 2003) that propose a ranking according to which some thematic roles take precedence over others in choosing a particular syntactic argument. The following ranking is adapted from Dowty (1991, p. 578). It illustrates that the agent has a very prominent role as it is the preferred candidate for the syntactic subject:

(13) Agent > Experiencer > Patient

A more fine-grained way to illustrate the ranking of different thematic roles is presented in the following (adapted from Dowty, 1991, p. 578):

(14) Causing event > Caused event
Moving argument > Source, Goal, Arg (i.e. an argument with neither proto-agent nor proto-patient features)
Experiencer > Arg

These rankings suggest that the agent is more prominent compared to other thematic roles and there is also evidence to support this claim from other domains. For example, constructions such as DO-clefts and personal passives are sensitive to different features of agentivity (e.g. Kretzschmar et al., 2019). Particularly relevant for the present purpose are studies that investigated the relation between thematic roles and referential expressions. As illustrated previously, personal pronouns have been shown to refer back to prominent referents. Following this line of reasoning, it can be concluded that personal pronouns help to reveal which features may contribute to a referent's prominence status. It could be shown that German personal pronouns are preferably interpreted as referring to the proto-agent (Schumacher et al., 2016, 2017). Taken together,

these accounts and studies therefore imply that thematic roles are an important prominence-lending factor and that thematic proto-agents appear to be more prominent compared to proto-patients.

In the context of active accusative verbs, the grammatical subject is also the proto-agent while the other argument is the grammatical object and proto-patient. As illustrated previously, the grammatical subject is considered more prominent compared to the grammatical object (e.g. Bosch et al., 2007). Furthermore, there is independent evidence from so-called case-hierarchies that rank nominative-marked arguments (i.e. the subject in the context of active accusative verbs) higher than accusative-marked arguments (Eisenberg, 2013). Therefore, this means that the argument with the highest-ranked grammatical function is also the argument with the highest-ranked thematic proto-role in the context of active accusative verbs. In the context of dative experiencer verbs, however, the picture is more complex: while one argument is the object and proto-agent, the other argument is the subject and proto-patient. This means that the highest-ranked grammatical function is not aligned with the highest-ranked thematic role. These verbs thus make it possible to investigate whether, for example, the personal pronoun is interpreted as referring to the subject or proto-agent. It can thus be investigated whether the grammatical or thematic role of the arguments is the more important prominence-lending cue (as first suggested by Schumacher et al., 2016).

After the first context sentence with either an accusative or dative experiencer verb, a second sentence followed that was incomplete and contained one of three masculine pronouns: either the personal pronoun, the demonstrative pronoun *der*, or the demonstrative pronoun *dieser*. Based on their masculine gender, the pronouns could potentially be associated with either referent from the first context sentence. The participants' task was to continue the story in written form. The experiment presented here is part of a larger story continuation task that will be presented in the next chapter. However, for the current purposes, only the continuation of the second incomplete sentence was analysed in order to determine how the participants interpreted the different pronouns.

In particular, the following hypotheses will be tested: For the demonstrative pronouns, a preference for the proto-patient (which is the second-mentioned referent in canonical contexts and the first-mentioned referent in non-canonical contexts) is expected. Based on previous results (e.g. Patil et al., 2020), it is not expected that participants interpret *dieser* in a different way than they interpret *der*. In the contexts of both verb types, the proto-agent appears before the proto-patient in the canonical word order. However, pronouns in contexts with dative experiencer verbs may be more difficult to interpret since the highest-ranked grammatical function and the highest-ranked thematic role are not aligned. Particularly for the non-canonical context, previous studies have observed difficulties when it comes to interpreting these sentence structures (e.g. Schumacher et al., 2016). It is thus expected that the verb type of the first context sentence has an

influence on the interpretive preferences for all three pronouns. The same analysis with a subset of the data was published by Fuchs & Schumacher (2020). In the next section, the experiment will be described in more detail.

3.3.1 Participants

The data from 249 participants was analysed for the current experiment (182 women, 64 men, and 3 persons of unknown gender; mean age = 23 years, SD = 6 years; age range: 17–77 years). The participants were monolingual speakers of German and participated in the experiment voluntarily or as part of their coursework. Each participant contributed one sentence continuation. Originally, text continuations were collected from 355 participants. However, 106 sentence continuations that were collected did not enter the analysis. There are several reasons why continuations had to be excluded (as the sentence continuations are part of a larger story continuation task that will be presented in the next chapter, the same criteria for exclusion applied as for the story continuations):

- 6 continuations had to be excluded because the continuation did not reveal how the participants understood the seemingly ambiguous pronoun in the second sentence
- 27 continuations had to be excluded because of direct speech (referential relations within direct speech are outside the scope of the current research)
- 6 continuations had to be excluded because the participants misunderstood the incomplete sentence pair, thus making analysis impossible (in two cases the dative experiencer verb *to impress* was misunderstood, in one case one referent (i.e. *the sailor*) was interpreted as an inanimate object (a boat), in one case the demonstrative pronoun *der* was interpreted as a definite article, and in two cases the participants overwrote some parts of the incomplete sentence pair and changed the word order or the pronoun)
- 6 continuations had to be excluded because they were non-sensical
- 3 continuations had to be excluded because they contained constructions that were impossible to annotate (e.g. **Dafür verlangte er den Soldaten zu seinem Adjutanten zu machen* where the verb *zu verlangen* 'to demand' is followed by an incorrect and ambiguous complement clause and the referent of PRO *zu machen* 'to make' is unclear)
- 1 continuation had to be excluded because two different handwritings suggested that the continuation was written by two different participants
- 24 continuations had to be excluded because they contained items that belonged to an item set that

was excluded as a whole (i.e. the antiquated *entgehen* 'to escape' which turned out to be unfamiliar to the participants, see Item 2 in Appendix A.2)

- 33 continuations introducing a soccer player and a tennis player as referents in the first context sentence had to be excluded because almost all stories were highly ambiguous (see Item 3 in Appendix A.1)

3.3.2 Material and procedure

The study followed a 2 (word order) x 3 (pronoun type) design. The items are inspired by Schumacher et al. (2016) and consist of a first context sentence and a second incomplete sentence. In the first sentence, two masculine definite noun phrases were mentioned after an auxiliary. The second sentence contained one of the three masculine pronouns (*er* vs *der* vs *dieser*). Examples of active accusative verbs are presented below.

(15)   a)   **First context sentence (active accusative verb, canonical word order)**

     Jeden Morgen hat der Pfleger den Heimbewohner gekämmt.

     every morning has the-NOM nurse the-ACC resident combed

     'Every morning, the (male) nurse combed the (male) resident.'

    b)   **Incomplete second sentence**

     *Dabei hat **er/der/dieser** oft…*

     during.this.process has he-PERS/he-DEM/he-DEM often…

     'During this process, **he** often…'

(16)   a)   **First context sentence (active accusative verb, non-canonical word order)**

     Jeden Morgen hat den Heimbewohner der Pfleger gekämmt.

     every morning has the-ACC resident the-NOM nurse combed

     'Every morning, the (male) nurse combed the (male) resident.'

    b)   **Incomplete second sentence**

     *Dabei hat **er/der/dieser** oft…*

     during.this.process has he-PERS/he-DEM/he-DEM often…

     'During this process, **he** often…'

Example (15a) illustrates the canonical word order. The nominative-marked argument (i.e. the proto-agent) appears before the accusative-marked argument (i.e. the proto-patient). Example (16a) illustrates the non-canonical word order in which the accusative-marked proto-patient precedes the nominative-marked

proto-agent and all sentence pairs were created in this way. A temporal or local adverb at the beginning of the first sentence introduced the context for the two referents and the event described in the following part of the sentence. After the adverb, the auxiliary and two definite noun phrases followed. The noun phrases either referred to professions (such as *the nurse* or *the detective*) or other roles of the referents that were easy to understand (such as *the resident* or *the traveller*). All noun phrases could only be identified as masculine due to the masculine definite article. The sentences were constructed in the present perfect, which is the most frequent and natural tense in German to describe past events.

In the second sentence, a sentence-initial adverbial was also followed by an auxiliary. However, the sentence was cut off after one of the three masculine singular pronouns (*er* vs *der* vs *dieser*) and an additional adverb. Masculine instead of feminine pronouns were used as the nominative singular and plural forms from the feminine pronoun paradigms are identical in German. Since this overlap could have influenced the understanding of the pronouns, only masculine pronouns and masculine noun phrases were introduced. The pronouns were potentially ambiguous, as – on the basis of their grammatical gender – they could be associated with either referent from the first context sentence. The sentence position of the two definite noun phrases and the pronoun after the finite verb reflects the fact that *dieser* typically occurs after the inflected verb (Ahrenholz, 2007). Because one of the central questions is how *dieser* behaves in contrast to *der* and *er*, all pronouns and both their potential referents were introduced after the finite verb. The additional adverb was inserted to signal to the participants that the demonstrative forms have to be interpreted as pronouns and not as definite or demonstrative articles, which have the same form in German.

Each second sentence was presented with the auxiliary *to be* and the auxiliary *to have*. In (15b), the second sentence contains the auxiliary *to have*. However, another version with the auxiliary *to be* was created. Some verbs in German take the auxiliary *to be*, while other verbs take the auxiliary *to have* in the present perfect. Since the sentence was discontinued after the auxiliary (and the adverb), the participants were prompted to add the past participle form of any verb that was compatible with the auxiliary. The auxiliaries *to be* and *to have* attracted different verbs, particularly with regard to the thematic roles of their arguments. Thus, as the auxiliary might have limited the verb choices, the versions were counterbalanced to ensure that the results were varied. Five items contained an active accusative verb (the above examples form one item set, i.e. four other items containing accusative verbs were constructed that were then distributed multiple times but, importantly, each participant only received one incomplete sentence pair).

An additional four items contained dative experiencer verbs,[3] and an example of a dative experiencer

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[3]Both verb types were treated as separate experiments for the analysis, which is why they are not mentioned in the initial description of the factorial design of the experiment.

verb can be found in (17a). Importantly, each verb was only mentioned in one sentence pair. In contrast to the accusative items, the excluded item for the dative experiencer group (*entgehen* 'to escape', see the section on the participants) could not be replaced due to the small number of available dative experiencer verbs. Examples of the canonical and non-canonical word order can be found below (see 17a and 18a). Significantly, in the canonical-order, the dative-marked argument (i.e. the proto-agent) appears before the nominative-marked argument (i.e. the proto-patient, Haider, 1993). The inclusion of these verbs makes it possible to investigate whether pronoun interpretation is mainly guided by grammatical functions or thematic roles. The whole item list for both verb types can be found in Appendix A.

(17)   a) **First context sentence (dative experiencer verb, canonical word order)**

   Im Hafen ist dem Urlauber der Segler aufgefallen.

   at.the harbour is the-DAT tourist the-NOM sailor noticed

   'At the harbour, the (male) tourist noticed the (male) sailor.'

   b) **Incomplete second sentence**

   *Wenig später ist **er/der/dieser** dann…*

   shortly afterwards is he-PERS/he-DEM/he-DEM then…

   'Shortly afterwards, **he** then…'

(18)   a) **First context sentence (dative experiencer verb, non-canonical word order)**

   Im Hafen ist der Segler dem Urlauber aufgefallen.

   at.the harbour is the-NOM sailor the-DAT tourist noticed

   'At the harbour, the (male) tourist noticed the (male) sailor.'

   b) **Incomplete second sentence**

   *Wenig später ist **er/der/dieser** dann…*

   shortly afterwards is he-PERS/he-DEM/he-DEM then…

   'Shortly afterwards, **he** then…'

As mentioned above, the sentence continuation task was part of a larger story continuation task. The participants' task was thus to continue the story by adding six additional sentences. However, for the current purpose, only the first sentence was analysed.

3.3.3   Data analysis

The goal was to investigate which referent was chosen for the three different German pronouns (*er* vs *der* vs *dieser*). For each story, two annotators decided separately whether the participants interpreted the pronoun

as referring to the first- or second-mentioned referent from the first context sentence. The annotators'
decisions were then compared and disagreements were discussed. In case of disagreement, each annotator
was told to choose the option they felt most comfortable with. In most instances, the rest of the sentence
revealed how the participants interpreted the pronoun. However, when it was not clear, the continuation was
excluded as described above (n = 6). Inter-annotator agreements were not calculated because every single
continuation was discussed between the annotators.

In the first step, the results were calculated separately for each verb type (accusative vs dative ex-
periencer verbs). For each verb type, the relationship between the pronoun type (*er* vs *der* vs *dieser*),
preferred referent (first- vs second-mentioned referent from first context sentence), and word order (canon-
ical vs non-canonical word order) was determined using generalised linear models.[4] The models contained
the interaction of the pronoun type and word order, and a reference to the second-mentioned referent as
the outcome variable.[5] Based on their order of appearance in the first context sentence, the two referents
were coded as "referent 1" and "referent 2". In canonical sentences, the first-mentioned referent is the ar-
gument with the higher-ranked thematic role (i.e. the proto-agent), while in non-canonical sentences the
second-mentioned referent is the argument with the higher-ranked thematic role. The lme4 package (Bates
et al., 2015) in RStudio (RStudio Team, 2019) was used.

In addition, the model containing the interaction of the pronoun type and word order was compared
to a reduced model with the pronoun type as a fixed effect to assess whether word order (canonical vs non-
canonical) affects the outcome variable (i.e. reference to the second-mentioned referent). For this comparison,
the likelihood-ratio test function from the lmtest package (Zeileis & Hothorn, 2002) was used.[6] In the last
step, it was assessed whether the verb type (accusative vs dative experiencer verb) had an effect on the
results. For this purpose, a model containing the three-way interaction of pronoun type, word order, and
verb type was compared to the reduced model containing the interaction of the pronoun type and word order,
using the lrtest function from the lmtest package (Zeileis & Hothorn, 2002).[7]

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[4]At first, generalised linear mixed models were determined. However, as the models did not converge, the random effects
structure consisting of the intercepts and random slopes for items had to be reduced and ultimately removed.

[5]In the following, the models for the accusative context are illustrated (the models for the dative context were identical with
the only exception that the dative was specified as the verb type):
glm(second-mentioned referent ~ pronoun_type * word_order (canonical), data = df[df$verb_type == "accusative",], family = binomial)glm(second-mentioned referent ~ pronoun_type * word_order(non-canonical), data = df[df$verb_type == "accusative",], family = binomial).

[6]In the following, the models for the accusative context are illustrated (the models for the dative context were identical with
the only exception that the dative was specified as the verb type):
m1 = glm(second-mentioned referent ~ pronoun_type * word_order, data = df[df$verb_type == "accusative",], family = binomial)m0 = glm(second-mentioned referent ~ pronoun_type, data = df[df$verb_type == "accusative",], family = binomial)
lrtest(m0, m1).

[7]m1 = glm(second-mentioned referent ~ pronoun_type * word_order * verb_type, data = df, family = binomial)
m0 = glm(second-mentioned referent ~ pronoun_type * word_order, data = df, family = binomial)
lrtest(m0, m1).

3.3.4 Results
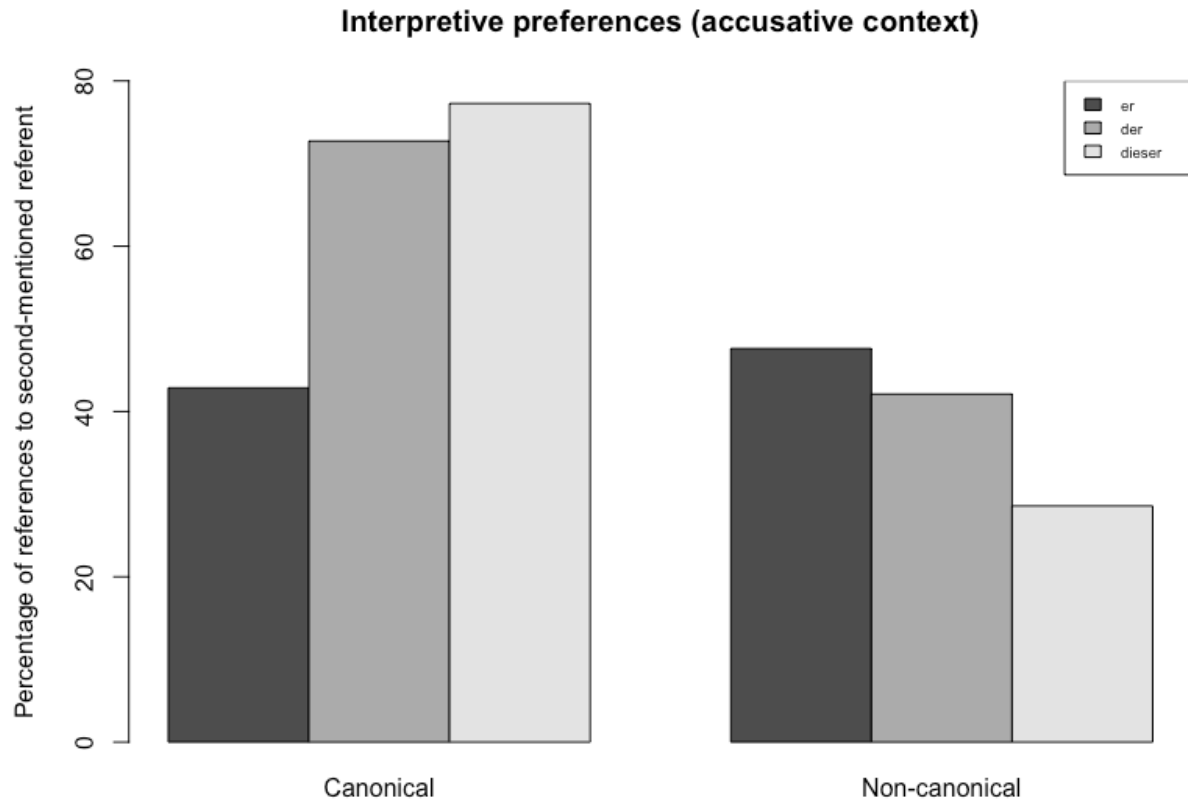
Figure 1: Proportion of references to the second-mentioned referent from the previous sentence for each pronoun type separated by word order in the context of accusative verbs.

Figure 1 depicts the interpretive preferences for the three different pronouns in contexts with accusative verbs. When the first context sentence contained the canonical word order (left panel), the two demonstratives *der* (73%) and *dieser* (77%) were both interpreted as referring back to the second-mentioned referent from the previous sentence. In contrast, the personal pronoun *er* was less frequently used to refer to the second-mentioned referent (43%). The statistical analysis confirmed that the difference between *dieser* and *er* is significant (difference measured in logits: -1.51, SE = 0.67, $p < 0.05$) while the difference between *der* and *er* (difference measured in logits: -1.27, SE = 0.65, $p = 0.0513$) is nearly significant. Importantly, the difference between *dieser* and *der* (difference measured in logits: -0.24, SE = 0.70, $p = 0.72801$) is not significant as was expected.

When the first context sentence contained the non-canonical word order (right panel), the demonstrative pronouns were less frequently interpreted as referring back to the second-mentioned referent (in 42% of all

cases for *der* and in 29% of all cases for *dieser*). The statistical analysis revealed that the interpretive preferences for *dieser* differ significantly between the canonical and non-canonical word order (difference measured in logits: -2.14, SE = 0.70, p < 0.01). This comparison between the canonical and non-canonical word order was computed in order to investigate whether *dieser* is interpreted as referring to the last-mentioned referent in both contexts. The figure suggests that *der* also behaved differently in the canonical vs non-canonical word order. However, this difference is only nearly significant (difference measured in logits: -1.30, SE = 0.67, p = 0.0515). As the figure indicates, there is no significant difference between the interpretive preferences for the personal pronoun *er* across the two word orders (difference measured in logits: 0.19, SE = 0.62, p = 0.7566).

In the panel on the right, the results for the three pronouns do not differ significantly from each other. The difference between *dieser* and *er* (difference measured in logits: 0.82, SE = 0.65, p = 0.20751), as well as the difference between *dieser* and *der* (difference measured in logits: 0.60, SE = 0.67, p = 0.37242), is not significant. The difference between *er* and *der* is also not significant (difference measured in logits: -0.22, SE = 0.64, p = 0.7264). The comparison between the reduced model with the pronoun type as a fixed effect and the more complex model with the interaction of pronoun type and word order confirmed that, generally speaking, the word order has an effect on the outcome variable as the complex model turned out to be a significantly better fit than the reduced model (likelihood-ratio test: p < 0.01).

Figure 2 depicts the interpretive preferences for the three different pronouns in contexts with dative experiencer verbs. The left-hand panel of the figure indicates that the demonstrative pronouns were more frequently interpreted as referring back to the second-mentioned referent from the previous clause (57% for *der* and 65% for *dieser*) compared to the personal pronoun (24%) following canonical contexts. The statistical analysis confirmed that both the difference between *dieser* and *er* (difference measured in logits: -1.79, SE = 0.67, p < 0.01) and the difference between *der* and *er* (difference measured in logits: -1.45, SE = 0.68, p < 0.05) is significant. As suggested by the figure, the difference between *dieser* and *der* is not significant (difference measured in logits: -0.34, SE = 0.62, p = 0.58324).

The right-hand panel of the figure does not reveal strong differences between the individual pronouns, which is confirmed by the statistical analysis. Neither the difference between *dieser* and *er* (difference measured in logits: -0.26, SE = 0.65, p = 0.688) nor the difference between *dieser* and *der* (difference measured in logits: 0.33, SE = 0.66, p = 0.619) is significant. The difference between *der* and *er* is also not significant (difference measured in logits: -0.60, SE = 0.64, p = 0.358) and interpretive preferences – especially for the demonstrative pronouns – are less clear. In 44% (*dieser*) and 53% (*der*) of all cases, they were interpreted as referring back to the second-mentioned referent. The statistical analysis further
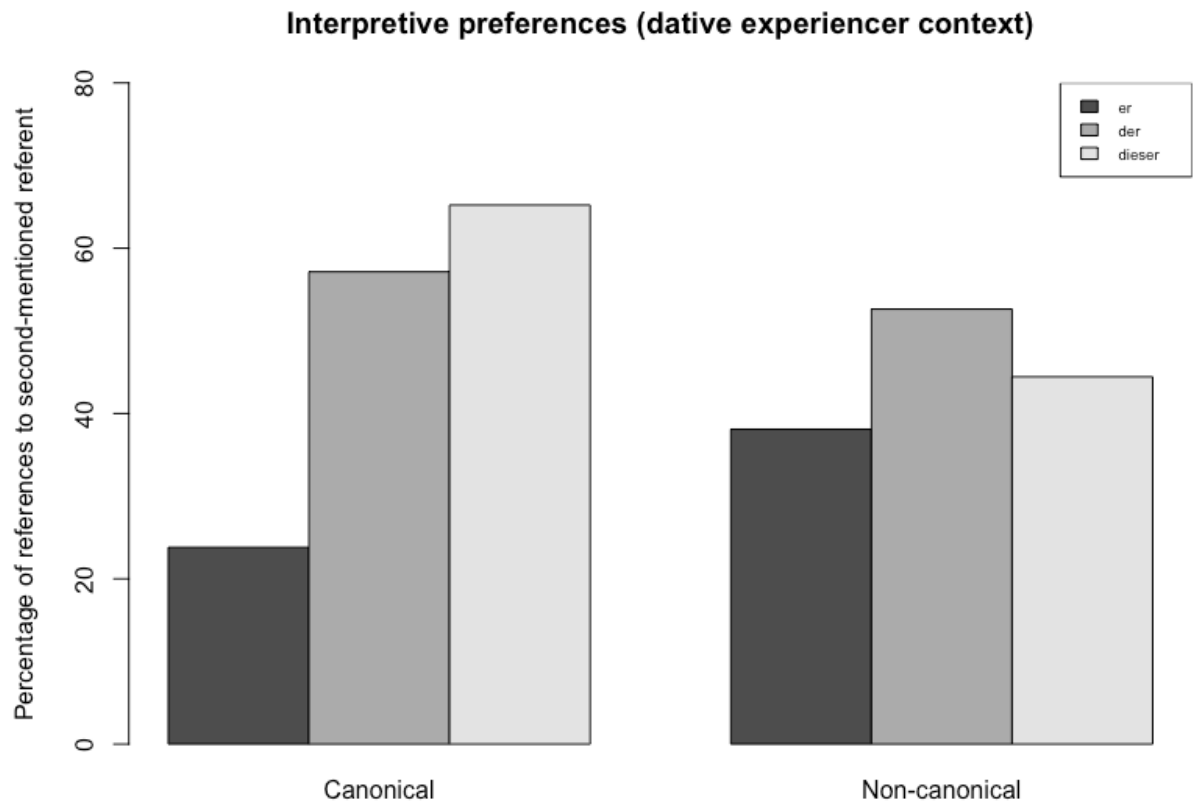
Figure 2: Proportion of references to the second-mentioned referent from the previous sentence for each pronoun type separated by word order in the context of dative experiencer verbs.

showed that the results for each pronoun do not differ significantly across the different word orders (*dieser* = difference measured in logits: -0.85, SE =0.65, p = 0.18699; *der* = difference measured in logits: -0.18, SE = 0.64, p = 0.7747; *er* = difference measured in logits: 0.68, SE = 0.68, p = 0.32005).

The comparison between the reduced model with the pronoun type as a fixed effect and the more complex model with the interaction of pronoun type and word order confirmed that there is no significant difference between the two models (likelihood-ratio test: p = 0.4125). In the context of dative experiencer verbs, the word order variation thus did not significantly influence how the pronouns were interpreted.

Finally, the comparison between a complex model containing the three-way interaction of pronoun type, word order, and verb type and the more reduced model containing the interaction of the pronoun type and word order revealed that the verb type did not significantly influence the results. The more complex model did not prove to be a significantly better fit than the reduced model (likelihood-ratio test: p = 0.4739), which is reflected in the two figures that display similar tendencies.

3.3.5   Discussion

To summarise, more distinct preferences and differences between the three pronouns could be observed in the context of the canonical word order (irrespective of the verb type). The two demonstrative pronouns were interpreted as referring back to the proto-patient (even when the proto-patient was also the grammatical subject of the sentence as in the case of dative experiencer verbs). In the context of accusative verbs and the non-canonical word order, *dieser* was significantly less frequently interpreted as referring back to the second-mentioned referent compared to the canonical word order. A similar tendency could be observed for *der*, indicating that both demonstrative pronouns were also interpreted as referring back to the proto-patient (which is the first-mentioned argument) in non-canonical contexts. This shows that the two demonstratives show similar preferences – at least in contexts in which only two potential referents are available. These results thus contradict the last-mention account (Zifonun et al., 1997), according to which *dieser* should have been interpreted as referring back to the last-mentioned referent irrespective of word order. Interestingly, *dieser* showed stronger effects overall.

In the context of dative experiencer verbs, only the canonical word order yielded clear results. Both types of demonstrative pronouns were significantly more frequently interpreted as referring to the second-mentioned referent (i.e. the proto-patient and grammatical subject) compared to the personal pronoun. These results thus support the importance of thematic roles for pronoun interpretation. In the context of the non-canonical word order, the interpretive preferences were less clear and more similar for all three pronouns,

indicating that the participants had difficulties to rank the referents. These findings will be discussed in more detail in the next section. Overall, the thematic role of the referents could be confirmed as an important factor for pronoun interpretation (in German). It is important to note that the current experiment does not provide evidence in favour of the linear order as the most important factor for the interpretation of any of the investigated pronouns.

3.4 General discussion

The goal of this chapter was to investigate how participants interpret three different anaphoric pronouns in German and to shed more light on prominence-lending cues that are important for pronoun interpretation. The main focus was on the comparison between *der* and *dieser* since the latter has received relatively little attention in the literature. It is generally assumed that demonstrative pronouns refer to referents that are in short- or long-term memory but that, significantly, are not as prominent as referents of personal pronouns (e.g. Gundel et al., 1993). Most research so far has tried to identify the characteristics that signal to the addressee whether a referent is more or less prominent. The discussed factors include grammatical functions and thematic roles (e.g. Bosch et al., 2007; Schumacher et al., 2016). In previous research, it could be demonstrated that the German personal pronoun and the demonstrative pronoun *der* are sensitive to the thematic roles of arguments (Schumacher et al., 2016). However, it has been suggested that the interpretation of the other type of German demonstrative pronoun (*dieser*) is guided by a different mechanism. More specifically, it has been proposed that *dieser* is simply interpreted as referring to the last-mentioned, possible referent (Zifonun et al., 1997), but the first empirical studies that were conducted do not support this account (Lange, 2016; Özden, 2016; Patil et al., 2020).

The results discussed above provide additional evidence for the fact that the linear order of the referents is not the main factor guiding the interpretation of *dieser*. This becomes especially clear when considering the results for the accusative verbs. The demonstrative pronoun *dieser* was significantly less commonly interpreted as referring to the second-mentioned referent in the non-canonical word order compared to the canonical word order. While *der* showed similar tendencies, this effect was even stronger for *dieser*. These results thus show that *dieser* is not always understood as referring to the last-mentioned referent. Therefore, it can be concluded that a last-mention account cannot be maintained (as already suggested by Özden, 2016; Patil et al., 2020).

Furthermore, the context of dative experiencer verbs provides evidence that thematic roles are an important factor that participants use when interpreting demonstrative pronouns. The two demonstrative

pronouns were associated with the proto-patient (and grammatical subject) while the personal pronoun was associated with the proto-agent (and grammatical object). However, the interpretive preferences were less clear for all three pronouns in the context of the non-canonical word order and the results for the dative experiencer verbs need to be discussed in more detail with respect to two aspects. Firstly, it needs to be discussed why no clear preferences could be observed in the non-canonical context. Secondly, it needs to be discussed why the current results are different from those reported by Lange (2016) who also tested dative experiencer verbs in her study.

Regarding the first aspect, it is not surprising that participants have difficulties to interpret demonstrative pronouns in the context of dative experiencer verbs and the non-canonical word order, since previous studies have reported similar results (e.g. Schumacher et al., 2016). As discussed in Schumacher et al. (2016), the non-canonical word order of dative experiencer verbs is characterised by a strong misalignment of prominence-lending cues that are usually used for pronoun interpretation. Hence, as described above, the thematic proto-agent is perceived as the most prominent referent in a sentence while the proto-patient is perceived as less prominent, which is why the two types of demonstrative pronouns are typically interpreted as referring to the proto-patient. However, other factors also seem to contribute to a referent's (more or less pronounced) prominence status. In the context of accusative verbs, the proto-patient is also the object. In dative experiencer, canonical word order contexts, the proto-patient is also the second-mentioned referent. Both the second-mentioned referent and the grammatical object have been described as less prominent in previous research (e.g. Bouma & Hopp, 2007; Gernsbacher & Hargreaves, 1988). Thus, clear interpretive preferences for the two types of demonstrative pronouns only emerge when an additional factor marks the proto-patient as less prominent. These ideas are based on the work of Schumacher et al. (2016), which provides a very detailed discussion of how different factors contribute to a referent's prominence status.

From this, it can also be concluded that the importance of the linear order of the referents may have been underestimated in previous experiments, as participants only showed clear interpretive preferences for the demonstrative pronouns in dative experiencer contexts when the thematic proto-patient was mentioned as the second referent. Hence, while it is still true that the linear order of the referents is not the main factor responsible for pronoun interpretation, it may be more important than is generally assumed and other studies also support these findings. Bosch et al. (2007), Schumacher et al. (2016), Burmester et al. (2018) and Patil et al. (2020) among others all report that the linear order of the referents modulated the interpretive preferences. Furthermore, in the current experiment even in the context of the active accusative verbs the differences between the individual pronouns were less clear following the non-canonical context. Since word order variations are generally assumed to reflect information-structural aspects, the results indicate that

changes in the information structure impact pronoun interpretation (see e.g. Colonna et al., 2012).

Regarding the second aspect, there are two main differences between the current study and the work of Lange (2016) who only tested dative experiencer verbs. Firstly, the personal pronoun was also interpreted as referring to the proto-patient (following dative experiencer canonical and non-canonical word order contexts) in the study conducted by Lange (2016). Secondly, all three pronouns were interpreted as referring to the proto-patient in the study presented by Lange (2016). Differences in how the items were constructed could explain the diverging results. While both studies were inspired by Schumacher et al. (2016), in the study by Lange (2016), the items introduced one referent before the auxiliary verb and one referent after the auxiliary verb while in the current study both referents were introduced after the auxiliary verb. Schumacher et al. (2016) also introduced one referent before and one referent after the auxiliary verb and reported similar results to those found in the current experiment. Therefore, this may not be the main reason for the diverging results.

Compared to the current study and the study by Schumacher et al. (2016), Lange's (2016) items contained relatively little contextual information and simply introduced the referents (*Dem Polizisten hat der Autofahrer missfallen. Er war…* 'The police officer disliked the driver. He was…', Lange, 2016, p. 26). In contrast, the items used in the current study contained many adverbial phrases to introduce the setting. Similarly, the items used in Schumacher et al.'s (2016) study introduced an additional clause that also provided some contextual information. One reason could thus be that the very limited contextual setting in Lange's (2016) study may have made it more difficult for the participants to construct a mental representation of the discourse and they may thus have used a very simple strategy for pronoun interpretation instead. All pronouns were interpreted as referring to the grammatical subject and the thematic proto-patient of the previous sentence. This time, in fact, the participants may simply have chosen the subject as a referent for any pronoun. The subject preference is well known (e.g. Bouma & Hopp, 2007; Colonna et al., 2012) and many of the other discussed factors such as agentivity and topichood often correlate with subjecthood. Thus, in case of doubt, the subject may be considered a good candidate for any pronoun. This may also explain why there are preferences for the non-canonical word order, whereas other studies could not find any preferences. The participants may not have fully processed the (non-canonical) sentences but may simply have chosen the subject. Such simplifying strategies are also known in other areas. For example, it could be shown that children simply rely on the linear order of referents and ignore case markings in order to interpret sentences when there is a processing overload (Lindner, 2003). As described previously, the results for the two types of demonstrative pronouns were stronger compared to those for the personal pronoun in Lange's (2016) study. The interpretive preferences for demonstrative pronouns were also more pronounced in many

previous studies (e.g. Bosch et al., 2007; Schumacher et al., 2016). Another possible explanation would thus be that participants used the simplified subject strategy for the personal pronoun, while they resolved the demonstrative pronouns as referring to the proto-patient.

Another aspect that needs to be discussed more generally is the syntactic position of the pronouns in the current experiment. The pronouns were introduced in the German middle field, which corresponds to the preferred syntactic position of the demonstrative pronoun *dieser*. The current experiment yielded stronger results for *dieser* compared to *der*. This may reflect the fact that *dieser* occurred in its preferred position while *der* has more often been observed in the German pre-field (Ahrenholz, 2007). However, as previous studies found similar patterns for *der*, it can be ruled out that the syntactic position had a major influence.

3.5 Conclusion

To conclude, the two German demonstrative pronouns *der* and *dieser* showed similar patterns in this experiment. Both types of demonstrative pronouns were preferably interpreted as referring to the proto-patient of the previous clause. The context with accusative verbs revealed that *dieser* is not associated with the closest possible referent, which contradicts proposals according to which the linear order is most relevant for the interpretation of *dieser* (Zifonun et al., 1997). However, the linear order does modulate the interpretive preferences for all three pronouns as the non-canonical contexts yielded less clear results. The context with dative experiencer verbs further demonstrated that thematic role information may be considered more important for pronoun resolution than grammatical role information. While this chapter investigated how different pronouns are interpreted with respect to the previous discourse (backward function), the next chapter will focus on how these pronouns influence the upcoming discourse (forward function). The extent to which pronominal forms signal whether the current prominence status of a referent will be maintained or changed in upcoming discourse will be investigated. Furthermore, it will be investigated to what extent the forward potential is influenced by the interpretive preferences that were discussed in this chapter.

4 How demonstrative pronouns change prominence relations in upcoming discourse (forward function)

4.1 Introduction

The previous chapter illustrated how personal and demonstrative pronouns are interpreted with respect to the previous discourse (backward function). The aim of this chapter is to investigate to what extent personal and demonstrative pronouns are interpreted as a signal to maintain or change the prominence status of their referents in upcoming discourse: "There are a number of signals marking the identity between what is being said and what has been said before. They […] have in common a 'deictic' reference, that is to say, they point back (A N A P H O R I C) or forward (C A T A P H O R I C) in discourse" (Quirk & Greenbaum, 1976, p. 302; also cited in Gernsbacher & Shroyer, 1989). This idea that referential forms do not only refer back to a previously mentioned referent but also indicate how the discourse will develop will be referred to as forward potential. It is implied by the second criterion of prominence, which states that the prominence status of a unit can change over time (Himmelmann & Primus, 2015). It has been claimed that demonstrative pronouns can change current prominence relations by promoting a previously less prominent referent to a more prominent status in upcoming discourse (e.g. Abraham, 2002; Weinrich, 1993). However, the idea that certain linguistic devices such as demonstrative pronouns have the potential to indicate which referent will be important in upcoming discourse has received relatively little attention in the (psycholinguistic) literature.

The extent to which German demonstrative pronouns initiate a shift in prominence (in comparison to personal pronouns) will thus be investigated in this chapter via a story continuation task. In particular, it will be investigated whether the shift function is an intrinsic semantic feature of demonstratives. According to this view, examples without a shift should be the exception. Accounts that associate demonstratives with a shift function (e.g. Abraham, 2002; Weinrich, 1993) are based on the assumption that demonstratives refer to less prominent referents. However, the previous chapter revealed that, in some cases, demonstrative pronouns can also be interpreted as referring to a prominent referent. Thus, it will be explored to what extent the shift function of demonstrative pronouns is modulated by initial pronoun interpretation. The story continuation task is based on the sentence continuation task that was presented in the previous chapter. However, while for the previous chapter only the continuation of the second sentence was analysed, for this chapter the complete continuations provided by the participants were analysed. All referents that were mentioned in the continuations were annotated. In this way, it could be tracked how often the more and less prominent referent was mentioned in the continuations depending on the pronoun type that the second sentence contained and

the pronoun interpretation. A high proportion of references to the previously less prominent referent is seen as a good indication of a referential shift. Furthermore, potential differences between the two types of demonstrative pronouns (*der* vs *dieser*) will be explored. More specifically, it will be investigated whether the two types of demonstrative pronouns (*der* vs *dieser*) increase references to the previously less prominent referent at different time points during the story development. Before the results of the continuation task are presented and discussed, an overview of the previous literature that explored the forward function will be provided, with a special focus on demonstratives (in English and German).

4.2 Shift potential of demonstratives

4.2.1 Forward potential of different referential forms

Givón (1983) proposed the idea that certain referential expressions or other linguistic constructions indicate whether the current topic will be continued or changed. According to his definition, the topic is the most central referent (i.e. "the participant *most crucially involved*", Givón, 1983, p. 8) within a paragraph and is often realised as the grammatical subject in many successive sentences within that paragraph. He describes different analyses to measure topic continuity that take both the previous and the following discourse into consideration. Of particular interest for this chapter are the measures of "referential distance ('look-back')" and "persistence" (which could be paraphrased as look-forward). The measure of look-back determines the number of clauses between a particular referential form and its previous mention, while a low number indicates a high degree of topic continuity, as little else is addressed in-between. The measure of persistence focuses on the subsequent discourse and counts the number of successive clauses in which a particular referent is mentioned. This is based on the idea that "[m]ore important discourse topics appear more frequently in the register, i.e. they have a higher probability of persisting longer in the register after a relevant measuring point" (Givón, 1983, p. 15). Thus, a high number indicates that a particular referent is mentioned in many successive sentences, showing its importance. Overall, these two measures thus give a good impression of how a particular referential expression is related to referential maintenance or shift. Several studies tested these assumptions and, generally, confirmed that while more reduced forms such as zero anaphora or unstressed pronouns indicate that the previous topic is maintained, more marked forms or constructions indicate that the previous topic is not continued (Givón, 1983). One of these studies will be illustrated in more detail below.

As part of Givón's (1983) volume about topic continuity, Brown (1983) analysed referential forms in a narrative by Ian Fleming. In the following, only the results for human referents are summarised that confirm

the correlation between the complexity of referential forms and their function with respect to signalling topic continuity (which could also be paraphrased as referential continuity). Among the analysed referential forms, zero anaphora was characterised by the highest degree of continuity followed by unstressed pronouns. The measured distance between unstressed pronouns and their prior mention was generally short but longer compared to zero pronouns since unstressed pronouns carry gender morphology so that their referent can be identified even if clauses intervene. Unstressed pronouns were also characterised by high persistence, i.e. a high number of successive clauses in which that particular referent was mentioned. For demonstrative noun phrases, a longer lookback distance and less referential persistence were measured compared to unstressed pronouns. However, the following example cited by Brown (1983, p. 334) shows that demonstrative noun phrases still highlight a particular discourse entity for a certain time (Fleming, 1958, p. 43): "And why had Doctor No got this mania for privacy? Why did he go to such expense and trouble to keep people away from his guano island?" In this case, *this mania for privacy* is elaborated on in the following sentence. However, as the narrative has one overall topic, the demonstrative noun phrase might not permanently change the topic (in contrast to what will be hypothesized for German demonstrative pronouns in the remaining parts of this chapter) and thus has a lower degree of persistence compared to unstressed pronouns. Hence, this study shows that particular referential forms can be seen as cues concerning how the discourse will develop.

This is further corroborated by results from other studies on English that focused more generally on larger discourse contexts and referential forms that are used to refer to more or less prominent referents throughout the stories. These studies suggest that shorter forms such as unstressed pronouns are used for the most prominent referent throughout the narrative, which was also described as the sentence topic (Fletcher, 1984), the main character (Anderson et al., 1983; Marslen-Wilson et al., 1982) or protagonist (Morrow, 1985), while more complex forms such as stressed pronouns and full noun phrases are used to refer to less prominent referents where needed (see also Comrie, 1997, for Dutch; Ahrenholz, 2007, for German). These studies thus nicely illustrate, in a very generalised way, that referential forms are associated with referents that have a particular prominence status on a larger discourse level. Therefore, they can modulate expectations as to who will be mentioned in subsequent discourse and more reduced forms generally indicate that the currently prominent referent will be mentioned again while more complex forms indicate that a less prominent referent will be picked up in subsequent discourse. Demonstratives are among the more complex forms and a few studies have investigated whether they promote a previously less prominent referent to a higher prominence status. Firstly, some studies focused on adnominal demonstratives, which are discussed in the following section.

4.2.2 Shift potential of adnominal demonstratives

Some studies particularly focused on the referential shift potential of demonstratives. Gernsbacher & Shroyer (1989, p. 536) explored the idea that languages make available "certain devices to mark [...] concepts that might play a pivotal role in the upcoming discourse." According to Gernsbacher & Shroyer (1989, p. 536), "concepts marked with these devices have a privileged status in the listeners' mental representation–in particular, they are more accessible." This means that it should require very little effort to make references to entities that were referred to via a forward-looking device. The authors investigated the indefinite demonstrative article *this* as an example of such a forward-looking device in English and conducted a continuation task. The participants were instructed to first listen to informal, oral narratives and then to continue the story. The last sentence of each story was incomplete and contained a new referent that was either introduced with the indefinite article *a* or the indefinite demonstrative article *this* (e.g. *an egg* vs *this egg*).

The new referent introduced with the indefinite demonstrative *this* was mentioned significantly more frequently in the participants' continuations compared to the new referent that was introduced with *a*. As frequency can be seen as an indication of a referent's importance in discourse, this result shows that the demonstrative article *this* has indeed promoted the new referent to a more prominent (or accessible) status in discourse. Furthermore, the new referent was already mentioned more often in the first clause of the continuation when it was headed by the indefinite article *this*. Finally, more reduced referential forms such as pronouns were used to refer to the new referent when it was introduced as a demonstrative noun phrase while more complex forms such as definite descriptions were used when the indefinite article *a* preceded the new referent. As explained in the previous chapter, less complex forms correlate with a higher prominence status of the referents. Taken together, these three measures thus indicate that the indefinite demonstrative article *this* renders the newly introduced discourse referent more prominent (or accessible in the authors' terminology).

A similar study was conducted by Chiriacescu (2011) who investigated the English indefinite demonstrative articles *this* and the German equivalent *so'n*. The author constructed informal, written narratives. The last sentence of each narrative introduced a new referent in the direct object position and varied with respect to the article that preceded the newly introduced referent. In both the English and German narratives, the indefinite demonstrative article (*this* or *so'n*) was contrasted with the simple indefinite article and the participants' task was to add five written sentences. The author counted how often the direct objects of the last sentence were mentioned in the participants' continuations. The analysis revealed that referents that were introduced as demonstrative noun phrases were mentioned more often compared to those introduced

as simple indefinite noun phrases. These results were reported for both English and German. When the demonstrative article was used to introduce the new direct object, it was mentioned more often than the other referent from previous discourse (although the graphs suggest that this effect seems more relevant for English).

Chiriacescu (2011) also looked at the first referential expression in each clause that was used to refer to the newly introduced referent. The initial hypothesis was that referents introduced with the indefinite demonstrative article would be more likely to be referred to with a pronoun due to their increased prominence status. However, a relation between the article of the newly introduced referent (indefinite demonstrative vs simple indefinite) and the referential form that was used to refer to it could not be found. This result is somewhat surprising as Gernsbacher & Shroyer (1989) could find such a relation as mentioned in the previous paragraph. However, Chiriacescu (2011) points out that the participants generally used more pronouns in Gernsbacher & Shroyer's (1989) experiment (also for the simple indefinite) while the participants generally used more definite noun phrases in her experiment. Chiriacescu (2011) concludes that differences in the animacy of the referents may influence which type of referential expression was used. Gernsbacher & Shroyer (1989) used animate and inanimate referents while she used only animate referents. According to Chiriacescu (2011), the latter scenario could make it necessary to use more explicit forms such as definite noun phrases in order to avoid ambiguity as it is more difficult to differentiate between two animate referents than it is to differentiate between an inanimate and an animate referent.

The previous two studies suggest that indefinite demonstrative articles enhance a referent's prominence status in discourse, which is reflected by an increased number of mentions in subsequent discourse. These results are corroborated by the next study. Deichsel & von Heusinger (2011) provide empirical evidence of the referential shift potential of the indefinite demonstrative article in German. They carried out a sentence continuation task and compared the indefinite demonstrative *dieser* with the simple indefinite article *ein*. As part of the continuation task, short contexts consisting of two to four sentences were introduced. In these context sentences, a first-person narrator—which was the first-mentioned subject in at least one of the sentences—appeared as a topic. Towards the end of these short stories, a new referent was introduced, either with the indefinite demonstrative or the simple indefinite article (e.g. *dieser Mann* 'this man' vs *ein Mann* 'a man'). Two measures were employed to estimate the referential shift potential. As a first approximation, and similar to the previous studies, all references to the new discourse entity were counted in the continuations. The analysis revealed that the number was higher when the discourse referent was introduced with the indefinite demonstrative article. In addition, the topic shift potential was analysed. For this measure, it was determined whether the new discourse referent was mentioned as a subject, which is

the typical topic position in German, at any point of the continuations. Indeed, 80% of the participants picked up the target referent as a topic at some point in their continuations when it was introduced with the indefinite demonstrative article (compared to 40% when it was introduced with the simple indefinite article). Therefore, the indefinite demonstrative article appears to have a higher topic shift potential compared to the simple indefinite article.

These studies show that indefinite demonstrative articles are associated with a shift function, which can be measured in different ways. The most frequent measure employed in the studies mentioned above is the measure of frequency. It confirmed that referents that were introduced via a demonstrative article were mentioned more often and were thus made more prominent in the continuations. The next section will describe accounts and studies that focused specifically on German demonstrative pronouns.

4.2.3 Shift potential of pronominal demonstrative pronouns

There are several theoretical accounts that refer to the shift potential of German demonstrative pronouns. Weinrich (1993) compares the forward functions of German demonstrative pronouns from the *der/die* paradigm to those of personal pronouns. According to him, the differentiation between thematic and rhematic information is relevant in order to understand the differences between demonstrative and personal pronouns. Thematic information is expected ("unauffällig") (Weinrich, 1993, p. 373) while rhematic information is conspicuous ("auffällig") (Weinrich, 1993, p. 373). Personal pronouns are used to signal referential continuity, i.e. they indicate that the expected referential chain is maintained. Demonstrative pronouns, in contrast, are used to highlight a particular referent that they keep in the focus of attention. This function of demonstrative pronouns is reflected by their preferred syntactic position. They mostly appear sentence-initially and are thus often very close to the referent that they draw attention to (e.g. the previous grammatical object). Weinrich (1993) gives an example from Alfred Döblin's *Berlin Alexanderplatz* in which the plural demonstrative pronoun *die* appears as a sentence-initial subject in a sentence and picks up the grammatical object from the preceding sentence. The grammatical object plays a central role in the upcoming discourse and the demonstrative is used to indicate the importance of this referent. This is further stressed by the fact that it is picked up by a pronoun in subject position (adapted from Weinrich, 1993, p. 382 (interlinear gloss and translation my own)):

(19) *Er nahm den kleinen Lüders [...] in sein Lokal zu den Viehhändlern mit. Die sollten Lüders ausfragen [...].*

he took the small Lüders [...] into his pub to the livestock.dealers with. they-DEM should Lüders

interrogate […].

'He took the small Lüders to his pub and the livestock dealers. They should interrogate Lüders […].'

As there are only a few descriptions of the discourse functions of German demonstrative pronouns, it can be helpful to also consider descriptions of the demonstrative article in German. Weinrich (1993, p. 440) describes the demonstrative article *dies-* as an attention signal for a conspicuous reference ("als Aufmerksamkeitssignal für eine auffällige Referenz"). Demonstrative pronouns and articles are thus both characterised as conspicuous. He further elaborates that demonstrative articles indicate that the current referential chain is slightly changed and the referent headed by the demonstrative article does refer back to the expected referent. However, the demonstrative noun phrases are often different expressions such as a hypernym (as in *the house - this building*). There is thus the potential for misunderstanding and the demonstrative article warns the addressee that the referent has not changed although a different expression has been used. Furthermore, the demonstrative article has a cataphoric potential that corresponds to the forward function as defined in this chapter, where the demonstrative article highlights a referent about whom further information follows in subsequent discourse.

Abraham (2002) defines the characteristics of German demonstrative pronouns in comparison with personal pronouns in a similar way and his description focuses on both types of demonstrative pronouns (*der/die* and *dieser/diese*), but does not differentiate between the two. He also uses the terminology of theme and rheme and, in addition, the framework of Centering Theory (see e.g. Grosz et al., 1995) in order to capture the different forward functions of demonstrative and personal pronouns. According to him, personal pronouns are used to maintain thematic (i.e. old) information. The personal pronoun is thus described as a "THEMAFORTSETZER" ('topic keeper'). In contrast, demonstrative pronouns do not refer back to thematic information and thus signal a referential shift, which is why the demonstrative pronoun is characterised as a "THEMAWECHSLER" ('topic shifter') (Abraham, 2002, p. 459). Using the terminology of Centering Theory, Abraham (2002) outlines that the demonstrative pronoun does not refer back to the preferred centre (i.e. the entity that is most likely to be mentioned in subsequent discourse). Importantly, the notions of rheme and theme have to be applied within the basic verb phrase structure according to the author. Hence, the demonstrative pronoun refers back to the referent that is the rhematic information within the basic order of the verb phrase which corresponds to the head of the most embedded constituent. The surface structure, which can be very different to the basic order within the verb phrase due to the option of scrambling in German, is not relevant for understanding the behaviour of demonstrative pronouns. This can explain why a demonstrative pronoun can refer to the first-mentioned grammatical object from a previous sentence because the grammatical object is the rhematic information within the basic order of the

verb phrase, which is also one reason why the present study investigates different word order variations.

These theoretical accounts suggest that German demonstrative pronouns are associated with a referential shift in discourse. There is also evidence from natural, oral contexts that appear to indicate that demonstrative pronouns in German initiate a referential shift towards a referent that has been less prominent in previous discourse. Delisle (1993) reports that demonstrative pronouns were used for topic shifts in informal phone calls. For example, the demonstrative pronouns were used to pick up a new referent that was introduced as part of a left dislocation construction. The author explains that these constructions signal a topic shift and that the demonstrative pronoun further reinforced the shift towards that referent as illustrated by the following example (adapted from Delisle, 1993, p. 248 (interlinear gloss my own)):

(20) *Du, meine Mutter, die hatte 'ne ganz phantastische Idee.*

you, my mother, she-DEM had an all fantastic idea

'You (know), my mother, she had a great idea.'

Importantly, demonstrative pronouns were also used to signal a topic shift on their own (i.e. without additional topic-shifting constructions such as left dislocations). However, the author of the study highlights that demonstrative pronouns are used for topic shifts when several referents are competing for the topic status as illustrated below (adapted from Delisle, 1993, p. 250 (interlinear gloss my own)):

(21) *Aber* sie *war nicht besonders begeistert.* Sie *hat nämlich den U zu Besuch mit seiner Frau...und* die *is auch en bißchen komisch, ...*

but she-PERS was not particularly enthusiastic. she-PERS has in.fact the U as visitor with his wife...and she-DEM is also a little strange

'But she wasn't very enthusiastic. She has U and his wife visiting...and the latter is also a little bit strange, ...'

In this example, there are two female referents (the pronoun *sie* 'she' as well as *seiner Frau* 'his wife') that the demonstrative pronoun could refer to. The demonstrative pronoun is used to initiate a referential shift towards the wife. According to Delisle (1993), demonstrative pronouns initiate a topic shift in contexts with several competing referents. In other contexts, a personal pronoun could also be used to change the current topic.

The shift function of demonstrative pronouns may further be supported by their preferred syntactic position, as already suggested above. Ahrenholz (2007) presented a very comprehensive study about demonstrative pronouns in spoken contexts based on different corpora. He reports that the preferred syntactic

position of demonstratives from the *der/die* paradigm in declarative sentences is correlated with their shift function. They predominantly occur sentence-initially (which corresponds to the pre-field in the topological model that is often applied to German sentences). Most demonstrative pronouns that were found in this position appeared in the nominative case (which mostly corresponds to the grammatical subject in German; see also Delisle (1993) and Weinert (2007) for similar findings regarding the preferred syntactic position of demonstrative pronouns in German). When demonstrative pronouns appear in declarative sentences, there is a link between their preferred syntactic position and their shift function. Sentence-initial subject pronouns often pick up the rhematic object from the previous sentence. Demonstrative pronouns thus initiate a shift whereby the previous grammatical object is realised as the sentence-initial subject in the following clause. Although it is not specifically mentioned, the referent is also realised in a more prominent thematic role through the shift. This is illustrated by the following example (Kommunikation in der Hochschullehre, D09-de3, Z. 16, adapted from Ahrenholz, 2007, p. 238 (interlinear gloss and translation my own)):

(22) *sind sie da bei <name> oder sowas? weil der macht n-grundkurs über kommunikationstheorie*

are you there at <name> or something? because he-DEM does an-introductory.course on theories.of.communication

'Are you in <name>'s class or something like that? because he offers an introductory course on theories of communication'

In examples like this one, the demonstrative pronouns highlight and keep the focus of attention on a particular (and very often newly introduced) referent that often becomes the topic (and thematic agent) in the subsequent discourse. However, demonstrative pronouns were also used as sentence-initial objects to pick up a non-nominative argument from the previous clause. In these cases, the prominent sentence-initial position of the demonstrative pronoun draws attention to its referent.

Finally, the importance of demonstrative pronouns from the *der/die* paradigm as topic shifters has been investigated by Weinert (2007). The author investigated spontaneous spoken data that consisted of informal conversations and formal academic consultations. In the analysed corpora, demonstrative pronouns often picked up a new or rhematic noun phrase that was introduced as part of an existential or copula clause while personal pronouns picked up established topics. In this way, demonstrative pronouns determined the further development of the discourse. The author concludes that – especially as spoken language is characterised by a very fast exchange of ideas – demonstrative pronouns are very important as they indicate which referent will be focused on next.

These accounts and observations indicate that demonstrative pronouns have an important shift function

in discourse. More specifically, the examples illustrated that demonstrative pronouns initiate a shift towards a referent that has been less prominent in previous discourse. However, as only relatively short examples were provided, it is not clear what role that referent plays in the subsequent discourse. Therefore, in order to measure the shift potential of demonstrative pronouns, empirical studies with pronoun prompts are useful. Thus, in the following, the one available empirical study that investigated the referential shift potential of demonstrative pronouns in German will be reviewed.

The study by Schumacher et al. (2015) investigated the referential shift potential of the German demonstrative pronoun *der* in comparison to the personal pronoun *er*. The experiment consisted of a story continuation task in which the participants received sentence pairs. Two masculine noun phrases were mentioned in the first context sentence, which varied with respect to the verb type (active accusative vs dative experiencer verb, see 10 and 11 for examples), and the word order (canonical vs non-canonical word order) it contained. The argument in sentence-initial position was considered as the aboutness topic (following Reinhart, 1982 as defined in the previous chapter). The second sentence contained a personal or demonstrative pronoun and was incomplete. The participants' task was to continue the story and the aim of the experiment was to investigate whether the occurrence of a demonstrative pronoun in the second sentence prompts participants to change the aboutness topic in their continuations.

For the analysis, it was thus measured which referent from the first sentence was mentioned as an aboutness topic in the sentences that the participants added. When the participants more frequently referred to the first-mentioned referent from the first context sentence in sentence-initial position, it was interpreted as evidence of topic maintenance. If, however, the participants referred to the second-mentioned referent from the context sentence more often in the sentence-initial position in their continuations, this was seen as evidence of a topic shift. When the second sentence contained the demonstrative pronoun *der*, tendencies for topic shift could be observed in the continuations (across the different verb types and word order conditions). However, when the second sentence contained the personal pronoun, the results were more varied. Generally, when the participants received a personal pronoun, they tended to maintain the previous topic with the exception of the non-canonical word order: In the context of dative experiencer verbs and the non-canonical word order, only a few cases of topic maintenance were observed and, in the context of accusative verbs and the non-canonical word order, a tendency for topic shifts was even reported.

4.2.4 Summary

The forward potential refers to the idea that linguistic devices can change current prominence relations in subsequent discourse (von Heusinger & Schumacher, 2019). With regard to referential expressions, it

has been argued that demonstratives indicate that a previously less prominent referent will become more important in upcoming discourse (e.g. Abraham, 2002; Weinrich, 1993). The forward function of referential expressions has not been extensively investigated in comparison to the backward function. However, there are a few studies that investigated how demonstrative articles and pronouns change current prominence relations. Many of these completion studies counted how often a previously less prominent referent was mentioned in the continuations when it was marked with a demonstrative form. The results suggest that (indefinite) demonstratives indeed function to promote a referent's prominence status in discourse. However, most evidence comes from adnominally-used demonstratives, and little is known about the shift function of anaphorically-used demonstrative pronouns in German. Schumacher et al. (2015) compared the forward function of the demonstrative pronoun *der* with the forward function of the personal pronoun *er* in a text continuation study. The results suggest that the demonstrative pronoun *der* encourages participants to mention a previously non-topical referent more often as an aboutness topic in their continuations. However, the results for the personal pronoun were less clear, especially in non-canonical contexts. Furthermore, the study only focused on one type of demonstrative pronoun (*der*) while the shift function of the other type of demonstrative pronoun (*dieser*) has not been addressed yet.

In the following, a text continuation task will thus be presented in order to shed more light on the forward functions of the two different types of demonstrative pronouns (*der* vs *dieser*) compared to the personal pronoun (inspired by Schumacher et al., 2015). The sentence continuation task that was discussed in the previous chapter is part of this larger text continuation task. Participants received an incomplete sentence pair and were asked to provide a continuation consisting of six sentences. The first context sentence introduced two referents that differed with respect to their prominence status. As described in the previous chapter, their prominence status was determined on the basis of their thematic roles (e.g. Dowty, 1991; Kretzschmar et al., 2019; Schumacher et al., 2016). However, while for the previous chapter the notion of proto-roles was applied, for the current purpose a more fine-grained approach was necessary and the agent and experiencer were treated as separate roles. Here, it is important to note that the discussed prominence hierarchies are not affected. The more prominent referent in the first context sentence is either the agent or experiencer and the less prominent referent is the patient. This more fine-grained approach was chosen because the thematic roles of the referents mentioned in the continuations were annotated. Being able to differentiate between different thematic roles made it possible to investigate the prominence status of the referents in more detail as will be described below.

While for the previous chapter, only the continuation of the second incomplete sentence was analysed, for this chapter the complete continuations that the participants were asked to write were analysed. For

this purpose, all animate referents that were mentioned in the continuations were annotated with respect to specific categories such as thematic roles, topic status and referential relations. In this way, referential chains could be tracked and other features could be determined. The aim of the continuation task is to address the question of how different pronominal forms influence upcoming discourse. More specifically, the following hypotheses will be tested:

1. While personal pronouns maintain the current prominence relations between the different referents, the two types of demonstrative pronouns (*der* and *dieser*) promote the previously less prominent referent (i.e. the patient from the first context sentence) to a more prominent discourse status in upcoming discourse. Following Givón (1983), it will be assumed that the frequency of mention is related to a referent's prominence status. If the previously less prominent referent is thus mentioned more often in the continuations after the two types of demonstrative pronouns, this will be interpreted as evidence of a referential shift.

This analysis is similar to those reported in earlier studies (e.g. Chiriacescu, 2011; Gernsbacher & Shroyer, 1989). However, many of the previous studies investigated demonstrative articles (such as *this egg*, Gernsbacher & Shroyer, 1989, p. 537), which means that the less prominent referent was clearly identifiable. In the current research, by contrast, the participants received a potentially ambiguous demonstrative or personal pronoun. They thus had to assign a referent to the pronoun (as discussed in the previous chapter), before continuing their story. How they interpreted the pronoun could thus have impacted the forward potential of any pronoun they received. The study by Schumacher et al. (2015) that investigated the forward function of *der* compared to *er* did not take into account how the participants interpreted the seemingly ambiguous pronouns. It is thus not clear to what extent the backward function (i.e. pronoun interpretation) influences the forward function (i.e. discourse development) and this will be addressed by the second hypothesis.

2. The backward and forward functions are interrelated, which means that how the participants interpret a particular pronoun has an impact on the forward potential of that pronoun. Accordingly, the forward potential can be modulated by the referent that was initially chosen for the pronoun and interpretation towards the prominent referent may decrease the shift potential of demonstrative pronouns. While demonstrative pronouns typically refer back to a non-prominent referent, the results from the previous chapter showed that demonstrative pronouns were also interpreted as referring to the more prominent referent in some cases. Specifically looking at these cases will thus provide insights into how pronoun interpretation affects the forward potential. This will be investigated by analysing the forward potential

depending on how the participants interpreted the pronoun and the following question will be asked: When the participants interpreted the (demonstrative) pronouns as referring to the more (or less) prominent referent from the first context sentence, how often was the less prominent referent mentioned in the continuations?

Furthermore, it will be determined whether – following a referential shift initiated by a demonstrative pronoun – the promoted referent is not only mentioned more frequently but also realised in ways that reflect its enhanced prominence status. Some of the summarised studies (e.g. Gernsbacher & Shroyer, 1989) found a correlation between the enhanced prominence status of a referent and its realisation in the continuations, which the following hypothesis refers to:

3. Following a referential shift initiated by a demonstrative pronoun, the promoted referent is realised in ways that reflect its enhanced prominence status. In particular, referential forms, grammatical cases, and thematic roles will be analysed. It is expected that the promoted referent is referred to via more reduced referential forms (e.g. Gernsbacher & Shroyer, 1989) and more prominent syntactic roles and thematic roles.

Finally, the difference between the two types of demonstrative pronouns will be investigated. Based on spoken data, Ahrenholz (2007) observed that *dieser* is used to select one referent among several potential referents, while *der* is used to keep the focus of attention on a particular referent. This could indicate that *der* and *dieser* differ with respect to the longevity of their shift potential, which is captured by the last hypothesis:

4. The two types of demonstrative pronouns (*der* vs *dieser*) differ in their shift potential. It will be assumed that this variation is reflected in different referential dynamics that the two different demonstrative pronouns evoke. It will be investigated whether one demonstrative pronoun increases references to the previously less prominent referent only temporarily while the other pronoun has a more long-term effect by looking at the time course of story development.

Investigating these aspects will also shed more light on how prominence relations can change in more general situations. The next section will describe the current research in further detail.

4.3 The current research

In the previous section, an overview of studies and accounts was provided that suggests that demonstratives serve to signal a referential shift in discourse. The aim of the current research is to investigate how two types of German demonstrative pronouns (*der* vs *dieser*) change current prominence relations in upcoming discourse. More specifically, it will be investigated whether the demonstrative pronouns are more likely to initiate a referential shift towards a previously less prominent referent compared to the personal pronoun.

For this purpose, a text continuation task was employed, which was inspired by Gernsbacher & Shroyer (1989) and Schumacher et al. (2015). It comprised the sentence continuation task that was presented in the previous chapter. Participants received an incomplete sentence pair that introduced two masculine noun phrases, which differed with respect to their prominence status, and a masculine pronoun (*er* vs *der* vs *dieser*). However, while for the previous research question only the continuations of the second sentence were analysed, for the current purpose, the whole story continuations that the participants were asked to provide were analysed. All referents that were mentioned in the continuations were annotated with respect to different categories such as referential relations, as well as referential forms, grammatical cases and thematic roles. On the basis of these text annotations, a series of analyses will be presented that investigate the shift potential of demonstrative pronouns from different angles.

The first hypothesis states that demonstrative pronouns initiate a referential shift towards the previously less prominent referent. Phrased differently, it is assumed that the referent with the lower-ranked thematic role from the first context sentence becomes more prominent in the participants' continuations. According to Givón (1983, p. 15) "[m]ore important discourse topics appear more frequently in the register, i.e. they have a higher probability of persisting longer in the register after a relevant measuring point." The measure of frequency should therefore indicate which referent took on the more prominent role in the continuations. While Givón (1983) suggests measuring the number of successive sentences in which a particular referent is mentioned, for the current purpose, it will be counted how often a referent is mentioned overall in the continuations. As discussed in the previous chapter, thematic roles can be hierarchised and there is evidence from different domains that agents and experiencers are more prominent compared to other thematic roles (e.g. Dowty, 1991; Fillmore, 2003; Kretzschmar et al., 2019; Schumacher et al., 2016). Since demonstrative pronouns were claimed to change current prominence relations, a higher number of references to the referent with the initially lower-ranked thematic role (i.e. the patient) is expected after one of the demonstrative pronouns. In contrast, after the personal pronoun, a higher number of references to the referent with the higher-ranked thematic role is expected. While for the previous chapter the notion of proto-roles

was applied, for the current purpose a more fine-grained approach is necessary that will be discussed in more detail below. Importantly, the main assumptions outlined in the previous chapter have not changed. If demonstrative pronouns initiate a referential shift, a contrast between continuations following one of the demonstrative pronouns and continuations following the personal pronoun should thus be reflected in how often the patient is mentioned in the continuations.

The second hypothesis is related to the particular design of the current experiment. In previous studies that investigated the referential shift potential of demonstratives, the new referent that was introduced was preceded by a demonstrative article (as in *this egg*, Gernsbacher & Shroyer, 1989, p. 537), whereby the less prominent target referent was clearly identifiable. In the current experiment, however, the participants had to (implicitly) assign a referent to the potentially ambiguous pronoun before they could proceed with their continuation. Thus, the question emerges of how the referent that was chosen for the pronouns in the first instance (i.e. the backward function) influences the forward potential of the different pronouns. This additional factor therefore has to be taken into account and leads to the following hypotheses that will also be tested.

The second hypothesis states that the referential shift potential can be modulated by the referent that was chosen for the demonstrative pronouns. Characterisations of demonstrative pronouns as "topic shifters" (Abraham, 2002, p. 459) or signals for a "conspicuous reference" (Weinrich, 1993, p. 440) are based on the assumption that demonstrative pronouns refer to less prominent referents. Chapter 3 revealed that demonstrative pronouns are typically interpreted as referring to a less prominent referent. However, the interpretive preferences were not fixed and demonstrative pronouns could also be interpreted as referring to the more prominent referent in some cases. Thus, it will be assumed that the shift function is not an intrinsic semantic feature of demonstrative pronouns, but can be modulated by initial pronoun interpretation. When any pronoun is interpreted as referring to the less prominent referent, this referent is likely to be maintained as the centre of attention in upcoming discourse. However, when any pronoun is interpreted as referring to the more prominent referent, there should be no changes regarding the prominence status of different referents in upcoming discourse. Givón (1983) assesses topic continuity by considering both previous and upcoming discourse, which may also support the current hypothesis that the backward and forward function are interrelated. In addition, research from other areas has shown that contextual factors can influence how certain features of a linguistic device are perceived (Kretzschmar et al., 2019). To test this hypothesis, the forward potential will be determined based on how the pronouns were initially interpreted.

The previous two hypotheses are built around the assumption that the promoted referent is mentioned more frequently in the continuations (which may be modulated by contextual factors such as the referent that

was chosen for the pronoun). The third hypothesis states that – following a referential shift initiated by a demonstrative pronoun – the promoted referent is also realised in ways that reflect its enhanced prominence status. As mentioned previously, it is generally assumed that less explicit referential forms are used for more prominent referents (e.g. Ariel, 1990; Gundel et al., 1993). It is therefore expected that the enhanced referent is referred to via more reduced forms. This correlation could be shown in a previous study focusing on English demonstrative articles (Gernsbacher & Shroyer, 1989; but for different results see Chiriacescu, 2011). In addition, the grammatical cases and thematic roles of the referents in the continuations will be analysed. As certain cases and thematic roles have been claimed to be more prominent compared to others (Dowty, 1991; Eisenberg, 2013), it is expected that the promoted referent is linked with those cases and thematic roles (i.e. the nominative case and subject or experiencer roles).

The fourth and final hypothesis concerns possible differences between the two types of German demonstrative pronouns concerning their forward potential. When a language makes two types of demonstrative pronouns available, it can be assumed that there is a functional difference between the two. It is thus assumed that the two types of demonstrative pronouns (*der* vs *dieser*) differ from each other and that this difference is reflected in the different referential dynamics that they evoke. To test this hypothesis, the time course of story development will be explored to reveal whether one pronoun only temporarily increases references to the previous patient while the other pronoun shifts the prominence structure more permanently. Ahrenholz's (2007) finding that demonstrative pronouns from the *der/die* paradigm are used to keep the focus of attention on a particular referent ('Fokuserhalt', Ahrenholz, 2007, p. 238) may indicate that they have the more long-lasting effect on discourse structure compared to demonstrative pronouns from the *dieser/diese* paradigm, but this needs to be tested. In the following, the annotation procedure will be explained in more detail before the results of the different analyses will be presented and discussed.

4.3.1 Participants

The participants and stories that entered the analysis and those that were excluded are outlined in Section 3.3.1. In addition, ten additional data points were excluded for which the intended referent of a referential expression in the continuations was not identifiable.

4.3.2 Material

See Section 3.3.2 for a description of the material.

4.3.3 Procedure

The current experiment followed a single-item design which means that each participant received a questionnaire with only one incomplete sentence pair and, accordingly, only one condition. For an example of an item that a participant received, see (23) below. The participants' task was to continue the story and to add six additional sentences in written form to the questionnaire. An example continuation taken from the experimental data is shown in (24).

(23) **Incomplete sentence pair (with demonstrative pronoun dieser)**

Nach dem Spiel hat der Trainer den Torwart beschimpft. Kurz darauf hat [dieser] dann…

after the match has the-NOM coach the-ACC goalkeeper insulted. shortly afterwards has he-DEM then…

'After the match, the coach insulted the goalkeeper. Shortly afterwards, [he] then…'

(24) **Continuation by participant**

a) *… [seine] Handschuhe an den Nagel gehangen.*

… his gloves to the nail hung

'… hung up [his] gloves.'

b) *[Er] war so wütend,*

he was so angry

'[He] was so angry,'

c) *denn [andere Spieler] auf dem Feld dürfen so viele Fehler machen*

because other players on the field are.allowed so many mistakes make

'because [other players] are allowed to make so many mistakes on the field'

d) *und [niemand] ist deshalb verärgert.*

and no.one is because.of.that angry

'and [no one] is angy because of that.'

e) *Wenn aber [der Torwart] einen Fehler macht,*

when but the goalkeeper a mistake makes

'However, when [the goalkeeper] makes a mistake,'

f) *so ist dies viel schlimmer*

   so is this much worse

   'then this is much worse'

g) *und [er] gerät schnell in die Schusslinie [aller], [die] nach [dem Schuldigen] der Niederlage suchen.*

   and he comes quickly into the firing.line of.all, who after the guilty.party of.the defeat look

   'and [he] quickly comes into the firing line of [all those] [who] are looking for [someone] to blame for the defeat.'

h) *Nach einer hitzigen Diskussion mit [dem Trainer] entschied [der Torwart] ab sofort nicht mehr im Tor [eingesetzt werden zu wollen].*

   after a heated discussion with the coach decided the goalkeeper from now.on not any.more in.the goal deployed to.be to want

   'After a heated discussion with [the coach] [the goalkeeper] decided to not [want to be deployed] as goalkeeper any more.'

i) *[Der Trainer] zeigte wenig Verständnis*

   the coach showed little understanding

   '[The coach] showed little sympathy'

j) *und [machte] [ihm] Vorwürfe.*

   and make him reproaches

   'and [reproached] [him].'

k) *[Der Torwart] ist jetzt Tankwart.*

   the goalkeeper is now petrol.attendant

   '[The goalkeeper] now works as a petrol attendant.'

The next section will illustrate how the continuations were annotated.

4.3.4 Annotation guidelines

In order to annotate the continuations, the annotation software MMAX2 (Müller & Strube, 2006) was used. Each story was annotated by at least two independent annotators and the annotators met regularly to

compare their annotations and discuss problems or disagreements. Since the annotators compared every story, inter-rater agreements were not measured. The annotators mostly agreed and the comparisons mainly served to avoid small mistakes. In cases where the annotators did not agree, each annotator chose the option that they felt most comfortable with. Tricky cases and other information were noted in a separate sheet.

In the continuations, all references to animate referents were marked (as illustrated by bracketing in 24) and annotated with regard to specific categories. In the following, the annotation guidelines for those categories that are relevant to the analyses as described above will be presented. The annotation guidelines were specifically developed for the current experiment and all examples are taken from the present experiment unless otherwise stated.[8] The examples are not fully annotated and only the sentence part that serves to illustrate a particular aspect of the guidelines is highlighted. The aim of the following sections is to give an overview of the annotation guidelines.

4.3.4.1 Referential relations (hypotheses 1 and 2)

The first two hypotheses state that the two types of demonstrative pronouns promote the previously less prominent referent (i.e. the patient) to a more prominent discourse status (reflected in a higher number of mentions) and that this shift potential can be modulated by the referent that was initially chosen for the demonstrative pronoun. In order to test these hypotheses, it had to be annotated whether a referent that was mentioned in the continuations referred to the previously more or less prominent referent. For this purpose, the masculine noun phrases that were introduced in the first context sentence were coded as "referent 1" and "referent 2" depending on their order of appearance. For the later analysis, it could be decoded whether for example "referent 1" was the more or less prominent referent (i.e. the agent/experiencer or patient). Furthermore, references to newly-introduced referents were annotated. This leads to the following available options:

- Other (when a referential form did not refer back to any of the referents introduced in the first context sentence)

- Referent 1 (when a referential form referred to the first-mentioned referent from the first context sentence)

- Referent 2 (when a referential form referred to the second-mentioned referent from the first context sentence)

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[8]For ease of reading, minor punctuation and spelling errors were corrected in the examples.

- Referent 1 + Referent 2 (when a referential form referred to both referents from the first context sentence)

- Referent 1 + other (when a referential form referred to the first-mentioned referent from the first context sentence and an additional referent or additional referents that was/were not introduced as part of the first context sentence)

- Referent 2 + other (when a referential form referred to the second-mentioned referent from the first context sentence and an additional referent or additional referents that was/were not introduced as part of the first context sentence)

- Referent 1 + Referent 2 + other (when a referential form referred to both referents from the first context sentence and an additional referent or additional referents that was/were not introduced as part of the first context sentence)

- Doubt (in cases where the intended referent was not unambiguously identifiable)

When a singular noun was used to refer to a group of people (such as *the pair* or, in the context of a soccer game, *the defence*) all referents that were evoked as part of the noun phrase were annotated:

(25) *[…] und warf dem Trainer vor, [**die Abwehr**]-OTHER falsch aufgestellt zu haben,*
'[…] and accused the coach of having selected [**the (wrong) defence**],'
*weshalb es oft zu gefährlichen Situationen für [**die Mannschaft**]-REF1+REF2+OTHER kam.*
'which lead to dangerous situations for [**the whole team**].'

(26) *[**Die beiden**]-REF1+REF2 diskutieren eine Weile.*
'[**Both of them**] debated for a while.'

Furthermore, the referent of the potentially ambiguous pronoun had to be determined in order to investigate whether interpretive choices influence the shift function of demonstrative pronouns. A detailed description of how the intended referent was determined can be found in the previous chapter on the backward function. In example (24), for instance, the continuation reveals that the participant must have interpreted the demonstrative pronoun as referring to the goalkeeper.

Additional categories were annotated for the analyses concerning the other hypotheses. The third hypothesis states that – following a referential shift initiated by a demonstrative pronoun – the promoted referent is realised in ways that reflect its enhanced prominence status. To test this hypothesis, the referential forms, grammatical cases, and thematic roles of the referents were annotated as described below.

4.3.4.2 Referential forms (hypothesis 3)

First, the type of referential expression was noted (e.g. whether it was a definite noun phrase or a personal pronoun). In the current experiment, a distinction between the following referential forms was made (for an overview of different referential expressions that can be annotated in German texts, see also Chiarcos et al., 2016):

- Definite noun phrase (*der Hotelier* 'the hotel keeper')

  *[**Der Hotelier**]-DEF.NP wünschte sich, jeder Gast sei so angenehm, wie dieser Reisende.*

  '[**The hotel keeper**] wished that every guest was as pleasant as this traveller.'

- Indefinite noun phrase (*ein großer Mann* 'a big man', *jeder Gast* 'every guest'):

  *Und da sah er, wie [**eine andere Frau**]-INDF.NP 20 Minuten später in dasselbe Haus eintrat.*

  'And then he saw how [**another woman**] entered the same house 20 minutes later.'

- Demonstrative noun phrase (*dieser Reisende* 'this traveller'):

  *Der Hotelier wünschte sich, jeder Gast sei so angenehm, wie [**dieser Reisende**]-DEM.NP.*

  'The hotel keeper wished that every guest was as pleasant as [**this traveller**].'

- Proper name:

  *[**Horst Gemir**]-PR war ein Mann mittleren Alters, möglicherweise 45 Jahre.*

  '[**Horst Gemir**] was a middle-aged man, possibly 45 years old.'

- Bare noun phrase:

  *[...] und zogen [**kleine Rehe**]-BR mit der Flasche groß.*

  '[...] and bottle raised [**little deer**].'

- Personal pronoun (*sie* 'she', *er* 'he'):

  Der Sohn brauchte zu lange in der Dusche,

  'The son needed too much time in the shower,'

  *weshalb [**er**]-PERS zu wenig Zeit für das Frühstück hatte.*

  'which is why [**he**] didn't have enough time for breakfast.'

- Demonstrative pronoun I (*die*, *der*):

  Er fühlte sich beobachtet

  'He felt observed'

  und erzählte dies später seiner Frau.

'and talked to his wife about it.'

*[Die]-*DEM *verstand die Aufregung nicht [...].*

'[**She**] didn't understand his outrage.'

- Demonstrative pronoun II (*diese*, *dieser*, *jene*, *jener*):

  Zu Fuß folgte er dem Ehemann dann durch die Fußgängerzone,

  'He followed the husband through the pedestrian zone on foot'

  *bis [dieser]-*DEM *wieder in sein Bürogebäude verschwunden war.*

  'until [**he**] vanished into his office again.'

- Possessive pronoun (*seine* 'her', *sein* 'his'):

  Kurz darauf ist dieser dann wütend in die Kabine gestürmt

  'Shortly afterwards he stormed into the changing rooms'

  *und hat [seine]-*POSS *Handschuhe auf den Boden geworfen.*

  'and threw [**his**] gloves onto the floor.'

  Possessive pronouns were annotated in the following ways:

  - possessive pronoun + inanimate referent

    *[seine]-*POSS *Handschuhe*

    '[**his**] gloves'

  - possessive pronoun + animate referent

    *[seine]-*POSS *[Frau]*

    '[**his**] [**wife**]'

  - preposition + possessive pronoun + inanimate referent

    *mit [seinen]-*POSS *Handschuhen*

    'with [**his**] gloves'

  - preposition + possessive pronoun + animate referent

    *mit [seiner]-*POSS *[Frau]*

    'with [**his**] [**wife**]'

For possessive pronouns, the annotation of some categories was not applicable (e.g. thematic roles). Therefore, only the referential form, the information whether or not they were part of an embedded clause (see below), and their referential relations were annotated.

- Indefinite pronouns (*beide* 'both', *alle* 'all', *niemand* 'nobody', *keiner* 'no one', *man* 'one', *jeder* 'everyone'):

  a) *Jeden Morgen hat den Heimbewohner der Pfleger gekämmt.*

  'Every morning the (male) nurse combed the (male) resident.'

  b) *Dabei hat der oft von seinem Alltag erzählt.*

  'During this process, he often talked about his everyday life.'

  c) *Dabei konnte er sich entspannen*

  'During this process, he could relax'

  d) *und einen Eindruck von den aktuellen Themen der jungen Menschen bekommen.*

  'and get an impression of current topics of young people.'

  e) *Vieles erschien ihm leichter,*

  'A lot seemed easier to him,'

  f) *[man]*-INDF.PRN *kann sich leichter verständigen*

  '[**one**] can communicate more easily'

  g) *und Distanzen durch Technik überbrücken,*

  'and bridge distances through technology,'

  h) *andere Dinge wirkten wie ein Druck auf die Menschen draußen.*

  'other aspects appear to put pressure on the people outside.'

In this example, the bold indefinite pronoun refers to young people in general. The nurse is not explicitly mentioned but undoubtedly belongs to the group of young people. Therefore, it can be argued that the nurse is activated through the indefinite pronoun. In the current experiment, the nurse was thus annotated as one of the referents of the indefinite pronoun.

- Reflexive pronoun (*sich* 'her-/himself'):

  *Wie jeden Tag hat [**sich**]-*REFL$_i$ *der Detektiv$_i$ gefragt [...].*

  'Like every day the detective$_i$ asked [**himself**]$_i$ [...].'

  *Wie jeden Tag hat der Detektiv$_i$ [**den Polizisten**]$_k$ gefragt [...].*

  'Like every day the detective$_i$ asked [**the police officer**]$_k$ [...].'

Reflexive pronouns were only annotated in the current experiment when they functioned as an argument of the verb, which can be tested in two ways: either they can be moved to the beginning of the sentence (Chiarcos et al., 2016) or replaced by another animate referent (as

illustrated above). Similar to the annotation of possessive pronouns, only the referential form, the information whether or not they occurred in an embedded clause, and their referential relations were annotated.

- Reciprocal pronoun (*sich/einander* 'each other'):

  *Nach dem Krieg fanden sie$_i$ [**sich**]-RECP$_i$ glücklicherweise wieder.*

  'After the war they$_i$ luckily found [**each other**]$_i$ again.'

  When the pronoun *sich* can be replaced by *sich gegenseitig* or *einander* ('each other'), the form has to be annotated as a reciprocal pronoun. Only the referential form, the information whether or not it occurred in an embedded clause, and their referential relations were annotated.

- Relative pronoun (*der*, *die* 'who'):

  Am Strand sah er mehrere andere Segler,

  'On the beach he saw several other sailors'

  [die]-REL ihre Boote aus dem Wasser holten.

  '[**who**] pulled their boats from the water.'

- Resumptive pronoun:

  *Die Segler, [**sie**]-RES waren sehr nett. (constructed example)*

  'The sailors, [**they**] were very nice.'

- Zero pronoun: Standard German is not a typical null-subject language and the use of zero pronouns is thus more restricted than in other languages such as Italian or Spanish. In the current experiment, zero pronouns were annotated in four different cases.

  – Zero in coordinate clauses:

    Wie auch die Tage davor ist er in seinen schwarzen BMW gestiegen,

    'As on the previous days he climbed into his black BMW,'

    [hat]-ZERO sein Handy gezückt

    '[**pulled out**] his cell phone'

    und erst einmal genau 3 Minuten [telefoniert]-ZERO.

    'and first of all [**phoned**] for exactly 3 minutes.'

    In coordinate clauses, the zero pronoun was marked from the second finite verb onwards. When a clause did not contain a finite verb, the zero pronoun was marked on the participle.

As will be outlined below, when two simple verbs were conjoined, they were not separated in the current experiment. The second verb in such constructions was thus not marked:

*[**Sie**]-PERS jagten und försteten von nun an gemeinsam.*

'[**They**] hunted and enforested from now on together.'

– Zero in embedded infinitive clauses:

*[…] und beschlossen, ein Bier [**trinken zu gehen**]-ZERO.*

'[…] and decided [**to go out**] for a pint of beer.'

In this experiment, infinitives that are part of embedded clauses were annotated as illustrated in the above example. This decision is based on findings from the processing literature. Boland et al. (1990) tested subject and object control verbs. In sentences with object control verbs, the object of the matrix verb is the subject of the infinitive (as in the example *The cowboy signalled the horse to surrender to the authorities*, Boland et al., 1990, p. 417). Accordingly, the horse is the subject of the infinitive, which, however, leads to an implausible sentence interpretation since a horse is unlikely to surrender itself to the police. The authors report that participants started to judge this sentence (and similar sentences) as implausible as soon as they encountered the infinitive. They conclude that the referent of the infinitive (here: *the horse*) must be activated as soon as the infinitive is encountered. There is additional evidence from Demestre et al. (1999) who conducted an ERP study. The authors tested Spanish sentences containing infinitival complements such as *Peter has advised Mary to be more polite with the employees* (adapted from Demestre et al., 1999, p. 300). As adjectives in Spanish carry gender agreement, the sentences were manipulated so that in some sentences the adjective did not agree in gender with the object from the matrix clause (which functions as antecedent). ERPs were measured on the adjective and in sentences with gender disagreement, a biphasic ERP wave was elicited that could also be detected in other studies that investigated syntactic irregularities. The study thus shows that the referent is activated as soon as PRO is encountered. Therefore, when a lexical item follows that does not morphologically agree with the referent, this is detected immediately. As the aim of the current experiment is to compare the activation of different referents throughout the continuations, zero pronouns were annotated in embedded clauses as suggested by the findings from the previous two studies.

– Zero in independent infinitive clauses:

Wenig später ist er dann zu dem Segler gegangen,

'A little later he then went to the sailor'

um ihn [kennenzulernen]-ZERO.

'in order to [**get to know**] him.'

 – Zero in independent adverbial participles and adverbs:

Halb [überrascht]-ZERO,

'Half [**surprised**],'

halb [verärgert]-ZERO [...].

'half [**annoyed**] [...].'

In the case of an adverbial participle or adverb that, due to its complexity, classifies as an independent clause (see below for the criteria that define independent clauses) but is part of an embedded clause, a zero pronoun was annotated but the adverbial participle or adverb was not separated into an independent discourse unit:

[...] und der Detektiv beschloss, das nächste Mal, [getarnt]-ZERO als Kunde, ebenfalls das Geschäft zu betreten.

'[...] and the detective decided to enter the shop as well the next time [**disguised**] as a customer.'

Some referential forms were not annotated in the current experiment. In the following examples, the expressions without brackets and marked in bold were *not* annotated.

- Noun phrases in predicative complements:
  *Der Dorfpolizist hingegen war **ein akribischer Mann**.*
  'The village policeman, however, was **a meticulous man**.'

In the above example, the second noun phrase (marked in bold) does not refer to a referent, but describes a characteristic of the first noun phrase (Chiarcos et al., 2016) and was therefore not annotated in the current experiment. However, if a predicative complement contained an additional reference to an animate entity, the additional reference was annotated, as in many cases the additional reference was picked up again in the following discourse (e.g. *Denn er war Mitglied [einer der einflussreichsten Drogenbanden in Boston]*. 'Because he was a member [**of one of the most influential drug gangs in Boston**].'). Similarly, the second argument in comparative constructions (such as *bigger as...*) was annotated, since an additional referent

is activated that does not refer back to the first-mentioned argument (*Sie war jünger als [der Ehemann].* 'She was younger than [**the husband**].').

- Noun phrases in appositions:

  *[…] dass beide, **Förster und Jäger**, […].*
  '[…] that both, **ranger and hunter**, […].'

  When the apposition contained an additional reference to an animate entity, the additional reference was annotated (*der Jäger, [des Försters] Erzfeind* 'the hunter, the archenemy of [**the ranger**]').

- Expletive pronouns:

  ***Es** war [ein großer Mann mit Bart, Brille und einem Hut]-*INDF.NP.
  '**It** was [**a big man with a beard, glasses and a hat**].'

  Expletive pronouns are also non-referential (Chiarcos et al., 2016). However, the referential form following the expletive pronoun was annotated in this experiment, since in many cases it was mentioned again in subsequent discourse.

Finally, a few general points regarding the annotation of referential forms need to be addressed. Firstly, when two referential forms were coordinated, both forms were marked separately (*Sowohl [dem Jäger] als auch [dem Förster] wurde klar, […].* 'Both [**the hunter**] and [**the ranger**] realised that […].'). Secondly, a few nouns, mostly collective nouns and weak definites, can either refer to an institution or a more abstract concept, or to the individual(s) behind the institution or concept. In this experiment, it depended on the larger context whether these kinds of referential forms were annotated or not. In the first two examples listed below, the collective nouns were annotated because it can be argued that the individuals working for the respective institutions are foregrounded (which is further stressed by the active verbs that the sentences contain and that assign both nouns the role of thematic agents). In the last example, however, the more abstract concept of a bakery is mainly evoked. Therefore, the weak definite was not annotated:

(27) *[Die Behörde]-*DEF.NP *ermahnte den Jäger daraufhin zur Vorsicht.*
     '[**The authorities**] urged the hunter to be more careful in the future.'

(28) *[**Die Polizei**]-*DEF.NP *würde ihnen sicher nicht auf die Schliche kommen.*

'[**The police**] surely wouldn't catch them.'

(29) *Jeden Tag ist er morgens **zum Bäcker** gegangen.*

'Every day he went to **the bakery** in the morning.'

This section addressed different referential forms that were marked and annotated. In the following sections, other categories that were annotated, such as grammatical case or thematic roles will be described since these are also assumed to reflect a referent's prominence status as stated by the third hypothesis.

4.3.4.3   Grammatical case (hypothesis 3)

In this experiment, a very straightforward scheme was applied to annotate grammatical relations in a sentence. The scheme is based on the distinction between referents that are grammatical arguments of the verb from the matrix clause and referents that are part of an embedded clause. When a referent was an argument of the verb from the main/matrix clause, the following options were available:

- Nominative case

- Accusative case

- Dative case:

  Dieser schaute sich das Problem an

  'He looked at the problem'

  *und erklärte [**dem Fahrer**]-*DAT*, dass sein Fahrrad mindestens zwei Wochen bei ihm bleiben müsse.*

  'and explained to [**the cyclist**] that his bike had to stay with him for at least two weeks.'

- Genitive case

- Oblique (for prepositional objects):

  *[...] und geht zurück [**zum General**]-*OBL *[...].*

  '[...] and goes back to [**the general**] [...].'

  The following criteria were applied to identify prepositional objects:

  - A prepositional phrase is the object of the verb, when the preposition has mostly lost its original lexical meaning (Eisenberg, 2013):

*Er trauert um [**die Katze**]-OBL. (constructed example)*

'He grieves for [**the cat**].'

– A prepositional phrase is the object of the verb, when the semantics of the verb require a specification of a place or time. In the following example, without the prepositional object, one would be left wondering where the person is going (Eisenberg, 2013):

*[...] und geht zurück [**zum General**]-OBL [...].*

'[...] and goes back to [**the general**] [...].'

Usually, the referents are marked without the preposition. However, in this case the preposition and the definite article of the noun phrase are combined/contracted (*zum = zu dem*) and therefore the preposition was also annotated.

– When the thematic agent is realised in a passive clause, the agent is marked as a prepositional object:

*Kurz darauf ist er dann von **seinem [Co-Trainer]**-OBL für sein Verhalten gerügt worden.*

'Shortly afterwards he was then scolded for his behaviour by **his [assistant coach**].'

– In a comparative construction, the entity after the preposition is annotated as a prepositional object:

*Sie war jünger als [**der Ehemann**]-OBL.*

'She was younger than [**the husband**].'

These were the available options for animate entities that are arguments of the verb from the matrix clause. In addition, there was the option "adjunct" for entities that were not arguments of the verb from the matrix clause but mentioned in addition to the arguments as part of a main or matrix clause:

• Adjuncts (that are not arguments of the verb, but appear as part of the matrix clause and are not part of an embedded construction):

*[...] um mit [**ihm**]-ADJUNCT zu frühstücken.*

'[...] in order to have breakfast with [**him**].'

Moreover, the annotators were told to choose the option "embedded" when the animate entity was not an argument of the verb from the main clause, but part of an embedded construction. The following list illustrates the different constructions that were summarised under the term "embedded".[9]

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[9]Embedded clauses are not assigned a topic and thus all referents appearing in embedded constructions received the tag "na" for annotations on the topic level.

- Embedded:

  - Attributive genitive:

    *Dies hat der Soldat durch das Putzen der Stiefel **seines [Bettnachbarn]**-EMBEDDED erreicht.*

    'The soldier achieved this by cleaning the shoes of **his** [**neighbour in the next bed**].'

  - Prepositional phrases that function as attributes:

    *Segelkurse für **[Jugendliche]**-EMBEDDED*

    'sailing courses for [**adolescents**]'

  - Animate entities that are mentioned in complement clauses and restrictive relative clauses:

    Dieser schaute sich das Problem an

    'He looked at the problem'

    *und erklärte dem Fahrer, dass sein Fahrrad mindestens zwei Wochen bei [**ihm**]-EMBEDDED bleiben müsse.*

    'and explained to the cyclist that his bike had to stay with [**him**] for at least two weeks.'

It is important to be able to distinguish between referents that are arguments of the verb from the main clause and entities that are mentioned in embedded constructions as there is evidence that entities in matrix clauses have a more prominent discourse status than referents in embedded clauses. For example, when an anaphor such as a pronoun or a noun phrase referred back to a referent that was not the topic of the previous discourse, the reading times for the anaphor were slower when the anaphor was introduced in a subordinate clause compared to when it was introduced as an argument of the verb from the main clause (Clifton & Ferreira, 1987). The distinction between referents in matrix and embedded clauses is therefore important for the final data analysis. However, for the purpose of this experiment, it is not necessary to differentiate between different embedded constructions as there are no hypotheses regarding the different embedded constructions. In general, this scheme has the advantage that it leaves very little room for interpretation since the main task is to differentiate between arguments of the verb from the matrix clause and other referents. The grammatical case of an argument is easy to identify. Nevertheless, grammatical relations and hierarchies can be established and case hierarchies suggest the following ranking of grammatical cases in German (Eisenberg, 2013, p. 63):

(30) Nominative > Accusative > Dative > Genitive, Prepositional Groups (Oblique in the current experiment)

Higher-ranked grammatical cases (such as the nominative case) are less marked compared to lower-

ranked grammatical cases that have more distinct suffixes. In addition, the hierarchy reflects the order in which verbs select their complements (i.e. intransitive verbs select a subject while transitive verbs preferably select a subject and an accusative object). This hierarchy can thus be related to the notion of prominence since higher-ranked grammatical cases are arguably more prominent than lower-ranked grammatical cases. Since the thematic role of animate entities was also annotated, as will be described in the following section, the grammatical role and thematic role taken together give a detailed picture of a referent's prominence status in discourse.

4.3.4.4 Thematic roles (hypothesis 3)

In this thesis, thematic roles are considered as a very important prominence-lending factor and were thus central to the hypotheses outlined at the beginning of the chapter. Therefore, the guidelines for the annotations of thematic roles are especially important. The classification of thematic roles is mainly based on Dowty (1991) and Primus (2012). In general, thematic roles were assigned based on the larger pragmatic context and not solely based on verb semantics (Holisky, 1987). The following thematic roles were annotated so that the prominence status of different referents in the story continuations could be ranked:

- Agent: In order to be classified as an agent of the clause, one of the following components has to apply.[10]

  - Volitionality: The agent X of a clause performs a volitional action and intends the event that is described by the verb (Dowty, 1991). Several tests have been suggested in order to check whether an entity controlled and volitionally caused an event. For example, consider the sentence *Around midnight, he went to the garage.* If the sentence can be rephrased in the following ways without changing its meaning, the referent in question is very likely to be the agent of the clause (tests taken and translated from Primus, 2012):

    what X did/refrained from doing was (*What he did was going to the garage.*)

    X intended to do something (*He intended to go to the garage.*)

    X tried to do something (*He tried to go to the garage.*)

    On the basis of these tests, it can be concluded that the entity *he* is likely to be the agent of the clause. These tests also help to classify verbs that describe end states (such as *to lose*, *to win* or *to escape*). When one can assume that the outcome described by the verb was intended (as in *to win the lottery* or *to win a football match*),the first argument of the verb is classified as an

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[10]Verbs differ with respect to how many components apply (Primus, 2012).

agent. If, however, the outcome was most likely not intended (as in *to lose something*), the first argument of the verb is not classified as an agent. If the first argument of stative verbs such as *to stand*, *to sit* or *to lie* is an animate entity, it is also classified as an agent: "when predicated of humans, verbs such as *sit, stand,* etc. are typically volitionally controlled" (Dowty, 1979, p. 176). This also serves to illustrate that thematic roles are not only assigned based on verb semantics but based on many interacting factors such as the animacy of the first argument (Holisky, 1987).

– Causality: The agent X of a clause (intentionally or unintentionally) causes the event that is described by the verb and there is a causal relation between the agent X and another entity Y (Dowty, 1991; Primus, 2012). Therefore, if a person spills something, they are classified as agent because they caused the spilling (irrespective of whether it was intended or not).

– Movement: The agent X is characterised by movement. The movement can be intentional or unintentional. Thus, if a person accidentally stumbles, they are classified as an agent (Dowty, 1991). On a more abstract level, verbs expressing bodily functions that can be observed from the outside are classified as agentive verbs (Dowty, 1991). A few examples (some of them constructed) include: *to sweat, to sneeze, to shiver, to cough, to stutter, to bleed, to sleep, to cry or to smile.*

– Possessor: The agent possesses something and has control over the possession. For example, the possession can be sold or passed on (Primus, 2012).

– Sentience: In the current experiment, sentience is treated as a separate role (see Experiencer below).

• Experiencer: The experiencer of a verb is associated with one of the following processes (Primus, 2012).

– Perception (*to see*, *to notice*)

– Sensation (*to freeze*)

– Emotion (*to like*, *to hate*)

– Evaluation (*to appreciate*, *to prefer*)

– Knowledge-based states or processes (*to know*, *to remember*; however, *to contemplate* and *to think about something* are treated as agentive verbs in the current experiment, as the subject argument has control over these thought processes)

• Patient: In order to be classified as a patient of the clause, one of the following components has to apply.

- The patient is characterised by a change of state (Dowty, 1991). Common examples found in the current experiment are *to fall asleep* or *to wake up* where the subject argument clearly changes its change of state (from being awake to being asleep or vice versa).

- Affectedness: The patient is causally affected by the actions of another participant (Primus, 2012) as in the example *Niemals zuvor hat [**ihn**]-PATIENT ein Urlauber angesprochen* ('Never before has a tourist addressed [**him**]'). For the purpose of the current experiment, this component was also taken to encompass situations in which a participant was affected by a situation (Larson, 1984) that was not necessarily caused by someone else and that was not intended by the participant as in the following example:

  *[…] so haben [**sie**]-PATIENT 12:0 verloren.*

  '[…] this way, [**they**] lost 12:0.'

- Stimulus: The patient is the stimulus and thus the participant that is being admired, loved, etc. (Primus, 2012).

- Recipient: In order to be classified as a recipient of the clause, one of the following components has to apply.

  - The recipient receives something concrete such as money or flowers (Primus, 2012).

  - The recipient receives information and is often the object of argument of a verb of communication. The recipient is informed about something and, therefore, expands its mindset:

    *Der Hotelier gab gerne Auskunft, um [**dem Reisenden**]-RECIPIENT sein Land näher zu bringen.*

    'The hotel keeper was happy to provide information in order to bring his country closer to [**the traveller**].'

    *Wenig später hat dieser dann [**den Segler**]-RECIPIENT angesprochen, wohin er denn als nächstes segeln würde.*

    'Shortly afterwards he then asked (addressed) [**the sailor**] where he would sail to next.'

When annotating the stories, it was not always straightforward to differentiate between thematic patients and recipients. Therefore, the annotators tried to evaluate whether affectedness or the reception of information was foregrounded in a sentence. In the current experiment, the object of the verb *to address* could be interpreted as a thematic patient or recipient. When *to address* was used as a synonym for approaching someone and taking the first step, the object was characterized as a patient. If, however, *to address* was used as a verb of communication and it was explained what was talked about,

the object was classified as a recipient. This is why the verb *to address* serves both to illustrate the role of the thematic patient and the role of the thematic recipient.

- Argument: In order to be classified as an argument of the clause, one of the following components has to apply.

  - There are verbs whose arguments do not differ from each other with regard to their thematic roles. One of those verbs is *to be similar to* (Primus, 2012). The category "argument" captures these verbs and other arguments that do not carry any characteristics of the other thematic roles (Dowty, 1991). Following this definition, subject arguments in predicative expressions were also classified as arguments in the current experiment:

    *[**Der Segler**]-ARGUMENT war älter.*

    '[**The sailor**] was older.'

  - Furthermore, arguments of verbs that express social relationships such as kinship were assigned the argument role as there is no hierarchy between the different participants (as in *X is the cousin of Y*, constructed example).

In contrast to the patient role, the argument role was chosen for neutral and static specifications of a location (for example, where someone is standing in front of someone else without necessarily affecting that person). However, when an object served to specify a location and that person was also affected by the movement of another person, the patient role was chosen:

*Wenig später ist der dann zu **seinem** [**Vorgesetzten**]-PATIENT gegangen.*

'Shortly afterwards he then went to **his** [**boss**].'

- Other: Finally, a category for objects that specify a location (or time point) was introduced.

  - *Dabei ist ihm an jeder Ampel ein schwarzes Auto hinter [**ihm**]-OTHER aufgefallen.*

    'During this process, he noticed a black car behind [**him**] at the traffic lights.'

    *Als dieser vor [**ihm**]-OTHER stand.*

    'When he was standing in front of [**him**].'

To conclude, a few general rules concerning the annotation of thematic roles have to be addressed.

- Modal verbs:

  There are no specific rules regarding the annotation of modal verbs in the literature. Therefore, for the purpose of this experiment, the guidelines for modal verbs were based on raising verbs where

the subject agrees in number and gender with the finite verb but receives its thematic role from the infinitive (Eisenberg, 2013). In the following example, the subject argument is the thematic patient, since the verb *to die* describes a change of state:

*[...] als [**jemand**]-PATIENT sterben wollte.*

'[...] when [**someone**] wanted to die.'

- Negation:

Negated sentences were annotated based on the respective context. Thus, losing a game and almost winning a game were treated similarly with respect to the thematic roles of their subject arguments and both were assigned the role of thematic patient for the reasons that were discussed further above.

- Adjuncts introduced via the preposition *with*:

In sentences where a referent also takes part in the action that the grammatical subject performs but is mentioned as part of an adjunct, that referent was treated as a thematic patient to reflect the hierarchy between the subject argument and the adjunct:

*Er geht mit [**ihr**]-PATIENT.*

'He goes with [**her**].'

- *to begin to do something*:

Both the referent of the finite verb and the one of the to-infinitive were marked separately, as decribed above. The thematic role of the finite verb is based on the thematic role of the infinitive. Hence, in the following example, both arguments are assigned the experiencer role:

*[**Er**]-EXPERIENCER fängt an [**zu verstehen**]-EXPERIENCER.*

'[**He**] begins to understand.'

- Hierarchy:

When two arguments of a verb have similar thematic roles, the first argument is ranked higher in order to reflect the hierarchical relation between the two. In the following examples, both arguments have typical characteristics of the thematic patient. The racing driver needs a good mechanic and is thus to some degree affected by the situation that makes it necessary to have a good mechanic while the mechanic is the stimulus. However, as the racing driver is the first argument, he is classified as an experiencer which is the higher thematic role.

*[**Ein Rennfahrer**]-EXPERIENCER ist auf [**einen guten Mechaniker**]-PATIENT angewiesen.*

'[**A racing driver**] needs [**a good mechanic**].'

- *in contrast to* constructions:

The entity that is mentioned as part of the *in contrast to* construction receives the same thematic role as the subject argument of the verb. Hence, in the following example, both the supervisor and the family are assigned the experiencer role.

*Im Gegensatz zu **seinem [Vorgesetzten]**-EXPERIENCER verstand **seine [Familie]**-EXPERIENCER sein Verhalten.*

'In contrast to **his [supervisor]**, **his [family]** understood his behaviour.'

- First context sentence:

  Sometimes the thematic roles that are assigned as part of the first context sentence depend on how the participants understood the context sentence, which is revealed by their continuations. For example, the verb *to meet* can have an agent and patient (when the participants intended to meet each other) or an experiencer and patient (when the participants bumped into each other). Significantly, in both cases, there is a prominence hierarchy between the agent or experiencer and the patient.

- Subjunctive mood:

  When participants used the subjunctive mood, the thematic role of the subject argument was based on the infinitive. In the following example, the pronoun marked in bold was assigned the agent role as *to sail* is an agentive verb.

  *Wenig später hat dieser dann den Segler angesprochen, wohin **[er]**-AGENT denn als nächstes segeln würde.*

  'Shortly afterwards he then asked (addressed) the sailor where **[he]** would sail to next.'

4.3.4.5 Discourse segmentation (hypothesis 4)

The final hypothesis states that the two demonstrative pronouns differ with respect to whether their shift function has a short-term or more long-term effect, which will be investigated by looking at the time course of the story development. For this purpose, the sentences were numbered. In this way, it could be analysed whether, for example, one demonstrative pronoun encourages participants to increase references to the previous patient only in sentences with a lower number while the other demonstrative encourages participants to increase references to the previous patient throughout the stories. Therefore, it is important to define which discourse units correspond to sentences. In the current experiment, the short stories were segmented into smaller units (sentences) based on semantic and pragmatic criteria. A discourse unit (sentence) is defined as an independent unit of meaning (Chiarcos et al., 2016) and, for the purpose of this experiment, corresponds to a clause with a verb (e.g. Mann & Thompson, 1988). The following list illustrates which clauses were treated as independent units of meaning (taken from the annotation guidelines

developed by Stede et al. (2016) for German unless otherwise stated), whereby each line of the following examples represents an independent unit (sentence).

- Simple main clauses:

  [Neulich hat der Detektiv den Ehemann beobachtet.]

  '[Recently, the detective observed the husband.]'

- Coordinate clauses (i.e. clauses containing one of the following conjunctions: *und* 'and', *oder* 'or', *denn* 'since', *aber* 'but', *sondern* 'but rather'):

  [Danach ist dieser dann in die Küche genangen]

  '[Afterwards, he then went into the kitchen]'

  [und hat seiner Frau bei den Vorbereitungen des Frühstücks geholfen.]

  '**[and helped his wife to prepare the breakfast.]**'

  When two simple verbs were coordinated (as in *Sie **jagten und försteten** von nun an gemeinsam.* 'They **hunted and enforested** from now on together.'), they were not separated in the current experiment (Wolf & Gibson, 2005). Verbs were only separated when at least one of them was part of a complex phrase and took a different complement than the other verb.

- Adverbial clauses:

  [Als es dunkel wurde,]

  '**[When it got dark]**'

  [schaltete er den Computer aus [...].]

  '[he turned off the computer [...].]'

- Infinitive clauses:

  - Clauses with *um zu* ('in order to'):

    [An diesem Tag ist er wieder nach Hause gefahren,]

    '[On this day, he drove back home again]'

    [um mit seiner Frau gemeinsam zu essen.]

    '**[in order to eat together with his wife.]**'

  - Clauses with *ohne* ('without'):

    '[Er spielte mehrere Stunden,]'

    [He played for several hours]

    [ohne vom Tisch aufzustehen.]

    '**[without leaving the table.]**'

– Clauses with *anstatt* ('instead of'):

[Dies erreichten sie,]

'[They achieved this]'

[indem sie [...] an den See schwimmen gingen,]

'[by going swimming [...] in the lake]'

[anstatt zum angesetzten Appell zu erscheinen.]

'**[instead of lining up for the appeal.]**'

- Adverbial participles and adverbs:

[Wenig später ist dieser dann [...],]

'[Shortly afterwards he then [...],]'

[über den Soldaten nachdenkend,]

'**[while thinking about the soldier,]**'

[über eine Türschwelle gestolpert.]

'[stumbled across a threshold.]'

Adverbial participles and adverbs were only separated in this experiment when they were part of a complex phrase. Simple adverbial participles and adverbs (as in ***Empört*** *hat der Förster [...].* '**Indignant**, the ranger [...].') were not separated. This is in line with the annotation guidelines regarding the segmentation of coordinated verbs.

- Non-restrictive relative clauses:

[Er schenkte die Münze seinem Sohn,]

[He gave the coin to his son]

[der sie bis an sein Lebensende behielt.]

'**[who kept it until he died.]**'

Complement clauses and restrictive relative clauses were not treated as independent units and thus not separated (in line with Mann & Thompson (1988), while Chiarcos et al. (2016) chose a more detailed approach):

- Complement clause:

*[Gegen Mitternacht hat er dann gefragt, **ob er im Team des Rennfahrers aushelfen könne.**]*

'[Around midnight he then asked **whether he could help out in the team of the racing driver.**]'

- Restrictive relative clauses:

  *[[…] und holt die Mittel, **die fehlen**.]*

  '[[…] and gets resources **that are missing**.]'

  Several authors acknowledge that non-restrictive relative clauses are distinct from and outside the scope of their matrix clause (e.g. Potts, 2005; Schlenker, 2013; Simons et al., 2010). Therefore, only non-restrictive relative clauses were treated as separate units, while restrictive relative clauses were not separated in this experiment as they are semantically and pragmatically more closely related to their matrix clause.

This list illustrates that many different units were treated as sentences and it can be argued that some of these units have a more prominent discourse status compared to other units. Following this, referents mentioned in more prominent units may also be perceived as more prominent (see next section for references). Therefore, it was also annotated whether each unit (sentence) was a main or subordinate clause, since merely looking at the number of sentences in which the patient mainly occurred may be misleading. Thus, besides the time course, tables will be provided that illustrate how often the patient occurred in a main or subordinate clause and the criteria for differentiating between the two will be presented below.

4.3.4.6   The distinction between main and subordinate clauses (hypothesis 4)

As described in the previous section, each grammatical clause was treated as an independent discourse unit (with the exception of complement clauses and restrictive relative clauses). While the exact clause type was not annotated (e.g. whether the clause was an adverbial or infinitive clause), the distinction between main and subordinate clauses was introduced. The complex sentence in (31) consists of two independent discourse units, namely an adverbial clause and a main clause:

(31) *[Als es dunkel wurde,]* = subordinate clause

'[**When it got dark**]'

[schaltete er den Computer aus […].] = main clause

'[he turned off the computer […].]'

The annotators coded whether each discourse unit was a main or subordinate clause as illustrated in (31). In this way, referents that were mentioned in main clauses could be distinguished from referents that were mentioned in subordinate clauses. This distinction was introduced for several reasons as outlined in the following. Firstly, several studies suggest that referents in subordinate clauses have a different discourse status than referents in main clauses. For example, in a sentence continuation experiment, Cooreman & Sanford (1996) showed that an ambiguous pronoun was more often interpreted as referring to a referent from a main clause than a referent from a subordinate clause. Similarly, in a reading time experiment a sentence containing an anaphor was read faster when the referent of the anaphor was introduced in a main clause compared to when it was introduced in a subordinate clause (at least when the complex clause contained a temporal connector). These results indicate that referents in main clauses are more prominent compared to referents in subordinate clauses (although the authors mention that these results may only be applicable to certain types of complex sentences and subordinate connectors, Cooreman & Sanford, 1996).

In another sentence completion task, participants received a complex sentence consisting of a main and subordinate clause and were asked to continue a main clause that began with an ambiguous pronoun. The participants more frequently interpreted the pronoun as referring back to the referent that was introduced as the subject of the main clause compared to the referent that was introduced as part of the subordinate clause. However, when the pronoun appeared in the subordinate clause, the interpretive preferences were less clear. These results also show that referents in main clauses are perceived as more prominent compared to referents in subordinate structures (Miltsakaki, 2003). The distinction between main and subordinate clauses thus made it possible to investigate whether one of the referents from the first context clause was mentioned predominantly in main or subordinate clauses. The following clauses were coded as main clauses:

- simple main clauses

- coordinated main clauses

- main clauses with a complement clause or restrictive relative clause

As mentioned above, the distinction between main and subordinate clauses was introduced in order to be able to distinguish between referents in main and subordinate clauses. Complement and restrictive relative clauses were not marked separately since the referents in these clauses were marked as "embedded" and thus easy to identify. The following clauses were coded as subordinate clauses:

- clauses containing a subordinate conjunction

- infinitive clauses

- non-restrictive relative clauses

Whether a referent occurred in a main or subordinate clause can thus provide additional information about its prominence status. Furthermore, whether a referent was annotated as a topic in a particular sentence can also help to more effectively interpret the time course of story development since aboutness topics have been claimed to be very prominent (Hinterwimmer, 2015).

4.3.4.7 Aboutness topic (hypothesis 4)

In the current experiment, each discourse unit was assigned exactly one aboutness topic and other referents that were introduced in the main or matrix clause were marked as "part of comment". Referents that appeared in an embedded construction (i.e. attributive genitive, prepositional phrase as attribute, complement or restrictive relative clause) were not characterised as a topic or part of a comment and no information was given on the topic level ("na"). The following guidelines for the annotation of the aboutness topic are roughly based on Götze et al. (2007), whereby the aboutness topic is defined as the entity about which the discourse unit makes a statement. In many cases, the aboutness topic appears sentence-initially in German and other languages (Götze et al., 2007). In the current experiment, the aboutness topic often corresponded to an animate referent. However, adverbs that referred to or summarised the previous discourse were also interpreted as the aboutness topic in this experiment as illustrated in example (33), where the adverb *dabei* 'in doing so' is the aboutness topic (note that Götze et al. (2007) only list referential and indefinite noun phrases, bare plurals, and some finite clauses as possible candidates for the aboutness topic in a sentence). It is important to note that although adverbs could be interpreted as aboutness topics, they were not marked as

such since only animate entities were annotated in the current experiment. However, when an adverbial was considered the aboutness topic of a particular discourse unit, this had consequences for the rest of the clause as all other referents were then annotated as part of the comment (unless they were part of an embedded construction).

(32) *[**Der Jäger**]-TOPIC hat wohl im letzten Sommer außerhalb des Waldes gejagt.*
'Apparently, [**the hunter**] hunted outside the forest last summer.'

(33) *Dabei hat [**er**]-PART.OF.COMMENT sich an den Rat des Mechanikers gehalten.*
'In doing so, [**he**] followed the mechanic's advice.'

In these examples, the aboutness topic appeared in the sentence-initial position. However, temporal or local adverbs that were fronted were interpreted as framesetters (Götze et al., 2007) and the topic thus appeared in a different syntactic position as illustrated in this example:

(34) *Gegen Mitternacht ist [**er**]-TOPIC dann in die Werkstatt gegangen.*
'Around midnight, [**he**] then went to the garage.'

As already mentioned, each discourse unit was assigned exactly one aboutness topic in this experiment. However, when two referents were coordinated, both were assigned the same status depending on their discourse function. For example, in the following sentence, both referents were interpreted as the aboutness topic:

(35) *Sowohl [**dem Jäger**]-TOPIC als auch [**dem Förster**]-TOPIC wurde klar, [...].*
'Both the [**hunter**] and [**the ranger**] realised [...].'

Zero pronouns could be interpreted as aboutness topics. In non-restrictive relative clauses, the relative pronoun was mostly interpreted as the aboutness topic:

(36) *Er schenkte die Münze seinem Sohn,*
'He gave the coin to his son'
*[**der**]-TOPIC sie bis an sein Lebensende behielt.*
'[**who**] kept it until he died.'

The following tests were applied in order to determine whether an entity X is the aboutness topic of a discourse unit S (Götze et al., 2007):

- discourse unit S sounds natural after the following announcement: *Let me tell you something about X.*

- discourse unit S is a good answer to the following question: *What about X?*

- discourse S can be rephrased in the following way: *Concerning X, 'discourse unit'.*

In contrast to Götze et al. (2007), also discourse new referents could be interpreted as aboutness topic of a particular discourse unit in this experiment. This is based on Reinhart (1982) who provides examples in which a new referent corresponds to the aboutness topic.

This concludes the description of the annotation guidelines. In the following the analyses of data are presented and discussed. The first analysis addresses the question of whether demonstrative pronouns initiate a referential shift and whether the backward and forward function are interrelated.

4.3.5 Frequency of mention (hypotheses 1 and 2)

In this section, the first analysis will be presented that determines how often the previously less prominent referent (i.e. the patient) is mentioned in the continuations depending on the pronoun type and pronoun interpretation. This is seen as a good indication of the shift potential of demonstrative pronouns and contextual factors that may modulate their shift potential. The same analysis with a subset of the data was published by Fuchs & Schumacher (2020).

Demonstrative pronouns have been claimed to shift the focus of attention away from the prominent referent towards another referent (e.g. Abraham, 2002). Given the context with two discourse referents, it is expected that demonstrative pronouns shift attention to the referent with the lower-ranked thematic role (i.e. the patient) and that this referent becomes more central in subsequent discourse, which will be measured via the frequency of mention (in line with Givón, 1983). When the previously less prominent referent is mentioned more frequently than other referents in the continuations, this will be interpreted as evidence of a referential shift. It is expected that the referent with the lower-ranked thematic role is mentioned more frequently compared to other animate referents after one of the demonstrative pronouns.

However, as participants had to assign a referent to the potentially ambiguous pronoun before continuing the story, it will also be investigated to what extent their interpretive choices influenced the shift potential of the demonstrative pronouns. In some previous studies (e.g. Gernsbacher & Shroyer, 1989), the demonstrative was used adnominally and thus already disambiguated (as in *this egg*, Gernsbacher & Shroyer, 1989, p. 537). By considering the referent that was chosen for the pronoun, the analysis can thus also provide evidence concerning the extent to which the shift potential can be modulated by contextual

factors. This approach makes it possible to answer the following questions: How often was the less prominent referent from the first context sentence mentioned in the continuations when the demonstrative (or personal) pronoun was initially interpreted as referring back to the less prominent referent? Or how often was the less prominent referent mentioned in the continuations when the demonstrative (or personal) pronoun was initially interpreted as referring back to the more prominent referent?

The results for the backward function (i.e. how the seemingly ambiguous pronoun from the second sentence was interpreted) were presented in the previous chapter on the backward function. The demonstrative pronouns were associated with the lower-ranked thematic role in the majority of cases and contexts. Significantly, the demonstrative pronouns could also be associated with the more prominent referent. Thus, it will be particularly interesting to compare those cases in which they were interpreted as referring to the less prominent referent to those cases where they were interpreted as referring to the more prominent referent to see how pronoun interpretation affects their shift potential. Based on the results from the previous chapter, similar results are expected for all context variations. However, in the context of dative experiencer verbs and the non-canonical word order, all three pronouns displayed similar tendencies and interpretive preferences were generally less clear in the previous chapter. This indicates that the first context sentence made it difficult to rank the referents according to their prominence status and, as a consequence, unambiguous pronoun interpretation failed. The possible reasons for this were discussed in the previous chapter. Therefore, it will be expected that the current analysis will also yield more ambiguous results following the non-canonical dative experiencer context.

4.3.5.1 Data analysis

To determine how often the patient was mentioned in relation to other referents in the continuations, all animate referents that were mentioned after the ambiguous pronoun were counted. When a plural expression was used, each referent that was evoked as part of the plural expression entered the analysis individually. For example, when a plural pronoun was used to refer to both referents from the first context sentence, it was recorded that both the first- and the second-mentioned referent were mentioned once.

To begin with, it was assessed whether pronoun interpretation influences how often the patient was mentioned in the continuations compared to other animate referents. Initially, the results were calculated for each verb type (accusative vs dative experiencer verbs) separately, since both verb types were treated as separate experiments. For each word order (canonical vs non-canonical word order), a generalised linear mixed model was specified. Whether or not the referential expressions in the continuations referred to the referent with the lower-ranked thematic role (i.e. the patient) was the outcome variable. Pronoun

interpretation (i.e. the referent that was chosen for the pronoun: referent with higher-ranked thematic role vs referent with lower-ranked thematic role) entered the model as a fixed effect. Furthermore, random intercepts for both participants and items were specified.[11]

After analysing whether pronoun interpretation influenced how often the patient was mentioned in the continuations, the differences between the three pronouns (*er* vs *der* vs *dieser*) depending on the pronoun interpretation were assessed. Again, the results were calculated separately for each verb type and whether or not the referential expressions in the continuations referred to the referent with the lower-ranked thematic role (i.e. the patient) was also the outcome variable. This model further contained the interaction of pronoun type (*dieser* vs *der* vs *er*) and pronoun interpretation (i.e. the referent that was chosen for the pronoun: referent with higher-ranked thematic role vs referent with lower-ranked thematic role), as well as random intercepts for the participants.[12]

Two linear models were then compared in order to assess whether word order influences the outcome variable (i.e. whether or not the referential expressions in the continuations referred to the referent with the lower-ranked thematic role).[13] The first model contained the three-way interaction of pronoun type (*er* vs *der* vs *dieser*), pronoun interpretation (i.e. the referent that was chosen for the pronoun: referent with higher-ranked thematic role vs referent with lower-ranked thematic role), and word order (canonical vs non-canonical) and the second one contained the interaction of the pronoun type and pronoun interpretation. A likelihood ratio test was performed (with the anova() function in R) in order to compare these two models.[14]

Finally, it was calculated whether the verb type that the first context sentence contained (accusative vs dative experiencer verb) influenced the results. For this purpose, two linear models that differed in their

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[11]In the following, the models for the accusative context are illustrated (the models for the dative context were identical with the only exception that the dative was specified as the verb type):
canonical = glmer(referent with lower thematic role ~ pronoun interpretation + (1|participantId) + (1|itemId), data = df[df$verb_type$ == "*accusative*"&dfword_order == "canonical",], family = binomial(link = "logit"));
non-canonical = glmer(referent with lower thematic role ~ pronoun interpretation + (1|participantId) + (1|itemId), data = df[df$verb_type$ == "*accusative*"&dfword_order == "non-canonical",], family = binomial(link = "logit")).

[12]The initial model with a more complex random effects structure did not converge. These are the models that were specified for the accusative context (the models for the dative context looked identical with the only exception that dative was specified as verb type):
canonical = glmer(referent with lower thematic role ~ pronoun interpretation * pronoun type + (1|participantId) + (1|itemId), data = df[df $ verb_type == "accusative" & df $ word_order == "canonical",], family = binomial(link = "logit")));
non-canonical = glmer(referent with lower thematic role ~ pronoun interpretation * pronoun type + (1|participantId) + (1|itemId), data = df[df $ verb_type == "accusative" & df $ word_order == "non-canonical",], family = binomial(link = "logit"))).

[13]Models with a more complex random effects structure did not converge.

[14]In the following, the comparison for the accusative context is illustrated (the comparison for the dative context was identical with the only exception that dative was specified as verb type):
complex model = glm(referent with lower thematic role ~ pronoun interpretation * pronoun type * word order, data = df[df $ verb_type == "accusative",], family = binomial(link = "logit"));
reduced model = glm(referent with lower thematic role ~ pronoun interpretation * pronoun type, data = df[df $ verb_type == "accusative",], family = binomial(link = "logit"))
anova(complex model, reduced model, test ="Chisq").

complexity were compared via a likelihood ratio test (which was performed in R with the anova() function).[15] Both models had the same outcome variable as in the previous models. The first one contained the three-way interaction of pronoun type (*er* vs *der* vs *dieser*), pronoun interpretation (i.e. referent that was chosen for the pronoun: referent with higher-ranked thematic role vs referent with lower-ranked thematic role), and verb type (accusative vs dative experiencer verb), while the second model contained the interaction of the pronoun type and pronoun interpretation.[16] All computations were performed in RStudio (RStudio Team, 2019) with the lme4 package (Bates et al., 2015).

4.3.5.2   Results

Figure 3 shows the results for the accusative context and the canonical word order. The figure illustrates how often the referent with the lower-ranked thematic role (i.e. the patient) was mentioned in the continuations. The left-hand panel depicts the results obtained in those cases where the three different pronouns were initially interpreted as referring back to the more prominent referent (i.e. the first-mentioned from the first context clause). The panel on the right depicts the results obtained in those cases where the three different pronouns were initially interpreted as referring back to the less prominent referent (i.e. the second-mentioned from the first context clause). The comparison between the two panels reveals that the less prominent referent was mentioned significantly more often in the continuations when the pronouns were initially interpreted as referring back to the less prominent referent, which is confirmed by the statistical analysis (difference measured in logits: 1.28, SE = 0.25, p < 0.001). The differences between the three pronouns within each panel did not turn out to be significant.[17]

Figure 4 shows the results for the accusative context and the non-canonical word order. Like the previous figure, it illustrates how often the referent with the lower-ranked thematic role was mentioned in the continuations. In this context, it is important to remember that in non-canonical contexts, the second-mentioned referent is the one with the higher-ranked thematic role and thus the one that is considered more prominent. The left-hand panel depicts the results obtained in those cases where the pronouns were initially

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[15]Models with a more complex random effects structure did not converge.

[16]For the canonical contexts, the following models were compared (the comparison for the non-canonical contexts was identical with the only exception that non-canonical was specified as the word order):
complex model = glm(referent with lower thematic role ~ pronoun interpretation * pronoun type * verb type, data = df[df $ word_order == "canonical",], family = binomial(link = "logit"));
reduced model = glm(referent with lower thematic role ~ pronoun interpretation * pronoun type, data = df[df $ word_order == "canonical",], family = binomial(link = "logit"))
anova(complex model, reduced model, test ="Chisq").

[17]These are the results of the pairwise comparisons when the first-mentioned referent was chosen as the referent for the pronoun. Difference between *er* and *der* measured in logits: -0.39, SE = 0.47, p = 0.406389; difference between *er* and *dieser* measured in logits: 0.52, SE = 0.45, p = 0.253224; difference between *der* and *dieser* measured in logits: 0.91, SE = 0.56, p = 0.105098). These are the results of the pairwise comparisons when the second-mentioned referent was chosen as the referent for the pronoun. Difference between *er* and *der* measured in logits: 0.23, SE = 0.36, p = 0.5238; difference between *er* and *dieser* measured in logits: 0.12, SE = 0.36, p = 0.7430; difference between *der* and *dieser* measured in logits: -0.11, SE = 0.30, p = 0.703251.

Figure 3: References to the referent with the lower-ranked thematic role in continuations dependent on the pronoun type and the referent that was chosen for the pronoun in the context of accusative verbs and the canonical word order.

interpreted as referring back to the less prominent referent (i.e. the first-mentioned) and the right-hand panel depicts the results obtained in those cases where the pronouns were initially interpreted as referring back to the more prominent referent (i.e. the second-mentioned). Similar to the previous figure, when the less prominent referent was chosen as the referent for any pronoun, this referent was also mentioned significantly more often in the continuations. When the more prominent candidate was chosen as referent for any pronoun, the less prominent referent was mentioned less frequently in the continuations. The visual difference between the two panels is again confirmed by statistical analysis (difference measured in logits: -1.09, SE = 0.34, p < 0.01).

However, the differences observed between the three pronouns within each panel did not turn out to be significant.[18] The results are thus very similar to the canonical context, with the exception that the first-mentioned referent is the less prominent one. The comparison between a more complex model containing the three-way interaction of pronoun type, pronoun interpretation, and word order and a more reduced one containing the interaction of the pronoun type and pronoun interpretation revealed that the more complex model is the better one to explain the data (p < 0.001). Thus, the word order variations in the first context sentence influenced how often the less prominent referent was mentioned in the continuations. A visual comparison of Figures 3 and 4 reveals how the canonical and non-canonical word orders differ from each other. In the figure depicting the canonical word order, the right-hand panel is larger than the panel on the left. In canonical contexts, the referent with the lower-ranked thematic role is the second-mentioned one. The referent with the lower-ranked thematic role was generally mentioned more often in the continuations (indicated by the height of the columns of the right-hand panel) when the referent with the lower-ranked thematic role was chosen as the referent for any pronoun (which the right-hand panel illustrates). In non-canonical contexts, the first-mentioned referent is the less prominent one. It is mentioned more often in the continuations when the pronouns were also interpreted as referring to that referent (left panel), which is why the left-hand panel is larger overall than the panel on the right.

Figures 5 and 6 show the results for the contexts with dative experiencer verbs. Figure 5 depicts the results for the canonical contexts in which the referent with the higher-ranked thematic role (but lower-ranked grammatical role) precedes the referent with the lower-ranked thematic role (but higher-ranked grammatical role). The figure suggests that when the referent with the lower-ranked thematic role (i.e. the

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[18]The pairwise comparisons when the first-mentioned referent with the lower-ranked thematic role was chosen yielded the following results. Difference between *er* and *der* mesured in logits: -0.52, SE = 0.49, p = 0.28837; difference between *er* and *dieser* measured in logits: -0.02, SE = 0.44, p = 0.95863; difference between *der* and *dieser* measured in logits: 0.49, SE = 0.47, p = 0.2919. The pairwise comparisons when the second-mentioned referent with the higher-ranked thematic role was chosen as the referent for the pronoun yielded these results. Difference between *er* and *der* measured in logits: 0.73, SE = 0.54, p = 0.17290; difference between *er* and *dieser* measured in logits: -0.11, SE = 0.62, p = 0.86263; difference between *der* and *dieser* measured in logits: -0.84, SE = 0.63, p = 0.1816.
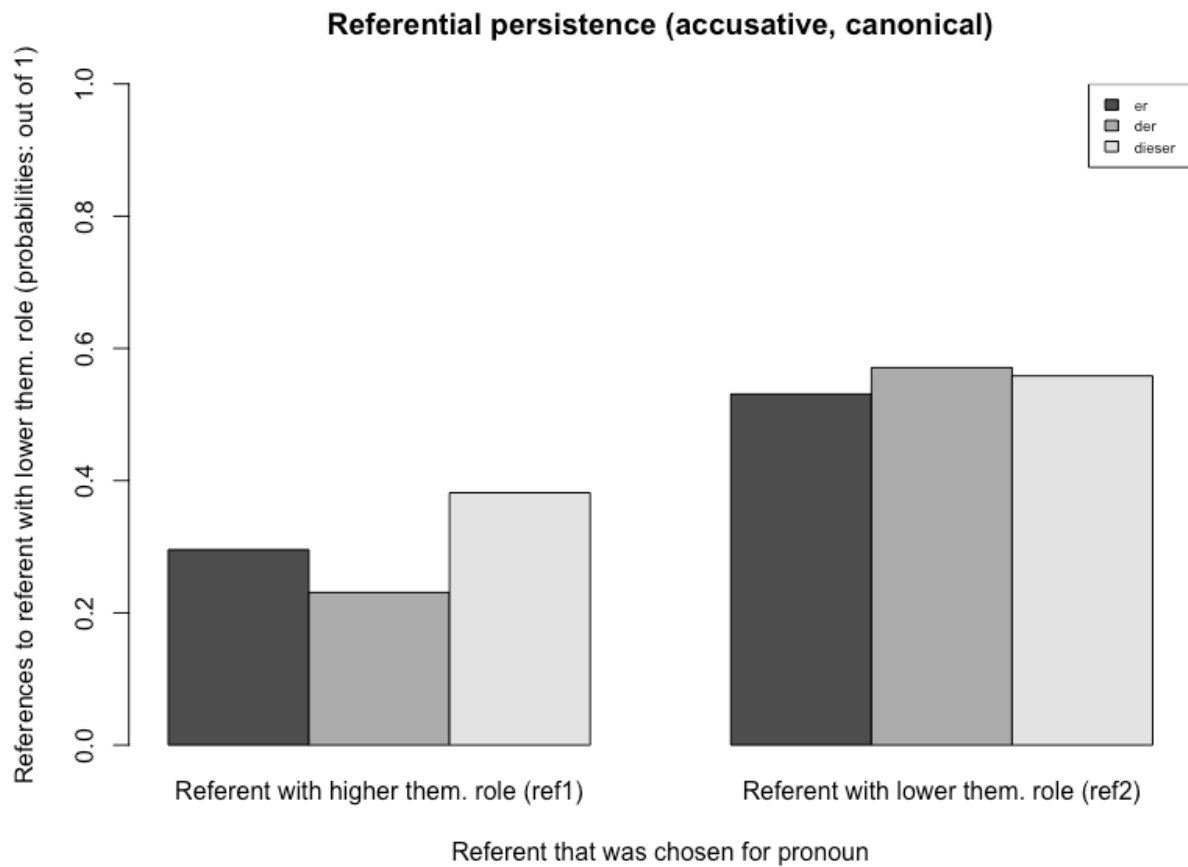
Figure 4: References to the referent with the lower-ranked thematic role in continuations dependent on the pronoun type and the referent that was chosen for the pronoun in the context of accusative verbs and the non-canonical word order.

second-mentioned) was chosen as a referent for the personal pronoun and the demonstrative pronoun *dieser*, this referent was also mentioned more frequently in the continuations (right panel) compared to when the referent with the higher-ranked thematic role was chosen as referent for the pronoun (left panel).

However, the demonstrative pronoun *der* shows a slightly different pattern across the two panels. Significantly, the less prominent referent was mentioned almost equally often in the continuations, regardless of whether *der* was initially interpreted as referring back to the less or more prominent referent. The statistical analysis could not confirm a significant difference between the panels on the right and left averaged over all pronouns, although the p-value is very close to the threshold (difference measured in logits: -0.46, SE = 0.24, p = 0.0525), indicating that the less prominent referent was mentioned less often when the pronouns were interpreted as referring to the first-mentioned referent.[19] The differences between the three pronouns within each panel also did not turn out to be significant.[20]

Figure 6 depicts the results for the non-canonical contexts in which the referent with the lower thematic role appears before the referent with the higher thematic role. The comparison between the two panels suggests that when the referent with the lower thematic role was chosen as a referent for any pronoun, this referent was also mentioned more frequently in the continuations (left panel) compared to when the referent with the higher thematic role was chosen as referent (right panel). The statistical analysis confirmed that the less prominent referent is mentioned more often in the continuations when the less prominent one was also chosen as the referent for the pronoun (difference measured in logits: 0.71, SE = 0.24, p < 0.01).[21] As in the previous contexts, the differences between the individual pronouns within each panel did not reach statistical significance.[22]

Similarly to the accusative context, the word order variations in the first context clause influenced how often the less prominent referent was mentioned in the continuations. This became clear by comparing a complex model with the three-way interaction of pronoun type, pronoun interpretation, and word order and

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[19]R returned a singular fit warning message, indicating that the model did not properly converge. The results thus have to be interpreted with caution.

[20]The results of the pairwise comparisons when the first-mentioned/more prominent referent was chosen as the referent for the pronoun are listed in the following. Difference between *er* and *der* measured in logits: 0.48, SE = 0.39, p = 0.2218; difference between *er* and *dieser* measured in logits: -0.13, SE = 0.39, p = 0.7363; difference between *der* and *dieser* measured in logits: -0.61, SE = 0.45, p = 0.1742. The results of the pairwise comparisons when the second-mentioned/less prominent referent was chosen as referent for the pronoun are summarized in the following. Difference between *er* and *der* measured in logits: -0.02, SE = 0.54, p = 0.971; difference between *er* and *dieser* measured in logits: 0.44, SE = 0.52, p = 0.406; difference between *der* and *dieser* measured in logits: 0.46, SE = 0.36, p = 0.2094.

[21]R returned a singular fit warning message, indicating that the model did not properly converge. The results thus have to be interpreted with caution.

[22]The results of the pairwise comparisons when the first-mentioned/less prominent referent was chosen as the referent for the pronoun yielded these results. Difference between *er* and *der* measured in logits: -0.26, SE = 0.39, p = 0.5077; difference between *er* and *dieser* measured in logits: -0.02, SE = 0.38, p = 0.9493; difference between *der* and *dieser* measured in logits: 0.24, SE = 0.41, p = 0.563. The results of the pairwise comparison when the second-mentioned/more prominent referent was chosen as the referent for the pronoun yielded these results. Difference between *er* and *der* measured in logits: -0.14, SE = 0.42, p = 0.7378; difference between *er* and *dieser* measured in logits: -0.21, SE = 0.44, p = 0.6353; difference between *der* and *dieser* measured in logits: -0.07, SE = 0.42, p = 0.876.

a more reduced model with the interaction of pronoun type and pronoun interpretation. The complex model turned out to be the significantly better fit ($p < 0.001$). A visual comparison of Figures 5 and 6 reveals that the right-hand panel is larger in size compared to the left-hand panel in the figure depicting the canonical context. In contrast, it is the other way around in the figure depicting the non-canonical context. In the canonical context, the referent with the lower-ranked thematic role is the second-mentioned. This referent is mentioned more frequently in the continuations (indicated by the height of the columns of the panel on the right) when any pronoun was interpreted as referring to the referent with the lower-ranked thematic role (right panel). In the non-canonical contexts, the first-mentioned referent is the one with the lower-ranked thematic role. The left-hand panel is thus larger because it depicts that the less prominent one is mentioned more frequently in the continuations when any pronoun was interpreted as referring back to the referent with the lower-ranked thematic role (left panel).

To summarise, in the context of dative experiencer verbs and the canonical word order, there are no statistical differences between the pronouns and the two panels (indicating pronoun interpretation). The less prominent referent was mentioned equally often in the continuations, regardless of which pronoun the second context sentence contained and which referent was chosen for the pronoun. In the non-canonical context, however, the less prominent referent was mentioned more frequently in the continuations when the less prominent referent was chosen as a referent for the pronoun compared to when the more prominent referent was chosen.

Finally, the results regarding the role of the two different verb types (accusative vs dative experiencer verbs) will be presented separately for each word order. The comparison between the more complex model with the interaction of pronoun type, pronoun interpretation, and verb type and the reduced one containing the interaction of pronoun type and pronoun interpretation revealed that in the context of the canonical word order, the verb type that the first context sentence contained influenced how often the referent with the lower-ranked thematic role was mentioned ($p < 0.001$). Figure 7 serves to illustrate the difference between the accusative and dative experiencer context. The first panel illustrates that the referent with the lower-ranked thematic role is mentioned slightly more often in dative experiencer contexts when the second sentence contains the personal pronoun. For the two demonstrative pronouns (second and third panels), the tendency is reversed and the referent with the lower-ranked thematic role is mentioned more frequently in the context of accusative verbs.

In the non-canonical contexts, however, the complex and reduced models did not differ significantly from each other ($p = 0.3119$), indicating that verb type did not play an important role. This becomes clear when considering Figure 8 which contrasts both verb types in the non-canonical order. The figure shows
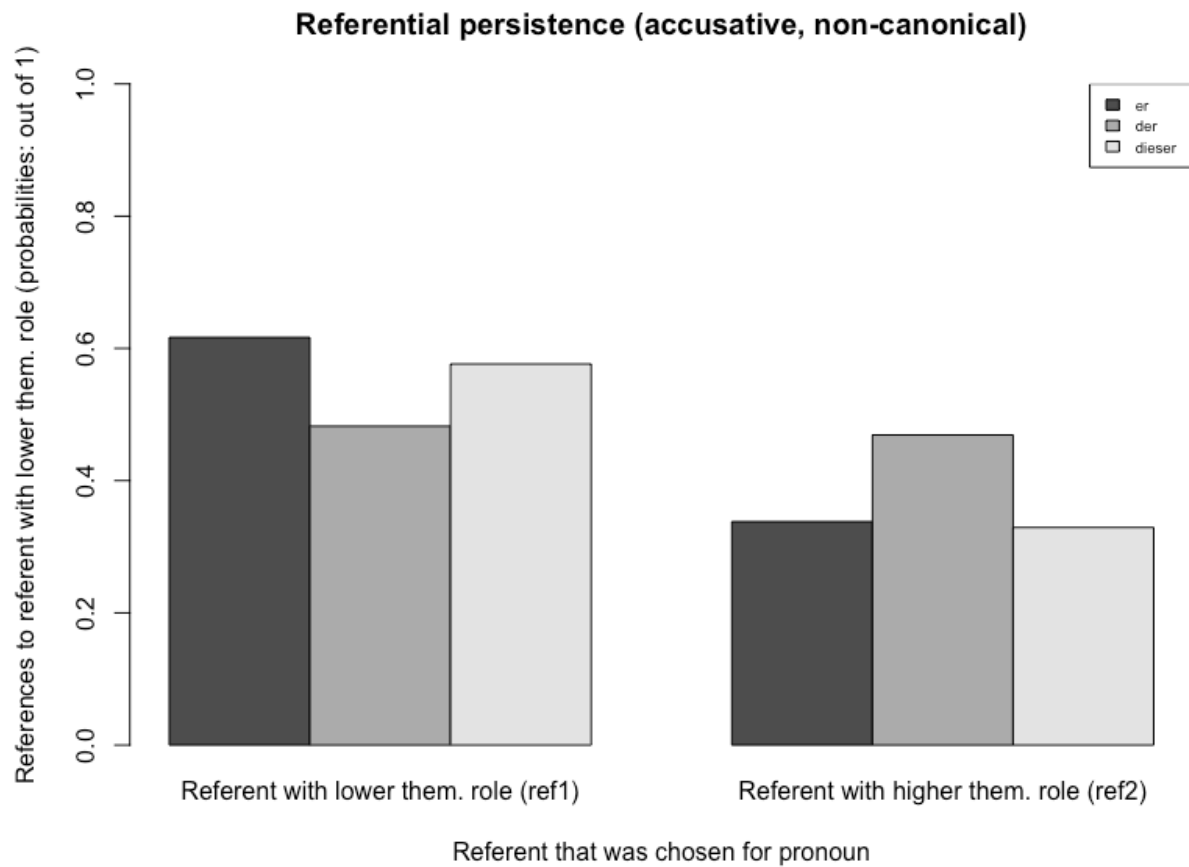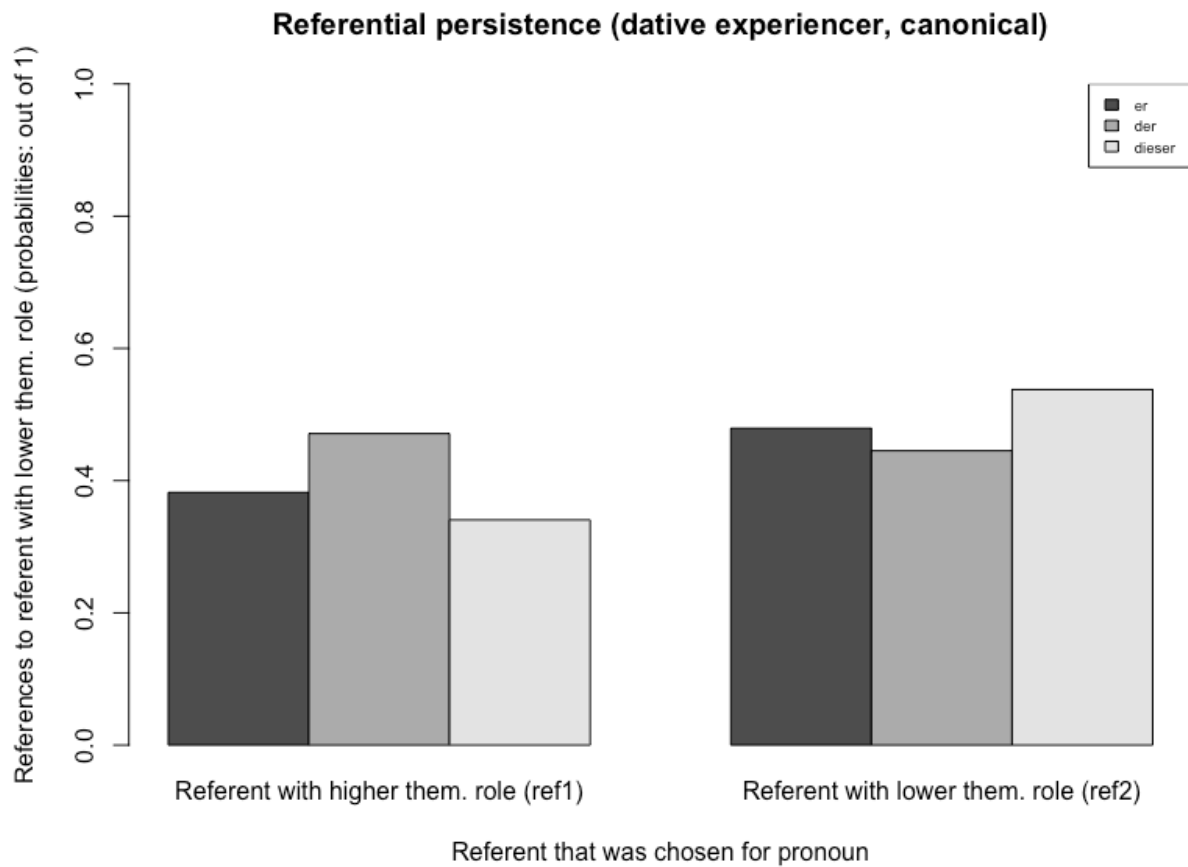
Figure 5: References to the referent with the lower-ranked thematic role in continuations dependent on the pronoun type and the referent that was chosen for the pronoun in the context of dative experiencer verbs and the canonical word order.
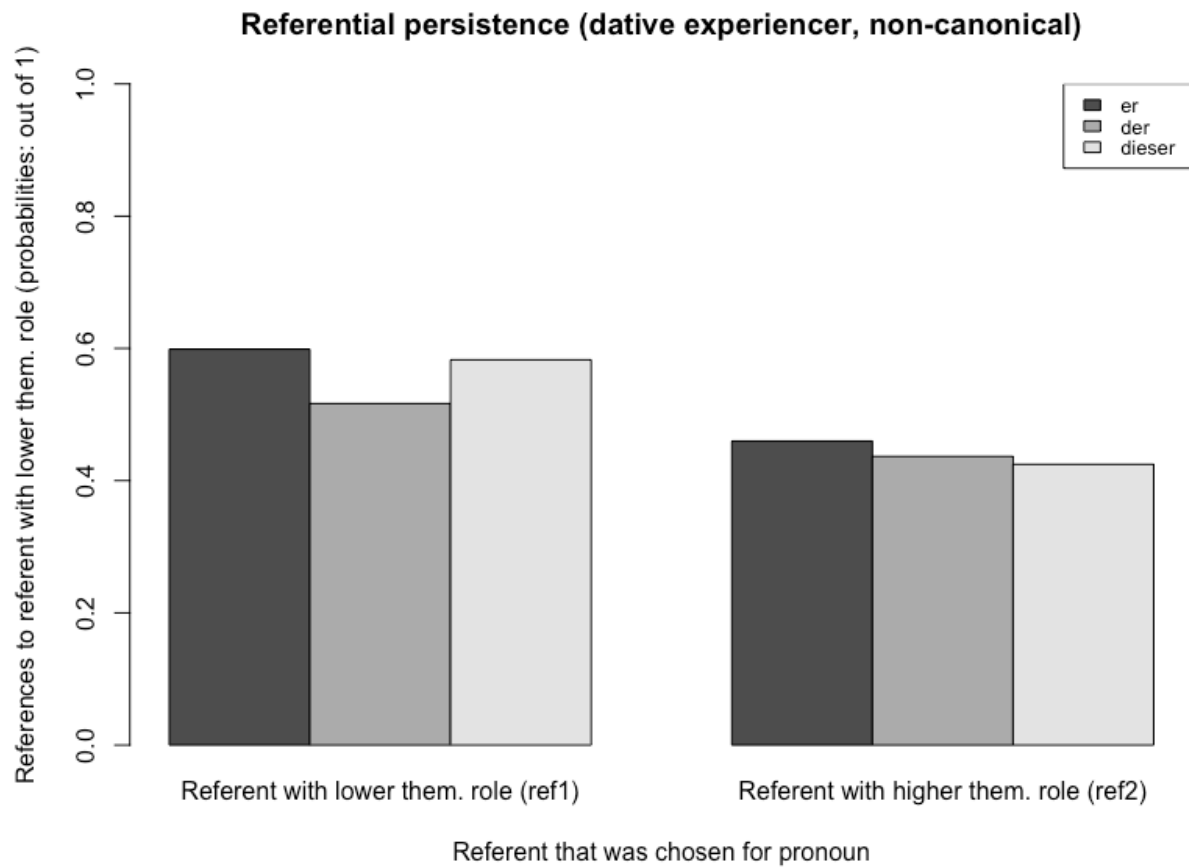
Figure 6: References to the referent with the lower-ranked thematic role in continuations dependent on the pronoun type and the referent that was chosen for the pronoun in the context of dative experiencer verbs and the non-canonical word order.
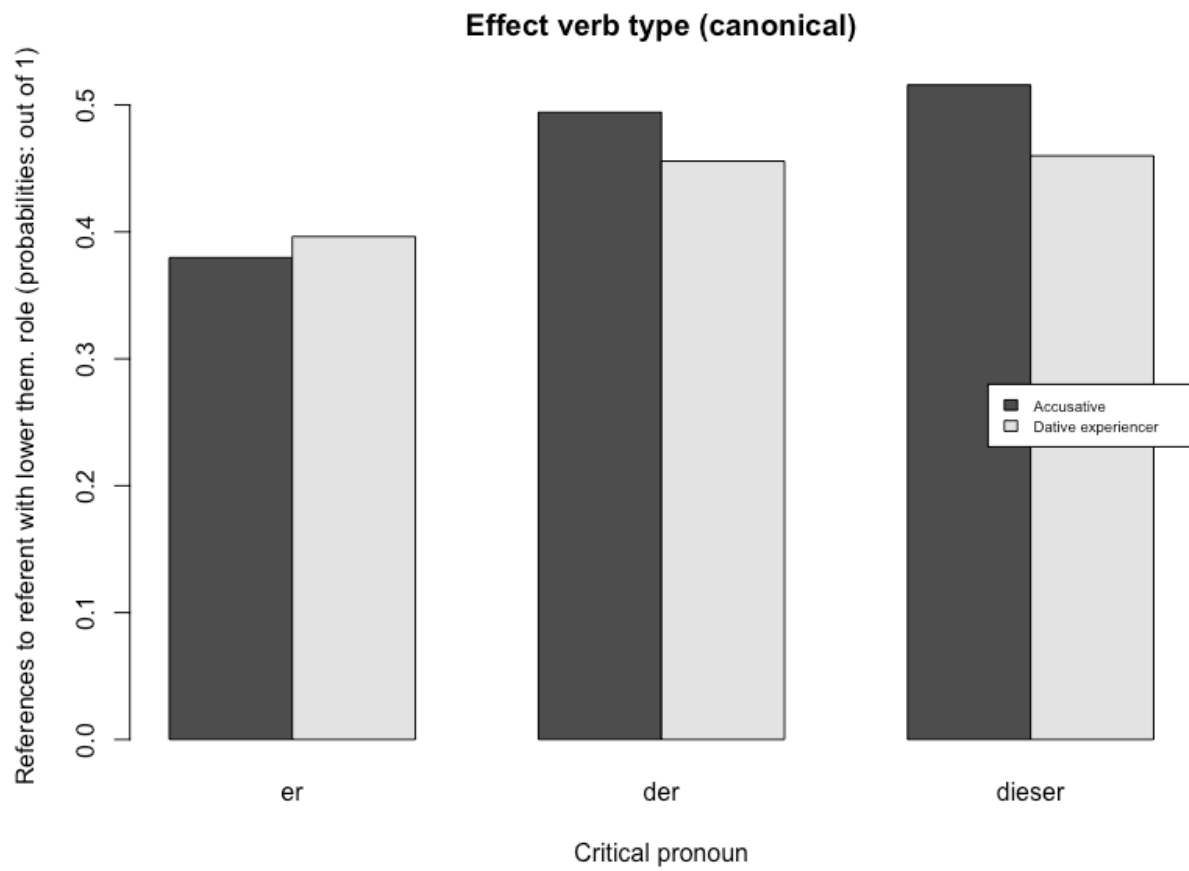
Figure 7: References to the referent with the lower-ranked thematic role in continuations dependent on the verb type and pronoun type in canonical contexts.

that all columns are very similar in size overall. However, when the second sentence contained the personal pronoun, the lower-ranked referent was mentioned more often in dative experiencer contexts.

Effect verb type (non-canonical)
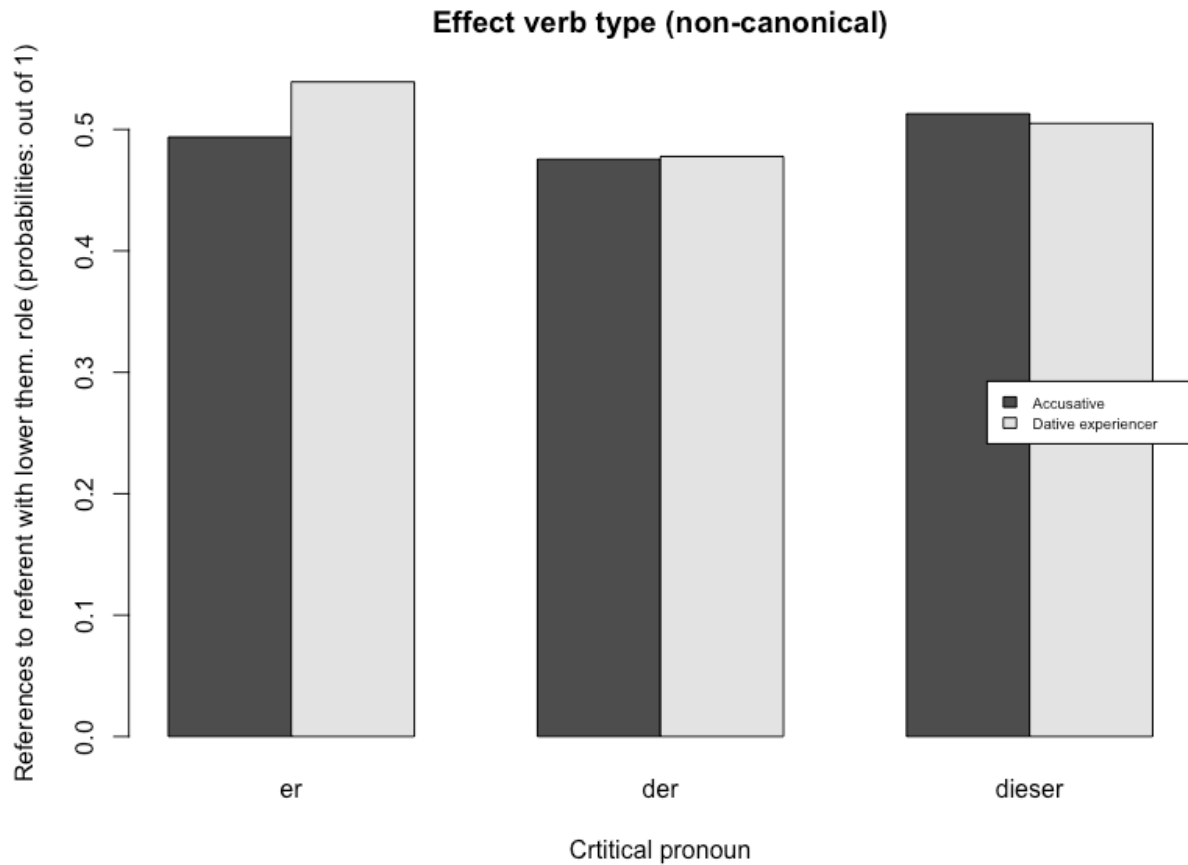
Figure 8: References to the referent with the lower-ranked thematic role in continuations dependent on the verb type and pronoun type in non-canonical contexts.

4.3.5.3 Discussion

The aim of this analysis was to assess whether demonstrative pronouns initiate a referential shift (as stated by the first hypothesis) and whether this shift function can be modulated by contextual factors such as pronoun interpretation (as stated by the second hypothesis that was outlined above).

In the context of accusative verbs, the main factor that appeared to determine whether the referent with the lower-ranked thematic role (i.e. the patient) was mentioned more frequently in the continuations is how the participants initially interpreted the pronoun. When the patient from the first context sentence was initially chosen as a referent for any pronoun, this referent was also significantly more frequently mentioned in the continuations (compared to when the referent with the higher-ranked thematic role was chosen, i.e. the

agent or experiencer), whereby it was irrelevant which pronoun the context sentence contained. In general, this pattern could be observed for both canonical and non-canonical contexts.

In the context of dative experiencer verbs, however, the picture is more complex. The figure depicting the canonical context appears to suggest that when the personal pronoun and the demonstrative pronoun *dieser* were interpreted as referring back to the patient, this referent was also significantly more frequently mentioned in the continuations (compared to when these pronouns were interpreted as referring to the agent or experiencer). Regarding the demonstrative pronoun *der*, the patient appears to be mentioned equally often in the continuations, irrespective of how it was interpreted. The difference between the two panels indicating how the pronouns were initially interpreted was nearly significant, while the differences between the individual pronouns within each panel were not significant. Moreover, the results for the non-canonical context are in line with the results reported for the accusative contexts. When the patient was chosen as a referent for any pronoun in the non-canonical contexts, this referent was also mentioned significantly more often in the continuations (compared to when the higher-ranked referent was chosen).

These results for the dative experiencer verbs need to be discussed further. For the canonical word order, a statistically reliable pattern could not be observed and it is surprising that the previous chapter revealed that the participants had clear interpretive preferences for the pronouns in this context. Thus, they assigned a referent to the pronoun but then did not develop stories in favour of one particular referent. However, Figure 5 suggests that there are different tendencies depending on how the pronoun was interpreted and the statistical analysis yielded a nearly significant result. The demonstrative pronoun *der* stands out since it shows similar results in both panels. Therefore, the difference between the two panels may be attenuated by the demonstrative pronoun *der*. This could indicate that the shift potential of the demonstrative pronoun *der* is less influenced by how it was initially interpreted, as the patient is mentioned equally often in the continuations irrespective of the initial pronoun interpretation.

Another surprising finding—contrary to what was reported in the previous chapter, in which participants did not show clear interpretive preferences—is that there were clear findings in non-canonical contexts (but see Schumacher et al. (2016) who also found interpretive preferences for the demonstrative pronoun *der* after non-canonical dative experiencer contexts that did not include any connective). One way to reconcile these two findings is to suggest that the participants may have had problems interpreting the (demonstrative) pronouns in this context, as indicated by the lack of clear patterns (see previous chapter). However, in those cases where the pronouns were interpreted as referring back to the patient (which happened in roughly half of the cases for *der* and in fewer cases for the other two pronouns, see previous chapter), then this referent was also mentioned more frequently in the continuations and a referential shift was initiated.

Furthermore, the current results need to be compared to those reported by Schumacher et al. (2015). As described previously, Schumacher et al. (2015) investigated the forward functions of the demonstrative pronoun *der* and the personal pronoun *er* and they report a robust shift potential for the demonstrative pronoun across different experimental conditions. However, the results for the personal pronoun were less clear. It was expected to see many cases of topic maintenance following the personal pronoun, which could only be confirmed for canonical contexts. In contrast, in non-canonical contexts this pattern was attenuated (dative experiencer verbs) or even reversed (accusative verbs). The authors calculated how often the second-mentioned referent introduced in the context sentence was mentioned as a sentence-initial aboutness topic in the continuations and a high value was interpreted as evidence of a topic shift. Thus, in Schumacher et al.'s (2015) study, the first-mentioned referent (topic) was considered more prominent while in the current research, the second-mentioned referent (agent) was considered more prominent in non-canonical contexts. What Schumacher et al. (2015) describe as topic shifts in the context of accusative verbs could thus also be interpreted as topic maintenance considering that the participants more frequently mentioned the agent in their continuations as an aboutness topic following the personal pronoun. However, it is not possible to directly compare these two studies as they employed different methodologies and the aim of the current research was also to investigate to what extent pronoun interpretation influences the forward functions of three different pronouns.

To summarise, contextual factors thus appear to influence the forward potential of all three pronouns. Whether a referential shift was initiated was mainly determined by the referent that was chosen for the pronoun. When any pronoun was interpreted as referring to the patient, this referent was also mentioned more often in the continuations and was thus promoted to a higher prominence status. Therefore, the shift function of demonstrative pronouns can be modulated when they are interpreted as referring to a prominent discourse referent. Likewise, personal pronouns can initiate a referential shift when they are interpreted as referring to a less prominent referent. However, as the previous chapter revealed, it has to be considered that demonstrative pronouns are associated with the less prominent referent in the majority of cases. Therefore, it can be concluded that they display a higher shift potential than personal pronouns. Crucially, the current analysis revealed that they do not necessarily encourage participants to initiate a shift which is corroborated by data from spoken contexts. Weinert (2011, p. 80f.) indicates that "demonstrative pronouns are not especially marked in spoken German and do not primarily shift attention to unexpected, new entities." The shift function thus does not seem to be an intrinsic feature of demonstrative pronouns. It may be a very prominent characteristic which, however, can be modulated by contextual factors such as pronoun interpretation (as indicated by the current research) or modality (as suggested by Weinert, 2011).

The next section will explore whether the promoted referent is mentioned in ways that reflect its enhanced prominence status.

4.3.6 Realisation of referents (hypothesis 3)

In this section, it will be determined whether the initially lower-ranked referent is realised in ways that reflect its enhanced prominence status following a referential shift initiated by a (demonstrative) pronoun (as stated by the third hypothesis). When a referential shift is initiated, the patient becomes more central in subsequent discourse. It is assumed that this referent is not only mentioned more frequently – as the previous analysis revealed – but also realised in ways that reflect its enhanced prominence status. Three different categories will be analysed that are assumed to reveal a referent's prominence status, namely the referential form, grammatical case, and thematic role.

The first category that will be assessed is the referential form of the referents. As pointed out previously, it is generally assumed that there is a connection between the referential form that is used to refer to a referent and its prominence status in discourse. More explicit forms such as definite noun phrases were argued to refer to less prominent referents and less explicit forms such as unstressed personal pronouns are thought to refer to highly prominent referents in discourse (e.g. Gundel et al., 1993). It will thus be assumed that once a referential shift has been initiated by a demonstrative pronoun, the previously less prominent referent will be referred to via more reduced forms such as unstressed personal pronouns and zero anaphora. Such findings could be confirmed by Gernsbacher & Shroyer (1989). However, Chiriacescu (2011) could not observe a link between a referential shift and a more frequent use of pronouns for the promoted referent. Chiriacescu (2011) argues that an additional factor that influences the use of referential forms is the animacy of the referents. She only used animate referents in her experiment and argues that more explicit forms were necessary to differentiate between the different referents. As two animate referents were also introduced in the current experiment, the frequency of shorter forms such as personal pronouns may therefore also be lower.

The second category that will be assessed is the grammatical case of the referents. Following case hierarchies (Eisenberg, 2013), the nominative case of a sentence is considered to be very prominent. In unmarked sentences, it appears sentence-initially and often corresponds to the topic of a sentence. It is thus assumed that the initially less prominent referent is more often realised as a subject once a referential shift has been initiated. Another aspect that may support this hypothesis is the fact that the pronoun in the second clause that initiated the referential shift was the subject of the clause. The previously less prominent referent is thus referred to with a subject pronoun. In subsequent sentences, this referent might thus be maintained as a grammatical subject.

Finally, the third category that will be assessed is the thematic role of the referents. As already extensively discussed, some thematic roles are perceived as more prominent compared to other roles (e.g. Dowty, 1991; Schumacher et al., 2016), whereby the highest-ranked roles are the agent and experiencer. It is thus assumed that the initially less prominent referent takes on more prominent thematic roles once a referential shift has been initiated by a (demonstrative) pronoun. These three analyses make it possible to determine whether the promoted referent is not only mentioned more often in the continuations but also realised in ways that reflect its enhanced prominence status. Furthermore, it can be assessed which of the three categories is the best indicator of a referent's prominence status in discourse.

4.3.6.1 Data analysis

The data analysis followed the same pattern in all three cases. Only those stories were analysed in which the pronouns in the second sentence were interpreted as referring to the referent with the lower-ranked thematic role since the previous analysis revealed that this is a good indication of a referential shift. For the different verb types and word order manipulations, it was then separately analysed for each pronoun which referential forms, grammatical cases, and thematic roles were used for the promoted (i.e. previously less prominent) referent in comparison to other animate referents. The selection of contexts is based on the first analysis that investigated how often the previously less prominent referent (i.e. the patient) was mentioned in the continuations. The analysis revealed that the word order variations influenced how often the patient was mentioned in the continuations for both verb types. Therefore, how the patient was realised will be specified separately for both word orders. However, as the verb type only had an effect in canonical contexts, the results will be presented together for both verb types in non-canonical contexts. Furthermore, as the context of dative experiencer verbs and the canonical word order did not yield statistically significant results, this context will not be considered.

4.3.6.2 Results

Table 1 illustrates the distribution of referential forms (in per cent) in accusative, canonical order contexts. The upper part of the table lists all referential forms that were used for the promoted (i.e. the previously less prominent) referent. The lower part lists all referential forms that were used for other referents (i.e. the prominent referent from the first context sentence and other animate referents). The distribution of referential forms was calculated for each pronoun individually, which is indicated by the first column.

There appear to be differences between the upper and lower parts of the table, and the referential forms that were used for the promoted referent are less explicit than the referential forms that were used

for other referents. This becomes especially obvious when considering the percentages of personal pronouns and definite noun phrases. For the promoted referent, more personal pronouns and fewer definite noun phrases were used, whereas for other referents, the opposite pattern (i.e. more definite noun phrases and fewer personal pronouns) can be observed. Furthermore, more zero pronouns and possessive pronouns were used for the promoted referent while there does not appear to be a major difference between the pronouns in the two parts of the figure and the main factor that appears to determine the distribution of referential forms seems to be the referent that is referred to. While it has to be pointed out that these observed differences were not statistically investigated (by means of a test of significance), these descriptive results display an interesting trend.

Table 2 illustrates the distribution of referential forms for non-canonical contexts (and both verb types) and the pattern seems to be very similar. Less definite noun phrases, and more personal pronouns and possessive pronouns, were used for the promoted character while more definite noun phrases and fewer pronouns were used for other animate referents. While these results suggest a clear link between the prominence status of the referents and the referential forms that were used to refer to them, the results for the other categories are less clear.

Table 3 shows the distribution of grammatical cases (in per cent) in accusative and canonical word order contexts. The upper part shows the results when reference was made to the previously less prominent referent while the lower part shows the results when reference was made to the higher-ranked referent from the first context sentence and other animate referents. The table shows that there are no major differences between the grammatical cases of the promoted referent (i.e. the one with the initially lower-ranked thematic role) and other animate referents that were mentioned in the continuations and nominative is, by far, the most frequently used case for all referents. However, there are some minor differences. The oblique case (for prepositional objects) was used less often for the promoted referent than for other referents. Furthermore, more instances of "na" (which was annotated in those cases where no grammatical case could be assigned) appear for the promoted referent. The previous tables (see 1 and 2) showed that many possessive pronouns were used to refer to the promoted referent. Since possessive pronouns are not arguments of verbs, the grammatical category of case could not be annotated which explains the large number of instances of "na" for the promoted referent.

Table 4 shows the results for the non-canonical word order (and both verb types). Similarly to the previous table, the nominative case was the most frequently used one for all referents. Nevertheless, small differences with regard to other cases become apparent. For other referents, the oblique case was more frequently used than for the promoted referent. In addition, other referents appeared more often in embedded

pronoun	referent	zero	pers.pro	poss.pro	rel.pro	refl.pro	recp.pro	dem.pro (der/die)	dem.pro (dieser/diese)	indf.pro	def.np	dem.np	pr.name	indf.np	bare.np
er	promoted	20	37	27	0	2	0	0	0	2	13	0	0	0	0
der	promoted	19	38	20	1	2	2	0	1	3	14	0	0	0	0
dieser	promoted	18	35	16	1	3	1	0	1	1	23	1	1	0	0
er	other	13	26	9	0	6	0	0	2	9	30	0	0	4	0
der	other	11	24	6	1	0	3	0	3	6	42	0	0	3	2
dieser	other	17	14	1	6	0	1	0	1	8	44	1	0	7	0

Table 1: Distribution of referential forms (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in accusative, canonical order contexts. Due to rounding, each line does not add up to exactly 100%.

pronoun	referent	zero	pers.pro	poss.pro	rel.pro	refl.pro	recp.pro	dem.pro (der/die)	dem.pro (dieser/diese)	indf.pro	def.np	dem.np	pr.name	indf.np	bare.np
er	promoted	19	39	15	0	1	2	0	0	0	24	0	0	0	0
der	promoted	21	39	17	0	3	1	0	1	1	16	0	1	0	0
dieser	promoted	21	35	15	0	3	1	0	1	2	21	0	0	0	0
er	other	11	15	5	3	1	3	1	4	1	49	0	0	7	1
der	other	14	27	7	2	1	1	0	2	1	40	0	1	5	0
dieser	other	14	19	8	1	1	2	0	2	4	42	1	0	4	1

Table 2: Distribution of referential forms (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in non-canonical order contexts.

pronoun	referent	nominative	accusative	dative	oblique	adjunct	embedded	na
er	promoted	48	0	5	2	0	22	23
der	promoted	51	4	5	1	0	19	20
dieser	promoted	51	3	10	2	0	16	18
er	other	55	4	2	4	0	25	11
der	other	50	7	7	10	1	18	8
dieser	other	54	4	4	7	2	28	2

Table 3: Distribution of grammatical cases (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in the context of accusative verbs and the canonical word order.

pronoun	referent	nominative	accusative	dative	oblique	adjunct	embedded	na
er	promoted	50	6	6	1	1	22	13
der	promoted	50	8	5	2	1	17	18
dieser	promoted	51	4	6	3	0	19	17
er	other	44	8	5	8	4	25	7
der	other	47	8	3	7	5	23	6
dieser	other	46	9	5	7	1	25	7

Table 4: Distribution of grammatical cases (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in the context of both verb types and the non-canonical word order.

constructions such as complement clauses and restrictive relative clauses.

Finally, the last tables show the distribution of thematic roles. Table 5 illustrates the frequency in accusative, canonical order contexts. The upper part shows the thematic roles that were used for the previously less prominent but subsequently promoted referent, while the lower part shows the thematic roles that were used for the more prominent referent from the first context sentence and other animate referents. While there do not appear to be major differences between the two groups, it is striking that there are more instances of "na" (which means that no thematic role was assigned) for the promoted referent. The reason behind this is that many possessive pronouns were used for that referent as described previously. Since possessive pronouns do not have any thematic role, the value "na" was assigned. Apart from that, agents, experiencers, and patients often occurred but were evenly distributed over the two groups with slight variations for the different pronouns.

Table 6 shows the results for both verb types and the non-canonical word order. Similarly to the previous table, the agent, patient, and experiencer appear to be the most frequent thematic roles. Furthermore, there are many instances of "na" for the referent with the initially lower-ranked thematic role which can be attributed to possessive pronouns as explained above. Apart from that, there appear to be slightly more agent roles for the referent with the previous lower-ranked thematic role. In addition, there seem to be

pronoun	referent	agent	experiencer	patient	recipient	argument	other	na
er	promoted	52	3	17	0	0	0	28
der	promoted	43	14	15	2	1	0	24
dieser	promoted	43	13	21	2	1	0	20
er	other	57	17	9	2	0	0	15
der	other	40	20	22	5	3	2	9
dieser	other	61	6	27	1	1	2	2

Table 5: Distribution of thematic roles (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in the context of accusative verbs and the canonical word order.

pronoun	referent	agent	experiencer	patient	recipient	argument	other	na
er	promoted	47	14	17	3	0	0	19
der	promoted	53	7	17	2	0	0	21
dieser	promoted	55	10	14	2	0	0	20
er	other	46	11	27	6	1	0	8
der	other	44	18	24	3	1	1	8
dieser	other	41	19	21	8	0	0	11

Table 6: Distribution of thematic roles (in per cent) in continuations where the referent with the lower-ranked thematic role was chosen as a referent for pronouns in the context of both verb types and the non-canonical word order.

slightly fewer experiencer and patient roles for the same referent in comparison to other referents.

4.3.6.3 Discussion

The aim of this section was to investigate whether the promoted referent is described in ways that reflect its enhanced prominence status. For this purpose, three categories were analysed: referential form, grammatical case, and thematic roles. The clearest results could be observed for the referential forms that were used to refer to the promoted referent.

Overall, more reduced forms such as pronouns and fewer explicit forms such as definite noun phrases were used for the promoted referent, whereas in contrast, more definite descriptions and fewer pronouns were used to refer to other referents. The overall prominence status of a referent in discourse thus appears to influence which referential forms are used to refer to it. When a pronoun referred to the referent with the lower-ranked thematic role from the first context sentence, this character became central in the subsequent discourse as the first analysis revealed. This section showed that this shift also has an impact on how this referent is referred to (in line with Gernsbacher & Shroyer, 1989) and more reduced forms were used to refer to it. Hence, as the referent has become the centre of attention, it is sufficient to use less explicit forms to refer to it. It has been argued that the competition of two animate referents makes use of more reduced

forms less likely (Chiriacescu, 2011). However, this could not be confirmed by the data provided in this section and there was a relatively clear link between the prominence status and the referential forms used.

However, the results for the other categories that were analysed are less clear. Regarding grammatical cases, for all types of referents, the nominative case was the most frequently used one although there are minor differences that may reflect the different prominence statuses of the referents. For instance, the promoted referent was less often realised as a prepositional object (oblique) compared to other referents. Furthermore, in non-canonical contexts, the promoted referent appeared less often in embedded constructions. These observations may reflect the different prominence statuses of the referents. However, the grammatical case does not appear to be the most important factor to express prominence relations. The observation that the grammatical case is not the most important prominence-lending factor is in line with research on pronoun resolution which showed that pronoun interpretation is guided by other factors (e.g. Bosch & Umbach, 2007; Hinterwimmer, 2015; Schumacher et al., 2016).

Regarding thematic roles, the picture is also less clear. In non-canonical contexts, the promoted referent appears to be realised as an agent slightly more often compared to other referents. However, all types of referents are most often realised as agents. There are some other minor differences in the non-canonical contexts and other referents appear to be more frequently realised as patients (and experiencers) compared to the promoted referent. Thus, while there are some hints to suggest that the prominence status is reflected by the choice of thematic role, the link is not as clear as with referential forms. Throughout this chapter, however, it has been argued that thematic roles contribute significantly to a referent's prominence status. It may thus be that thematic roles are used as information when other factors such as the complexity of referential forms cannot be used to infer a referent's prominence status. This would explain why participants used thematic roles to interpret the pronouns when both referents were introduced as definite noun phrases in the first context sentence. However, as discourse unfolds, participants may rely more on referential forms to signal the discourse status of the referents and the attribution of thematic roles may become more flexible. Kaiser (2005) reports results for the Finnish personal pronoun that can be interpreted in favour of this explanation. The author reports that for the interpretation of the Finnish personal pronoun the referential form of the previous referents may be more important than other factors. When the first-mentioned object was realised as a pronoun and the second-mentioned subject was realised as a full noun phrase in OVS sentences, the personal pronoun was more often associated with the previous pronoun (even though it was the grammatical object). Thus, when different referential forms are available during pronoun interpretation, this information may be prioritised.

To conclude, the promoted referent is described in ways that reflect its promoted discourse status. In

particular, there is a strong link between its discourse status and the referential forms that were used to refer to it. The results for the other categories may be less clear but also reflect its enhanced discourse status to some degree. In addition to measuring how often a particular referent is mentioned, it can be useful to also analyse its referential forms in order to assess its prominence status.

4.3.7 Referential dynamics/time course of story development (hypothesis 4)

The first analysis revealed that one important factor that influences whether a referential shift is initiated is the referent that is chosen for the pronoun. Since a clear difference between the two types of demonstrative pronouns could not be observed, this section will focus on the differences between the two types of demonstrative pronouns in more detail by looking at the time course of story development. It is assumed that the two types of demonstrative pronouns provoke different referential dynamics (as stated in the fourth hypothesis). A similar analysis with a subset of the data was published by Fuchs & Schumacher (2020).

In order to investigate referential dynamics, the story developments were analysed in more detail. While the first analysis provides an overall picture of how often the less prominent referent was mentioned in the continuations depending on pronoun type and pronoun interpretation, it does not give any information about the different time points within story development and it is possible that the pronouns provoke different referential dynamics. For example, in the context of one demonstrative pronoun, the number of references to the referent with the lower-ranked thematic role could only increase initially while in the context of the other demonstrative pronoun, references to the referent with the lower-ranked thematic role could be kept stable throughout story development. This analysis serves to reveal these kinds of differences between the two demonstrative pronouns.

There is little information in the literature regarding how exactly the two demonstrative pronouns may differ. In spoken contexts, the demonstrative pronoun *der* was used to maintain a previously less prominent referent as the new centre of attention (Ahrenholz, 2007). However, since only short extracts of the discourse following the use of the demonstrative pronouns were provided, it is difficult to judge how long these referents were kept as the centre of attention. Furthermore, a preliminary analysis of a subset of the current data (Fuchs & Schumacher, 2020) seems to suggest that the demonstrative pronoun *der* has a more long-lasting effect on the subsequent discourse structure. Following the assumption that the two demonstrative pronouns evoke different referential dynamics, this could indicate that *dieser* has a more temporary effect. However, these are merely some considerations based on the scant evidence that is available and a more thorough investigation is required.

4.3.7.1 Data analysis

In order to investigate referential dynamics, graphs were designed that depict the story development, whereby the x-axis depicts the sentence number (which corresponds to the number of the discourse unit as defined in Section 4.3.4.5). The number of the discourse unit thus serves to measure story development and higher numbers correspond to a more advanced point in story development. For each discourse unit, it was determined how many of the referents that were mentioned referred to the referent with the lower-ranked thematic role from the first context sentence. The y-axis thus depicts the proportion of references to the referent with the lower-ranked thematic role (for each discourse unit). As the referents in the first context sentence were given, the analysis starts with the second sentence. However, the potentially ambiguous pronoun from the second context sentence is also not included in the analysis. If a participant made two additional references in the second sentence in addition to the seemingly ambiguous pronoun, these two references entered the analysis. Similarly to the first analysis, when a plural expression was used, each referent that was evoked as part of the plural expression entered the analysis separately. The number of references is thus higher than the number of referential expressions that were used. As before, a high proportion of references to the referent with the lower-ranked thematic role is seen as an indication of referential shift.

In this analysis, the referent that was chosen for the pronoun is not considered. The aim of this analysis is to reveal general patterns of the different pronouns irrespective of how they were interpreted. This approach also has the advantage that there are more data points for each sentence. An analysis of the proportion of references to the lower-ranked referent in only those cases where the pronoun from the second clause was interpreted as referring back to the less prominent referent would have resulted in a small number of observations for each discourse unit. This was not a problem for the previous analysis because all references were considered together (and not each discourse unit individually as in the current analysis).

The figures were designed for different contexts based on the results of the previous analysis which confirmed an effect of verb type only for the canonical word order. Therefore, the first figure depicts the time course of continuations following accusative, canonical word order contexts. A figure illustrating the time course of continuations following the dative experiencer and the canonical contexts is included in the appendix because the first analysis investigating frequency of mention did not reveal statistically significant results for this context. The second figure illustrates the results for both accusative and dative experiencer contexts with the non-canonical word order. The previous analysis could not confirm an effect of verb type in non-canonical contexts. This is why the two verb types are summarised in one figure for non-canonical contexts. Finally, a figure depicting the time course averaged over all verb types and word order variations

will be presented.

For each figure, additional information is provided in order to be able to interpret the results. Firstly, it is stated how many of the references that entered the analysis were part of an embedded construction. As mentioned previously, referential expressions that were not an argument of the verb from the matrix clause were annotated as embedded. It can be argued that referents appearing in complement or restrictive relative clauses have an inferior discourse status to referents appearing as an argument of the main verb (e.g. Clifton & Ferreira, 1987). Furthermore, it was determined how many references occurred in subordinate clauses. It has also been argued that referents in subordinate clauses may have a less prominent discourse status (e.g. Miltsakaki, 2003). For these reasons, these two aspects were taken into consideration. Finally, it was calculated how many references that entered the analysis were classified as aboutness topics. As the aboutness topic is a very central referent (e.g. Hinterwimmer, 2015), this provides additional information that goes beyond the mere counting of references.

These data points thus serve to put the information that is provided by the graphs into context and an overview of these factors was calculated for each pronoun. In this way, it can be determined whether there are differences depending on the pronoun that the second sentence contains.

4.3.7.2 Results

Figure 9 shows the results for the accusative, canonical word order context. As mentioned above, it shows the proportion of references to the lower-ranked referent (y-axis) for each discourse unit (x-axis). The dashed line illustrates the results for the personal pronoun, the dotted line represents the results for the demonstrative pronoun *der*, and the solid line represents the results for the demonstrative pronoun *dieser*.

At the beginning (up until the eighth or ninth discourse unit) the demonstrative pronoun *dieser* appears to evoke the highest proportion of references to the lower-ranked referent. The personal pronoun appears to provoke the smallest proportion of references to the lower-ranked referent while the demonstrative pronoun *der* ranks in the middle region (with a small exception right at the beginning where it peaks). The results towards the end of the graph need to be considered with more caution as each continuation contained a different number of discourse units. The participants were asked to provide six sentences, but some wrote more than six sentences or very long sentences (which were then segmented into smaller discourse units). Thus, there are generally fewer data points for the higher numbers and the proportions may be slightly contorted. However, the graph appears to suggest that references to the referent with the lower-ranked thematic role were kept more stable towards the end in the context of the demonstrative pronoun *der*, while there were more dramatic peaks and troughs in the context of *dieser*.

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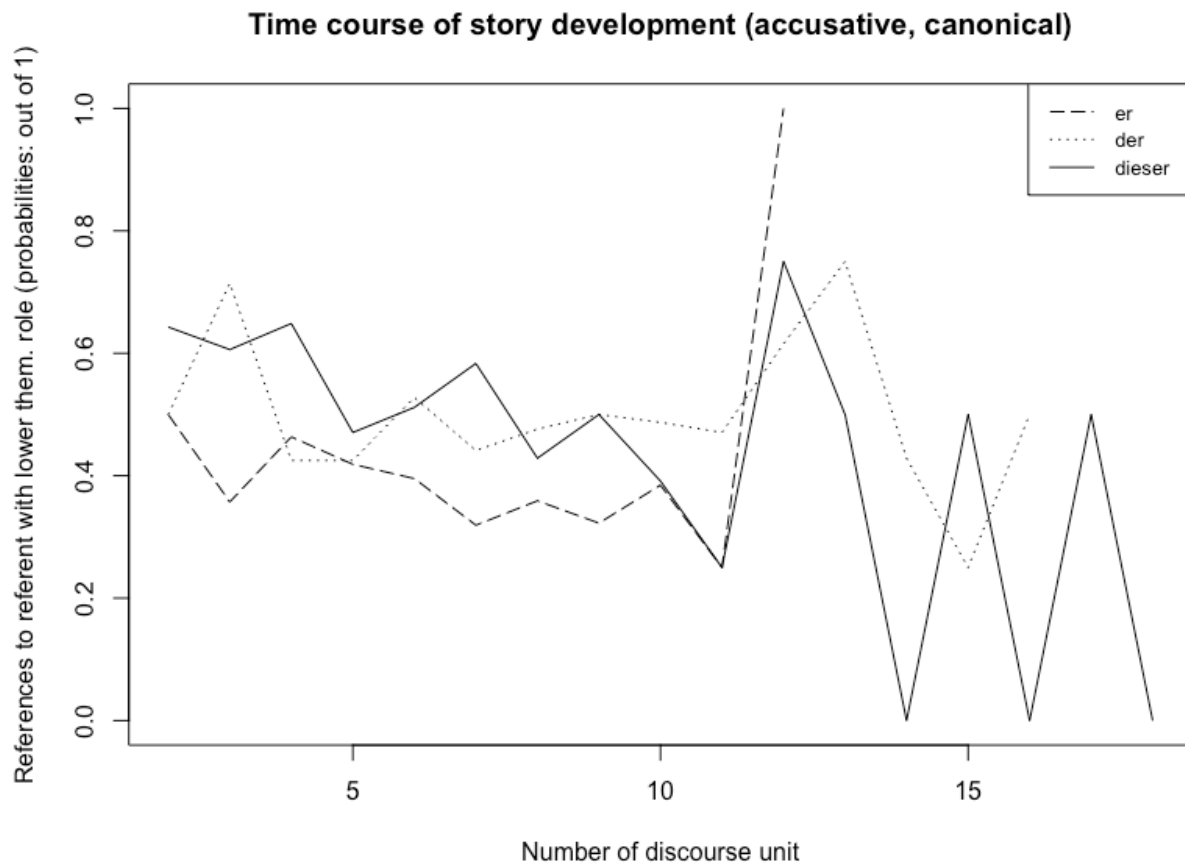
Figure 9: Proportion of references to the referent with the lower-ranked thematic role over the time course of story development dependent on the pronoun type in the context of accusative verbs and the canonical word order.

pronoun	total number of references to patient	embedded	sub-clauses	aboutness topic
er	120	25	8	43
der	171	19	15	50
dieser	163	15	13	50

Table 7: Proportion of references to the referent with the lower-ranked thematic role that appeared in embedded constructions, in subordinate clauses, and as aboutness topics depending on the pronoun type in the context of accusative verbs and the canonical word order.

Regarding the additional data points that are presented in Table 7, there does not seem to be a big difference between the two demonstrative pronouns. The second column of the table summarises the total number of references to the referent with the lower-ranked thematic role dependent on the pronoun type (first column). The third column specifies how many of these references appeared in embedded constructions, while the fourth column specifies how many of the references appeared in subordinate clauses. Finally, the last column specifies how many of these references were annotated as aboutness topics. Overall, all three pronouns have very similar values, whereby it is striking that the personal pronoun diverges from the two demonstrative pronouns in all three categories. For example, in the context of the personal pronoun, there is a higher proportion of references in embedded constructions and a smaller proportion of references that were annotated as aboutness topics. However, there do not appear to be major differences between the two demonstrative pronouns. In fact, their proportion of aboutness topics is equal. In general, the annotation of embedded referents and those occurring in subordinate clauses does not seem to have greatly influenced the results as the numbers are relatively low.

Figure 10 illustrates the time course in non-canonical contexts (and for both verb types). In this context, the lines for the personal pronoun (dashed line) and for the demonstrative pronoun *dieser* (solid line) run parallel at the beginning. However, the line for the demonstrative pronoun *dieser* shows more peaks towards the end but, as has already been pointed out, the results for higher discourse units need to be interpreted carefully. The line for the other type of demonstrative pronoun *der* peaks initially before it declines and rises again.

Regarding the additional data points that were calculated (Table 8), the values for all three pronouns are very similar again. In general, the proportion of referents appearing in embedded constructions or subordinate clauses is relatively low. Furthermore, the proportions are almost identical for all three pronouns indicating that the annotation of referents in embedded constructions and subordinate clauses has not greatly influenced the results. Almost half of the mentioned referents were annotated as aboutness topics, with the figure being highest for the demonstrative pronoun *dieser*.

Finally, Figure 11 illustrates the time course averaged over all conditions. Overall, the demonstrative

Time course of story development (accusative and dative, non-canonical)
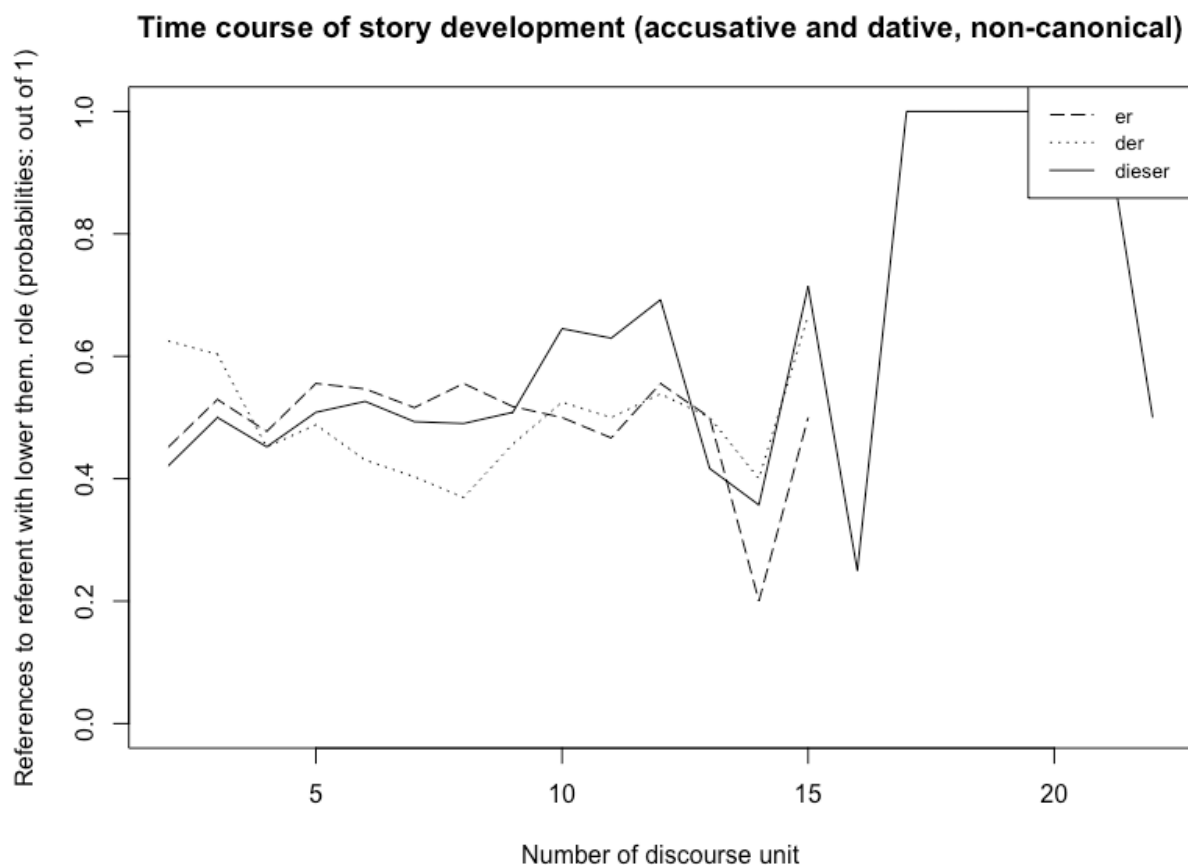
Figure 10: Proportion of references to the referent with the lower-ranked thematic role over the time course of story development dependent on the pronoun type in non-canonical contexts.

pronoun	total number of references to patient	embedded	sub-clauses	aboutness topic
er	331	21	15	46
der	276	20	17	48
dieser	308	21	14	50

Table 8: Proportion of references to the referent with the lower-ranked thematic role that appeared in embedded constructions, in subordinate clauses, and as aboutness topics depending on the pronoun type in the context of both verb types and the non-canonical word order.

pronoun *dieser* appears to evoke the highest proportion of references to the referent with the lower-ranked thematic role. There are different points within story development where the other type of demonstrative pronoun (*der*) has a higher proportion of references to the lower-ranked referent (right at the beginning and towards the end). However, in general the line for the demonstrative pronoun *dieser* (solid line) appears to dominate, while the lines for the personal pronoun (dashed line) and the demonstrative pronoun *der* (dotted line) are more parallel.
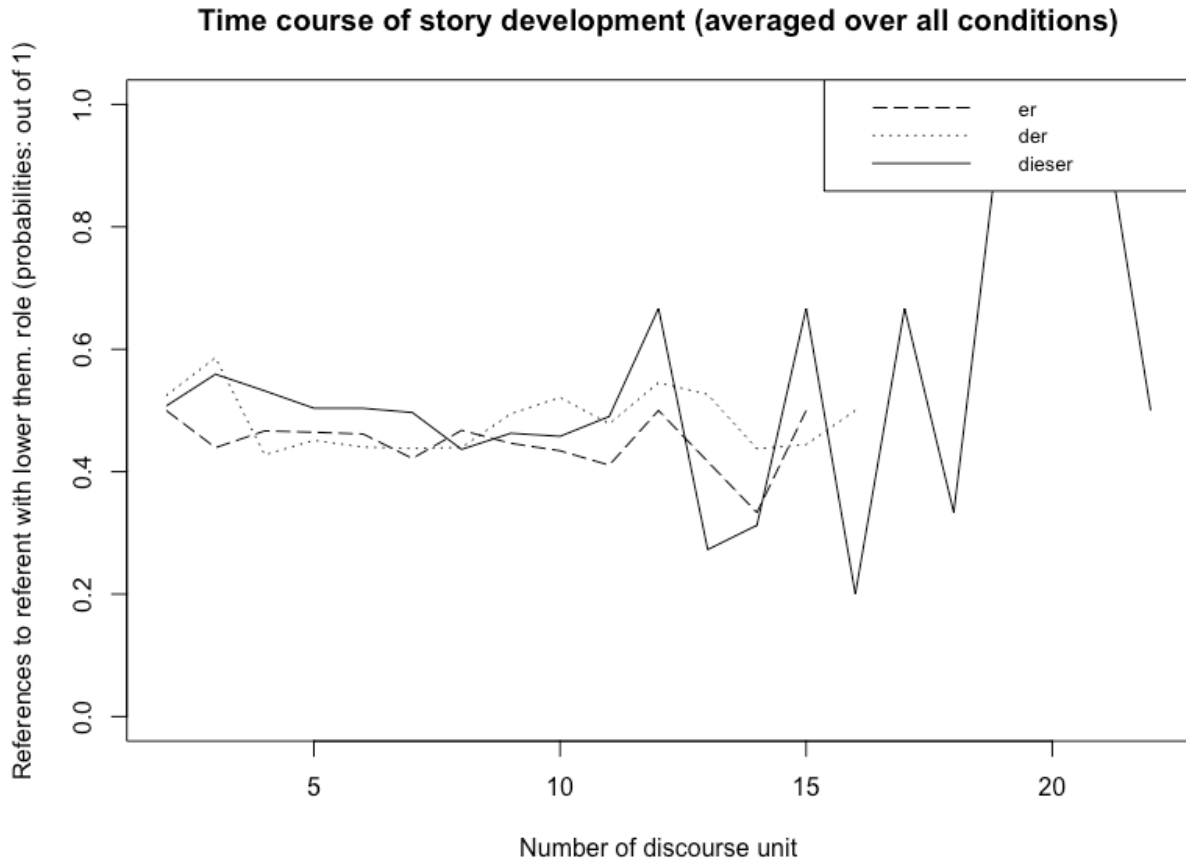
Figure 11: Proportion of references to the referent with the lower-ranked thematic role over the time course of story development dependent on the pronoun type averaged over all conditions.

The additional data points (Table 9) confirm what has already been observed for the other contexts. The proportion of embedded referents and those appearing in subordinate clauses is relatively low and similar for all three pronouns. Furthermore, the proportion of referents annotated as aboutness topics is almost equal for all three pronouns, with the highest number for the demonstrative pronoun *dieser*.

pronoun	total number of references to patient	embedded	sub-clauses	aboutness topic
er	581	23	12	46
der	581	21	16	48
dieser	632	21	13	49

Table 9: Proportion of references to the referent with the lower-ranked thematic role that appeared in embedded constructions, in subordinate clauses, and as aboutness topics depending on the pronoun type averaged over all conditions.

4.3.7.3 Discussion

The aim of this section was to gain a more detailed understanding of how the two demonstrative pronouns may evoke different referential dynamics. Almost all graphs revealed that the demonstrative pronoun *dieser* provokes a high proportion of references to the referent with the lower-ranked thematic role in the first part of the stories (up until the tenth discourse unit). This became especially clear in the graph depicting the accusative, canonical context and in the graph depicting the results averaged over all conditions. What these two figures also appear to suggest is that the demonstrative pronoun *der* keeps references to the referent with the lower-ranked thematic role relatively stable towards the end where the lines for the other two pronouns show more variation. However, there were fewer data points for higher numbers and these observations need to be interpreted with caution. In the non-canonical contexts, the line for the personal pronoun was initially very similar to the line for the demonstrative pronoun *dieser*.

A high number of references to the lower-ranked referent throughout story development is seen as one indication of a high referential shift potential. However, these references can appear in different sentence constructions and some constructions (such as main clauses) may indicate a higher discourse status while other constructions (such as subordinate clauses or embedded constructions) may indicate a lower discourse status. Thus, it was also analysed in what kind of constructions the previously lower-ranked referent was mentioned. The analysis revealed that the proportion of references to the referent with the lower-ranked thematic role that appeared in lower-ranked constructions such as embedded constructions and subordinate clauses was similar for all three pronouns and generally low. This indicates that the annotation of embedded referents and of those in subordinate clauses has not distorted the time course analyses. Furthermore, the proportion of references to the referent with the lower-ranked thematic role that was annotated as aboutness topics was similar for all three pronouns with the number being highest for *dieser*.

All in all, there thus seems to be evidence that the demonstrative pronoun *dieser* has a high referential shift potential. The high number of references to the lower-ranked referent at the beginning of story development could indicate that *dieser* has a more short-term effect. However, the stories were of different lengths and it is possible that most stories were within that frame. In fact, an analysis of the average length

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of the stories revealed that most stories consisted of ten discourse units (including the given sentence pair).[23] Thus, it has to be assumed that there were only a few stories that were longer than ten sentences. Therefore, it remains an open question whether the demonstrative pronoun *dieser* has a short-term effect when only a few stories appear to exceed ten sentences. However, in those stories that are rather long, the demonstrative pronoun *der* does appear to keep references to the initially lower-ranked referent relatively stable towards the end. For future analyses, it would thus be interesting to only compare stories that have the same sentence length to get a better understanding of referential dynamics in discourse.

4.4   General discussion

The aim of this chapter was to investigate the forward potential of German demonstrative pronouns compared to personal pronouns. Three main analyses were conducted to test the following hypotheses that were outlined at the beginning.

The first hypothesis stated that demonstrative pronouns initiate a referential shift towards a previously less prominent referent (i.e. the patient), which should result in a higher number of references to the patient in the continuations. The second hypothesis stated that the shift function (i.e. the forward function) is dependent on initial pronoun interpretation (i.e. the backward function). The text continuation task that was conducted in order to test these hypotheses revealed that demonstrative pronouns and personal pronouns initiated a referential shift when they were initially interpreted as referring to the less prominent patient. However, when any pronoun was interpreted as referring to the more prominent referent, there were no major changes in the prominence status of the referents in the upcoming discourse. The previous chapter revealed that demonstrative pronouns were more often interpreted as referring to the patient than personal pronouns. This means that in general, they have a larger potential for referential shift compared to personal pronouns. However, the current analysis revealed that the shift potential is modulated by contextual factors such as initial pronoun interpretation. The shift function thus does not seem to be an intrinsic semantic property of demonstrative pronouns since they did not necessarily encourage participants to initiate a shift as will be discussed in more detail below.

There were some minor context variations that need to be discussed, whereby especially the dative experiencer, canonical word order context stands out as there were no clear preferences for this context. Surprisingly, the results for the backward function revealed that participants had clear interpretive preferences for the pronouns. Nevertheless, they did not develop their continuations clearly in favour of one of

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[23]The last discourse unit of each story that contained a referential expression entered the analysis; discourse units following after that without any referential expressions could not be considered.

the two referents. Dative experiencer verbs are more difficult to process than accusative verbs as important prominence-lending factors fall on different arguments. In these contexts, the highest-ranked thematic role (agent/experiencer) is realised as a different argument than the highest-ranked grammatical role (subject). However, it is surprising that clear preferences could be observed for non-canonical but not for canonical contexts. The first context sentence in canonical contexts must have made both referents appear equally interesting. However, there are visual differences that are not unlike those observed for the other contexts. Only the column for the demonstrative pronoun *der* stands out, which might have confounded the results.

In general, these results indicate that referential shift does not appear to be an intrinsic feature of demonstrative pronouns. There is also evidence from spoken language that seems to confirm that demonstrative pronouns do not have to initiate a referential shift. Weinert (2011) presents results regarding the use of demonstrative pronouns from the *der/die* paradigm from goal-oriented dialogues in which participants had to talk about landmarks on each other's maps. She gives examples such as the following where a demonstrative pronoun picks up a very prominent referent (Weinert, 2011, p. 86 (interlinear gloss and translation my own)):

(37) *hast du ne wiese – die habe ich*

    have you a meadow-F – that-F-DEM have I

    'do you have a meadow – I have that one'

In this example, the object is the referent and, although grammatical objects are generally considered less prominent (e.g. Bosch et al., 2003), in this case, the object is very prominent and "singled out for attention" (Weinert, 2011, p. 86). The author also observed that demonstrative pronouns were often used in contexts where zero (but not the personal pronoun) would be possible (i.e. sentence-initially) as in the following example (adapted from Weinert, 2011, p. 83 (interlinear gloss and translation my own)):

(38) *[…] komme ich auf eine ruine – die hab ich auch ja*

    […] come I to a ruin-F – that-F-DEM have I too yes

    '[…] I get to a ruin – I have that one as well'

In this example, the demonstrative pronoun could be replaced by a zero pronoun in spoken German, indicating that the demonstrative pronoun has a very prominent referent. Weinert (2011, p. 80f.) thus concludes that "demonstrative pronouns are not especially marked in spoken German and do not primarily shift attention to unexpected, new entities." While shifting attention and changing prominence relations may still be an important feature of demonstrative pronouns, it may be modulated by contextual factors

such as pronoun interpretation (as indicated by the current research) and possibly modality (as suggested by Weinert, 2011). There is also evidence from other domains that seems to suggest that contextual factors can highlight (and attenuate) certain features of a linguistic device. Research on agentivity showed that "[i]n different constructions different agentive features may be prioritised leading to a changing highlighting of agentive features" (Kretzschmar et al., 2019). Agentivity is composed of different features (see Section 4.3.4.4). The authors tested agentive verbs in different sentence constructions and reported that in some constructions, certain features of agentivity are less preferred than others. These results show that context is very important when describing linguistic devices. Thus, assuming intrinsic features without considering how contextual factors can modulate these features may be problematic as the current research revealed. Furthermore, these results support the definition of prominence as outlined in the previous chapter which highlights the dynamicity of linguistic devices in discourse (von Heusinger & Schumacher, 2019).

The third hypothesis stated that – once a referential shift has been initiated by a (demonstrative) pronoun – the promoted referent is realised in ways that reflect its enhanced prominence status. The analysis of different categories revealed that particularly referential forms highly correlate with the prominence status of a referent, whereby more reduced forms were used to refer to the promoted referent and more complex forms were used for other referents. This result corroborates findings for English from Gernsbacher & Shroyer (1989) who focused on the demonstrative article *this*. Furthermore, it stresses the importance of referential forms as a prominence-lending feature. Most empirical research so far constructed items with two definite noun phrases, thus ignoring the contribution of referential forms for pronoun interpretation and prominence assignment. However, there is evidence that referential forms may be crucial for pronoun interpretation. Kaiser (2005) reports that for the Finnish personal pronoun the referential form of the previous referents is a major factor. When the first-mentioned object was realised as a pronoun and the second-mentioned subject was realised as a full noun phrase in OVS sentences, the participants more often linked the personal pronoun to the previous pronoun (i.e. the object). As shown in the previous chapter, personal pronouns typically refer to prominent referents and subjects are considered more prominent compared to objects (e.g. Bosch et al., 2003). However, referential forms appear to be prioritised over grammatical functions in pronoun interpretation as Kaiser's (2005) observation indicates. Furthermore, corpus studies have shown that German demonstrative pronouns from the *der/die* paradigm refer back to a full noun phrase significantly more often than personal pronouns (Weinert, 2007; for similar results see Portele & Bader, 2016). These observations may therefore explain the current results. When arguments are realised via different referential forms, this information is considered more important than other factors such as thematic roles and grammatical functions. However, when the arguments have the same referential form (as for example in the first context

sentence of the current experiment) other factors such as thematic roles are used to resolve the pronouns. The correlation between referential forms and the prominence status of their referents may be so strong (see Ariel, 1990; Gundel et al., 1993) that other prominence-lending features can be distributed more freely as the current analysis revealed. Neither for grammatical cases nor for thematic roles could such a correlation be found.

The fourth hypothesis stated that the two demonstrative pronouns differ from each other with respect to their shift potential. A clear description of how these two demonstrative pronouns differ is lacking so far. Therefore, story development was analysed in order to reveal possible differences between the two demonstrative pronouns. The results suggest that the demonstrative pronoun *dieser* has a strong potential for referential shift. However, some open questions remain concerning the interpretation of the time course analyses. In the context of *dieser*, references to the referent with the lower-ranked thematic role seem to increase initially but drop after the tenth sentence. However, most stories did not exceed ten sentences. In those stories that were longer than ten sentences, the demonstrative pronoun *der* appears to keep references to the previously lower-ranked referent relatively stable. Further investigations are necessary to determine whether one demonstrative pronoun has a more short-term effect compared to the other demonstrative pronoun. As described in the previous chapter, the context sentence introduced all pronouns in the German middle field (i.e. after the inflected verb), which is the preferred syntactic position of demonstrative pronouns from the *dieser/diese* paradigm (Ahrenholz, 2007). However, demonstrative pronouns from the *der/die* paradigm have more often been observed before the inflected verb (Ahrenholz, 2007). Furthermore, it could be shown that the shift potential of the demonstrative pronoun *der* is strongly correlated with its preferred syntactic position as it is often realised as a sentence-initial subject and picks up the previous grammatical object, which frequently is the last-mentioned referent (e.g. Ahrenholz, 2007; Weinrich, 1993). Thus, it would be interesting to test both pronouns in the German pre-field (i.e. before the inflected verb) to investigate to what extent the syntactic position can influence their shift potential.

Another question that future research needs to address is the extent to which different modalities and registers influence the shift potential of demonstrative pronouns. The current research is based on written language and possibly a more formal register, and there is conflicting evidence concerning the role of different modalities and registers. Demonstrative pronouns from the *der/die* paradigm are sometimes considered more informal compared to demonstrative pronouns from the *dieser/diese* paradigm. Empirical findings from Patil et al. (2020) seem to suggest that *dieser* is indeed associated with more formal registers. This may explain the more robust findings for *dieser* in the time course analysis. However, the other type of demonstrative pronoun could also be observed in formal contexts. Both Ahrenholz (2007) and Weinert (2007) report that

demonstrative pronouns from the *der/die* paradigm often occur in academic contexts. Their observations are based on spoken language, but academic contexts (such as consultations between lecturers and students) can be considered rather formal. Similarly, the fact that *der* is not very often found in newspapers, for example, does not have to indicate that its use is restricted to less formal contexts, as discussed in Chapter 2. Several authors argue that not necessarily modality and register but rather communicative goals influence the use of different pronominal forms (Ahrenholz, 2007; Weinrich, 1993). Demonstrative pronouns from the *der/die* paradigm are less often found in newspaper articles because they usually explore one main topic and frequent topic shifts may thus simply not be necessary. In contrast, there is also Weinert's (2011) account which claims that the shift function of demonstrative pronouns is attenuated in spoken (and what may be rather informal) contexts. Future research thus needs to determine the role of different modalities and registers.

Related to this is the question of how different text types influence the shift potential of different pronouns. The current research is based on short stories that introduced two referents. Thus, the experimental design might have made it more likely that participants focus on one of these referents for a rather long time. However, in other text types such as newspapers or dialogues, it might not be necessary or possible to maintain the centre of attention on a previously less prominent referent for a longer period of time. Especially in dialogues, the attention is frequently shifted from one referent or topic to another. Thus, the shift function of demonstratives may be weaker in such contexts. This is also a question that future research needs to address.

4.5   Conclusion

To conclude, this chapter provided evidence that demonstrative pronouns have a high potential for referential shift. However, it could be shown that this potential can be modulated by other factors and the best predictor of whether or not a referential shift will be initiated is pronoun interpretation. When a pronoun is interpreted as referring to the less prominent referent from previous discourse, a referential shift towards that referent in upcoming discourse is very likely. However, as demonstrative pronouns refer to the less prominent referent more often than personal pronouns, it can be argued that they have a higher potential for referential shift. These results also show that the backward and forward functions of anaphoric pronouns are closely linked and it should be questioned whether both can be considered independently. The time course analysis further revealed that particularly the demonstrative pronoun *dieser* appears to have a high shift potential at the beginning of story development, but there are open questions concerning this aspect and thus further research is needed. One question concerns the influence of the syntactic position on the

shift potential of the different demonstrative pronouns. Other contextual factors that need to be addressed in future research include modality, register, and different text types. For the description of any linguistic device, different contextual factors should be taken into account since the current research clearly showed that contextual factors influence how certain features of a linguistic device are perceived.

The next chapter will focus on the on-line processing of demonstrative pronouns in order to shed further light on potential differences between *der* and *dieser* and to relate the backward and forward functions to more general language processing mechanisms.

5 Neural correlates of the backward and forward functions

5.1 Introduction

The previous two chapters investigated two discourse functions of German personal and demonstrative pronouns that are closely associated with attention-orienting, namely the backward and forward functions. With regard to the backward function (i.e. how different pronouns are interpreted), it could be shown that the two types of German demonstrative pronouns direct attention to a less prominent referent while the German personal pronoun is more ambiguous or associated with a prominent referent from previous discourse. In the sentence continuation task that was presented in Chapter 3, thematic roles could be confirmed as important factors influencing the prominence status of the referents (as observed by Schumacher et al., 2016). More specifically, (proto-)agents were shown to be more prominent compared to (proto-)patients. The linear order of the referents could not be confirmed as the main factor guiding pronoun interpretation (contrary to what has been claimed for the demonstrative pronoun *dieser*, Zifonun et al., 1997). Furthermore, significant differences between the two types of demonstrative pronouns could not be observed with regard to their interpretive preferences.

It could also be shown that personal and demonstrative pronouns do not only refer back to referents with specific prominence statuses, but that personal and demonstrative pronouns also signal how subsequent discourse will develop (forward function). Demonstrative pronouns are not only interpreted as referring to a less prominent referent in the majority of cases, but they also promote the previously less prominent referent to a more prominent discourse status in upcoming discourse. This was reflected by the number of references to the previously less prominent referent in the participants' story continuations. However, it could be shown that the personal pronoun can also initiate such a shift when it is initially interpreted as referring to a less prominent referent. However, since the personal pronoun is generally less often associated with a less prominent referent, it can be argued that demonstrative pronouns have a stronger potential for referential shift.

The aim of this chapter is to investigate the language processing mechanisms that are underlying the backward and forward functions and to determine the neural correlates of these two discourse functions by conducting an event-related potential (ERP) experiment. Furthermore, the ERP experiment can shed further light on potential differences between *der* and *dieser*. ERPs reflect the brain's electrical activity when a particular stimulus (e.g. a personal or demonstrative pronoun) is encountered and are thus a very time-sensitive method. Since the behavioural results presented in the previous two chapters did not show large differences between *der* and *dieser*, it may therefore be possible to detect subtle differences between *der* and

dieser using ERPs. There is evidence from previous studies that ERPs can reveal subtle effects that are not detectable in behavioural experiments. For example, Sneed German et al. (2015) investigated the processing of misplaced French pronouns in native and non-native speakers of French. Interestingly, behavioural results showed that second-language learners with a low-intermediate level did not judge misplaced clitic pronouns as ungrammatical. However, their neural responses revealed an effect that was similar to those of native speakers. Similarly, McLaughlin et al. (2004) report that ERP results revealed effects with respect to second-language learners' word recognition capacity that were not discernable in behavioural experiments. Thus, the ERP experiment presented here can contribute to a better understanding of the differences between *der* and *dieser* with regard to their backward and forward functions. Furthermore, since so few ERP studies have been conducted on demonstratives, the current ERP experiment contributes to the literature by providing further evidence about the neural correlates of anaphoric processing. While previous research investigated the processing of the demonstrative pronoun *der* (Schumacher et al., 2015), the current experiment is the first one to investigate the processing of *dieser*. The backward and forward functions of *der* and *dieser* will be related to two specific components and language processing mechanisms (as suggested by Schumacher et al., 2015).

The backward function will be related to predictive processing. It will be assumed that listeners and readers generate expectations about which referent will be mentioned next (for example, Stevenson et al. (1994) and Rosa & Arnold (2017) demonstrated that readers have expectations regarding which thematic role will be mentioned next) and that certain referential forms can meet or violate these expectations. Following von Heusinger & Schumacher (2019), it is expected that prominent referents are more likely to be mentioned again in the following discourse. As demonstrative pronouns typically do not refer back to a prominent (or "expected", Comrie, 1997, p. 51) referent, they should violate the expectations that were generated based on the previous discourse. Previous studies investigating neural correlates of language processing have shown that the N400 component is associated with predictive processing and that unpredicted linguistic input such as unpredicted referents evokes a more pronounced negative deflection (e.g. Burkhardt, 2006; Kutas & Hillyard, 1980; Szewczyk & Schriefers, 2013). Therefore, it is expected that demonstrative pronouns will evoke a higher N400 compared to the personal pronoun (as shown for the demonstrative pronoun *der* vs the personal pronoun *er* by Schumacher et al., 2015). However, demonstrative pronouns could evoke a more pronounced negative deflection compared to the personal pronoun for two reasons: either because they refer to a less prominent referent (as suggested above) or because their referential form might be more unexpected. These two aspects might be closely connected: the referential form of demonstrative pronouns could be more unexpected precisely because they refer to less prominent referents. In the current experiment, it is not

possible to disentangle these two aspects. Therefore, it will simply be assumed that demonstrative pronouns evoke a higher N400 compared to personal pronouns. As mentioned above, to what extent the two types of demonstrative pronouns differ from each other will also be addressed.

The forward function will be related to mental model updating. As demonstrative pronouns promote a previously less prominent referent to a more prominent discourse status, the mental representation of the discourse needs to be reorganised in favour of the promoted referent. Previous ERP studies have linked late positivities to mental model updating (e.g. Burkhardt, 2006; Hung & Schumacher, 2012; Kuperberg et al., 2020). It is thus expected that demonstrative pronouns evoke a higher late positivity compared to personal pronouns (as shown for the demonstrative pronoun *der* vs the personal pronoun *er* by Schumacher et al., 2015). In order to test these hypotheses, an event-related potential experiment with similar items to those from the previous two experiments will be presented that sheds light on the language processing mechanisms that demonstrative and personal pronouns trigger.

This chapter is structured in the following way: Firstly, a brief introduction to ERPs will be provided (based on Luck, 2014). Subsequently, the two general language processing mechanisms that are relevant for the backward and forward function (i.e. predictive processing and mental model updating) and their neural correlates are discussed. Finally, the current research is presented.

5.2 Introduction to event-related potentials (based on Luck, 2014)

ERPs reflect the brain's electrical activity when a particular stimulus (e.g. a personal or demonstrative pronoun) is encountered. The ERPs are determined by attaching electrodes to the scalp of participants and each stimulus generates a particular waveform. In order to remove activity that was not caused by the stimulus, all single-trial waveforms for each stimulus are averaged. The resulting averaged waveform reflects "[a]ny brain activity that was consistently elicited by the stimulus" (Luck, 2014, p. 8). For an example of averaged waveforms, see Figure 12.

The y-axis illustrates the amplitude size (measured in microvolts) while the x-axis illustrates the time course of brain activity after the onset of a particular stimulus such as a personal or demonstrative pronoun (measured in milliseconds). The different lines represent various conditions that are compared in an experiment (e.g. the personal pronoun compared to two types of demonstrative pronouns). The different deflections that are visible are also referred to as components, which can be defined in the following way (Luck, 2014, p. 66): "Conceptually, an ERP component is a scalp-recorded neural signal that is generated in a specific neuroanatomical module when a specific computational operation is performed." Applied to

Grand average ERPs (accusative, non−canonical)
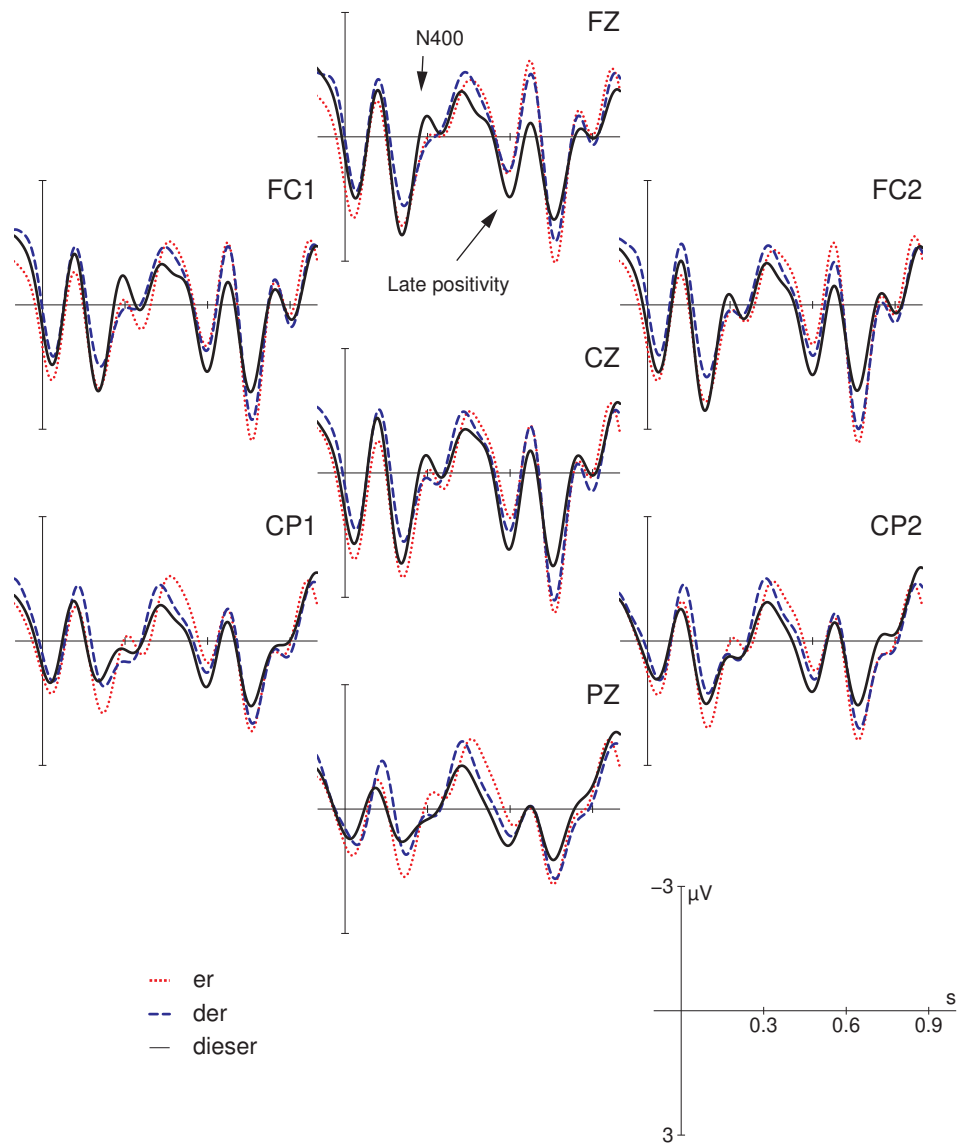
Figure 12: Example of averaged waveforms.

language, certain components are associated with specific language processing mechanisms ("computational operations", Luck, 2014, p. 66). The names chosen for the different components often reflect whether the deflection is positive or negative (N for negative deflections and P for positive deflections). Furthermore, the position of the deflection is often included in the name – either by stating the position in relation to other deflections (e.g. P2 for the second positive deflection) or the time point (latency) at which the deflection becomes visible (e.g. N400 for a negative deflection 400 ms after stimulus onset). For some researchers, it is also of interest to state in which brain regions a particular effect becomes visible. Thus, ERPs are generally characterised in terms of their amplitude size, their latency (time point of occurring), their polarity (positive or negative), and their topography (brain regions). In the following, two such components – namely, the N400 and late positivities – will be presented and discussed in relation to the backward and forward functions of German pronouns.

5.3 Relevant ERP components

5.3.1 The backward function and predictive processing

Predictive processing is an important mechanism in language processing, which has been acknowledged by several researchers. Early on, Goodman (1970) recognised the importance of predictive processing for reading and pointed out that readers constantly use the available graphic, semantic, and syntactic information in order to generate predictions about what is going to follow in the upcoming text (Goodman, 1970). "The ability to anticipate that which has not been seen [...] is vital in reading just as the ability to anticipate what has not yet been heard is vital in listening" (Goodman, 1970, p. 108). Being able to predict upcoming information facilitates comprehension and, for example, it can be predicted which word class (e.g. a determiner) is going to follow (Goodman, 1970).

More recent accounts (e.g. Pickering & Garrod, 2007, 2013) have elaborated on the role that predictive processing plays in language production and comprehension. Pickering & Garrod (2013) use so-called forward models in order to explain why listeners easily understand their interlocutors most of the time. They "assume that actors construct forward models of their actions before they execute those actions, and that perceivers of others' actions construct forward models of others' actions that are based on their own potential actions" (Pickering & Garrod, 2013, p. 332). A non-linguistic example can help to illustrate the forward model that someone generates for their own actions: when someone plans to touch something with their hand, the person not only performs the action but – before performing the action – envisions the experience of the action and its end result. The actual perception of moving the hand and reaching the target can then be

compared to the perception that was predicted. Mismatches will be noted and used to reach the desired outcome (Pickering & Garrod, 2013). "[P]redicting the perceptual outcomes of an action" (Pickering & Garrod, 2013, p. 334) is thus the main function of forward models. Likewise, the forward model helps to generate predictions about another person's actions (and the actual outcome of the other person's action can then be compared to the one envisioned earlier). This concept can also be used to explain language comprehension: according to Pickering & Garrod (2013), the addressee also generates expectations about subsequent linguistic input. These expectations are generated based on how the addressee would continue, for example, a particular sentence and on experiences of how other persons have continued a similar sentence in particular circumstances in the past. These predictions concern different levels such as syntax and phonology, whereby the actual input can then be compared to what was predicted.

Based on these accounts, it can thus be assumed that predictions are constantly generated. The literature on reference management suggests that predictions about which referent is going to be mentioned next are also generated. For instance, Centering Theory (e.g. Grosz et al., 1995) states that when readers encounter a sentence with several referents, they generate predictions about which of these referents is going to be the most central one in the following utterance. Rosa & Arnold (2017) report that participants predicted which thematic goals would be mentioned next when presented with sentences introducing one referent as the goal and one referent as the source (for similar results, see also Arnold, 2001). Results by Stevenson et al. (1994) also indicate that participants have clear expectations regarding which thematic role will be mentioned next, reflected by a higher number of first references to that role in a continuation task. These studies show that during discourse comprehension, expectations regarding which referent is most likely to be mentioned next are generated. Inspired by these accounts and studies, in the following it will be assumed that prominence relations between referents are used to generate expectations regarding who will be mentioned next.

In sentences with a proto-agent and a proto-patient, the proto-agent is considered more prominent, as already discussed extensively in the previous chapters. Assuming that the more prominent referent is more likely to be mentioned again in the subsequent discourse (von Heusinger & Schumacher, 2019), addressees will expect a reference to the proto-agent and reference to another referent should thus violate this prediction. As outlined in the introduction to this chapter, the processing of three different anaphoric pronouns (*er* vs *der* vs *dieser*) will be compared. It is expected that demonstrative pronouns violate the parser's predictions while the personal pronoun fulfills the parser's predictions. Demonstrative pronouns could violate the parser's predictions for two reasons: either because their referential form is less expected or because they refer to a less prominent referent. These two aspects might be closely connected, as demonstrative pronouns may be

the least expected referential form (compared to the personal pronoun) because they are associated with less prominent referents. However, these two aspects cannot be disentangled in the current experiment and it will simply be assumed that demonstrative pronouns violate the previously generated prediction with regard to who is going to be mentioned next. The N400 has been discussed as a neural component that reflects the costs related to predictive processing as will be shown in the following.

The name N400 refers to a negative deflection that reaches its peak 400 ms after the onset of a particular stimulus and could be observed in several studies on language processing (for an overview see Bornkessel-Schlesewsky & Schlesewsky, 2019). Firstly, some studies showed a general relation between the N400 and predictive processing. Many of these studies focused on semantic predictions. For example, Kutas & Hillyard (1980) presented their participants with sentences that contained a semantically unexpected and, crucially, incongruent final word as in *He took a sip from the transmitter* (Kutas & Hillyard, 1980, p. 203) where another word would be more fitting in the final position. They report that unexpected and incongruent words such as *the transmitter* in the above context evoked a more pronounced negative deflection around 400 ms after stimulus onset compared to less unexpected words. The study thus indicates that the N400 component is related to predictive processing. Furthermore, it illustrates that the size of the negative deflection can be seen as a reflection of processing costs since the size of the amplitude was larger in the context of highly unexpected and incongruent words. In another study, Kutas et al. (1984) showed that a more pronounced N400 component also emerges after words that are semantically possible, but improbable in a particular context (such as *Captain Sheir wanted to stay with the sinking **raft***, adapted from Kutas et al., 1984, p. 222) compared to words that are semantically possible and probable. However, the size of the amplitude was smaller for improbable words compared to incongruent words such as in the previous experiment.

The studies mentioned above tested individual sentences. In the following, studies will be presented that focus on how broader discourse contexts shape expectations about upcoming linguistic input. Van Berkum et al. (2005) constructed larger discourse contexts in Dutch that made the occurrence of a particular noun very likely. However, when a noun occurred that violated the predictions that were generated based on the previous discourse, a larger N400 component was registered compared to when a highly expected noun occurred. A translated example of a highly expected vs unexpected noun can be found in the following (adapted from Van Berkum et al., 2005, p. 446): *The burglar had no trouble locating the secret family safe. Of course, it was situated behind a big but unobtrusive painting (predicted) vs a bookcase (unpredicted).*

Furthermore, Szewczyk & Schriefers (2013) showed that Polish speakers have expectations as to whether an animate or inanimate object will follow after short stories. In Polish, adnominal adjectives agree with the following noun and there are specific gender markings for masculine-animate and masculine-inanimate

nouns. When participants encountered an adjective that violated the previous expectation with respect to the gender of the noun, this caused a more pronounced N400 compared to when they encountered an adjective that confirmed the expectation.

Nieuwland & Van Berkum (2006a) showed that the larger pragmatic context can even support a usually semantically impossible interpretation and a less pronounced N400 was registered for a usually improbable event (e.g. inanimate objects expressing feelings) when the context favoured such an interpretation compared to when the context did not favour such an interpretation.

The N400 also seems to be sensitive to phonological predictions. DeLong et al. (2005) showed that participants had expectations regarding the phonological form of the English indefinite article.[24] For example, when the context made the occurrence of a noun starting with a consonant likely (as in *The day was breezy so the boy went outside to fly…. (a kite)*, adapted from DeLong et al., 2005, p. 1117) but the indefinite article *an* followed, this caused a more pronounced negative deflection compared to when the article *a* followed.

The studies that have been summarised so far indicate that discourse comprehenders constantly use the preceding discourse to generate predictions about what is going to follow. These predictions relate to different linguistic levels such as semantics, pragmatics, and phonology and the violation of previously generated predictions causes a more pronounced N400 compared to non-violations. In the following, it will be shown that discourse comprehenders also generate expectations regarding which referent is most likely to be mentioned next.

With respect to the processing of referents and referential expressions, previous studies showed that the size of the N400 amplitude reflects how predictable a referent is in a particular discourse. For example, Burkhardt (2006) conducted an ERP experiment in order to investigate the processing of referents that were mentioned in short German discourse contexts. The target referents differed with respect to whether they were previously mentioned, completely new and unexpected, or inferable from the previous context. An example of an inferable referent is *the conductor* in the following sentence pair where the mention of a concert supports the introduction of a conductor (Burkhardt, 2006, p. 161):

(39) *Tobias besuchte ein Konzert in Berlin.*

'Tobias visited a concert in Berlin.'

Er erzählte, dass der Dirigent sehr beeindruckend war.

'He said that the conductor was very impressive.'

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[24]But see Nieuwland et al. (2018) for a replication study that did not corroborate these findings.

ERPs that were measured after the onset of the target referent (*the conductor* in the above example) revealed that new referents evoked the most pronounced N400 while given referents evoked a much weaker N400. Referents whose mention was supported by the previous context as in the above example evoked a less pronounced deflection compared to new referents but a more pronounced deflection compared to given referents. Thus, the most unpredictable referent evoked the highest processing costs, which are reflected in the most pronounced negative deflection. In addition, the most unpredictable (i.e. the new) referent also evoked a late positive deflection, which will be linked to updating in the next section.

Furthermore, Hung & Schumacher (2012) showed that the previous discourse is also used to make predictions about which referent will be mentioned as a topic in the next sentence in Chinese. In Chinese, the topic generally corresponds to the first-mentioned and given argument. The authors thus designed sentence pairs that varied with respect to the sentence position of the target referent in the second sentence: The first sentence introduced a topic (e.g. *What about Zhangsan?*, Hung & Schumacher, 2012, p. 60) that was either also mentioned as a topic in the following sentence (topic continuity) or occurred in the following sentence as second-mentioned referent and another referent took on the topic role (topic shift). In addition, some first sentences did not mention any topic (*What happened?*, Hung & Schumacher, 2012, p. 60), whereby the following sentence contained a new topic. It was assumed that participants have expectations – based on the first sentence – concerning who will be mentioned as the topic in the second sentence and that topic continuity should be most expected. To test this assumption, the neural responses to the topic in the second sentence were measured. Indeed, the most pronounced N400 was registered for topic shifts, followed by new topics and continued topics. Linking deflection size to the degree of unexpectedness, these results show that topic continuity is most expected and topic shift most unexpected. New topics evoked a less pronounced N400 compared to topic shifts as no prior prediction could be violated since the previous question did not contain any topic (Hung & Schumacher, 2012).

These results show that the N400 is a good approach to investigate how predictable a referent is in a particular discourse. Furthermore, they illustrate that a more pronounced negative deflection is associated with less predicted referents. While the previous studies tested full noun phrases (Burkhardt, 2006) or proper names (Hung & Schumacher, 2012), there is also evidence that the N400 is a suitable candidate to investigate the processing of anaphoric pronouns (e.g. Filik et al., 2008, 2011). Furthermore, several studies showed that the N400 is sensitive to factors facilitating or impeding pronoun interpretation. In Chapter 3, parallelism has been discussed as a factor that guides pronoun interpretation (e.g. Chambers & Smyth, 1998). In an ERP experiment, Streb et al. (1999) found a less pronounced negative deflection (and thus less processing costs) for personal pronouns whose referent occurred in an identical sentence position in

the previous sentence compared to personal pronouns whose referent occupied a different sentence position. Similarly, it could be shown that the size of the negative amplitude reflects the distance between a personal pronoun and its referent and pronouns whose referents were mentioned at an earlier point in discourse evoked more pronounced negativity (Streb et al., 2004).

One previous study (Schumacher et al., 2015) specifically investigated the N400 in response to the German demonstrative pronoun *der* and the personal pronoun *er*. The study used items that were similar to those in (10) and (11) where a potentially ambiguous personal or demonstrative pronoun followed a sentence with two referents and either an active accusative or dative experiencer verb in canonical or non-canonical word order. The authors' aim was to investigate whether the demonstrative pronoun evokes a more pronounced negative deflection compared to the personal pronoun, which indeed could be observed for the canonical contexts. However, this difference only emerged in non-canonical dative experiencer contexts, while it was absent in non-canonical accusative contexts. The authors attribute the general pattern (i.e. a more pronounced negative deflection for *der*) to the fact that reference towards a less prominent referent (as required when encountering *der*) is more demanding, which is reflected in more pronounced negativity and thus higher processing costs. However, they also consider the violation of a previously generated prediction as a possible explanation for the negativity. It can likely be assumed that re-mention of the most prominent referent was expected by the participants, but this prediction was then violated by the demonstrative pronoun which typically refers back to the less prominent referent. Thus, the more pronounced negativity could also reflect this violation and, as mentioned above, this is the approach that will be pursued in this chapter (for a discussion of whether the N400 differentiates between prediction and integration see Nieuwland et al., 2019).

Before the forward function will be related to mental model updating in the next section, a negative component called NRef must be discussed. Nieuwland & Van Berkum (2008) conclude, on the basis of several studies, that there is a distinct negative deflection, referred to as NRef, that is different from the N400 and that occurs in response to ambiguous referential expressions such as pronouns that could be interpreted as referring to several potential referents. The following example contains an ambiguous anaphora to illustrate how they understand ambiguity (Nieuwland et al., 2007, p. 230):

(40) At the family get-together, Jim had been talking to one nephew who was very much into politics and another one who was really into history. But Jim himself was only interested in sports, cars, girls etc. The **nephew** who was […].

In this example, the two potential referents do not have a different prominence status as both are

introduced as grammatical objects, thus making interpretation difficult.[25] This true ambiguity differs from situations in which pronouns are ambiguous on the basis of their gender but where the context makes interpretation towards one particular referent (among several possible referents) more likely. Nieuwland & Van Berkum (2006b) tested third-person pronouns that were ambiguous on the basis of gender. However, the context varied with respect to how likely the interpretation towards one referent was (based on coherence relations or other factors that were discussed as prominence-lending cues in Section 3.2). When the context supported interpretation towards one referent (or, to use the current terminology, introduced one referent as more prominent) as in *Linda invited Anna when her…* (Nieuwland & Berkum, 2006b, p. 157), the negative deflection was much smaller. Thus the NRef seems to be sensitive to truly ambiguous pronouns.

These studies thus show that the N400 reflects how predictable a particular referent is in discourse. Generally, referents that are given, and especially those that are introduced as topics, are more expected compared to new referents or new topics. Furthermore, potentially ambiguous referential expressions evoked a more pronounced negative deflection when they are generally associated with less prominent referents. In the next section, the forward function will be related to mental model updating.

5.3.2 The forward function and mental model updating

The previous section illustrated that discourse comprehenders generate expectations about upcoming discourse based on the current discourse context. Information regarding the *current* discourse is stored in a mental representation of the discourse, which can be defined as a "cognitive representation of the events, actions, persons, and in general the situation, a text is about" (Van Dijk & Kintsch, 1983, p. 11f.). As discourse unfolds, changes will have to be incorporated into the mental representation of the discourse. Van Dijk & Kintsch (1983, p. 5) outline a dynamic process of discourse comprehension during which "understanding takes place on-line with the processing of input data, gradually, and not post hoc." For example, new referents could be introduced or a previously less prominent referent could be promoted to a more central discourse status. The incorporation of these changes into the mental model will be referred to as mental model updating.

Following von Heusinger & Schumacher (2019), it will be assumed that prominence relations between the referents also enter the mental (or cognitive) representation of the discourse. In the previous chapter, it could be shown that anaphoric pronouns and particularly demonstrative pronouns can indicate that a previously less prominent referent will become more central in upcoming discourse. Accordingly, when a

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[25]One referent is more recent compared to the other referent, but all other prominence-lending factors being equal, this does not seem to dramatically enhance the prominence status of the more recent referent.

demonstrative pronoun is understood as indicating such a shift, the mental representation of the discourse needs to change. It needs to be updated with respect to the prominence ranking of the referents since one referent has been promoted. The re-arrangement of the prominence ranking of the referents in the mental representation should evoke higher processing costs compared to situations where the prominence ranking of the referents stays the same and late positivites have been suggested as neural candidates that reflect mental model updating as will be shown in the following section.

In the following, ERP studies will be presented that found late positive components when discourse updating was required (for an overview of late positivities in language comprehension see also Kuperberg et al., 2020). Firstly, some studies measured neural activities in response to crucial information that had to be related to the previous discourse, whereby the information was either new or resolved previous ambiguities. For example, in an ERP study focusing on English question-answer pairs, Cowles et al. (2007) report that clefted nouns following wh-questions elicited late positivities. An example of such a question-answer pair can be found below (adapted from Cowles et al., 2007, p. 228):

(41) What ate the lettuce in your garden, the deer or the rabbits?

    It was **the rabbits** that ate the lettuce.

According to the authors, the clefted noun (i.e. *the rabbits*) needs to be syntactically integrated (i.e. related to the previous question, which may correspond to model updating under the current view) and this can explain the occurrence of the late positivity (Cowles et al., 2007).

Similarly, in a German ERP study, focused noun phrases that provided the answer to a previous wh-question evoked a more pronounced positivity compared to unfocused noun phrases (Bornkessel et al., 2003). The preceding wh-question directs attention to the focused noun phrase that is expected to be crucial with respect to the previous question, as illustrated in the following example where *the gardener* is focused (adapted from Bornkessel et al., 2003, p. 873):

(42) *Klaus fragt sich, wer am Sonntag den Lehrer besucht hat.*
    'Klaus asks himself who visited the teacher on Sunday.'

    Dann erfuhr er, dass der Gärtner den Lehrer besucht hat.
    'Then he heard that the gardener visited the teacher.'

It was irrelevant whether the focused noun phrase was mentioned as the first or second noun phrase in the answer. Bornkessel et al. (2003, p. 880) interpret the observed positivity "as a marker of successful

contextual integration." Thus, in these two studies, the integration of new and relevant information with respect to the previous discourse representation triggered positivities.

Another study (Federmeier et al., 2010) showed that late positivities also emerge in shorter contexts that require updating. In this study, participants saw short cues that served to generate expectations with respect to the words that followed. For example, when participants read *an insect*, they were assumed to expect a congruent and highly probable word like *ant*. However, when they encountered a congruent but unexpected word like *hornet* (Federmeier et al., 2010, p. 4), a (frontal) positivity emerged in younger (but not older) age groups.[26] Interestingly, when the participants encountered an incongruent word, a (frontal) positivity could not be observed. The authors thus argue that the observed positivity is linked to the integration of plausible information.

A study by DeLong et al. (2014) can directly be related to this. The authors report a more pronounced late (frontal) positivity for unexpected, but crucially plausible, targets (e.g. *It was difficult to understand the visiting professor. Like many foreigners he spoke with a lisp* (compared to *an accent*), adapted from DeLong et al., 2014, p. 28). The authors "speculate that this frontal positivity may relate to a necessary suppression of mental representations arising from pre-activation of highly probable but not presented sentence continuations, when a plausible alternative is encountered" (DeLong et al., 2014, p. 18).

Inspired by these and similar findings, Kuperberg et al. (2020) particularly link frontal positivities to updates with regard to the broader situational model that contains all the relevant information on the current discourse. The authors argue that when new and unpredicted linguistic information is encountered, the previous situational model needs to be updated. For example, a story that introduces a shark and a lifeguard makes it more likely that the lifeguard warns swimmers (instead of trainees). Thus, when trainees are introduced as the ones being warned, the situational model needs to be modified, which results in late (frontal) positivities.

The studies that have been summarised so far indicate that positivities are associated with an updating of the current discourse representation. Furthermore, some studies specifically focused on referential changes in discourse that also require the updating of the mental model since a new discourse referent or a new topic is introduced. Hung & Schumacher (2012) found late positivities following topic shifts in Chinese. When a question was asked about a referent that was also the topic and the following question placed another referent in the topic position, this evoked a more pronounced positive deflection compared to topic continuity in the answer (see Section 5.3.1 for example stimuli). The authors attribute the occurrence of the late positivity to mental model updating, as the changing discourse statuses of the previous and new topics need to be

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[26]For a critical discussion on the role that age plays in predictive processing, see Bornkessel-Schlesewsky (2015).

accomodated. Interestingly, topics following a neutral question (i.e. a question where no previous topic was mentioned) did not evoke a strong positivity. This leads the authors to conclude that late positivities mainly indicate the re-arrangement of an existing discourse structure.

Similarly, Hirotani & Schumacher (2011) focused on the processing of topic shifts in Japanese. In this study, a pronounced positive deflection was found in short discourse contexts when the final sentence introduced a topic-marked discourse referent that was not explicitly mentioned in a previous sentence. When the final sentence introduced a discourse referent that was not marked as a topic (and also not explicitly mentioned in a previous sentence), this evoked a less pronounced positive deflection by comparison. Importantly, this effect mainly occurred when the context made the mention of the topic likely (e.g. when a conductor was mentioned as a topic in the context of a concert). These results thus show that the mental representation of an existing (and coherent) discourse representation needs to be modified once a new topic is encountered. The costs related to this process become visible in the form of late positivities (Hirotani & Schumacher, 2011).

In another ERP experiment, referents that were mentioned for the first time in a discourse also evoked a more pronounced positive deflection compared to given referents (Burkhardt, 2006), whereby it was irrelevant whether the referents were mentioned out of context or could be inferred from the previous context (such as, for example, a conductor when the previous context mentioned a concert). These results show that the costs related to the incorporation of new referents into the mental model are also reflected by positive waveforms (Burkhardt, 2006).

However, Schumacher & Hung (2012) were able to show that in German the syntactic position of newly introduced referents modulates whether or not a more pronounced positive deflection emerges. The authors tested German sentence pairs in which the second sentence introduced either an inferrable (i.e. new) or given referent. They report that referents that were inferrable from the previous context only caused a more pronounced positivity compared to given referents when they were not mentioned sentence-initially. According to the authors, one explanation for this observation could be that the German pre-field serves to introduce a new topic. Accordingly, "a new discourse layer" (Schumacher & Hung, 2012, p. 307) is established in the mental representation of the discourse, which may not be very demanding from a processing point of view. Thus, when a new referent is introduced sentence-initially in German, this does not cause high costs (reflected in less pronounced positivities). However, when new referents have to be related to an already established discourse representation (indicated by their introduction as a second-mentioned entity), this might cause higher costs which are reflected by more pronounced late positivities. As shown above, in another experiment (Schumacher & Hung, 2012), topics following a neutral context with no prior topic also

did not evoke a positive deflection. It is thus possible that late positivities indeed mainly reflect costs related to the re-arrangement of existing (and not the creation of new) discourse representations as suggested by Schumacher & Hung (2012).

Baumann & Schumacher (2012) present additional evidence for the claim that the re-arrangement of existing discourse representations causes costs that are reflected by late positive waveforms. In their ERP study, they investigated the processing of new vs given referents in short German discourse contexts. The study revealed that new discourse referents that were contrasted with a previous one (as in *Frauke said that the lumberjack was not very cheerful. She mentioned that the **winegrower** was very cheerful*, adapted from Baumann & Schumacher, 2012, p. 366) caused a more pronounced positive deflection in comparison to discourse referents that were familiar (as in *Vivian talked about a winegrower in Baden. She mentioned that the **winegrower** was very cheerful*, adapted from Baumann & Schumacher, 2012, p. 367). In the context with the new discourse referent, the mental model needs to be updated concerning who is cheerful, namely *the winegrower* instead of *the lumberjack*. In the context with a familiar discourse referent, in contrast, the mental model does not need to be updated when encountering *the winegrower* in the second sentence as he is already familiar. These results thus further illustrate that new information that is relevant with respect to an existing mental representation of a discourse evokes late positivities, which reflect costs related to mental model updating (Baumann & Schumacher, 2012).

Wang & Schumacher (2013) also tested contexts that evoked a contrast between two referents in Japanese. In short discourse contexts consisting of two sentences, the referent in the second sentence caused a very pronounced positive deflection when it was new and contrasted with the referent from the first context sentence (e.g. *Mr. Satoo returned the record to the director, didn't he? No, he returned the record to the librarian.*, Wang & Schumacher, 2013, p. 5). However, in discourse contexts where the referent in the second sentence was inferrable from the previous context (for example *the librarian* in the context of *the library*) or was already mentioned in the first sentence, the positive deflection gradually decreased. These results were again attributed to the need for mental model updating when a new discourse referent has to be incorporated into an existing representation (Wang & Schumacher, 2013).

The previous studies served to illustrate that the modification of an existing discourse representation causes processing costs which can be measured via late positivities. In addition, there is one study that is directly linked to the current research question concerning to what extent different anaphoric pronouns in German require discourse updating. It was conducted by Schumacher et al. (2015) who compared the demonstrative pronoun *der* to the personal pronoun with regard to mental model updating. They used sentence pairs as illustrated in (10) and (11) and varied the word order. Significantly, in all sentences one

referent was considered more prominent compared to another referent and the subsequent pronouns (either the personal or demonstrative pronoun *der*) indicated whether this relation was maintained or changed in subsequent discourse. The results of this ERP experiment revealed that the demonstrative pronoun *der* caused a more pronounced positive deflection compared to the personal pronoun *er*. This difference was particularly strong following canonical contexts, but also emerged after non-canonical contexts. When the previously less prominent referent is promoted to a more prominent discourse status following *der*, this shift needs to be accounted for in the mental representation of the discourse. The authors argue that this modulation of the discourse representation is reflected in the more pronounced positivity for *der* compared to the personal pronoun.

The studies that have been reviewed in this section illustrate that the modification of an existing mental representation of a discourse evokes processing costs that surface as late positivities. Some studies showed that (plausible) linguistic input that is relevant with respect to a previous discourse representation evokes late positivities.[27] More specifically, some studies showed that changes with respect to which referent is most prominent in a discourse prompt mental model updating (e.g. Schumacher et al., 2015).

5.3.3 Summary

The studies that have been reviewed in this section illustrate that unpredicted linguistic input causes processing costs which surface as a component referred to as N400 and that linguistic input that needs to be integrated into the current discourse representation causes costs which surface as late positivities. Demonstrative pronouns in German have two discourse-functions (a backward and forward function), which are expected to illustrate both of these language processing mechanisms. In the following, an ERP experiment will thus be presented that contrasts the two types of German demonstrative pronouns (*der* vs *dieser*) with the personal pronoun (*er*). Following Schumacher et al. (2015), the backward function will be related to predictive processing (N400) and the forward function to model updating (late positivities). With regard to the backward function, it is expected that demonstrative pronouns violate previous predictions about upcoming discourse (because they refer to unexpected referents) and thus cause a more pronounced negative deflection compared to the personal pronoun. Concerning the forward function, it is expected that demonstrative pronouns prompt discourse updating as they promote a previously less prominent referent to a more central discourse status and thus cause a more pronounced positive deflection compared to the personal pronoun. Furthermore, the difference between the two types of German demonstrative pronouns (*der* vs *dieser*) will

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[27]In these studies, late positivities either resulted from the fact that relevant information answered a previous question, resolved ambiguity, or was unexpected and thus required a new interpretation of the discourse model, see e.g. Bornkessel et al. (2003); Cowles et al. (2007); Kuperberg et al. (2020).

be assessed. The experiment is presented in more detail in the next section.

5.4 The current research

In this section, an ERP experiment will be presented to shed light on the processing mechanisms behind different anaphoric pronouns. The aim is to compare the processing of two different types of German demonstrative pronouns (*der* vs *dieser*) and the personal pronoun (*er*) with regard to their backward and forward functions. While the N400 component has been established as relevant for predictive processing and the backward function in the previous section, late positivities have been established as relevant for mental model updating and the forward function. In the following, it will be investigated to what extent the different pronouns modulate these components. In particular, the hypotheses outlined in the following will be tested.

With regard to the backward function, it will be tested whether demonstrative pronouns are less predicted compared to personal pronouns. Demonstrative pronouns could be more unexpected because they are usually interpreted as referring back to less expected referents, namely proto-patients (see Chapter 3), or because their referential form indicates co-reference with a less prominent referent and is thus less expected. These two aspects may be closely connected (since demonstrative pronouns may be less expected because they signal reference with less expected referents), whereby it is not possible to disentangle these two aspects in the current experiment. However, this will not impact the results since the personal pronoun will be assumed to be more expected for the same reason (i.e. because it typically refers to an expected referent, namely the proto-agent, and/or because of being the more expected referential form). Furthermore, it will be tested to what extent the two demonstrative pronouns differ from each other. However, as the sentence continuation task could not reveal a significant difference between the two demonstrative pronouns, it is not expected that their deflections differ in size. The major difference is thus expected to be between the demonstrative pronouns on the one hand and the personal pronoun on the other hand. Regarding the context manipulations, the text continuation task revealed distinct interpretive preferences in all contexts except the non-canonical word order of dative experiencer verbs. It is thus expected that the current experiment also yields less clear results following this context. In general, more robust results are expected for the canonical word order of both verb types based on the results of the sentence continuation task (which is also supported by Schumacher et al. (2015) who report more robust results for canonical contexts, while non-canonical accusative contexts yielded no significant difference between *er* and *der*).

With regard to the forward function, it will be tested whether demonstrative pronouns prompt the

re-arrangement of the mental representation of the discourse. The text continuation task (see Chapter 4) revealed that demonstrative pronouns have a higher potential for referential shift compared to personal pronouns, although any pronoun can initiate a referential shift when initially interpreted as referring to a less prominent referent. Demonstrative pronouns were more often interpreted as referring to the less prominent proto-patient and thus more frequently promoted the proto-patient to a more prominent discourse status in subsequent discourse. The promotion of a previously less prominent referent to a more central discourse status requires the updating of the mental representation of the discourse. It is thus expected that demonstrative pronouns evoke a more pronounced positive deflection compared to personal pronouns. Regarding the difference between the two demonstrative pronouns, the analysis that measured the frequency of mention (see Section 4.3.5) could not reveal a difference between the two pronouns. However, the time course analysis (see Section 4.3.7) suggests that *dieser* has a stronger potential for referential shift as it evoked a higher number of references to the previously less prominent referent up until the tenth sentence, which was the average story length. The demonstrative pronoun *dieser* might thus require the highest degree of updating, reflected in the most pronounced positive deflection, followed by *der* and *er*. Regarding the context manipulations, the frequency analysis yielded only marginally significant results for the dative experiencer, canonical word order context. It is thus expected that the processing is hampered for all three pronouns in this condition (although Schumacher et al. (2015) found effects in this condition when comparing *er* and *der*).

As before, the two verb types (active accusative verbs vs dative experiencer verbs) were studied in two separate experiments. The results are thus presented separately in the following section.

5.4.1 Accusative context

5.4.1.1 Participants

The findings for the accusative context were derived from 26 native speakers of German who participated in the experiment (19 women, 7 men; mean age: 23.54; age range: 18–29 years). Originally, 34 participants took part in the experiment. However, eight participants had to be excluded: Four participants had to be excluded because of programming errors and an additional four participants had to be excluded because of too many artefacts or incorrect or unanswered comprehension questions and thus too much data loss. All participants were raised monolingually and were right-handed. They had normal or corrected-to-normal vision and did not report any neurological impairments. Most of the participants were students from the University of Cologne who received a small reimbursement or course credit for participation and gave written consent before participating in the study. The experiment was conducted in the Laboratory

for Experimental Linguistics at the University of Cologne. It was approved by the Ethics Committee of the German Linguistics Society.

5.4.1.2 Material

The items were designed in an identical way to those discussed in Section 3.3.2. The only exception was that the second sentence was not discontinued after the ambiguous pronoun and the adverb, but was continued in a neutral way. An example of such a neutral continuation of the second sentence can be found below:

(43)   a) **First context sentence (active accusative verb, canonical word order)**
       Nach dem Spiel hat der Trainer den Torwart beschimpft.
       after the match has the-NOM coach the-ACC goalkeeper insulted.
       'After the match, the coach insulted the goalkeeper.'

       b) **Neutral continuation of the second sentence**
       Kurz darauf ist er/der/dieser dann in die Katakomben gegangen.
       shortly afterwards is he-PERS/he-DEM/he-DEM then into the catacombs went
       'Shortly afterwards, he then went down into the catacombs.'

Importantly, the continuation of (43b) can be associated with either referent from the first context sentence. In total, 90 different sentence pairs were created that appeared in six different conditions: The first context sentence in canonical subject-object order followed by the personal or one of the two types of demonstrative pronouns and the first sentence in non-canonical object-subject order (for an example, see 16a) followed by the personal or one of the two types of demonstrative pronouns.

In addition to these stimuli, 60 filler sentences were created that contained a personal pronoun that was disambiguated on the basis of gender (either the masculine third-person singular form of the personal pronoun or the feminine third-person singular form of the personal pronoun). The filler sentences were similar to the critical items, with the only exception that the noun phrases in the first context sentence differed with respect to their gender (either masculine, feminine or neuter) so that the personal pronoun (*er* 'he' or *sie* 'she') in the second sentence could unambiguously be interpreted as referring to one of the referents from the first sentence as illustrated in (44). Thirty filler sentences contained the masculine third-person singular form of the personal pronoun and 30 filler sentences contained the feminine third-person singular form of the personal pronoun. The number of times the personal pronoun referred back to the first or second noun phrase from the first clause was balanced. This way, it was avoided that participants derive an "order

of mention strategy" that they might transfer to the critical stimuli. Importantly, the accusative verbs in the filler sentence pairs were different from those in the critical stimuli.

(44) **Filler sentence pair**

   In der Nacht hat der Einbrecher die Mieterin bestohlen.
   during the night has the-M burglar the-F tenant robbed
   'During the night, the (male) burglar robbed the (female) tenant.'

   Daraufhin hat sie dann die Polizei alarmiert.
   after.that has she then the police called
   'After this, she called the police.'

Besides the critical stimuli and the filler sentences, comprehension questions were constructed for each sentence pair to ensure that the participants were paying attention to the stimuli. The comprehension questions targeted the first or second sentence of each pair. The number of questions targeting the first and second sentence was balanced and, in addition, the number of times a particular element within the first or second sentence was questioned was also balanced. Furthermore, yes and no answers were balanced over the critical stimuli and the filler sentences. An example of a comprehension question prompting a positive answer can be found in (45).

(45) **Comprehension question**

   Hat die Mieterin die Polizei informiert?
   has the-F tenant the police informed
   'Did the (female) tenant inform the police?'

The 540 critical items (90 sentence pairs x 6 conditions) were distributed over six different experimental lists. Each experimental list contained 180 critical items (30 critical items for each condition) and 60 filler sentences. Importantly, every list contained only two sentence pairs from each stimulus set. For example, the sentence pair with *the coach* and *the goalkeeper* in its two word order variations and three possible continuations for each word order variation forms one item set, but one list only contained, for instance, the canonical word order followed by *er* and the non-canonical word order followed by *der*. Furthermore, different combinations of sentence pairs were taken from each stimulus set in order to avoid a systematic repetition. For example, from one item set the canonical word order followed by *er* and the non-canonical word order followed by *der* were taken while from another item set the canonical word order followed by *dieser* and the non-canonical word order followed by *er* were taken. Furthermore, the 240 items from each experimental

list were divided into six blocks and each block contained 30 critical items (5 items for each condition) and 10 filler sentences. The blocks were first pseudo-randomised to ensure that every block contained the same number of critical items for each condition and to avoid two critical items from one stimulus set appearing in the same block. The stimuli were then randomized using CONAN.

5.4.1.3 Procedure

The procedure is based on the one presented in the work of Schumacher et al. (2015). The participants were sitting in a dimly lit, sound-proof cabin while they took part in the experiment. The sentence pairs and comprehension questions were presented on a screen that was placed at a comfortable distance in front of the participants. Grey letters were used for the stimuli that appeared on an off-white background. At the beginning of each trial, a fixation star appeared in the middle of the screen for 500 ms. The fixation star was followed by a blank screen for 150 ms before the participants saw the stimuli. The stimuli were presented in smaller segments as illustrated by the bar in the example below (where the bar indicates a blank screen). Adverbial phrases, auxiliaries, noun phrases, pronouns, and the past participle forms of the verb appeared in individual segments. In some cases, very long adverbial phrases were also segmented.

(46) **Presentation of stimuli**

Nach dem Spiel | hat | der Trainer | den Torwart | beschimpft.
after the match | has | the-NOM coach | the-ACC goalkeeper | insulted
'After the match | the coach | insulted | the goalkeeper.'

Kurz darauf | ist | er | dann | in die Katakomben | gegangen.
shortly afterwards | is | he-PERS | then | into the catacombs | gone
'Shortly afterwards | he | then | went | down | into the catacombs.'

Single-word and double-word segments were presented for 450 ms while three-word segments were presented for 550 ms and four-word segments for 600 ms, whereby the interval between these individual segments (ISI) was 150 ms. After each sentence pair, a question requiring a yes or no answer was posed to ensure the participants were paying attention to the sentences. Questions were presented as a whole for 3000 ms. They were preceded by a blank screen for 500 ms that was followed by three question marks in the middle of the screen that were presented for 500 ms. The participants indicated their answers by pressing one of two buttons on a games console. Half of the participants had to indicate positive answers by pressing the right button, and half of the participants had to indicate positive answers by pressing the left button on the games console. After each question, a blank screen occurred for 1000 ms before the fixation star

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announced the beginning of the next trial. After each block, the participants could take a short break in order to have a drink and refresh themselves. Before the experiment, there was a short practice session for the participants.

5.4.1.4 EEG recording and preprocessing

A total of 24 Ag/AgCl scalp electrodes were integrated into an elastic cap (*Easycap*, Munich, Germany) and the arrangement of the electrodes followed the international 10/20 system (American Encephalographic Society, 1994). The ground electrode was placed at AFz while the reference electrode was attached to the left mastoid. Offline, the data were re-referenced to linked mastoids. In addition to these electrodes, four electrodes around the eyes were included in order to measure artefacts stemming from the eye movements of the participants (EOG). One electrode was positioned at the outer area of each eye and two further electrodes were positioned above and underneath the right eye. The electrode impedances were below 4kΩ in the current experiment. The EEG and EOG signals passed through the *BrainAmp DC* amplifier (Munich, Germany) and were then digitized at a rate of 500 Hz.

Next, a band-pass filter with 0.3–20 Hz was applied offline in order to prevent low and high frequencies from passing. Using this filter is in line with the previous study by Schumacher et al. (2015; for an overview of other research groups that applied this filter see also Schumacher et al., 2015). In order to correct artefacts, automatic (set to $\pm$ 40 μV for the EOG rejection criterion) and manual rejection techniques were applied. Furthermore, when participants answered a question incorrectly or let too much time pass before answering (i.e. did not answer while the question was displayed for 3000 ms), these individual trials also did not enter the final analysis. On the basis of these rejection criteria, 36.45% of the data points had to be excluded. The averaged ERPs were time-locked to the onset of the pronoun (*er* vs *der* vs *dieser*) in the second sentence.

5.4.1.5 Data analysis

Similar to Schumacher et al. (2015), repeated measures analyses of variance (ANOVA) with the factors PRONOUN (*er* vs *der* vs *dieser*), WORD ORDER (canonical vs non-canonical), and REGION OF INTEREST (ROI; see further below for the different ROIs) were performed. The statistical analysis was conducted separately for lateral electrodes and midline electrodes. The lateral electrodes were divided into four different ROIs: One region comprised left anterior electrodes (F7, F3, FC1 and FC5 = ROI I) while another region comprised right anterior electrodes (F4, F8, FC2 and FC6 = ROI II). Furthermore, regions including left posterior electrodes (CP1, CP5, P3 and P7 = ROI III) and right posterior electrodes (CP2, CP6, P4 and P8 = ROI IV) were considered. The midline electrodes included the electrodes Fz, Cz, FCz,

CPz, Pz, and POz; each electrode was treated as a separate ROI. The ANOVAs were calculated for two separate time windows that were determined based on visual inspection as outlined further below (250–350 ms and 500–650 ms) on the basis of the mean amplitude values for each subject and each condition, whereby the interactions were resolved. Based on the outlined hypotheses concerning the difference between the individual pronouns, pairwise comparisons between the individual pronouns were also computed. Huynh-Feldt corrections for sphericity were used for effects involving factors with more than two levels. In addition, p-values were Bonferroni corrected following Keppel's (1991) modified approach in the case of the pairwise comparisons and p-values below the threshold of < 0.03 were considered significant. For the statistical analyses, the ez-packge (Lawrence, 2016) in RStudio (version 1.2.5033, RStudio Team, 2019) was employed.

5.4.1.6 Results

Figure 13 depicts the results for the accusative, canonical word order context. As described above, the ERPs were time-locked to the pronoun onset. The figure shows that the demonstrative pronoun *dieser* (black line) evoked a more pronounced negative deflection in a time window between 250 and 350 ms, especially compared to the personal pronoun *er* (red line). The deflection for the demonstrative pronoun *der* (blue line) appears to be less pronounced compared to *dieser* but more pronounced compared to *er*, suggesting a three-way gradation between *dieser*, *der*, and *er*. With regard to the expected positive deflection, the demonstrative pronoun *dieser* (black line) evoked a more pronounced positive deflection compared to both the demonstrative pronoun *der* (blue line) and the personal pronoun *er* (red line) in a time window between 500 and 650 ms.

Figure 14 depicts the results for the accusative, non-canonical word order context. In identical time windows (250–350 ms for the negative deflection and 500–650 ms for the positive deflection), the demonstrative pronoun *dieser* (black line) elicited a more pronounced deflection compared to both the demonstrative pronoun *der* (blue line) and the personal pronoun *er* (red line).

Based on these observations, these two time windows were also determined for the statistical analysis: the time window between 250 and 350 ms for the N400 and the time window between 500 and 650 ms for the late positivities. Regarding the first time window between 250 and 350 ms, the statistical analysis for the lateral electrodes revealed an interaction of PRONOUN X ROI ($F_{(6, 150)} = 2.54$, $p < 0.05$). The resolution of the interaction yielded no significant effects (ROI I: $F_{(2, 50)} = 1.56$; ROI II: $F_{(2, 50)} = 2.33$; ROI III: $F_{(2, 50)} = 0.19$; ROI IV: $F_{(2, 50)} = 0.12$). Furthermore, pairwise comparisons regarding the difference between the individual pronouns were computed. The comparison between the personal pronoun *er* and the demonstrative pronoun *der*, as well as the comparison between the two types of demonstrative

Grand average ERPs (accusative, canonical)
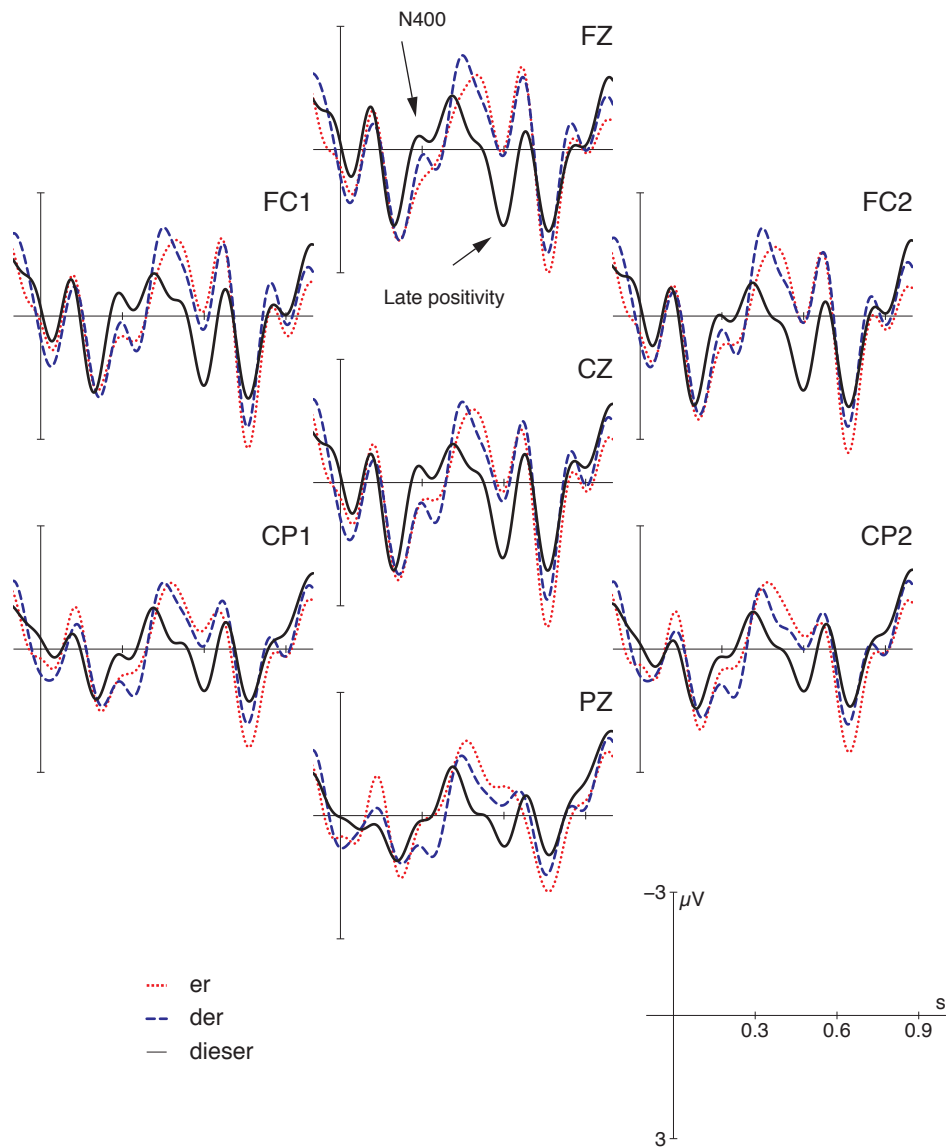
Figure 13: Grand-average ERPs (n = 26) time-locked to the pronoun onset (intersection of two axes) for accusative, canonical word order contexts illustrated at selected electrodes. The results for the personal pronoun *er* represented in red, the demonstrative pronoun *der* in blue, and the demonstrative pronoun *dieser* in black. Negativity is plotted upwards on the y-axis and the x-axis covers a time span from 100 ms before the onset of the pronouns until 1000 ms after the onset of the pronouns.
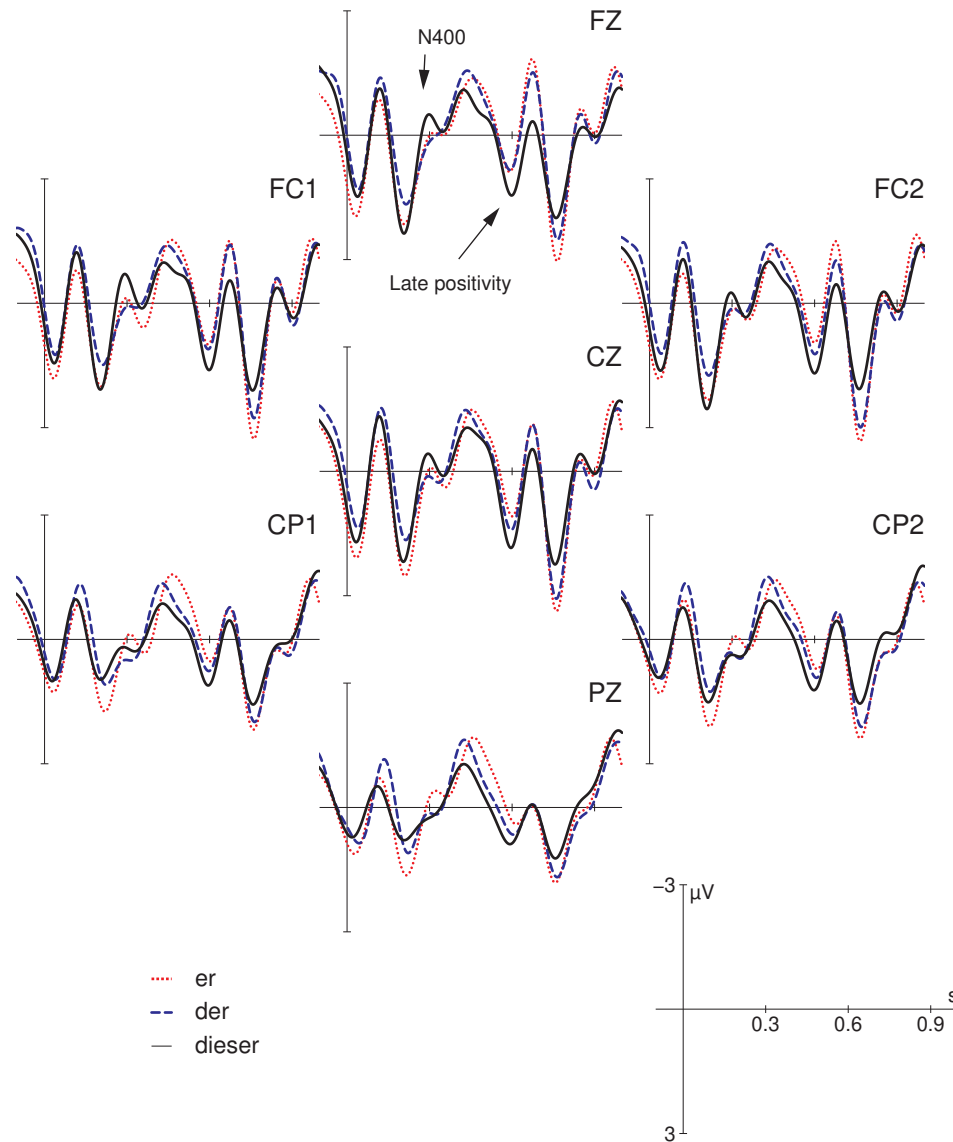
Figure 14: Grand-average ERPs (n = 26) time-locked to the pronoun onset (intersection of two axes) for the accusative, non-canonical word order context illustrated at selected electrodes. The results for the personal pronoun *er* represented in red, the demonstrative pronoun *der* in blue, and the demonstrative pronoun *dieser* in black. Negativity is plotted upwards on the y-axis and the x-axis covers a time span from 100 ms before the onset of the pronouns until 1000 ms after the onset of the pronouns.

pronouns, yielded no significant effect. The pairwise comparison between the personal pronoun *er* and the demonstrative pronoun *dieser* revealed an interaction of PRONOUN X ROI ($F_{(3, 75)} = 3.43$, $p < 0.03$). However, the effect of PRONOUN did not reach significance in any ROI (ROI I: $F_{(1, 25)} = 1.36$; ROI II: $F_{(1, 25)} = 3.22$; ROI III: $F_{(1, 25)} = 0.06$; ROI IV: $F_{(1, 25)} = 0.19$).

The statistical analysis for the midline electrodes also registered an interaction of PRONOUN X ROI ($F_{(10, 250)} = 6.13$, $p < 0.001$) for this time window. The interaction of the resolution yielded no significant effect (ROI I: $F_{(2, 50)} = 2.42$; ROI II: $F_{(2, 50)} = 2.01$; ROI III: $F_{(2, 50)} = 2.75$; ROI IV: $F_{(2, 50)} = 1.35$). Pairwise comparisons were also computed. The comparison between *er* and *der* revealed an interaction of PRONOUN X ROI ($F_{(5, 125)} = 4.64$, $p < 0.001$), but the resolution of the interaction with regard to ROI yielded no significant PRONOUN effects (Fz: $F_{(1, 25)} = 0.48$; Cz: $F_{(1, 25)} = 0.03$; FCz: $F_{(1, 25)} = 0.35$; CPz: $F_{(1, 25)} = 0.88$; Pz: $F_{(1, 25)} = 2.2$; POz: $F_{(1, 25)} = 1.22$). Furthermore, the comparison between *er* and *dieser* revealed an interaction of PRONOUN X ROI ($F_{(5, 125)} = 8.35$, $p < 0.001$). However, the resolution of the interaction also did not reveal any significant PRONOUN effects (Fz: $F_{(1, 25)} = 3.13$; Cz: $F_{(1, 25)} = 2.04$; FCz: $F_{(1, 25)} = 3.57$; CPz: $F_{(1, 25)} = 0.51$; Pz: $F_{(1, 25)} = 0.07$; POz: $F_{(1, 25)} = 0.93$). Finally, the comparison between the two types of demonstrative pronouns revealed an interaction of PRONOUN X ROI ($F_{(5, 125)} = 4.01$, $p < 0.01$), whereby the resolution of this interaction also did not reveal any significant PRONOUN effects (Fz: $F_{(1, 25)} = 2.39$; Cz: $F_{(1, 25)} = 3.29$; FCz: $F_{(1, 25)} = 3.06$; CPz: $F_{(1, 25)} = 2.98$; Pz: $F_{(1, 25)} = 1.26$; POz: $F_{(1, 25)} = 0.02$). Thus, the effects over the lateral and midline electrodes were very similar.

Regarding the second time window between 500 and 650 ms, the statistical analysis for the lateral electrodes revealed a main effect of PRONOUN ($F_{(2, 50)} = 10.92$, $p < 0.001$) and WORD ORDER ($F_{(1, 25)} = 7.82$, $p < 0.01$). Furthermore, an interaction of PRONOUN X ROI was registered ($F_{(6, 150)} = 3.92$, $p < 0.01$). The resolution of the interaction revealed that the pronoun effect reached significance in all four ROIs (ROI I: $F_{(2, 50)} = 14.30$, $p < 0.001$; ROI II: $F_{(2, 50)} = 12.46$, $p < 0.001$; ROI III: $F_{(2, 50)} = 3.39$, $p < 0.05$; ROI IV: $F_{(2, 50)} = 3.27$, $p < 0.05$).

Pairwise comparisons were also computed for this time window. The comparison between *er* and *der* yielded no significant effect while the comparison between *er* and *dieser* revealed a main effect of PRONOUN ($F_{(1, 25)} = 20.63$, $p < 0.001$) in addition to an interaction of PRONOUN X ROI ($F_{(3, 75)} = 3.73$, $p < 0.03$). The main effect of PRONOUN emerged in all four ROIs (ROI I: $F_{(1, 25)} = 21.83$, $p < 0.001$; ROI II: $F_{(1, 25)} = 20.12$, $p < 0.001$; ROI III: $F_{(1, 25)} = 5.83$, $p < 0.03$; ROI IV: $F_{(1, 25)} = 7.33$, $p < 0.03$). Finally, the comparison between the two demonstrative pronouns (*der* vs *dieser*) also revealed a main effect of PRONOUN ($F_{(1, 25)} = 8.89$, $p < 0.01$) and an interaction of PRONOUN X ROI $F_{(3, 75)} = 8.43$, $p < 0.001$).

The resolution of the interaction showed that the main effect of PRONOUN reached significance in ROI I ($F_{(1, 25)}$ = 21.70, p < 0.001) and ROI II ($F_{(1, 25)}$ = 12.70, p < 0.01). Overall, more robust effects were thus registered for the time window between 500 and 650 ms where the demonstrative pronoun *dieser* significantly differs from both other pronouns.

The statistical analysis for the midline electrodes also revealed a main effect of PRONOUN ($F_{(2, 50)}$ = 9.67, p < 0.001) and a main effect of WORD ORDER ($F_{(1, 25)}$ = 4.65, p < 0.05). Pairwise comparisons were also computed, whereby the comparison between *er* and *der* yielded no significant effect. Similar to the analysis for the lateral electrodes, the comparison of *er* and *dieser* revealed a main effect of PRONOUN ($F_{(1, 25)}$ = 21.90, p < 0.001). Finally, the comparison between the two types of demonstrative pronouns also revealed a main effect of PRONOUN ($F_{(1, 25)}$ = 9.00, p < 0.01). The analysis of the midline electrodes thus also indicates that *dieser* differs from both other pronouns.

5.4.1.7 Discussion

The results of the analysis presented above will be discussed separately for the two components. Regarding the N400 component, the most pronounced negative deflection could be observed for the demonstrative pronoun *dieser*.

At the beginning of this chapter, the N400 component was related to predictive processing and a more pronounced negative deflection was associated with less predicted input (e.g. Burkhardt, 2006; Kutas & Hillyard, 1980). It has been hypothesised that demonstrative pronouns are less expected compared to personal pronouns. Therefore, the finding that the demonstrative pronoun *dieser* elicited a very pronounced negative deflection supports this hypothesis. However, the contrast between the pronouns did not turn out to be significant and the pronouns differ less strongly from each other than expected. Especially the demonstrative pronoun *der* appears to differ less strongly from the personal pronoun as Figures 13 and 14 illustrate and the reasons for this will be addressed in the general discussion.

Regarding the positive deflections, there were generally more robust effects. The demonstrative pronoun *dieser* again evoked the most pronounced deflection and differed significantly from both the demonstrative pronoun *der* and the personal pronoun *er*. For this component, the word order variations appear to have modulated the results more strongly, as reflected by an overall main effect of WORD ORDER.

Late positivities have been associated with mental model updating and more pronounced positive deflections were reported for referents changing the previous discourse structure (such as new topics, e.g. Hung & Schumacher, 2012). The finding that *dieser* evoked the most pronounced positive deflection indicates

that it has the strongest effect on subsequent discourse. However, it is again surprising that a less pronounced positive deflection emerged for the demonstrative pronoun *der* and the context must have weakened its impact as a signal indicating a referential shift. This point will be discussed in more detail in the general discussion.

What can be concluded for now is that the demonstrative pronoun *dieser* evoked very robust effects. Based on the assumption that the N400 is related to predictive processing, the results suggest that *dieser* is perceived as highly unexpected—either because it refers to an unexpected referent or because its referential form is unexpected. Furthermore, assuming that late positive deflections are related to mental model updating, the results suggest that a current discourse representation changes, potentially because *dieser* indicates discourse development in favour of the unexpected referent. In the next section, the results for the contexts with dative experiencer verbs will be presented.

5.4.2 Dative experiencer context

5.4.2.1 Participants

The same criteria for participation and exclusion applied as specified in Section 5.4.1.1. On this basis, 25 participants took part in the experiment (15 women, and 10 men; mean age: 22.68; age range: 19–27 years). Originally, 30 participants took part in the experiment. However, five participants had to be excluded from the analysis because of excessive data loss due to artefacts or incorrectly answered or unanswered comprehension questions.

5.4.2.2 Material

The items were designed in an identical way to those described in Section 5.4.1.2 with the only difference being that dative experiencer verbs were used instead of active accusative verbs. A description of the properties of dative experiencer verbs can be found in Section 3.3.2 and a sentence pair is illustrated below in which the second sentence is continued in a neutral way:

(47)   a) **First context sentence (dative experiencer verb, canonical word order)**

   Im Hafen ist dem Urlauber der Segler aufgefallen.

   at.the harbour is the-DAT tourist the-NOM sailor noticed

   'At the harbour, the (male) tourist noticed the (male) sailor.'

   b) **Neutral continuation of second sentence**

   *Wenig später ist **er/der/dieser** dann über ein Seil gestolpert.*

shortly afterwards is he-PERS/he-DEM/he-DEM then over a rope stumbled

'Shortly afterwards, **he** then stumbled over a rope.'

This sentence was also presented in the non-canonical word order as illustrated in (18a). The distribution over lists and blocks followed the same approach as described in Section 5.4.1.2 while the construction of filler sentences and comprehension questions also followed this scheme and the only difference was that normal dative verbs were used in the filler sentences as illustrated below:

(48) **Filler sentence pair**

Beim Spazierengehen hat die Hündin dem Besitzer gehorcht.

at going.for.a.walk has the-F-NOM dog the-F-DAT owner obeyed

'When going for a walk, the (female) dog obeyed the owner.'

Zuhause hat sie dann ein Leckerli bekommen.

at.home has she then a treat got

'At home, she got a treat.'

5.4.2.3 Procedure

A description of the procedure can be found in Section 5.4.1.3.

5.4.2.4 EEG recording and preprocessing

A description of the data recording and preprocessing can be found in Section 5.4.1.4. On the basis of the rejection criteria, as specified in Section 5.4.1.4, 24.42% of the data points had to be excluded.

5.4.2.5 Data analysis

A description of the data analysis can be found in Section 5.4.1.5.

5.4.2.6 Results

Figure 15 illustrates the results for the dative experiencer, canonical word order context. The figure shows that both types of demonstrative pronouns elicited a more pronounced negative deflection in a time window between 250 and 350 ms compared to the personal pronoun. In a later time window between 500 and 650 ms, the demonstrative pronoun *dieser* evoked the strongest positive deflection, followed by the two other pronouns (*er* and *der*).

Grand average ERPs (dative experiencer, canonical)

Figure 15: Grand-average ERPs (n = 25) time-locked to the pronoun onset (intersection of two axes) for the dative experiencer, canonical word order context illustrated at selected electrodes. The results for the personal pronoun *er* represented in red, the demonstrative pronoun *der* in blue, and the demonstrative pronoun *dieser* in black. Negativity is plotted upwards on the x-axis and the y-axis covers a time span from 100 ms before the onset of the pronouns until 1000 ms after the onset of the pronouns.

Figure 16 illustrates the results for the dative experiencer, non-canonical word order context. The figure suggests that the demonstrative pronoun *dieser* (black line) caused again the most pronounced negative deflection in a time window between 250 and 350 ms, followed by the personal pronoun *er* (red line) and the demonstrative pronoun *der* (blue line). In a later time window between 500 and 650 ms, the two types of demonstrative pronouns elicited a more pronounced positive deflection compared to the personal pronoun *er*.

Based on these figures, two time windows were specified for the statistical analysis: the time window between 250 and 350 ms for the N400 and the time window between 500 and 650 ms for the late positivities. Regarding the first time window, the statistical analysis for the lateral electrodes revealed an interaction of PRONOUN X WORD ORDER ($F_{(2, 48)} = 3.30$, $p < 0.05$) and an interaction of PRONOUN X ROI ($F_{(6, 144)} = 3.55$, $p < 0.01$). The resolution of the interactions with regard to WORD ORDER and ROI yielded no significant PRONOUN effects (canonical word order: $F_{(2, 48)} = 1.6$; non-canonical word order: $F_{(2,48)} = 1.45$; ROI I: $F_{(2, 48)} = 1.74$; ROI II: $F_{(2, 48)} = 1.59$; ROI III: $F_{(2, 48)} = 0.69$; ROI IV: $F_{(2, 48)} = 1$).

Furthermore, pairwise comparisons between the different pronouns were computed. The comparison between the personal pronoun and the demonstrative pronoun *der* revealed an interaction of PRONOUN X WORD ORDER ($F_{(1, 24)} = 4.92$, $p = 0.036$) and an interaction of PRONOUN X ROI ($F_{(3, 72)} = 3.49$, $p < 0.03$). The resolution of the former interaction with regard to WORD ORDER (canonical word order: $F_{(1, 24)} = 2.41$; non-canonical word order: $F_{(1, 24)} = 2.26$) and the latter interaction with regard to ROI (ROI I: $F_{(1, 24)} = 0.85$; ROI II: $F_{(1, 24)} = 0.01$; ROI III: $F_{(1, 24)} = 0.36$; ROI IV: $F_{(1, 24)} = 1.95$) yielded no significant PRONOUN effects. The comparison between the personal pronoun and the demonstrative pronoun *dieser* yielded an interaction of PRONOUN X ROI ($F_{(3, 72)} = 4.89$, $p < 0.01$) but the resolution of the interaction with regard to ROI yielded no significant PRONOUN effects (ROI I: $F_{(1, 24)} = 2.35$; ROI II: $F_{(1, 24)} = 2.07$; ROI III $= F_{(1, 24)} = 1.23$; ROI IV: $F_{(1, 24)} = 1.13$). Finally, the comparison between the two types of demonstrative pronouns (*der* vs *dieser*) did not yield any significant effect.

The statistical analysis for the midline electrodes also revealed an interaction of PRONOUN X WORD ORDER ($F_{(2, 48)} = 4.60$, $p < 0.05$) and an interaction of PRONOUN X ROI ($F_{(10, 240)} = 3.33$, $p < 0.001$). However, neither the resolution of the former interaction with regard to WORD ORDER nor the resolution of the latter interaction with regard to ROI yielded any significant PRONOUN effects (canonical word order: $F_{(2, 48)} = 1.44$; non-canonical word order: $F_{(2, 48)} = 2.46$; Fz: $F_{(2, 48)} = 2.15$; Cz: $F_{(2, 48)} = 1.06$; FCz: $F_{(2, 48)} = 1.61$; CPz: $F_{(2, 48)} = 0.58$; Pz: $F_{(2, 48)} = 0.29$; POz: $F_{(2, 48)} = 0.26$). Pairwise comparisons were also computed. The comparison between the personal pronoun and the demonstrative pronoun *der* revealed an interaction of PRONOUN X WORD ORDER ($F_{(1, 24)} = 7.27$, $p < 0.03$). The interaction was then
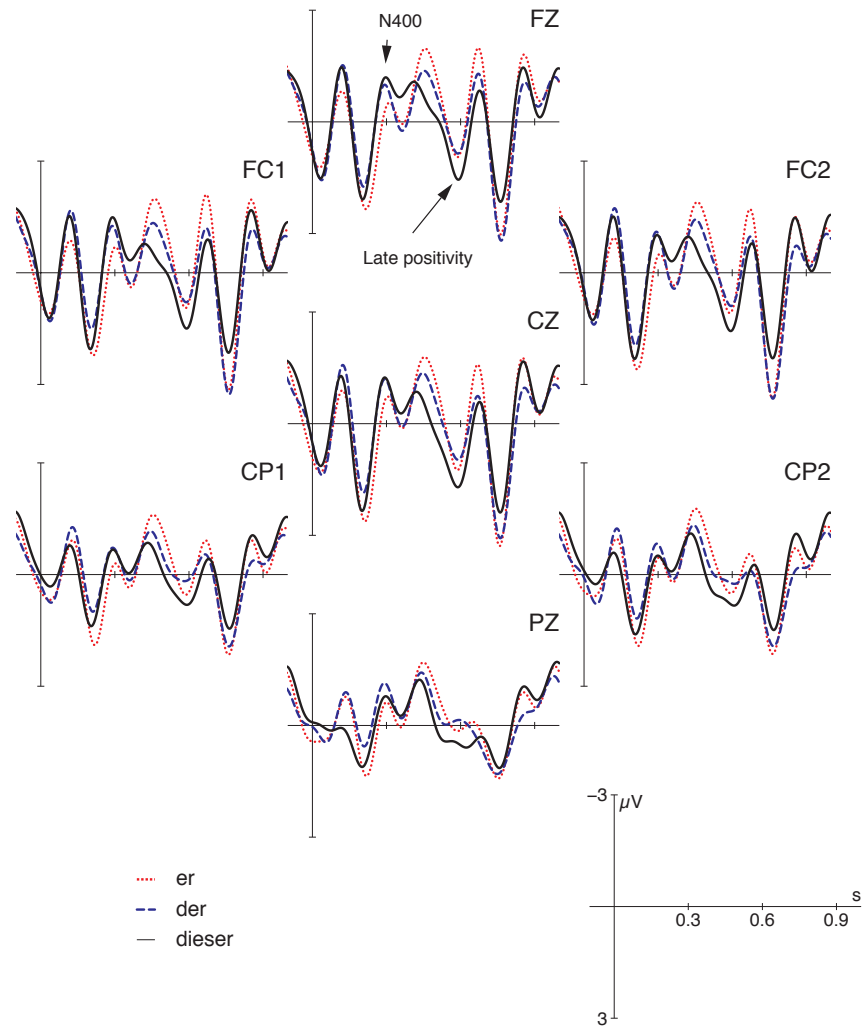
159
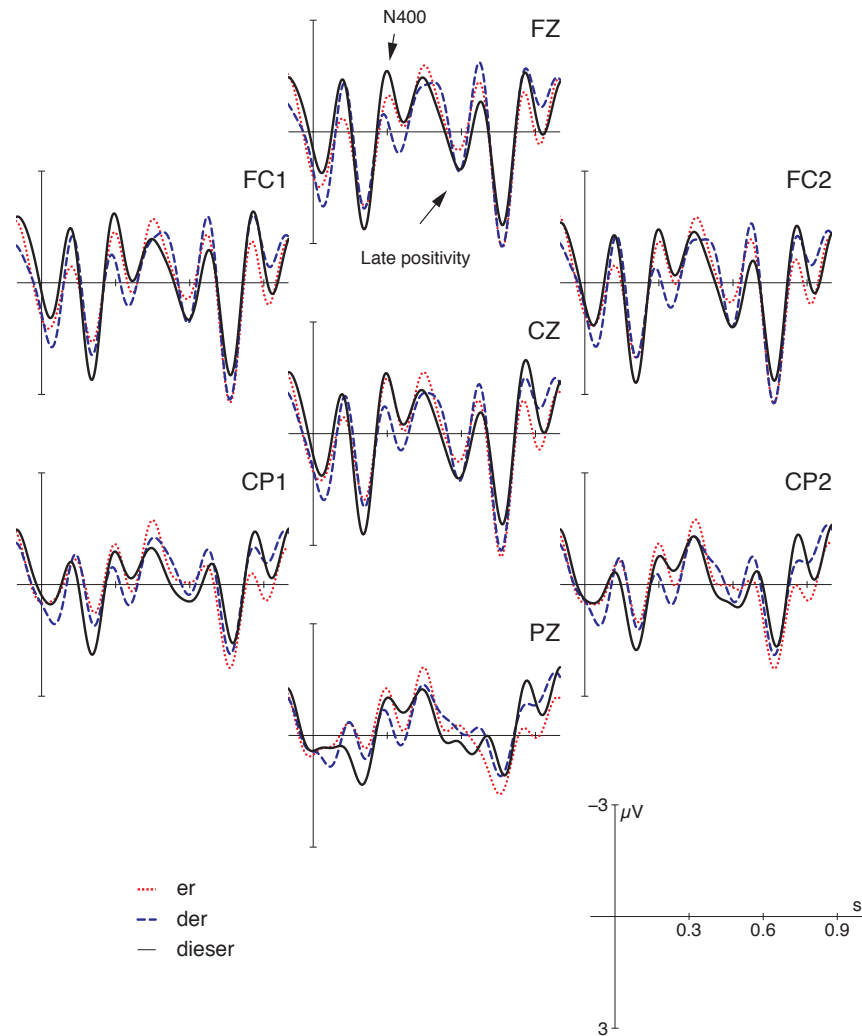
Figure 16: Grand-average ERPs (n = 25) time-locked to the pronoun onset (intersection of two axes) for the dative experiencer, non-canonical word order context illustrated at selected electrodes. The results for the personal pronoun *er* represented in red, the demonstrative pronoun *der* in blue, and the demonstrative pronoun *dieser* in black. Negativity is plotted upwards on the x-axis and the y-axis covers a time span from 100 ms before the onset of the pronouns until 1000 ms after the onset of the pronouns.

resolved with regard to WORD ORDER. The non-canonical word order yielded a small difference between pronouns but overall no reliable effect could be registered for either WORD ORDER variation (canonical word order: $F_{(1, 24)} = 1.98$, $p = 0.17$; non-canonical word order: $F_{(1, 24)} = 4.13$, $p = 0.053$). Furthermore, the comparison between the personal pronoun and the demonstrative pronoun *dieser* revealed a main effect of ORDER ($F_{(1, 24)} = 7.95$, $p < 0.01$) in addition to an interaction of PRONOUN X ROI ($F_{(5, 120)} = 5.95$, $p < 0.001$) but the resolution of this interaction with regard to ROI yielded no reliable effect (Fz: $F_{(1, 24)} = 3.03$; Cz: $F_{(1, 24)} = 1.02$; FCz: $F_{(1, 24)} = 2.19$; CPz: $F_{(1, 24)} = 0.12$; Pz: $F_{(1, 24)} = 0.01$; POz: $F_{(1, 24)} = 0.23$). Finally, the comparison between the two types of demonstrative pronouns yielded no significant effect, thus replicating the results from the previous analysis. Overall, the results are very similar over the lateral and midline electrodes.

Regarding the statistical analysis for the second time window between 500 and 650 ms, the analysis for the lateral electrodes revealed a main effect of PRONOUN ($F_{(2, 48)} = 10.69$, $p < 0.001$). Furthermore, there was a main effect of ORDER ($F_{(1, 24)} = 5.18$, $p < 0.05$), indicating that the word order variations influenced the results. Finally, there was an interaction of PRONOUN X ROI ($F_{(6, 144)} = 3.0$, $p < 0.01$), whereby the resolution of the interaction showed that the PRONOUN effect reached significance in ROI I ($F_{(2, 48)} = 10.69$, $p < 0.001$), in ROI II ($F_{(2, 48)} = 11.51$, $p < 0.001$) and in ROI IV ($F_{(2, 48)} = 6.97$, $p < 0.01$).

Furthermore, pairwise comparisons were also computed for this time window. The comparison between the personal pronoun and the demonstrative pronoun *der* yielded no significant effect. The comparison between the personal pronoun and the demonstrative pronoun *dieser* yielded a main effect of PRONOUN ($F_{(1, 24)} = 20.08$, $p < 0.001$), indicating that the two pronouns differed significantly from each other. The difference becomes clear when inspecting both figures. Furthermore, there was an interaction of PRONOUN X ROI ($F_{(3, 72)} = 6.40$, $p < 0.001$). The interaction of the resolution revealed that the main effect of PRONOUN reached significance in ROI I ($F_{(1, 24)} = 21.33$, $p < 0.001$), ROI II ($F_{(1, 24)} = 24.31$, $p < 0.001$) and in ROI IV ($F_{(1, 24)} = 11.94$, $p < 0.01$). Finally, the comparison between the two types of demonstrative pronouns (*der* vs *dieser*) revealed a main effect of PRONOUN ($F_{(1, 24)} = 11.72$, $p < 0.01$), indicating that both pronouns differed significantly from each other, which becomes especially clear when examining Figure 15.

The analysis for the midline electrodes revealed a main effect of PRONOUN ($F_{(2, 48)} = 8.31$, $p < 0.001$), a main effect of WORD ORDER ($F_{(1, 24)} = 5.01$, $p < 0.05$) and an interaction of PRONOUN X ROI ($F_{(10, 240)} = 2.06$, $p < 0.05$). The resolution of the interaction revealed that the PRONOUN effect reached significance at electrodes Fz ($F_{(2, 48)} = 10.42$, $p < 0.001$), Cz ($F_{(2, 48)} = 8.06$, $p < 0.001$), FCz (F

$_{(2,\ 48)}$ = 9.29, p < 0.001), CPz (F $_{(2,\ 48)}$ = 7.28, p < 0.01) and Pz (F $_{(2,\ 48)}$ = 4.90, p < 0.05). Pairwise comparisons were also computed. While the comparison between the personal pronoun and *der* yielded no significant effects, the comparison between the personal pronoun and *dieser* revealed a main effect of PRONOUN (F $_{(1,\ 24)}$ = 11.19, p < 0.01) and an interaction of PRONOUN X ROI (F $_{(5,\ 120)}$ = 4.08, p < 0.01). The resolution of the interaction revealed that the PRONOUN effect reached significance at electrodes Fz (F $_{(1,\ 24)}$ = 21.71, p < 0.001), Cz (F $_{(1,\ 24)}$ = 10.40, p < 0.01), FCz (F $_{(1,\ 24)}$ = 14.76, p < 0.001), CPz (F $_{(1,\ 24)}$ = 8.87, p < 0.01) and Pz (F $_{(1,\ 24)}$ = 5.18, p = 0.032). Finally, the comparison between the two types of demonstrative pronouns revealed a main effect of PRONOUN (F $_{(1,\ 24)}$ = 12.55, p < 0.01). Thus, the results for the lateral and midline electrodes are very similar overall.

5.4.2.7   Discussion

The results for the two components will again be discussed separately. Regarding the first time window (250–350 ms), the overall interaction of PRONOUN X WORD ORDER indicates that the results were modulated by the word order variations, whereby particularly the personal pronoun and the demonstrative pronoun *der* appear to be affected by the word order variations. A visual inspection of the two figures (15 and 16) indicates that in the canonical context, both types of demonstrative pronouns differ from the personal pronoun whereas, in the non-canonical context, there appears to be a three-way gradation between the pronouns: The most pronounced negative deflection emerged for *dieser*, followed by the personal pronoun and the demonstrative pronoun *der*.

The results for the canonical context confirm the hypothesis that both types of demonstrative pronouns are less expected (presumably because they refer to less prominent referents). However, in non-canonical contexts, the demonstrative pronoun *der* evoked the least pronounced negative deflection. Thus, the question arises as to why the personal pronoun evoked a more pronounced negative deflection compared to a demonstrative pronoun (namely *der*) following non-canonical contexts. The personal pronoun typically refers to a prominent referent. It is thus unexpected that its occurrence evoked a more pronounced negative deflection compared to a demonstrative pronoun that typically refers to a less prominent referent. However, the current experiment does not take into account how the pronouns were initially interpreted. As previously shown (see Chapter 3), each pronoun has an overall tendency to refer to a more or less prominent referent but interpretive preferences are not fixed and the participants could have interpreted the pronouns differently from what was expected. For instance, the demonstrative pronoun *der* may have been interpreted as referring to a more expected referent compared to the personal pronoun in non-canonical contexts. Chapter 3 revealed that no clear interpretive preferences for any pronoun could be observed in dative experiencer, non-canonical

word order contexts. This lends support to the assumption that in the current experiment, the personal pronoun and *der* were interpreted in an untypical way.

Regarding the later time window (500–650 ms), there were generally more robust effects and a main effect of PRONOUN. In addition, there was a main effect of WORD ORDER. The demonstrative pronoun *dieser* elicited the most pronounced positive deflection and seems to differ from both other pronouns (which is supported by the fact that PRONOUN main effects emerged for all pairwise comparisons that included *dieser*) particularly following canonical contexts. Figure 16 suggests that *dieser* and *der* display more similarities following non-canonical contexts.

To summarise, the demonstrative pronoun *dieser* evoked the most pronounced negative and positive deflection in all contexts, which corroborates the findings from the accusative context and lends support to its important function as a discourse-structuring device. The demonstrative pronoun *der* displayed more variation, which will be discussed in more detail in the following section.

5.5 General discussion

The aim of this chapter was to investigate the neural mechanisms behind different discourse functions of German personal and demonstrative pronouns. The backward function has been linked to predictive processing and negative neural components while the forward function has been linked to mental model updating and late positive components.

An important part of language processing is the ability to make predictions about what is going to follow in the upcoming discourse (e.g. Goodman, 1970; Pickering & Garrod, 2007, 2013). Among others, listeners or readers make predictions about which referent is going to be mentioned next. Adopting the framework of prominence (von Heusinger & Schumacher, 2019), the most prominent referent is considered most likely to be mentioned next. As the current and previous research (e.g. Bosch & Umbach, 2007; Hinterwimmer, 2015) established that demonstrative pronouns usually refer to a less prominent referent, they should violate the previously generated prediction. Several ERP studies have shown that the N400 component is related to predictive processing and less predicted referents have led to more pronounced negative deflections compared to more predicted referents (e.g. Burkhardt, 2006; Hung & Schumacher, 2012). In the current experiment, the processing of two types of demonstrative pronouns compared to the personal pronoun was investigated. Based on the previous findings regarding the processing of unexpected referents, a more pronounced negative deflection was expected for the demonstrative pronouns.

In the context of accusative verbs, the demonstrative pronoun *dieser* evoked the most pronounced

negative deflection. This result confirms the general assumption that a demonstrative pronoun violates the previously generated prediction about which referent is most likely to be mentioned next to a higher degree than a personal pronoun. However, the results for the demonstrative pronoun *der* were less robust.

In the context of dative experiencer verbs, *dieser* also evoked a very pronounced negative deflection across all contexts. The results for the dative experiencer verbs suggest that the demonstrative pronoun *der* and the personal pronoun are more strongly affected by context variations. Following canonical contexts, both demonstrative pronouns seem to differ from the personal pronoun, while following non-canonical contexts, the demonstrative pronoun *der* evoked the least pronounced negative deflection. These findings for the non-canonical context are surprising and will be discussed in more detail below.

The most robust finding in the current experiment is that the demonstrative pronoun *dieser* caused a very pronounced negative deflection across different conditions. Why is the demonstrative pronoun *dieser* perceived as such a strong violation of a previously generated prediction? Interestingly, Chapter 3 also revealed very robust interpretive preferences for the demonstrative pronoun *dieser*. With the exception of the dative experiencer, non-canonical word order context, interpretive preferences for the demonstrative pronoun *dieser* were at least numerically more robust compared to the interpretive preferences for *der*. Although both pronouns were interpreted as referring to the less prominent patient, this preference was generally more robust for *dieser* which is in line with the results of the current experiment. One explanation for this could be that the demonstrative *dieser* has been associated with the marking of contrast (Bisle-Müller, 1991). It has been described how the use of the demonstrative article *dieser* "schließt irgendwie die Abgrenzung von etwas anderem mit ein. Auch wenn *dieser* alleine auftritt, denken wir uns irgendwie immer etwas mit wie 'aber dieser nicht'" ('even when *dieser* occurs on its own, it implies excluding something else; we always think something like "but not that one"') (Bisle-Müller, 1991, p. 70). Therefore, although in a contextual setting with only two discourse referents the two demonstrative pronouns may be interpreted as referring to the same referent, the additional feature of *dieser* as a marker of contrast might violate the parser's prediction more strongly. The study by Baumann & Schumacher (2012) that was summarised above contrasted referents with different information statuses (new vs given). When a new referent was contrasted with a given one, this caused a pronounced negative (and positive) deflection (see also Wang & Schumacher, 2013). Similarly, the demonstrative pronoun *dieser* could contrast the less prominent with the more prominent referent; it might be connected with the explicit request to exclude the most prominent referent whereas this aspect might be not as strongly connected with the other type of demonstrative pronoun (namely *der*). Other researchers (e.g. Weinert, 2011) have also remarked that *der* does not necessarily have to refer to a less prominent referent (although this might depend on one's definition of prominence). And

even in the dative experiencer, non-canonical word order context where behavioural results revealed no clear pattern (see Chapter 3), the request to exclude one referent (whichever this may be) that is associated with *dieser* could have evoked a very pronounced negative deflection. It may then have been the previous context that made it difficult for the participants to compute which referent is less prominent in the sentence continuation task (which is indicated by no clear interpretive preferences), but the instruction to exclude one referent must have been perceived strongly in the current experiment as the negative deflection for *dieser* suggests.

As mentioned, the results for the demonstrative pronoun *der* were more varied and, in the dative experiencer, non-canonical word order context, it evoked the least pronounced negative deflection. This suggests that in this particular context, the demonstrative pronoun *der* may not have been interpreted as referring to a less prominent referent. In contrast to many previous studies (e.g. Burkhardt, 2006; Hung & Schumacher, 2012), the current study tested potentially ambiguous pronouns. Whereas previous studies used noun phrases or proper names that left no room for interpretation, in the current study, the anaphoric pronouns could potentially refer to two possible referents. When interpreting the results, it thus has to be taken into account that the participants may have interpreted the pronouns differently than expected. The participants still might have had clear interpretive preferences (which is why the tested pronouns are not truly ambiguous in the sense that Nieuwland & Van Berkum (2008) understand ambiguity), but their interpretive preferences may have been untypical. This is why effects emerged although these were more varied.

There is evidence that the demonstrative pronoun *der* does not have to refer to a less prominent referent (Weinert, 2011). Since the current experiment featured another demonstrative pronoun (*dieser*) and participants were exposed to all three pronouns, the direct comparison of *dieser* and *der* might have weakened its impact as an "attention signal" for a conspicuous reference (Weinrich, 1993, p. 440). As indicated in Chapter 2, the demonstrative pronoun *dieser* is more complex compared to *der* since it consists of a stem and additional suffixes; its complexity might further support its important function to guide attention to less expected referents. By comparison, *der* might not have been perceived so strongly as a referential expression indicating a reference to a less prominent referent. The study by Schumacher et al. (2015) compared the processing of the demonstrative pronoun *der* and the personal pronoun *er*. Interestingly, the authors also could not find a significant difference between these two pronouns in some contexts (i.e. following non-canonical accusative contexts).

Once a particular referential form is encountered, this also has consequences for the upcoming discourse. It has been argued that referential forms also indicate whether the current discourse structure will be

maintained or changed and demonstrative pronouns have been described as "THEMAWECHSLER" ('topic shifter(s)') (Abraham, 2002, p. 459). Adopting the framework of prominence (von Heusinger & Schumacher, 2019), it is assumed that demonstrative pronouns make a previously less prominent referent more prominent in upcoming discourse and these changes concerning the prominence status of different referents need to be incorporated into the mental representation of the discourse. Previous ERP studies have associated late positive deflections with mental model updating. For example, when a new discourse referent or a new topic had to be incorporated into the discourse structure, this caused a more pronounced positive deflection compared to when there were no changes concerning the referents' discourse statuses (e.g. Burkhardt, 2006; Hirotani & Schumacher, 2011). Since demonstrative pronouns render a previously less prominent referent more central in upcoming discourse, it was assumed that they cause a more pronounced positive deflection compared to the personal pronoun.

Generally, the effects were more robust for this component, reflected by the main effects of PRONOUN for both verb types. Regarding the context of active accusative verbs, the demonstrative pronoun *dieser* evoked a more pronounced positive deflection compared to both other pronouns. Concerning the context of the dative experiencer verbs, *dieser* again elicited the most pronounced positive deflection and differed significantly from both other pronouns, which especially became clear following canonical contexts.

The general pattern regarding this component is that the demonstrative pronoun *dieser* elicited the strongest deflections across contexts. Thus, it must not only have been perceived as a strong signal indicating reference to a less prominent referent, but also as a signal to promote the other (i.e. not excluded) referent to a more prominent status. These functions may be strongly related, which is indicated by the robustness of this effect across neural components and conditions.

Furthermore, the main effects of WORD ORDER were registered for both verb types, indicating that the word order variations modulated the effects. A visual inspection of the figures suggests that, particularly following dative experiencer verbs, there are differences depending on the word order variations. Following canonical contexts, *dieser* appears to differ from both other pronouns, while following non-canonical contexts, both types of demonstrative pronouns appear to differ from the personal pronoun. Thus, the results for the demonstrative pronoun *der* were again more strongly modulated by context variations and it is difficult to describe the forward potential of *der* in a unified way since *der* seems to be very sensitive to context modifications. This is in line with Weinert's (2011, p. 90) observation that *der* is "not typically demonstrative in spoken language." The current experiment used written stimuli, but this quote serves to illustrate that *der* can have varying features and functions depending on the respective context.

This aspect was evidenced in the current experiment. The demonstrative pronoun *der* can have a

potential for referential shift, as reflected by very pronounced positive deflections in some contexts, but it seems to maintain current prominence relations in other contexts. The study by Schumacher et al. (2015) could find a more pronounced deflection for *der* compared to *er*, particularly following canonical contexts. However, the presence of *dieser* may have weakened the shift potential of *der* in the current experiment as discussed above. Furthermore, the study by Schumacher et al. (2015) introduced one referent in the German pre-field and another referent in the middle field (as in *Der Feuerwehrmann will den Jungen retten...* 'The fire fighter wants to rescue the boy...', Schumacher et al., 2015, p. 5) and mentioned the pronoun in the pre-field. The contrast between the two referents may thus have more easily been detectable compared to the current experiment in which both referents were introduced in the middle field. As described previously, the demonstrative pronoun *der* typically occurs as the subject and picks up the object from the previous sentence (e.g. Ahrenholz, 2007). Schumacher et al. (2015) may thus have created conditions that supported the shift function of *der*. In the current experiment, the pronouns were mentioned in the middle field. In order to test whether the position of the pronouns influenced the results, all pronouns were also presented sentence-initially in an (unpublished) follow-up experiment in which similar results to those presented in this chapter emerged. The follow-up study still mentioned both referents in the middle field, which may explain the results. However, further research is needed to determine the exact contexts in which the demonstrative pronoun *der* displays its referential shift function.

The experiments presented in this chapter not only shed more light on potential differences between different pronouns in German, but also served to illustrate more general language processing mechanisms. In Chapter 3 it was shown that the demonstrative pronoun *dieser* is typically understood as referring to the previous patient, i.e. a less prominent and less expected referent. In the current experiment, *dieser* evoked a very pronounced negative deflection across the different experimental conditions. This result is thus in line with previous studies (e.g. Burkhardt, 2006; Kutas & Hillyard, 1980; Szewczyk & Schriefers, 2013) which showed that less predicted linguistic input evokes more pronounced negative deflections compared to expected input. More specifically, while many previous studies used unambiguous targets such as noun phrases, the present study could show that (gender-ambiguous) anaphoric pronouns associated with less expected referents also cause negative deflections (see also Schumacher et al., 2015; Streb et al., 1999). Furthermore, the present study suggests that reference to a less predicted referent has consequences for the mental representation of the discourse. The demonstrative pronoun *dieser* also caused a very pronounced positive deflection across all conditions in the current experiment. Based on the findings from the text continuation task, this is interpreted as costs reflecting changes with regard to the prominence statuses of the referents in the subsequent discourse. Thus, the present research provides further evidence for accounts

linking late positive deflections to mental model updating (e.g. Hung & Schumacher, 2012; Kuperberg et al., 2020; Schumacher et al., 2015).

5.6 Conclusion

To conclude, the demonstrative pronoun *dieser* elicited very robust effects in this experiment. On the one hand, it was interpreted as referring to the least expected referent (reflected in very pronounced negative deflections). On the other hand, it was also interpreted as indicating a change in subsequent discourse (reflected in very pronounced late positive deflections). The demonstrative pronoun *der*, however, was not constantly perceived as indicating a reference to less expected referents and a change in subsequent discourse, and whether or not participants perceived it as a signal redirecting attention was modulated by context variations. Furthermore, while many previous studies tested noun phrases or proper names, in the current experiment, the N400 component could also be shown to be sensitive to anaphoric (demonstrative) pronouns. Late positivities could be confirmed as reflecting costs relating to mental model updating.

6 Conclusion

In this thesis, the German demonstrative pronouns *der* and *dieser* were contrasted with respect to two discourse functions: the backward and forward functions. In their backward use, demonstrative pronouns were argued to guide attention to an unexpected and less prominent referent (Comrie, 1997). Numerous studies have investigated how participants interpret *der* in comparison to the personal pronoun (e.g. Bosch et al., 2007; Schumacher et al., 2016). However, research concerning *dieser* is sparse (Lange, 2016; with the exception of Özden, 2016; Patil et al., 2020). The first aim of this thesis was thus to investigate how participants interpret *dieser* in comparison to *der* (backward function). Since it has been claimed that prominence relations between referents influence the interpretation of these pronouns, an additional aim was to shed light on the factors that affect a referent's prominence status. The second aim of this thesis was to provide empirical evidence on how the two types of German demonstrative pronouns influence upcoming discourse (forward function) since demonstratives were claimed to change prominence relations in upcoming discourse (e.g. Abraham, 2002). The third aim of this thesis was to determine potentially more subtle differences between *der* and *dieser* and to determine the neural correlates of the backward and forward function using time-sensitive ERPs (following Schumacher et al., 2015). Investigating these discourse functions also contributes to a better understanding of the role of prominence (following Himmelmann & Primus, 2015; von Heusinger & Schumacher, 2019) in discourse. In the following, the experimental findings are summarised and implications (for the notion of prominence) are discussed.

6.1 Results regarding pronoun interpretation (backward function)

The first aim of the current research was to investigate how participants interpret *dieser* in comparison to *der* and to shed light on the features that contribute to a referent's prominence status. Previous research suggests that *der* is interpreted as referring to the proto-patient from the previous sentence (e.g. Schumacher et al., 2016). While previous studies (Özden, 2016; Patil et al., 2020) have shown that *dieser* is not always interpreted as referring to the last-mentioned referent, contrary to Zifonun et al. (1997), the question of whether *dieser* is also typically interpreted as referring to the proto-patient could not be answered unequivocally in a previous study (Lange, 2016).

The sentence continuation task revealed very robust findings for the two types of demonstrative pronouns. In the context of accusative verbs, they were predominantly interpreted as referring to the object/proto-patient from the previous clause. Crucially, whether the object/proto-patient was mentioned as the first- or second-mentioned referent did not significantly impact the interpretation of either demon-

strative pronoun. The interpretation preferences for the personal pronoun were less distinct following both word order variations. In the context of dative experiencer verbs, clear results only emerged following the canonical context sentences. In these cases, both types of demonstrative pronouns were predominantly interpreted as referring to the proto-patient (and subject) while the personal pronoun was more often interpreted as referring to the proto-agent (and object). However, no clear patterns for any pronoun could be observed following non-canonical context sentences.

What do these results reveal about pronoun interpretation and prominence-lending factors? Firstly, the results that emerged in the context of accusative verbs clearly show that the linear order of the referents is not the main factor guiding the interpretation of any demonstrative pronoun (as already observed by Özden, 2016; Patil et al., 2020) which is contrary to what has been claimed for *dieser* (Zifonun et al., 1997). Across the different word order variations, both *der* and *dieser* were mainly interpreted as referring to the object/proto-patient from the previous clause (which is the second-mentioned referent in canonical context sentences and the first-mentioned referent in non-canonical context sentences).

Secondly, thematic roles are more important than grammatical functions for the interpretation of both types of demonstrative pronouns which becomes evident when considering the dative experiencer, non-canonical word order context. Both grammatical functions and thematic roles were shown to contribute significantly to a referent's prominence status and thus influence pronoun interpretation (e.g. Bosch et al., 2007; Schumacher et al., 2016). When the subject/proto-agent was contrasted with the object/proto-patient, participants interpreted the demonstrative pronouns as referring to the object/proto-patient. However, when the proto-patient (and subject) was contrasted with the object (and proto-agent), participants interpreted both types of demonstrative pronouns as referring to the proto-patient. Thus, thematic roles appear to be more relevant for a referent's prominence status than grammatical functions, confirming the results reported by Schumacher et al. (2016) for *der* vs *er*.

Thirdly, the two types of demonstrative pronouns displayed similar patterns and no significant differences between *der* and *dieser* could be observed in the sentence continuation task. While the initial assumption was that the two demonstrative pronouns differ from each other, in context sentences with two discourse referents, no clear differences could be observed. However, although the two types of demonstrative pronouns displayed similar patterns, stronger effects (both statistically and numerically) emerged for *dieser*. This could indicate that *dieser* is more strongly associated with the less prominent referent. Both demonstrative pronouns are typically interpreted as referring to the less prominent proto-patient, as the results discussed above have revealed. However, the demonstrative pronoun *dieser* might refer to the less prominent referent with more emphasis. In Chapter 2, it was illustrated that *dieser* has been associated with

both greater specificity (see Ahrenholz (2007) who points out that *dieser* is used to select one referent out of several possible referents and Weinrich (1993)) and with the marking of contrast (Bisle-Müller, 1991). These characteristics could explain the slightly stronger interpretive preferences for *dieser* that were observed in the sentence continuation task since similar descriptions do not exist for *der*. This aspect will be picked up again in the discussion of the ERP results.

Finally, the limitations of the current research need to be discussed. As mentioned above, the context sentence introduced only two potential referents. Thus, in order to reveal potentially stronger differences between the two types of demonstrative pronouns, future research should consider designing context sentences with more than two referents. This can not only help to reveal differences between the two types of demonstrative pronouns that could not be detected with the current experimental design but also shed more light on prominence relations between more than two referents in a sentence. In most previous studies, two referents were contrasted and, through the lens of pronoun interpretation, it could then be established which one is perceived as more prominent compared to the other referent. However, there may be varying degrees of prominence and one demonstrative pronoun might in fact refer to a referent with an intermediate level of prominence. Since *dieser* is the most specific one as discussed above, the demonstrative pronoun *der* might be used to refer to referents with an intermediate prominence level. This is an interesting research question that future studies could address. A possibility to introduce three referents in a sentence would be to use complex sentences in which, for example, two referents could be introduced in a main clause while another referent could be introduced in a subordinate clause. As mentioned in Section 4.3.4.6, referents in subordinate clauses are perceived as less prominent compared to referents in main clauses (see e.g. Cooreman & Sanford, 1996; Miltsakaki, 2003). Thus, introducing another clause level with additional referents might help to reveal more subtle differences between the two types of demonstrative pronouns that the current experiment could not reveal. Other limitations that also apply to the other experiments will be discussed in more detail below.

6.2 Results regarding referential shift potential (forward function)

The second aim of this thesis was to assess whether demonstrative pronouns initiate a referential shift in the subsequent discourse and whether this shift function is an intrinsic semantic feature of demonstrative pronouns. Furthermore, it was investigated to what extent the two demonstrative pronouns *der* and *dieser* differ from each other with respect to their shift potential.

The story continuation task revealed that initial pronoun interpretation determined whether the previ-

ously less prominent referent was promoted to a more prominent discourse status in the subsequent discourse (i.e. mentioned more often in the continuations), whereby differences between the individual pronouns could not be observed. Thus, once a referent had been associated with a particular referent, this referent remained prominent in the continuations. However, it has to be considered that demonstrative pronouns were generally more frequently interpreted as referring to the less prominent referent (see previous section) and thus may be associated with a stronger shift potential. This pattern emerged across all contexts with the exception of the dative experiencer, canonical word order context. When such a referential shift was initiated, reduced referential forms such as personal pronouns were used more often for the promoted referent than for other referents. However, such a correlation could not be observed for grammatical cases and thematic roles. The results for the time course analysis revealed that references to the previously less prominent referent were kept relatively high up until the tenth discourse unit when the second context sentence contained the demonstrative pronoun *dieser*. In stories with more than ten discourse units, the demonstrative pronoun *der* appeared to have prompted participants to keep references to the previously less prominent referent relatively stable until the end. However, most stories also had an average length of ten sentences and there is generally more variation towards the end due to the lower number of stories that entered the analysis at this point. Furthermore, *der* showed more variation up until the tenth sentence. In some conditions, participants even mentioned the previously less prominent referent less often when the context sentence contained *der* compared to when it contained the personal pronoun. These results have several implications as outlined in the following.

Firstly, the shift potential does not appear to be an intrinsic semantic feature of demonstrative pronouns as the demonstrative pronouns did not invariably encourage participants to mention the previously less prominent referent more often. Rather, how the demonstrative pronouns (and the personal pronouns) were interpreted ultimately determined whether or not a shift was initiated. These results support the view that initial pronoun interpretation primarily influences how subsequent discourse develops. The fact that personal pronouns could also initiate a shift in the few cases when they were interpreted as referring to the less prominent referent could indicate that the referent that is associated with the pronoun is kept as the centre of attention as a natural consequence. However, this does not deny that demonstratives are generally more strongly associated with a shift function compared to personal pronouns. The data presented in this thesis does not allow the conclusion that shift is an intrinsic feature of demonstratives, but generally shows that demonstrative pronouns are very likely to initiate a shift (since they typically refer to a less prominent referent). These findings also support the dynamicity criterion of prominence (see von Heusinger & Schumacher, 2019) which states that certain features of a linguistic device can be emphasised or attenuated

depending on the context (see also Kretzschmar et al., 2019).

Secondly, referential forms appear to be the most direct indicator of a referent's prominence status. Once the previously less prominent referent had been promoted to a higher prominence status, it was referred to more often via reduced referential forms such as personal pronouns, while the other referents were more frequently referred to via more explicit referential forms such as definite noun phrases. For the other categories (grammatical case and thematic roles), no such correlation emerged. These findings are in line with accounts that associate more reduced forms with more prominent referents in discourse (e.g. Ariel, 1990; Gundel et al., 1993). Furthermore, they show that referential forms may be the most direct measure of a referent's prominence status. Results from Kaiser (2005) support this view: Participants preferably interpreted the Finnish personal pronoun as referring to the previous pronoun when it was the grammatical object of a clause and not to the previous subject when it was realised as a full noun phrase. Most research on anaphora has contrasted two definite noun phrases. When both referents do not differ with respect to their referential forms, other information such as thematic roles may be used for prominence computations. However, the current research shows that there is such a strong correlation between a referential form and the prominence status of its referent that other features such as thematic roles can be used more freely in a sentence when referential forms are available as cues for prominence computations.

Thirdly, the two demonstrative pronouns may differ with respect to the longevity of their shift function. The current research suggests that it depends on the pronoun type for how long participants increase references to the previously less prominent referent. It seems that *der* prompted participants to keep references to the previously less prominent referent relatively stable until the end of the stories, while *dieser* encouraged participants to increase references to the previously less prominent referent for a certain period (up until the tenth sentence). However, it has to be pointed out that the stories were of different lengths and that most stories also had an average length of ten sentences. In those stories that did exceed ten sentences, *der* does appear to have encouraged participants to mention the previously less prominent referent more consistently until the end (while in the context of *dieser* there were more dramatic peaks and troughs in the end). Ahrenholz (2007) observed that while *dieser* is used to select one referent among other potential referents, *der* is used to keep a referent as the center of attention and the results discussed here would support this distinction. However, these are very preliminary conclusions and future research is necessary. In future studies, it would be interesting to only compare stories that consist of a similar number of sentences. This leads to an examination of other limitations of the current research (which also apply to the sentence continuation task) and suggestions for future research.

In the current research, the context sentences were introduced in written form. Since written language

could be considered more formal compared to spoken language, it is possible that if the participants associated individual pronouns with certain modalities or registers, this could have influenced the results. However, previous research did not establish a clear link between certain pronouns and particular registers or the modalities in which they are used (see e.g. Ahrenholz, 2007; Weinert, 2007; also Patil et al., 2020). Some authors have suggested that not necessarily the modality or register determines whether or not a particular pronoun is used, but rather the communicative goal (Ahrenholz, 2007; Weinrich, 1993), as indicated in Section 2.3. The participants taking part in the story continuation task discussed above were asked to provide short stories based on the context sentences with two discourse referents. Short stories usually only mention very few referents and this knowledge was probably familiar to the participants. This knowledge about the structure and communicative goal of short stories could then have influenced how the participants continued the stories. For example, when they interpreted a demonstrative pronoun as referring to the less prominent referent, they kept the less prominent referent in a relatively prominent position throughout the stories (irrespective of which demonstrative pronoun the second sentence contained) because short stories often have one or two protagonists. Thus, major differences between the two types of demonstrative pronouns could not be observed in the story continuation task, since the text type arguably only allowed for one kind of shift. The time course analysis does suggest that the two types of demonstrative pronouns may differ with respect to the longevity of their shift potential; however, this difference may be even more pronounced in less restrictive contexts. Thus, for future research, it would be interesting to investigate the shift potential of the two types of German demonstrative pronouns in different contexts. Some contexts such as dialogues may require more frequent and temporary referential shifts while other contexts such as the short stories in the current experiment may require longer-lasting referential shifts. For example, it would be interesting to determine which contexts require temporary or longer-lasting shifts and then investigate whether one type of demonstrative pronoun is used more often in contexts requiring temporary or longer-lasting referential shifts. This approach could help to reveal more pronounced differences between the two types of German demonstrative pronouns with regard to their referential shift potential.

6.3 Results regarding the neural correlates

The third aim of this thesis was to detect more subtle differences between *der* and *dieser* and to determine the neural correlates of the backward and forward functions using ERPs. The ERP experiment revealed very robust effects for *dieser*. With regard to both neural correlates that were investigated, *dieser* evoked the most pronounced deflections across all contexts. However, the results for the other two pronouns (*er* and *der*) were more varied. The results regarding the N400 component can be summarised as follows: With

regard to the accusative context, the demonstrative pronoun *dieser* elicited the most pronounced deflection while the personal pronoun *er* elicited a less pronounced deflection. In the dative experiencer context, the word order variations appear to have affected the results more strongly, as indicated by an interaction of PRONOUN X WORD ORDER. Both types of demonstrative pronouns (*dieser* and *der*) differed from the personal pronoun in canonical contexts while there appeared to be a three-way gradation between *dieser* followed by the personal pronoun and the demonstrative pronoun *der* in non-canonical contexts. The results regarding the late positivities can be summarised as follows: In both the accusative and dative experiencer contexts, the demonstrative pronoun *dieser* differed from both other pronouns (indicated by the main effects of PRONOUN regarding the pairwise comparisons that included *dieser*, although the difference between *dieser* and *der* appears to be less pronounced following dative experiencer, non-canonical contexts). These results allow for the derivation of several conclusions as outlined in the following.

Firstly, assuming that the N400 reflects costs related to predictive processing (e.g. Burkhardt, 2006; DeLong et al., 2005; Kutas & Hillyard, 1980), the results indicate that the demonstrative pronoun *dieser* is perceived as indicating reference with a very unexpected referent (and/or as the most unpredicted referential form). It evoked the most pronounced negative deflections across all conditions. The sentence continuation task revealed that both demonstrative pronouns were interpreted as referring to the same (i.e. less prominent) referent. However, the demonstrative pronoun *dieser* evoked stronger negative deflections compared to the demonstrative pronoun *der* in the current experiment. How can this finding be reconciled with the results from the sentence continuation task? *Dieser* is the (morphologically) most complex form, consisting of a stem and additional suffixes, as already mentioned above. Prominence hierarchies (e.g. Ariel, 1990; Gundel et al., 1993) are based on the assumption that more explicit referential forms have less prominent referents. Thus, on prominence hierarchies adapted for German (e.g. Ahrenholz, 2007; Ellert, 2011), *dieser* might signal a lower prominence status of its referent compared to *der*. Thus, the complexity of *dieser* could account for the fact that *dieser* was more strongly associated with the less prominent referent in the ERP experiment. Hence, in direct comparison with the other two pronouns (*er* and *der*), it might attract more attention. Furthermore, it has been associated with the marking of contrast (Bisle-Müller, 1991). Thus, *dieser* might be more strongly associated with the instruction to exclude a prominent referent. ERPs measure the neural responses during reading and thus allow for tracking processing mechanisms as they happen while the text continuation task allowed the participants to carefully consider how they could interpret the pronouns. *Dieser* might thus immediately be perceived "as an attention signal" (Weinrich, 1993, p. 440) indicating a reference to a less prominent referent (reflected in very pronounced negative deflections), while *der* might be less strongly perceived as indicating a reference to a less prominent referent (reflected in less pronounced

negative deflections). The fact that *der* was still interpreted as referring to the less prominent referent in the text continuation task indicates that it also draws attention to particular referents (and even in the sentence continuation task it evoked weaker effects compared to *dieser*, as discussed above). Thus, its function to co-refer with less prominent referents may be weaker (at least in some contexts) compared to the demonstrative pronoun *dieser*.

Secondly, assuming that late positive deflections reflect costs related to mental model updating (e.g. Federmeier et al., 2010; Hung & Schumacher, 2012), the results indicate that *dieser* leads to mental model updating. The text continuation task revealed that any pronoun could prompt participants to initiate a referential shift (thus requiring mental model updating) when interpreted as referring to the less prominent referent. However, the current results indicate that *dieser* required the highest degree of mental model updating. The same reasons that were discussed above could also explain the difference between the current findings and those from the text continuation task since *dieser* might immediately be perceived as a signal for attentional re-orientation (due to its morphological complexity and contrast marking function). As a consequence, costs related to the updating of the mental model become visible since the referent to which attention has been drawn is also likely to remain the new centre of attention in upcoming discourse. Hence, the other pronouns may not as reliably be interpreted as cues indicating the re-organisation of the discourse, which leads to the next point.

Thirdly, the interpretation of the demonstrative pronoun *der* (and the personal pronoun) can more easily be influenced by context manipulations, whereby this observation applies to both components: the N400 and late positivities. The results for the demonstrative pronoun *der* varied across the different conditions. While in some conditions it appeared between the demonstrative pronoun *dieser* and the personal pronoun, in other conditions it displayed similarities with the personal pronoun or even evoked the least pronounced deflection. Interpretive preferences are not fixed for any pronoun. There are usually tendencies, but any pronoun can potentially be interpreted as referring to any referent as the sentence continuation task has revealed. In the ERP experiment, it could not be taken into account how the pronouns were interpreted. Interpretive preferences for the personal pronoun are generally more flexible as the sentence continuation task and previous research have shown (e.g. Bosch et al., 2007; Schumacher et al., 2016). The current experiment suggests that the interpretive preferences for *der* are also less fixed. In those cases where it displayed similarities with the personal pronoun or even caused the least pronounced deflection, participants may have interpreted it in an untypical way. After the arguably most straightforward context sentence with an accusative verb and the canonical word order, the results suggest a three-way gradation between *dieser* followed by *der* and the personal pronoun with regard to the N400. This shows that in rather simple

contexts, *der* displayed the anticipated effects as it evoked more pronounced deflections compared to the personal pronoun, indicating that it was interpreted as referring to a less expected referent. For the reasons discussed above, it is plausible that *der* showed less pronounced deflections compared to *dieser*. However, when the context sentences were more complex, the interpretive preferences for *der* were less clear.

For future research, it would thus be useful to design ERP experiments that also take pronoun interpretation into account. The current experiment contained comprehension questions. However, the comprehension questions did not target the referent of the potentially ambiguous pronoun in order to 'disguise' the purpose of the experiment. An option to take pronoun interpretation into account while still disguising the experimental purpose would be to combine an ERP experiment with another experimental paradigm such as the visual world eye-tracking paradigm. The visual world eye-tracking paradigm has been used to study pronoun interpretation (see e.g. Schumacher et al., 2017) and different pictures appear while participants process a potentially ambiguous pronoun. Where participants look can reveal how they interpret the potentially ambiguous pronoun. Tracking participants' eye movements while recording their neural responses would thus allow for investigating the processing of pronouns whilst taking into account how they are interpreted. Such an experimental design could help to shed light on the variations that were observed in the current experiment.

6.3.1 General implications

The aim of this thesis was to shed light on the discourse functions of two different types of German demonstrative pronouns (*der* vs *dieser*) against the background of prominence. Each experiment served to address different research questions, as summarised above. Taken together, the results from the three experiments lead to the more general implications outlined in the following.

The two types of demonstrative pronouns (*der* vs *dieser*) seem to differ from each other, whereby the potential differences between these two demonstrative pronouns have largely been ignored in previous research (with the exception of Ahrenholz, 2007). Those studies that focused on the difference between *der* and *dieser* either concluded that both demonstrative pronouns refer to the same referent (Lange, 2016; Özden, 2016) or attributed the difference to a preference for different registers (Patil et al., 2020). However, the current research found subtle differences between *der* and *dieser* in a single modality/register (namely, written/formal language). Thus, the difference cannot solely be attributed to a preference for different registers and modalities. Rather, the two types of demonstrative pronouns seem to have different effects on the addressee. The sentence continuation task revealed similar patterns for both types of demonstrative pronouns, although stronger effects emerged for *dieser*. Furthermore, the story continuation task revealed

that *dieser* has a strong impact on the subsequent discourse for a certain period of time. Finally, the ERPs revealed very robust effects for *dieser* across different contexts. Taken together, these findings allow the conclusion that, although on the surface *der* and *dieser* share similarities as indicated by similar interpretive preferences, they seem to have subtle underlying differences. It has been argued that the morphological complexity of *dieser* immediately attracts attention, while – particularly in direct comparison – the less complex *der* might be less strongly associated with indicating a reference to a less prominent referent and signalling a change in upcoming discourse. These subtle differences could only be revealed using different experimental methods and particularly the ERPs revealed strong differences between *der* and *dieser*. Thus, the current research highlights the importance of using a variety of methods to investigate linguistic phenomena.

One method that proved particularly useful in investigating the forward potential of different (demonstrative) pronouns is the story continuation task. For this thesis, a corpus of short stories was annotated with respect to different categories. This made it possible to investigate how discourse develops after a personal or demonstrative pronoun. Since the story continuations were annotated with respect to different categories, different measures could be applied to assess whether a referent's prominence status changed over time. The current research thus also helped to shed light on different measures that can be used to determine whether a referent is promoted to a more prominent status. In particular, frequency of mention (Givón, 1983) and referential forms are good indicators of a referent's prominence status (see also Gernsbacher & Shroyer, 1989). Furthermore, it could be assessed whether references to the previously less prominent referent were increased at different time points during story development. Such a time course analysis is a new approach and useful for future research. In general, the analyses and annotation guidelines that were specifically designed for this experiment can be used in future research to investigate the forward potential of various linguistic devices in different registers and modalities.

Finally, the current research provided empirical evidence for the dynamicity criterion of prominence (Himmelmann & Primus, 2015; von Heusinger & Schumacher, 2019). Linguistic devices such as demonstrative pronouns can change current prominence relations in discourse, as the story continuation task revealed. However, one crucial finding of the current research is that demonstrative pronouns do not have to initiate a referential shift. Previous accounts describing demonstrative pronouns as "THEMAWECHSLER" ('topic shifter(s)') (Abraham, 2002, p. 459) are based on the assumption that demonstrative pronouns refer to less prominent referents. However, the current research showed that, although demonstrative pronouns are typically interpreted as referring to less prominent referents, interpretive preferences are not fixed. Thus, whether or not a shift is initiated after a (demonstrative) pronoun depends on how it is initially interpreted. This variability of interpretive preferences lends further support to the assumption that discourse is dynamic

and can highlight or attenuate certain features of a linguistic device (see also Kretzschmar et al., 2019).

6.4 Conclusion

The experiments conducted as part of this thesis showed that the demonstrative pronoun *dieser* is an important discourse structuring device. It draws attention to a less prominent referent (backward function), which is then likely to remain the (new) centre of attention in upcoming discourse (forward function). While behavioural results suggest that the demonstrative pronoun *der* behaves similarly, event-related potentials showed that *dieser* is more strongly perceived as indicating a reference to a less expected referent and signalling the continued importance of that referent. These results further stress the important role of *dieser* in structuring discourse. In this thesis, it has been argued that its morphological complexity and contrast marking function (Bisle-Müller, 1991) inevitably attract attention. Thus, when used in discourse, the addressee can hardly ignore it. However, whether the other demonstrative pronoun (*der*) is perceived as a signal indicating a reference to a less prominent referent and attentional re-orientation depends on the context. Future research should focus on different contexts in order to gain a better understanding of the difference between the two types of German demonstrative pronouns.

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Appendix A: Materials for sentence and text continuation task (Chapters 3 + 4)

A.1 Active accusative verbs

1. Neulich hat der Detektiv den Ehemann beobachtet. An diesem Tag hat/ist er/der/dieser wieder...

1. Neulich hat den Ehemann der Detektiv beobachtet. An diesem Tag hat/ist er/der/dieser wieder...

2. Jeden Morgen hat der Pfleger den Heimbewohner gekämmt. Dabei hat/ist er/der/dieser oft...

2. Jeden Morgen hat den Heimbewohner der Pfleger gekämmt. Dabei hat/ist er/der/dieser oft...

3. Im Restaurant hat der Fußballspieler den Tennisspieler getroffen. Dort hat/ist er/der/dieser wie immer...

3. Im Restaurant hat den Tennisspieler der Fußballspieler getroffen. Dort hat/ist er/der/dieser wie immer...

4. In der Hotelbar hat der Mechaniker den Rennfahrer beraten. Gegen Mitternacht hat/ist er/der/dieser dann...

4. In der Hotelbar hat den Rennfahrer der Mechaniker beraten. Gegen Mitternacht hat/ist er/der/dieser dann...

5. Nach dem Spiel hat der Trainer den Torwart beschimpft. Kurz darauf hat/ist er/der/dieser dann...

5. Nach dem Spiel hat den Torwart der Trainer beschimpft. Kurz darauf hat/ist er/der/dieser dann...

6. Jeden Morgen hat der Vater den Sohn geweckt. Danach hat/ist er/der/dieser dann...

6. Jeden Morgen hat den Sohn der Vater geweckt. Danach hat/ist er/der/dieser dann...

A.2 Dative experiencer verbs

1. Im Hafen ist dem Urlauber der Segler aufgefallen. Wenig später hat/ist er/der/dieser dann...

1. Im Hafen ist der Segler dem Urlauber aufgefallen. Wenig später hat/ist er/der/dieser dann...

2. Am frühen Morgen ist dem Übersetzer der Einheimische entgangen. Wenig später hat/ist er/der/dieser dann...

2. Am frühen Morgen ist der Einheimische dem Übersetzer entgangen. Wenig später hat/ist er/der/dieser dann...

3. Letzten Sommer hat dem Förster der Jäger missfallen. Im darauffolgenden Herbst hat/ist er/der/dieser dann...

3. Letzten Sommer hat der Jäger dem Förster missfallen. Im darauffolgenden Herbst hat/ist er/der/dieser dann...

4. In der Kaserne hat dem General der Soldat imponiert. Wenig später hat/ist er/der/dieser dann...

4. In der Kaserne hat der Soldat dem General imponiert. Wenig später hat/ist er/der/dieser dann...

5. Letzten Sommer hat dem Hotelier der Reisende gefallen. Jeden Tag hat/ist er/der/dieser morgens...

5. Letzten Sommer hat der Reisende dem Hotelier gefallen. Jeden Tag hat/ist er/der/dieser morgens...

Appendix B: Materials for ERP experiments (Chapter 5)

B.1 Active accusative verbs (critical items, comprehension questions and filler sentences)

1. Gestern hat der Sanitäter den Jungen gerettet. Daraufhin hat er/der/dieser dann ein Brötchen gegessen.

   - Wurde ein Brötchen eingefroren?

1. Gestern hat den Jungen der Sanitäter gerettet. Daraufhin hat er/der/dieser dann ein Brötchen gegessen.

   - Hat der Sanitäter gestern den Jungen gerettet?

2. In der Pause hat der Lehrer den Schüler gesprochen. Anschließend hat er/der/dieser dann ein Brot ausgepackt.

   - Wurde ein Brot weggeworfen?

2. In der Pause hat den Schüler der Lehrer gesprochen. Anschließend hat er/der/dieser dann ein Brot ausgepackt.

   - War der Schüler in der Pause?

3. Nach dem Spiel hat der Torwart den Spieler umarmt. In der Kabine hat er/der/dieser später eine Dusche genommen.

   - Wurde später in der Kabine gebadet?

3. Nach dem Spiel hat den Spieler der Torwart umarmt. In der Kabine hat er/der/dieser später eine Dusche genommen.

   - Hat der Torwart nach dem Spiel den Spieler umarmt?

4. Letzte Woche hat der Polizist den Verbrecher verfolgt. An diesem Tag hat er/der/dieser abermals einen leichten Schnupfen gehabt.

- Hat jemand geschwitzt?

4. Letzte Woche hat den Verbrecher der Polizist verfolgt. An diesem Tag hat er/der/dieser abermals einen leichten Schnupfen gehabt.

    - War der Verbrecher letzte Woche an einer Verfolgung beteiligt?

5. Gestern Vormittag hat der Oberarzt den Patienten entlassen. Vorher hat er/der/dieser kurz mit einer Krankenschwester gesprochen.

    - Hat jemand mit einer Krankenschwester geschimpft?

5. Gestern Vormittag hat den Patienten der Oberarzt entlassen. Vorher hat er/der/dieser kurz mit einer Krankenschwester gesprochen.

    - Hat der Oberarzt gestern Vormittag den Patienten entlassen?

6. Letzte Woche hat der Ehemann den Wahrsager aufgesucht. Während des Gesprächs hat er/der/dieser ab und zu gehustet.

    - Wurde während des Gesprächs gelacht?

6. Letzte Woche hat den Wahrsager der Ehemann aufgesucht. Während des Gesprächs hat er/der/dieser ab und zu gehustet.

    - Hat der Ehemann letzte Woche den Wahrsager aufgesucht?

7. Gestern hat der Großvater den Jungen gewaschen. Danach hat er/der/dieser dann einen Mittagsschlaf gemacht.

    - Wurde danach gegessen?

7. Gestern hat den Jungen der Großvater gewaschen. Danach hat er/der/dieser dann einen Mittagsschlaf gemacht.

    - Hat der Großvater gestern den Jungen gewaschen?

8. Neulich hat der Detektiv den Ehemann beobachtet. An diesem Tag hat er/der/dieser wieder eine rote Hose getragen.

    - Wurde eine rote Hose geflickt?

8. Neulich hat den Ehemann der Detektiv beobachtet. An diesem Tag hat er/der/dieser wieder eine rote Hose getragen.

    - Wurde der Metzger beobachtet?

9. Gestern Morgen hat der Bauer den Lehrling ausgeschimpft. Danach ist er/der/dieser dann mit dem Traktor gefahren.

    - Ist jemand geflogen?

9. Gestern Morgen hat den Lehrling der Bauer ausgeschimpft. Danach ist er/der/dieser dann mit dem Traktor gefahren.

- Hat der Bauer den Zulieferer ausgeschimpft?

10. Neulich hat der Polizist den Bäcker angehalten. An diesem Tag hat er/der/dieser erneut einen Geburtstag vergessen.

    - Wurde gefeiert?

10. Neulich hat den Bäcker der Polizist angehalten. An diesem Tag hat er/der/dieser erneut einen Geburtstag vergessen.

    - Wurde der Fußgänger angehalten?

11. Jeden Morgen hat der Pfleger den Heimbewohner gekämmt. Dabei hat er/der/dieser oft ein Lied gesummt.

    - Wurde dabei gelacht?

11. Jeden Morgen hat den Heimbewohner der Pfleger gekämmt. Dabei hat er/der/dieser oft ein Lied gesummt.

    - Hat der Pfleger den Jungen gekämmt?

12. Auf der Karnevalsveranstaltung hat der Maler den Jäger geohrfeigt. Danach ist er/der/dieser schnell weggegangen.

    - Ist jemand ausgerutscht?

12. Auf der Karnevalsveranstaltung hat den Jäger der Maler geohrfeigt. Danach ist er/der/dieser schnell weggegangen.

    - War der Indianer auf der Karnevalsveranstaltung?

13. Zum Abschied hat der Journalist den Künstler umarmt. In diesem Moment hat er/der/dieser plötzlich geniest.

    - Hat jemand geflucht?

13. Zum Abschied hat den Künstler der Journalist umarmt. In diesem Moment hat er/der/dieser plötzlich geniest.

    - Hat der Journalist den Kaufmann umarmt?

14. Letztes Jahr hat der Geschädigte den Kranführer verklagt. Seitdem hat er/der/dieser oft einem Anwalt geschrieben.

    - Hat jemand einem Anwalt gedroht?

14. Letztes Jahr hat den Kranführer der Geschädigte verklagt. Seitdem hat er/der/dieser oft einem Anwalt geschrieben.

    - Wurde der Reiseleiter verklagt?

15. Vorletzte Nacht hat der Hund den Papagei geärgert. Am nächsten Tag hat er/der/dieser dann nur geschlafen.

- Wurde am nächsten Tag nur gefressen?

15. Vorletzte Nacht hat den Papagei der Hund geärgert. Am nächsten Tag hat er/der/dieser dann nur geschlafen.

    - Hat der Hund den Welpen geärgert?

16. Im Bahnhof hat der Dieb den Reisenden angerempelt. Daraufhin ist er/der/dieser schnell in den Zug eingestiegen.

    - Ist jemand in den Zug gesprungen?

16. Im Bahnhof hat den Reisenden der Dieb angerempelt. Daraufhin ist er/der/dieser schnell in den Zug eingestiegen.

    - War der Dieb im Bahnhof?

17. Letztens hat der Hai den Goldfisch gesehen. In diesem Moment ist er/der/dieser gerade aus einer Höhle geschwommen.

    - Ist jemand aus einer Höhle geflogen?

17. Letztens hat den Goldfisch der Hai gesehen. In diesem Moment ist er/der/dieser gerade aus einer Höhle geschwommen.

    - Hat der Hai letztens den Goldfisch gesehen?

18. Im Restaurant hat der Fußballspieler den Tennisspieler getroffen. Dort hat er/der/dieser wie immer ein Steak bestellt.

    - Wurde ein Steak zurückgeschickt?

18. Im Restaurant hat den Tennisspieler der Fußballspieler getroffen. Dort hat er/der/dieser wie immer ein Steak bestellt.

    - War der Fußballspieler im Restaurant?

19. Auf der Feier hat der Vater den Sohn beglückwünscht. Anschließend hat er/der/dieser dann ein Stück Kuchen gegessen.

    - Wurde ein Stück Kuchen fallen gelassen?

19. Auf der Feier hat den Sohn der Vater beglückwünscht. Anschließend hat er/der/dieser dann ein Stück Kuchen gegessen.

    - War der Vater auf der Feier?

20. Um 12 Uhr hat der Arzt den Patienten verabschiedet. Im Anschluss hat er/der/dieser dann einen Anruf getätigt.

    - Hat jemand im Anschluss einen Anruf ignoriert?

20. Um 12 Uhr hat den Patienten der Arzt verabschiedet. Im Anschluss hat er/der/dieser dann einen Anruf getätigt.

- Hat der Arzt um 12 Uhr den Patienten verabschiedet?

21. Am Freitagnachmittag hat der Koch den Kellner überrascht. Um Mitternacht hat er/der/dieser dann Feierabend gemacht.

    - Wurde um Mitternacht angestoßen?

21. Am Freitagnachmittag hat den Kellner der Koch überrascht. Um Mitternacht hat er/der/dieser dann Feierabend gemacht.

    - Hat der Koch am Freitagnachmittag den Kellner überrascht?

22. Im Wald hat der Bär den Wolf gegrüßt. Dort hat er/der/dieser gerade aus einem Bach getrunken.

    - Ist jemand gerade aus einem Bach geklettert?

22. Im Wald hat den Wolf der Bär gegrüßt. Dort hat er/der/dieser gerade aus einem Bach getrunken.

    - War der Bär im Wald?

23. Neulich hat der Polizist den Briefträger eingeladen. An diesem Tag hat er/der/dieser zum ersten Mal ein neues Parfüm aufgelegt.

    - Wurde ein neues Parfüm verschüttet?

23. Neulich hat den Briefträger der Polizist eingeladen. An diesem Tag hat er/der/dieser zum ersten Mal ein neues Parfüm aufgelegt.

    - Hat der Polizist den Briefträger eingeladen?

24. Gestern hat der Hausmeister den Maler angerufen. Nach dem Gespräch hat er/der/dieser dann das Radio wieder angeschaltet.

    - Wurde das Radio verschenkt?

24. Gestern hat den Maler der Hausmeister angerufen. Nach dem Gespräch hat er/der/dieser dann das Radio wieder angeschaltet.

    - Hat der Lehrer den Maler angerufen?

25. Aus dem Küchenfenster hat der Opa den Nachbarn beobachtet. Um 17 Uhr hat er/der/dieser wie immer den Fernseher angeschaltet.

    - Wurde gestrickt?

25. Aus dem Küchenfenster hat den Nachbarn der Opa beobachtet. Um 17 Uhr hat er/der/dieser wie immer den Fernseher angeschaltet.

    - Hat der Koch den Nachbarn beobachtet?

26. Am Sonntagmittag hat der Onkel den Neffen besucht. Danach hat er/der/dieser dann ein Fußballspiel angesehen.

    - Wurde ein Fußballspiel besucht?

26. Am Sonntagmittag hat den Neffen der Onkel besucht. Danach hat er/der/dieser dann ein Fußballspiel angesehen.

   - Hat der Pfleger den Neffen besucht?

27. Gegen 18 Uhr hat der Lehrer den Vater angerufen. Im Anschluss hat er/der/dieser erst einmal eine Zigarette geraucht.

   - Wurde eine Zigarette weggeschmissen?

27. Gegen 18 Uhr hat den Vater der Lehrer angerufen. Im Anschluss hat er/der/dieser erst einmal eine Zigarette geraucht.

   - Hat der Dieb den Vater angerufen?

28. Letzten Montag hat der Zauberer den Zwerg besucht. Im Wald hat er/der/dieser anschließend noch Pilze gesammelt.

   - Wurden Pilze gekocht?

28. Letzten Montag hat den Zwerg der Zauberer besucht. Im Wald hat er/der/dieser anschließend noch Pilze gesammelt.

   - Hat der Elf den Zwerg besucht?

29. Den ganzen Vormittag hat der Kameramann den Schauspieler gefilmt. In der Mittagspause hat er/der/dieser wie immer einen Espresso bestellt.

   - Hat jemand einen Espresso verschüttet?

29. Den ganzen Vormittag hat den Schauspieler der Kameramann gefilmt. In der Mittagspause hat er/der/dieser wie immer einen Espresso bestellt.

   - Hat der Tourist den Schauspieler gefilmt?

30. Im Restaurant hat der Kellner den Gast bedient. Um 22 Uhr hat er/der/dieser plötzlich einen Anruf erhalten.

   - Hat jemand einen Anruf beendet?

30. Im Restaurant hat den Gast der Kellner bedient. Um 22 Uhr hat er/der/dieser plötzlich einen Anruf erhalten.

   - War der Klassenlehrer im Restaurant?

31. Auf dem Markt hat der Zahnarzt den Hausmeister getroffen. Dort hat er/der/dieser wie jede Woche einen Blumenstrauß gekauft.

   - War der Zahnarzt auf dem Markt?

31. Auf dem Markt hat den Hausmeister der Zahnarzt getroffen. Dort hat er/der/dieser wie jede Woche einen Blumenstrauß gekauft.

   - Wurde dort wie jede Woche ein Kürbis gekauft?

32. Nach dem Spiel hat der Trainer den Torwart beschimpft. Kurz darauf ist er/der/dieser dann in die Katakomben gegangen.

   - Hat der Trainer nach dem Spiel den Torwart beschimpft?

32. Nach dem Spiel hat den Torwart der Trainer beschimpft. Kurz darauf ist er/der/dieser dann in die Katakomben gegangen.

   - Ist jemand in ein Restaurant gegangen?

33. Auf dem Fest hat der König den Ritter geehrt. An diesem Abend hat er/der/dieser wie immer zu viel Wein getrunken.

   - War der König auf dem Fest?

33. Auf dem Fest hat den Ritter der König geehrt. An diesem Abend hat er/der/dieser wie immer zu viel Wein getrunken.

   - Wurde Milch getrunken?

34. Am Filmset hat der Schauspieler den Statisten geküsst. Danach hat er/der/dieser erst einmal die Zähne geputzt.

   - War der Schauspieler am Filmset?

34. Am Filmset hat den Statisten der Schauspieler geküsst. Danach hat er/der/dieser erst einmal die Zähne geputzt.

   - Wurden Schuhe geputzt?

35. Vor Weihnachten hat der Metzger den Zulieferer gedrückt. Im Anschluss ist er/der/dieser für eine Woche in den Skiurlaub gefahren.

   - Hat der Metzger den Zulieferer gedrückt?

35. Vor Weihnachten hat den Zulieferer der Metzger gedrückt. Im Anschluss ist er/der/dieser für eine Woche in den Skiurlaub gefahren.

   - Ist jemand auf Dienstreise gefahren?

36. Gestern hat der Bürgermeister den Sekretär hereingerufen. An diesem Tag hat er/der/dieser wie immer braune Schuhe getragen.

   - Hat der Bürgermeister gestern den Sekretär hereingerufen?

36. Gestern hat den Sekretär der Bürgermeister hereingerufen. An diesem Tag hat er/der/dieser wie immer braune Schuhe getragen.

   - Wurde ein brauner Mantel getragen?

37. Jeden Montag hat der Medizinstudent den Sportstudenten mitgenommen. Zu Beginn des neuen Semesters hat er/der/dieser dann die Universität gewechselt.

   - Hat der Medizinstudent den Sportstudenten mitgenommen?

37. Jeden Montag hat den Sportstudenten der Medizinstudent mitgenommen. Zu Beginn des neuen Semesters hat er/der/dieser dann die Universität gewechselt.

- Wurde die Wohngegend gewechselt?

38. Im Bergrestaurant hat der Skilehrer den Touristen gegrüßt. Daraufhin hat er/der/dieser an der Theke ein Getränk bestellt.

- War der Skilehrer im Bergrestaurant?

38. Im Bergrestaurant hat den Touristen der Skilehrer gegrüßt. Daraufhin hat er/der/dieser an der Theke ein Getränk bestellt.

- Wurde ein Schnitzel bestellt?

39. Jeden Morgen hat der Vater den Sohn geweckt. Anschließend hat er/der/dieser stets ein Croissant gefrühstückt.

- Hat der Vater den Sohn geweckt?

39. Jeden Morgen hat den Sohn der Vater geweckt. Anschließend hat er/der/dieser stets ein Croissant gefrühstückt.

- Wurde Müsli gefrühstückt?

40. Am Strand hat der Onkel den Jungen eingecremt. An diesem Tag hat er/der/dieser zum ersten Mal eine neue Badehose angehabt.

- War der Onkel am Strand?

40. Am Strand hat den Jungen der Onkel eingecremt. An diesem Tag hat er/der/dieser zum ersten Mal eine neue Badehose angehabt.

- Hat jemand ein geblümtes T-Shirt angehabt?

41. Beim Wandern hat der Vater den Sohn an die Hand genommen. Am Abend hat er/der/dieser dann Schmerzen in den Beinen gehabt.

- Hat der Vater den Sohn an die Hand genommen?

41. Beim Wandern hat den Sohn der Vater an die Hand genommen. Am Abend hat er/der/dieser dann Schmerzen in den Beinen gehabt.

- Hat jemand schlechte Laune gehabt?

42. Vorgestern hat der Auftraggeber den Schreiner bezahlt. Deswegen hat er/der/dieser an dem Tag so viel Geld dabeigehabt.

- Hat der Auftraggeber den Schreiner bezahlt?

42. Vorgestern hat den Schreiner der Auftraggeber bezahlt. Deswegen hat er/der/dieser an dem Tag so viel Geld dabeigehabt.

- Hat jemand viele Bücher dabeigehabt?

43. Neulich hat der Banker den Nachbarn mitgenommen. Unterwegs hat er/der/dieser plötzlich eine Geliebte gesehen.

- Hat der Banker den Nachbarn mitgenommen?

43. Neulich hat den Nachbarn der Banker mitgenommen. Unterwegs hat er/der/dieser plötzlich eine Geliebte gesehen.

- Wurde ein Einhorn gesehen?

44. Im Wald hat der Fuchs den Hasen gejagt. Dann hat er/der/dieser auf einmal einen Jäger gerochen.

- War der Fuchs im Wald?

44. Im Wald hat den Hasen der Fuchs gejagt. Dann hat er/der/dieser auf einmal einen Jäger gerochen.

- Wurde Futter gerochen?

45. Neulich hat der Richter den Zeugen vereidigt. An diesem Tag hat er/der/dieser immer noch eine heisere Stimme gehabt.

- Hat der Richter den Zeugen vereidigt?

45. Neulich hat den Zeugen der Richter vereidigt. An diesem Tag hat er/der/dieser immer noch eine heisere Stimme gehabt.

- Hat jemand Fieber gehabt?

46. Letzte Woche hat der Elektriker den Verwalter angerufen. Beim Telefonat hat er/der/dieser plötzlich einen Hustenanfall bekommen.

- Hat der Elektriker den Verwalter angerufen?

46. Letzte Woche hat den Verwalter der Elektriker angerufen. Beim Telefonat hat er/der/dieser plötzlich einen Hustenanfall bekommen.

- Hat jemand einen Tee bekommen?

47. Am Montag hat der Hund den Kater gejagt. Dann ist er/der/dieser plötzlich auf nassem Laub ausgerutscht.

- Hat der Hund den Kater gejagt?

47. Am Montag hat den Kater der Hund gejagt. Dann ist er/der/dieser plötzlich auf nassem Laub ausgerutscht.

- Ist jemand auf einer Banane ausgerutscht?

48. In der Kneipe hat der Zahnarzt den Apotheker getroffen. Am nächsten Morgen hat er/der/dieser dann Kopfschmerzen gehabt.

- War der Apotheker in der Kneipe?

48. In der Kneipe hat den Apotheker der Zahnarzt getroffen. Am nächsten Morgen hat er/der/dieser dann Kopfschmerzen gehabt.

- Hat jemand Hunger gehabt?

49. Gegen 10 Uhr hat der Polizist den Reiter verwarnt. Kurz darauf hat er/der/dieser dann einen Spaziergänger gegrüßt.

    - Hat der Polizist den Reiter verwarnt?

49. Gegen 10 Uhr hat den Reiter der Polizist verwarnt. Kurz darauf hat er/der/dieser dann einen Spaziergänger gegrüßt.

    - Wurde einen Radfahrer gegrüßt?

50. Nach der Pause hat der Lehrer den Schüler abgefragt. Währenddessen hat er/der/dieser immerzu mit dem Fuß gewippt.

    - Hat der Lehrer den Schüler abgefragt?

50. Nach der Pause hat den Schüler der Lehrer abgefragt. Währenddessen hat er/der/dieser immerzu mit dem Fuß gewippt.

    - Wurde mit dem Stuhl gewippt?

51. Gestern Abend hat der Cellist den Kritiker beeindruckt. Nach der Vorstellung hat er/der/dieser noch eine Freundin zum Essen ausgeführt.

    - Hat der Cellist den Kritiker beeindruckt?

51. Gestern Abend hat den Kritiker der Cellist beeindruckt. Nach der Vorstellung hat er/der/dieser noch eine Freundin zum Essen ausgeführt.

    - Wurde ein Hund ausgeführt?

52. Am Dienstagabend hat der Dekan den Kanzler gesprochen. Am nächsten Tag hat er/der/dieser plötzlich sein Amt aufgegeben.

    - Hat der Dekan den Kanzler gesprochen?

52. Am Dienstagabend hat den Kanzler der Dekan gesprochen. Am nächsten Tag hat er/der/dieser plötzlich sein Amt aufgegeben.

    - Wurde eine Bestellung aufgegeben?

53. Am Nachmittag hat der Psychiater den Patienten hereingebeten. Im Behandlungszimmer hat er/der/dieser nach einiger Zeit ein Glas Wasser umgestoßen.

    - Hat der Psychiater den Patienten hereingebeten?

53. Am Nachmittag hat den Patienten der Psychiater hereingebeten. Im Behandlungszimmer hat er/der/dieser nach einiger Zeit ein Glas Wasser umgestoßen.

    - Wurde eine Tasse Kaffee umgestoßen?

54. Auf dem Neujahrsempfang hat der Rektor den Minister begrüßt. Am Buffet hat er/der/dieser später einen alten Schulfreund erkannt.

- War der Minister auf dem Neujahrsempfang?

54. Auf dem Neujahrsempfang hat den Minister der Rektor begrüßt. Am Buffet hat er/der/dieser später einen alten Schulfreund erkannt.

   - Hat jemand einen Kollegen erkannt?

55. Letzte Woche hat der Passant den Schuhputzer ausgelacht. Seitdem hat er/der/dieser noch oft an die Situation gedacht.

   - Hat der Passant den Schuhputzer ausgelacht?

55. Letzte Woche hat den Schuhputzer der Passant ausgelacht. Seitdem hat er/der/dieser noch oft an die Situation gedacht.

   - Wurde an einen Geburtstag gedacht?

56. Heute Morgen hat der Bäcker den Bauern beliefert. Danach hat er/der/dieser kurz mit einem Freund telefoniert.

   - Hat der Bäcker heute Morgen den Bauern beliefert?

56. Heute Morgen hat den Bauern der Bäcker beliefert. Danach hat er/der/dieser kurz mit einem Freund telefoniert.

   - Wurde mit einer Behörde telefoniert?

57. Gestern Nachmittag hat der Journalist den Dirigenten befragt. Nach dem Interview hat er/der/dieser noch einen Rotwein getrunken.

   - Hat der Journalist gestern Nachmittag den Dirigenten befragt?

57. Gestern Nachmittag hat den Dirigenten der Journalist befragt. Nach dem Interview hat er/der/dieser noch einen Rotwein getrunken.

   - Wurde Wasser getrunken?

58. Auf der Strandpromenade hat der Künstler den Urlauber gezeichnet. Danach hat er/der/dieser minutenlang für einen Kaffee angestanden.

   - War der Urlauber auf der Strandpromenade?

58. Auf der Strandpromenade hat den Urlauber der Künstler gezeichnet. Danach hat er/der/dieser minutenlang für einen Kaffee angestanden.

   - Wurde für eine Kugel Eis angestanden?

59. Letzte Woche hat der Politiker den Professor getroffen. Kurz darauf hat er/der/dieser dann eine Dienstreise angetreten.

   - Hat der Politiker letzte Woche den Professor getroffen?

59. Letzte Woche hat den Professor der Politiker getroffen. Kurz darauf hat er/der/dieser dann eine Dienstreise angetreten.

- Hat jemand eine Kreuzfahrt angetreten?

60. In der Hotelbar hat der Mechaniker den Rennfahrer beraten. Gegen Mitternacht ist er/der/dieser dann zurück auf das Hotelzimmer gegangen.

   - War der Rennfahrer in der Hotelbar?

60. In der Hotelbar hat den Rennfahrer der Mechaniker beraten. Gegen Mitternacht ist er/der/dieser dann zurück auf das Hotelzimmer gegangen.

   - Ist jemand in den Pferdestall gegangen?

61. Am Abreisetag hat der Hotelier den Gast gefahren. Unterwegs hat er/der/dieser die ganze Zeit geredet.

   - Hat der Hotelier den Gast vor vielen Jahren gefahren?

61. Am Abreisetag hat den Gast der Hotelier gefahren. Unterwegs hat er/der/dieser die ganze Zeit geredet.

   - Hat der Hotelier den Koch am Abreisetag gefahren?

62. Im Fitnessstudio hat der Pilot den Taucher kennengelernt. Dort hat er/der/dieser zum ersten Mal trainiert.

   - Hat der Pilot den Taucher am Flughafen kennengelernt?

62. Im Fitnessstudio hat den Taucher der Pilot kennengelernt. Dort hat er/der/dieser zum ersten Mal trainiert.

   - Hat der Pilot den Seemann im Fitnessstudio kennengelernt?

63. Am Abend hat der Tankwart den Autofahrer beraten. Währenddessen hat er/der/dieser mehrmals gehustet.

   - Hat der Tankwart den Autofahrer vor der Schule beraten?

63. Am Abend hat den Autofahrer der Tankwart beraten. Währenddessen hat er/der/dieser mehrmals gehustet.

   - Hat der Tankwart den Bademeister am Abend beraten?

64. Auf der Feier hat der Mexikaner den Holländer getroffen. Nach Mitternacht hat er/der/dieser dann ein Taxi gerufen.

   - War der Mexikaner im Büro?

64. Auf der Feier hat den Holländer der Mexikaner getroffen. Nach Mitternacht hat er/der/dieser dann ein Taxi gerufen.

   - Hat der Mexikaner den Engländer auf der Feier getroffen?

65. Auf dem Bolzplatz hat der Rentner den Hobbyspieler angemeckert. Seitdem ist er/der/dieser nicht mehr dorthin zurückgekehrt.

   - War der Rentner auf der Pferderennbahn?

65. Auf dem Bolzplatz hat den Hobbyspieler der Rentner angemeckert. Seitdem ist er/der/dieser nicht mehr dorthin zurückgekehrt.

   - Hat der Rentner den Schiri auf dem Bolzplatz angemeckert?

66. Neulich hat der Reiseleiter den Einheimischen angesprochen. Während des Gesprächs hat er/der/dieser die ganze Zeit ein Kaugummi gekaut.

   - Hat der Reiseleiter den Einheimischen vor vielen Jahren angesprochen?

66. Neulich hat den Einheimischen der Reiseleiter angesprochen. Während des Gesprächs hat er/der/dieser die ganze Zeit ein Kaugummi gekaut.

   - Hat der Reiseleiter Touristen neulich angesprochen?

67. In der Kneipe hat der Schotte den Briten blamiert. Dort hat er/der/dieser wie jeden Mittwoch einen Stammtisch besucht.

   - War der Schotte in einem Flugzeug?

67. In der Kneipe hat den Briten der Schotte blamiert. Dort hat er/der/dieser wie jeden Mittwoch einen Stammtisch besucht.

   - Hat der Schotte den Belgier in der Kneipe blamiert?

68. Nach der Abendvorstellung hat der Tänzer den Clown geküsst. An diesem Abend hat er/der/dieser zum ersten Mal ein neues Programm aufgeführt.

   - Hat der Tänzer den Clown an Karneval geküsst?

68. Nach der Abendvorstellung hat den Clown der Tänzer geküsst. An diesem Abend hat er/der/dieser zum ersten Mal ein neues Programm aufgeführt.

   - Hat der Tänzer den Clown geküsst?

69. In der Mittagspause hat der Auftraggeber den Zeichner einbestellt. Nach kurzer Zeit hat er/der/dieser plötzlich Bauchschmerzen bekommen.

   - War der Zeichner auf dem Riesenrad?

69. In der Mittagspause hat den Zeichner der Auftraggeber einbestellt. Nach kurzer Zeit hat er/der/dieser plötzlich Bauchschmerzen bekommen.

   - Hat der Auftraggeber den Zeichner einbestellt?

70. Nach dem Fußballspiel hat der Franzose den Italiener gesehen. In diesem Moment hat er/der/dieser gerade neben einer Würstchenbude gestanden.

   - Hat der Franzose den Italiener auf dem Konzert gesehen?

70. Nach dem Fußballspiel hat den Italiener der Franzose gesehen. In diesem Moment hat er/der/dieser gerade neben einer Würstchenbude gestanden.

   - Hat der Franzose den Italiener gesehen?

71. Auf der Arbeit hat der Chef den Helfer angeschrien. Danach ist er/der/dieser dann nach Hause gefahren.

    - War der Helfer im Urlaub?

71. Auf der Arbeit hat den Helfer der Chef angeschrien. Danach ist er/der/dieser dann nach Hause gefahren.

    - Hat der Chef den Helfer angeschrien?

72. In der Dämmerung hat der Wolf den Elch beobachtet. Währenddessen hat er/der/dieser die ganze Zeit auf dem Feld gestanden.

    - War der Elch in der Wüste?

72. In der Dämmerung hat den Elch der Wolf beobachtet. Währenddessen hat er/der/dieser die ganze Zeit auf dem Feld gestanden.

    - Hat der Wolf den Elch beobachtet?

73. In der Bar hat der Kapitän den Taucher befragt. Dort hat er/der/dieser wie immer eine Cola getrunken.

    - War der Taucher auf dem Berg?

73. In der Bar hat den Taucher der Kapitän befragt. Dort hat er/der/dieser wie immer eine Cola getrunken.

    - Hat der Kapitän den Taucher befragt?

74. In der Tankstelle hat der Schmuggler den Passagier angesprochen. Dort hat er/der/dieser gerade einen Schokoriegel gekauft.

    - War der Passagier in der Bahnhofshalle?

74. In der Tankstelle hat den Passagier der Schmuggler angesprochen. Dort hat er/der/dieser gerade einen Schokoriegel gekauft.

    - Hat der Schmuggler den Passagier angesprochen?

75. Nach dem Konzert hat der Fan den Sänger aufgehalten. Danach ist er/der/dieser dann in ein Café gegangen.

    - War der Sänger in einem Sportkurs?

75. Nach dem Konzert hat den Sänger der Fan aufgehalten. Danach ist er/der/dieser dann in ein Café gegangen.

    - Hat der Fan den Sänger aufgehalten?

76. Gestern hat der Arzt den Piloten untersucht. Währenddessen hat er/der/dieser die ganze Zeit lustige Anekdoten erzählt.

    - Hat der Arzt den Piloten gestern beschimpft?

76. Gestern hat den Piloten der Arzt untersucht. Währenddessen hat er/der/dieser die ganze Zeit lustige Anekdoten erzählt.

- Hat der Optiker den Piloten gestern untersucht?

77. Am Freitagmittag hat der Fischer den Seemann getreten. Anschließend hat er/der/dieser noch bis abends weitergearbeitet.

- Hat der Fischer den Seemann ausgelacht?

77. Am Freitagmittag hat den Seemann der Fischer getreten. Anschließend hat er/der/dieser noch bis abends weitergearbeitet.

- Hat der Junge den Seemann am Freitagmittag getreten?

78. Auf der Wiese hat der Affe den Kater erschreckt. Danach ist er/der/dieser wieder einen Baum hochgeklettert.

- Hat der Affe den Kater auf der Wiese beklaut?

78. Auf der Wiese hat den Kater der Affe erschreckt. Danach ist er/der/dieser wieder einen Baum hochgeklettert.

- War der Tiger auf der Wiese?

79. Im Flughafen hat der Zöllner den Botschafter durchsucht. Danach hat er/der/dieser dann einen Schluck Wasser getrunken.

- Hat der Zöllner den Botschafter angelächelt?

79. Im Flughafen hat den Botschafter der Zöllner durchsucht. Danach hat er/der/dieser dann einen Schluck Wasser getrunken.

- War der Elefant im Flughafen?

80. Vor dem Wettkampf hat der Reporter den Sportler interviewt. An diesem Tag hat er/der/dieser wie so häufig Kontaktlinsen getragen.

- Hat der Reporter den Sportler vor dem Wettkampf angerufen?

80. Vor dem Wettkampf hat den Sportler der Reporter interviewt. An diesem Tag hat er/der/dieser wie so häufig Kontaktlinsen getragen.

- Hat der Trainer den Sportler vor dem Wettkampf interviewt?

81. Vor einem halben Jahr hat der Kapitän den Matrosen eingestellt. An diesem Tag hat er/der/dieser abends noch seinen Geburtstag gefeiert.

- Hat der Kapitän den Matrosen angerempelt?

81. Vor einem halben Jahr hat den Matrosen der Kapitän eingestellt. An diesem Tag hat er/der/dieser abends noch seinen Geburtstag gefeiert.

- Hat der Pirat den Matrosen vor einem halben Jahr eingestellt?

82. Letzte Woche hat der Türsteher den Einbrecher festgehalten. An diesem Tag hat er/der/dieser wie fast immer eine graue Armbanduhr getragen.

- Hat der Türsteher den Einbrecher letzte Woche abgetastet?

82. Letzte Woche hat den Einbrecher der Türsteher festgehalten. An diesem Tag hat er/der/dieser wie fast immer eine graue Armbanduhr getragen.

    - Hat der Betrunkene den Einbrecher letzte Woche festgehalten?

83. Letzten Monat hat der Tierschützer den Wachmann bedroht. An diesem Tag hat er/der/dieser morgens eine Kopfschmerztablette genommen.

    - Hat der Tierschützer den Wachmann befreit?

83. Letzten Monat hat den Wachmann der Tierschützer bedroht. An diesem Tag hat er/der/dieser morgens eine Kopfschmerztablette genommen.

    - Hat der Spaziergänger den Wachmann letzten Monat bedroht?

84. Auf der Versammlung hat der Bauer den Jäger vorgestellt. Währenddessen hat er/der/dieser ständig mit dem Kopf gewackelt.

    - Hat der Bauer den Jäger angerempelt?

84. Auf der Versammlung hat den Jäger der Bauer vorgestellt. Währenddessen hat er/der/dieser ständig mit dem Kopf gewackelt.

    - War der Bauer auf der Versammlung?

85. Letzte Woche hat der Boxer den Sponsor kontaktiert. Während des Gesprächs hat er/der/dieser ununterbrochen ein Hustenbonbon gelutscht.

    - Hat der Boxer den Sponsor vergessen?

85. Letzte Woche hat den Sponsor der Boxer kontaktiert. Während des Gesprächs hat er/der/dieser ununterbrochen ein Hustenbonbon gelutscht.

    - Hat der Boxer den Sponsor letzte Woche kontaktiert?

86. Im Winter hat der Osterhase den Weihnachtsmann unterstützt. Danach hat er/der/dieser erst einmal Urlaub gemacht.

    - Hat der Osterhase den Weihnachtsmann geärgert?

86. Im Winter hat den Weihnachtsmann der Osterhase unterstützt. Danach hat er/der/dieser erst einmal Urlaub gemacht.

    - Hat der Osterhase den Weihnachtsmann im Winter unterstützt?

87. Gestern Vormittag hat der Riese den Zwerg aufgesucht. Danach hat er/der/dieser noch einen Spaziergang gemacht.

    - Hat der Riese den Zwerg beschützt?

87. Gestern Vormittag hat den Zwerg der Riese aufgesucht. Danach hat er/der/dieser noch einen Spaziergang gemacht.

- Hat der Riese den Zwerg gestern Vormittag aufgesucht?

88. Letzten Monat hat der Wächter den Mann beschützt. Danach hat er/der/dieser dann auf einem Stuhl Platz genommen.

- Hat der Wächter den Mann eingestellt?

88. Letzten Monat hat den Mann der Wächter beschützt. Danach hat er/der/dieser dann auf einem Stuhl Platz genommen.

- Hat der Wächter den Mann letzten Monat beschützt?

89. Im Zirkus hat der Clown den Jungen gekniffen. Nach der Vorstellung hat er/der/dieser dann einen Luftballon fliegen gelassen.

- Hat der Clown den Jungen eingesperrt?

89. Im Zirkus hat den Jungen der Clown gekniffen. Nach der Vorstellung hat er/der/dieser dann einen Luftballon fliegen gelassen.

- War der Clown im Zirkus?

90. Letzte Woche hat der Astronaut den Mechaniker gerufen. Danach hat er/der/dieser noch ein Skype-Gespräch geführt.

- Hat der Astronaut den Mechaniker verklagt?

90. Letzte Woche hat den Mechaniker der Astronaut gerufen. Danach hat er/der/dieser noch ein Skype-Gespräch geführt.

- Hat der Astronaut den Mechaniker letzte Woche gerufen?

Filler sentences

1. Gestern hat das Mädchen den Jungen geschlagen. Danach hat er dann geweint.

- Hat der Junge geweint?

2. In der Nacht hat der Einbrecher die Mieterin bestohlen. Daraufhin hat sie dann die Polizei alarmiert.

- Hat die Mieterin die Polizei alarmiert?

3. Im Training hat der Akrobat die Cheerleaderin aufgefangen. Dabei hat sie wie immer gelacht.

- Hat die Cheerleaderin gelacht?

4. Auf dem Jahrmarkt hat der Hütchenspieler die Zuschauerin ausgetrickst. Deshalb hat sie an diesem Tag viel Geld verloren.

- Hat die Zuschauerin viel Geld verloren?

5. Am Abend hat der Zauberer die Assistentin gefesselt. Anschließend hat sie dann die Fesseln gelöst.

- Hat die Assistentin die Fesseln gelöst?

6. Am Morgen hat der Arzt die Patientin informiert. Danach ist sie sofort ins Krankenhaus geeilt.

   - Ist die Patientin ins Krankenhaus geeilt?

7. Gestern hat der Koch die Praktikantin gelobt. Danach hat sie nur noch gekichert.

   - Hat die Praktikantin gekichert?

8. Auf der Arbeit hat der Kollege die Auszubildende imitiert. Deswegen hat sie später eine Beschwerde eingereicht.

   - Hat die Auszubildende eine Beschwerde eingereicht?

9. Nach der Besprechung hat der Fahrer die Angestellte abgeholt. Danach hat sie wie immer viel Trinkgeld gegeben.

   - Hat die Angestellte viel Trinkgeld gegeben?

10. Am Wochenende hat die Frau den Mann bekocht. Danach hat er wie immer das Geschirr gespült.

    - Hat der Mann das Geschirr gespült?

11. Am Morgen hat die Beklaute den Angreifer beschrieben. Danach hat sie dann Anzeige erstattet.

    - Hat die Beklaute Anzeige erstattet?

12. Im Atelier hat die Künstlerin den Politiker karikiert. Danach hat sie noch lange geschmunzelt.

    - Hat die Künstlerin geschmunzelt?

13. In der Schule hat die Lehrerin den Schüler getestet. Am Nachmittag hat sie dann den Test korrigiert.

    - Hat die Lehrerin den Test korrigiert?

14. Am Morgen hat die Ärztin den Patienten eingewiesen. Danach hat sie noch das Formular unterschrieben.

    - Hat die Ärztin das Formular unterschrieben?

15. Im Kindergarten hat die Erzieherin den Jungen belustigt. Dafür hat sie wie so häufig Grimassen gezogen.

    - Hat die Erzieherin Grimassen gezogen?

16. Vorgestern hat die Mitarbeiterin den Chef erreicht. Danach hat sie dann gefaulenzt.

    - Hat die Mitarbeiterin gefaulenzt?

17. Auf dem Turnier hat die Tänzerin den Partner getauscht. Danach hat sie zum ersten Mal gewonnen.

    - Hat die Tänzerin gewonnen?

18. Gestern hat die Verkäuferin den Kunden angelogen. Deswegen hat sie die ganze Zeit gekichert.

    - Hat die Verkäuferin gekichert?

19. Gestern hat die Kellnerin den Gast verärgert. Danach hat sie dann die Küche aufgeräumt.

    - Hat die Kellnerin die Küche aufgeräumt?

20. Letztes Wochenende hat die Bäckerin den Metzger angegrinst. An diesem Tag hat sie wie immer fröhlich gewirkt.

    - Hat die Bäckerin fröhlich gewirkt?

21. Beim Abendessen hat die Mutter den Sohn ermahnt. An diesem Abend hat sie wie so häufig Salat gegessen.

    - Hat die Mutter Salat gegessen?

22. Vor der Aufführung hat die Maskenbildnerin den Clown geschminkt. Danach hat sie wie immer auf den Rängen Platz genommen.

    - Hat die Maskenbildnerin auf den Rängen Platz genommen?

23. Gestern hat die Verkäuferin den Kunden bedient. Danach hat sie dann die Ware eingepackt.

    - Hat die Verkäuferin die Ware eingepackt?

24. Beim Training hat die Boxerin den Anfänger verletzt. Danach hat er dann die Wunde gekühlt.

    - Hat der Anfänger die Wunde gekühlt?

25. Am Morgen hat die Chefin den Angestellten gerügt. Danach hat er sofort gekündigt.

    - Hat der Angestellte gekündigt?

26. Gestern hat die Gefangene den Wächter attackiert. Danach hat er unverzüglich den Vorfall gemeldet.

    - Hat der Wächter den Vorfall gemeldet?

27. Letztes Jahr hat der Enkel die Großmutter beerbt. Daraufhin hat er erst einmal eine Reise gemacht.

    - Hat der Enkel eine Reise gemacht?

28. Am Morgen hat die Friseurin den Kunden rasiert. Dabei hat sie die ganze Zeit gegrinst.

    - Hat die Friseurin gegrinst?

29. Gestern hat die Musikerin den Kritiker überzeugt. Danach hat er dann eine Rezension formuliert.

    - Hat der Kritiker eine Rezension formuliert?

30. Gestern hat die Leserin den Autor entdeckt. Daraufhin hat er dann schnell das Buch signiert.

    - Hat der Autor das Buch signiert?

31. Am Morgen hat die Angestellte den Boten verlangt. Daraufhin ist er sofort aufgebrochen.

    - Ist der Bote sofort aufgebrochen?

32. Am Abend hat die Mutter den Sohn ausgezogen. Dabei hat sie wie immer ein Lied gesummt.

    - Hat die Mutter ein Lied gesummt?

33. Letzten Dienstag hat die Vermieterin den Mieter angeklagt. Danach ist er plötzlich verschwunden.

    - Ist der Mieter verschwunden?

34. Letzten Samstag hat die Wirtin den Kellner gebraucht. Deswegen hat er den ganzen Tag geholfen.

    - Hat der Kellner geholfen?

35. In der Schule hat die Lehrerin den Schüler korrigiert. Danach hat er schnell die Aufgabe verbessert.

    - Hat der Schüler die Aufgabe verbessert?

36. Für den Geburtstag hat die Mutter den Zauberer gebucht. Kurz davor hat er plötzlich abgesagt.

    - Hat der Zauberer abgesagt?

37. Gestern hat die Beamtin den Bürger überzeugt. Daraufhin hat er dann den Vertrag unterschrieben.

    - Hat der Bürger unterschrieben?

38. Am Morgen hat die Schülerin den Lehrer genervt. Nach Feierabend hat er dann die Ruhe genossen.

    - Hat der Lehrer die Ruhe genossen?

39. Gestern hat die Kölnerin den Berliner geschubst. Danach hat er unverzüglich die Polizei alarmiert.

    - Hat der Berliner die Polizei alarmiert?

40. Am Abend hat die Studentin den Dozenten angeschrieben. Kurz darauf hat sie bereits eine Antwort erhalten.

    - Hat die Studentin eine Antwort erhalten?

41. Vor Jahren hat der Mann die Frau geliebt. Doch dann ist sie plötzlich weggezogen.

    - Ist die Frau weggezogen?

42. In der Diskothek hat der Tänzer die Frau angetanzt. Danach hat er dann ein Getränk geordert.

    - Hat der Tänzer ein Getränk geordert?

43. Letzte Woche hat der Detektiv die Verdächtige ausspioniert. Danach hat sie mehrmals davon berichtet.

    - Hat die Verdächtige davon berichtet?

44. Gestern hat die Künstlerin den Mann gemalt. Danach hat sie noch schnell das Atelier aufgeräumt.

    - Hat die Künstlerin das Atelier aufgeräumt?

45. Am Wochenende hat der Fotograf die Braut fotografiert. Danach hat er dann die Bilder bearbeitet.

    - Hat der Fotograf die Bilder bearbeitet?

46. Gestern hat der Junge das Mädchen beklaut. Danach ist er sofort weggerannt.

    - Ist der Junge weggerannt?

47. Gestern hat der Lehrer die Schülerin bestraft. Danach hat er unverzüglich den Unterricht fortgesetzt.

    - Hat der Lehrer den Unterricht fortgesetzt?

48. Beinahe hat der Busfahrer die Dame angefahren. Daraufhin hat er dann um Verzeihung gebeten.

    - Hat der Busfahrer um Verzeihung gebeten?

49. In den letzten Wochen hat der Detektiv die Ehefrau beschattet. Danach hat er dann eine Vermutung geäußert.

    - Hat der Detektiv eine Vermutung geäußert?

50. Gestern hat der Direktor die Lehrerin abgemahnt. Kurz darauf hat sie dann Urlaub eingereicht.

    - Hat die Lehrerin Urlaub eingereicht?

51. An der Haltestelle hat der Mann die Passantin ausgeraubt. Danach hat er schnell die Flucht ergriffen.

    - Hat der Mann die Flucht ergriffen?

52. Letzten Sonntag hat der Pfarrer die Gläubige getauft. Danach hat er dann die Gemeinde gesegnet.

    - Hat der Pfarrer die Gemeinde gesegnet?

53. Gestern hat der Gärtner die Köchin geheiratet. Wenig später hat er dann einen Ehevertrag unterschrieben.

    - Hat der Gärtner einen Ehevertrag unterschrieben?

54. Vorgestern hat der Mieter die Nachbarin bestohlen. Am nächsten Tag hat er dann die Wohnung gekündigt.

    - Hat der Mieter die Wohnung gekündigt?

55. Am Wochenende hat der Bürger die Politikerin gewählt. Daraufhin hat sie dann die Wahl gewonnen.

    - Hat die Politikerin die Wahl gewonnen?

56. Gestern hat der Maurer die Anwohnerin belästigt. Danach hat sie lange mit der Polizei telefoniert.

    - Hat die Anwohnerin mit der Polizei telefoniert?

57. Am Abend hat der Förster die Bürgermeisterin verständigt. Danach hat er mehrere Stunden gewartet.

    - Hat der Förster gewartet?

58. Letzten Dienstag hat der Arzt die Patientin wieder belebt. Danach hat er erst einmal tief durchgeatmet.

    - Hat der Arzt tief durchgeatmet?

59. Gestern hat der Chef die Angestellte gelobt. Danach hat er dann den Vertrag verlängert.

    - Hat der Chef den Vertrag verlängert?

60. Gestern hat der Wirt die Stammkundin fotografiert. Danach hat er dann das Bild aufgehängt.

    - Hat der Wirt das Bild aufgehängt?

B.2 Dative experiencer verbs (critical items, comprehension questions and filler sentences)

1. Gestern ist dem Feuerwehrmann der Polizist aufgefallen. Kurz darauf hat er/der/dieser plötzlich einen Notruf erhalten.

   - Hat jemand einen Notruf getätigt?

1. Gestern ist der Polizist dem Feuerwehrmann aufgefallen. Kurz darauf hat er/der/dieser plötzlich einen Notruf erhalten.

   - Ist dem Feuerwehrmann der Polizist gestern aufgefallen?

2. Beim Konzert hat dem Boxer der Musiker imponiert. An diesem Tag hat er/der/dieser wie immer eine schwarze Hose getragen.

   - Wurde eine schwarze Hose gekauft?

2. Beim Konzert hat der Musiker dem Boxer imponiert. An diesem Tag hat er/der/dieser wie immer eine schwarze Hose getragen.

   - War der Lehrer beim Konzert?

3. Auf dem Flug hat dem Urlauber der Pilot behagt. Nach der Landung hat er/der/dieser dann zum Abschied gewinkt.

   - Wurde zum Abschied geweint?

3. Auf dem Flug hat der Pilot dem Urlauber behagt. Nach der Landung hat er/der/dieser dann zum Abschied gewinkt.

   - Hat dem Urlauber der Arzt behagt?

4. Bei der Show hat dem Tänzer der Komiker gefallen. Nach dem Auftritt hat er/der/dieser noch ein Interview gegeben.

   - Wurde ein Interview abgelehnt?

4. Bei der Show hat der Komiker dem Tänzer gefallen. Nach dem Auftritt hat er/der/dieser noch ein Interview gegeben.

   - War der Bademeister bei der Show?

5. Auf der Karnevalsparty ist dem Clown der Indianer aufgefallen. Dort ist er/der/dieser bis morgens geblieben.

   - Hat jemand bis morgens geschlafen?

5. Auf der Karnevalsparty ist der Indianer dem Clown aufgefallen. Dort ist er/der/dieser bis morgens geblieben.

   - Ist dem Clown der Pirat auf der Karnevalsparty aufgefallen?

6. Auf der Baustelle hat dem Schreiner der Klempner behagt. Auf dem Weg nach Hause hat er/der/dieser dann einen Autounfall verursacht.

- Hat jemand einen Autounfall verhindert?

6. Auf der Baustelle hat der Klempner dem Schreiner behagt. Auf dem Weg nach Hause hat er/der/dieser dann einen Autounfall verursacht.

   - War der Klempner auf der Baustelle?

7. Gestern Abend hat dem Dirigenten der Trompeter gefallen. Nach der Vorstellung hat er/der/dieser dann viele Freunde eingeladen.

   - Hat jemand viele Freunde warten gelassen?

7. Gestern Abend hat der Trompeter dem Dirigenten gefallen. Nach der Vorstellung hat er/der/dieser dann viele Freunde eingeladen.

   - Hat dem Dirigenten der Gittarist gefallen?

8. Letzten Sommer hat dem Hotelier der Reisende gefallen. Jeden Tag hat er/der/dieser morgens freundlich gegrüßt.

   - Ist jemand jeden Tag schwimmen gegangen?

8. Letzten Sommer hat der Reisende dem Hotelier gefallen. Jeden Tag hat er/der/dieser morgens freundlich gegrüßt.

   - Hat dem Hotelier der Koch letzten Sommer gefallen?

9. Im Restaurant hat dem Gast der Kellner behagt. Um Mitternacht ist er/der/dieser dann nach Hause gegangen.

   - Ist jemand nach Hause geflogen?

9. Im Restaurant hat der Kellner dem Gast behagt. Um Mitternacht ist er/der/dieser dann nach Hause gegangen.

   - Hat dem Gast der Kellner behagt?

10. Auf dem Campus ist dem Studenten der Professor aufgefallen. Dort hat er/der/dieser gerade einen Espresso getrunken.

    - Wurde ein Espresso umgestoßen?

10. Auf dem Campus ist der Professor dem Studenten aufgefallen. Dort hat er/der/dieser gerade einen Espresso getrunken.

    - War der Professor auf dem Campus?

11. Beim Morgenkreis hat dem Kindergärtner der Junge imponiert. Im Anschluss hat er/der/dieser wie immer gefrühstückt.

    - Wurde im Anschluss gebastelt?

11. Beim Morgenkreis hat der Junge dem Kindergärtner imponiert. Im Anschluss hat er/der/dieser wie immer gefrühstückt.

- War der Opa beim Morgenkreis?

12. Im Pferdestall hat dem Reiter der Stallbursche behagt. Dort hat er/der/dieser gerade einen Hund gestreichelt.

    - Wurde ein Hund ausgeschimpft?

12. Im Pferdestall hat der Stallbursche dem Reiter behagt. Dort hat er/der/dieser gerade einen Hund gestreichelt.

    - War der Stallbursche im Pferdestall?

13. Beim Transport hat dem Hengst der Esel behagt. Während der Fahrt hat er/der/dieser mehrmals mit den Hufen gescharrt.

    - Wurde während der Fahrt gefressen?

13. Beim Transport hat der Esel dem Hengst behagt. Während der Fahrt hat er/der/dieser mehrmals mit den Hufen gescharrt.

    - Hat dem Hengst der Esel beim Transport behagt?

14. Am Tag der offenen Tür hat dem Astronauten der Besucher missfallen. An der Bar hat er/der/dieser wenig später ein Glas Wasser bestellt.

    - Wurde ein Glas Wasser fallen gelassen?

14. Am Tag der offenen Tür hat der Besucher dem Astronauten missfallen. An der Bar hat er/der/dieser wenig später ein Glas Wasser bestellt.

    - War der Student beim Tag der offenen Tür?

15. Letzten Dienstag hat dem Zöllner der Raucher missfallen. Daraufhin hat er/der/dieser dann schlechte Laune bekommen.

    - Hat jemand schlechte Laune gehasst?

15. Letzten Dienstag hat der Raucher dem Zöllner missfallen. Daraufhin hat er/der/dieser dann schlechte Laune bekommen.

    - Hat dem Zöllner der Raucher missfallen?

16. Bei der Begrüßungsrede hat dem Reisenden der Schiffskapitän gefallen. Kurz darauf hat er/der/dieser dann ein Glas Sekt getrunken.

    - Wurde ein Glas Sekt hochgehalten?

16. Bei der Begrüßungsrede hat der Schiffskapitän dem Reisenden gefallen. Kurz darauf hat er/der/dieser dann ein Glas Sekt getrunken.

    - War der Jäger bei der Begrüßungsrede?

17. In der Bäckerei hat dem Lehrer der Sportler gefallen. Dort hat er/der/dieser gerade einen Kaffee getrunken.

- Wurde ein Kaffee reklamiert?

17. In der Bäckerei hat der Sportler dem Lehrer gefallen. Dort hat er/der/dieser gerade einen Kaffee getrunken.

    - Hat dem Lehrer der Sportler in der Bäckerei gefallen?

18. Beim Festmahl hat dem König der Koch imponiert. Danach hat er/der/dieser dann zufrieden ein Lied gesummt.

    - Wurde ein Lied komponiert?

18. Beim Festmahl hat der Koch dem König imponiert. Danach hat er/der/dieser dann zufrieden ein Lied gesummt.

    - War der König beim Festmahl?

19. An Karneval ist dem Cowboy der Indianer entgangen. Kurz danach ist er/der/dieser plötzlich schlimm gestürzt.

    - Ist jemand vehaftet worden?

19. An Karneval ist der Indianer dem Cowboy entgangen. Kurz danach ist er/der/dieser plötzlich schlimm gestürzt.

    - Ist dem Cowboy der Indianer entgangen?

20. In der Heimatkaserne hat dem General der Soldat imponiert. Wenig später hat er/der/dieser dann einen Auslandsdienst angetreten.

    - Wurde ein Auslandsdienst verweigert?

20. In der Heimatkaserne hat der Soldat dem General imponiert. Wenig später hat er/der/dieser dann einen Auslandsdienst angetreten.

    - War der Clown in der Heimatkaserne?

21. Auf der Pressekonferenz hat dem Sportler der Journalist missfallen. Im Anschluss hat er/der/dieser dann ein Taxi gerufen.

    - Wurde ein Taxi mit Eiern beworfen?

21. Auf der Pressekonferenz hat der Journalist dem Sportler missfallen. Im Anschluss hat er/der/dieser dann ein Taxi gerufen.

    - Hat dem Sportler der Journalist auf der Pressekonferenz missfallen?

22. In der Boxengasse ist dem Rennfahrer der Mechaniker entgangen. Wenig später ist er/der/dieser dann wieder nach Hause geflogen.

    - Ist jemand hingefallen?

22. In der Boxengasse ist der Mechaniker dem Rennfahrer entgangen. Wenig später ist er/der/dieser dann wieder nach Hause geflogen.

- War der Jäger in der Boxengasse?

23. Bei der Vernissage hat dem Künstler der Gastgeber gefallen. An diesem Tag hat er/der/dieser wie immer Wasser getrunken.

    - Wurde Wasser verschüttet?

23. Bei der Vernissage hat der Gastgeber dem Künstler gefallen. An diesem Tag hat er/der/dieser wie immer Wasser getrunken.

    - Hat dem Besucher der Gastgeber gefallen?

24. Im Hafen ist dem Urlauber der Segler aufgefallen. Wenig später ist er/der/dieser dann über ein Seil gestolpert.

    - Ist jemand über ein Seil balanciert?

24. Im Hafen ist der Segler dem Urlauber aufgefallen. Wenig später ist er/der/dieser dann über ein Seil gestolpert.

    - War der Urlauber im Hafen?

25. Auf der Parkwiese hat dem Rentner der Jogger missfallen. Wenig später hat er/der/dieser dann den Park verlassen.

    - Hat jemand den Park gefegt?

25. Auf der Parkwiese hat der Jogger dem Rentner missfallen. Wenig später hat er/der/dieser dann den Park verlassen.

    - Hat dem Jungen der Jogger auf der Parkwiese missfallen?

26. Im Speisesaal ist dem Gast der Reiseleiter aufgefallen. In diesem Moment hat er/der/dieser gerade neben dem Buffet gestanden.

    - Wurde neben dem Buffet getanzt?

26. Im Speisesaal ist der Reiseleiter dem Gast aufgefallen. In diesem Moment hat er/der/dieser gerade neben dem Buffet gestanden.

    - War der Gast im Speisesaal?

27. Am Montagmorgen ist dem Polizisten der Verbrecher entgangen. Gegen Mittag hat er/der/dieser dann einen Anruf getätigt.

    - Hat jemand einen Anruf verpasst?

27. Am Montagmorgen ist der Verbrecher dem Polizisten entgangen. Gegen Mittag hat er/der/dieser dann einen Anruf getätigt.

    - Ist dem Polizisten der Verbrecher entgangen?

28. Auf der Agrarmesse ist dem Bauern der Schäfer aufgefallen. Dort hat er/der/dieser eine Weile auf einer Bank gesessen.

- Wurde auf einer Bank getanzt?

28. Auf der Agrarmesse ist der Schäfer dem Bauern aufgefallen. Dort hat er/der/dieser eine Weile auf einer Bank gesessen.

    - War der Bauer auf der Agrarmesse?

29. Am frühen Morgen ist dem Übersetzer der Einheimische entgangen. Wenig später ist er/der/dieser dann am Hafen herumgelaufen.

    - Ist jemand am Hafen eingeschlafen?

29. Am frühen Morgen ist der Einheimische dem Übersetzer entgangen. Wenig später ist er/der/dieser dann am Hafen herumgelaufen.

    - Ist dem Gärtner der Einheimische am frühen Morgen entgangen?

30. Bei der Abendvorstellung hat dem Clown der Zauberer missfallen. Am nächsten Morgen hat er/der/dieser zum ersten Mal verschlafen.

    - Hat jemand am nächsten Morgen gekündigt?

30. Bei der Abendvorstellung hat der Zauberer dem Clown missfallen. Am nächsten Morgen hat er/der/dieser zum ersten Mal verschlafen.

    - War der Rennfahrer bei der Abendvorstellung?

31. In der Sonntagsmesse hat dem Gläubigen der Prediger missfallen. Nach der Messe hat er/der/dieser dann einen alten Bekannten gegrüßt.

    - War der Gläubige in der Sontagsmesse?

31. In der Sonntagsmesse hat der Prediger dem Gläubigen missfallen. Nach der Messe hat er/der/dieser dann einen alten Bekannten gegrüßt.

    - Wurde eine Sängerin gegrüßt?

32. An der Bar ist dem Passagier der Minister aufgefallen. Dort hat er/der/dieser gerade einen Whiskey bestellt.

    - Ist dem Passagier der Minister an der Bar aufgefallen?

32. An der Bar ist der Minister dem Passagier aufgefallen. Dort hat er/der/dieser gerade einen Whiskey bestellt.

    - Wurde eine Limonade bestellt?

33. Beim Abendessen hat dem Verleger der Designer gefallen. Gegen 10 Uhr hat er/der/dieser dann das Restaurant verlassen.

    - War der Verleger beim Abendessen?

33. Beim Abendessen hat der Designerdem Verleger gefallen. Gegen 10 Uhr hat er/der/dieser dann das Restaurant verlassen.

- Wurde der Zoo verlassen?

34. Beim Mittagessen hat dem Chemiker der Physiker missfallen. Danach hat er/der/dieser noch eine wichtige Besprechung gehabt.

    - Hat dem Chemiker der Physiker missfallen?

34. Beim Mittagessen hat der Physiker dem Chemiker missfallen. Danach hat er/der/dieser noch eine wichtige Besprechung gehabt.

    - Hat jemand einen Azttermin gehabt?

35. Auf der Baustelle hat dem Techniker der Maurer gefallen. In der Mittagspause ist er/der/dieser dann zum Kiosk gegangen.

    - War der Techniker auf der Baustelle?

35. Auf der Baustelle hat der Maurer dem Techniker gefallen. In der Mittagspause ist er/der/dieser dann zum Kiosk gegangen.

    - Ist jemand zur Polizei gegangen?

36. Auf der Ausstellung hat dem Geldgeber der Bildhauer gefallen. Zu diesem Anlass hat er/der/dieser wie immer ein Glas Sekt getrunken.

    - Hat dem Geldgeber der Bildhauer auf der Ausstellung gefallen?

36. Auf der Ausstellung hat der Bildhauer dem Geldgeber gefallen. Zu diesem Anlass hat er/der/dieser wie immer ein Glas Sekt getrunken.

    - Wurde ein Weizenbier getrunken?

37. Gestern Abend ist dem Wanderer der Pilzsammler entgangen. Danach ist er/der/dieser noch stundenlang im Wald herumgeirrt.

    - Ist dem Wanderer der Pilzsammler aufgefallen?

37. Gestern Abend ist der Pilzsammler dem Wanderer entgangen. Danach ist er/der/dieser noch stundenlang im Wald herumgeirrt.

    - Wurde in der Stadt herumgeirrt?

38. Bei der Paketannahme hat dem Briefträger der Schneider gefallen. Danach hat er/der/dieser dann eine kurze Kaffeepause gemacht.

    - War der Briefträger bei der Paketannahme?

38. Bei der Paketannahme hat der Schneider dem Briefträger gefallen. Danach hat er/der/dieser dann eine kurze Kaffeepause gemacht.

    - Wurde eine Fahrradtour gemacht?

39. Auf dem Betriebsfest hat dem Handwerker der Buchhalter imponiert. Dort hat er/der/dieser wenig später eine traurige Nachricht erhalten.

- War der Handwerker auf dem Betriebsfest?

39. Auf dem Betriebsfest hat der Buchhalter dem Handwerker imponiert. Dort hat er/der/dieser wenig später eine traurige Nachricht erhalten.

    - Hat jemand eine Beförderung erhalten?

40. Vorgestern Morgen ist dem Doktor der Pfleger entgangen. Seitdem hat er/der/dieser dann keine Frühschicht mehr gehabt.

    - Ist dem Doktor der Pfleger vorgestern Morgen entgangen?

40. Vorgestern Morgen ist der Pfleger dem Doktor entgangen. Seitdem hat er/der/dieser dann keine Frühschicht mehr gehabt.

    - Hat jemand Kopfschmerzen gehabt?

41. Bei der Generalprobe hat dem Regisseur der Schauspieler behagt. Am Tag der Premiere hat er/der/dieser plötzlich Migräne bekommen.

    - War der Regisseur bei der Generalprobe?

41. Bei der Generalprobe hat der Schauspieler dem Regisseur behagt. Am Tag der Premiere hat er/der/dieser plötzlich Migräne bekommen.

    - Hat jemand Husten bekommen?

42. Gestern Morgen hat dem Pförtner der Mieter missfallen. Zu diesem Zeitpunkt hat er/der/dieser gerade vor der Tür geraucht.

    - Hat dem Pförtner der Mieter missfallen?

42. Gestern Morgen hat der Mieter dem Pförtner missfallen. Zu diesem Zeitpunkt hat er/der/dieser gerade vor der Tür geraucht.

    - Wurde in der Cafeteria geraucht?

43. In der Werkstatt hat dem Polizisten der Mechaniker gefallen. Nach dem Termin hat er/der/dieser dann eine längere Mittagspause gemacht.

    - War der Polizist in der Werkstatt?

43. In der Werkstatt hat der Mechaniker dem Polizisten gefallen. Nach dem Termin hat er/der/dieser dann eine längere Mittagspause gemacht.

    - Wurde ein Freudentanz gemacht?

44. Bei der Premiere hat dem Trompeter der Geiger imponiert. Nach der Vorstellung hat er/der/dieser dann eine Sektflasche geöffnet.

    - War der Trompeter bei der Premiere?

44. Bei der Premiere hat der Geiger dem Trompeter imponiert. Nach der Vorstellung hat er/der/dieser dann eine Sektflasche geöffnet.

- Wurde ein Paket geöffnet?

45. Am frühen Morgen hat dem Gutachter der Ingenieur missfallen. Danach ist er/der/dieser noch zu einer anderen Baustelle gefahren.

   - Hat dem Gutachter der Ingenieur letztens imponiert?

45. Am frühen Morgen hat der Ingenieur dem Gutachter missfallen. Danach ist er/der/dieser noch zu einer anderen Baustelle gefahren.

   - Ist jemand ins Altersheim gefahren?

46. Im Supermarkt ist dem Mann der Sänger aufgefallen. Dort hat er/der/dieser gerade einen Einkaufswagen geschoben.

   - Ist dem Mann der Sänger aufgefallen?

46. Im Supermarkt ist der Sänger dem Mann aufgefallen. Dort hat er/der/dieser gerade einen Einkaufswagen geschoben.

   - Wurde ein Kinderwagen geschoben?

47. Bei der Wahlveranstaltung hat dem Politiker der Leibwächter imponiert. Nach Dienstende hat er/der/dieser noch eine Geburtstagsfeier besucht.

   - War der Leibwächter bei der Wahlveranstaltung?

47. Bei der Wahlveranstaltung hat der Leibwächter dem Politiker imponiert. Nach Dienstende hat er/der/dieser noch eine Geburtstagsfeier besucht.

   - Wurde ein Schwimmbad besucht?

48. Letzten Sommer hat dem Förster der Jäger missfallen. Im darauffolgenden Herbst hat er/der/dieser dann ein neues Revier bekommen.

   - Hat dem Förster der Jäger letzten Sommer missfallen?

48. Letzten Sommer hat der Jäger dem Förster missfallen. Im darauffolgenden Herbst hat er/der/dieser dann ein neues Revier bekommen.

   - Hat jemand ein Zwergkaninchen bekommen?

49. Auf dem Sommerfest hat dem Gärtner der Winzer behagt. An diesem Tag hat er/der/dieser wie so oft gute Laune gehabt.

   - War der Winzer auf dem Sommerfest?

49. Auf dem Sommerfest hat der Winzerdem Gärtner behagt. An diesem Tag hat er/der/dieser wie so oft gute Laune gehabt.

   - Hat jemand einen Unfall gehabt?

50. In Berlin ist dem Maler der Dichter aufgefallen. Kurz darauf ist er/der/dieser wieder nach Köln gezogen.

- War der Dichter in Berlin?

50. In Berlin ist der Dichter dem Maler aufgefallen. Kurz darauf ist er/der/dieser wieder nach Köln gezogen.

  - Ist jemand nach Marokko gezogen?

51. Gestern Abend ist dem Reiseleiter der Hotelier entgangen. Am nächsten Tag hat er/der/dieser dann einen freien Tag gehabt.

  - Ist dem Reiseleiter der Hotelier entgangen?

51. Gestern Abend ist der Hotelier dem Reiseleiter entgangen. Am nächsten Tag hat er/der/dieser dann einen freien Tag gehabt.

  - Hat jemand Geburtstag gehabt?

52. Bei der Verfolgungsjagd ist dem Kommissar der Einbrecher entgangen. Danach hat er/der/dieser erst mal eine Zigarette geraucht.

  - Ist dem Kommissar der Einbrecher bei der Verfolgungsjagd entgangen?

52. Bei der Verfolgungsjagd ist der Einbrecher dem Kommissar entgangen. Danach hat er/der/dieser erst mal eine Zigarette geraucht.

  - Wurde eine Pfeife geraucht?

53. Im Wildpark hat dem Wolf der Bär imponiert. Später hat er/der/dieser plötzlich einen Zeckenbiss gespürt.

  - War der Wolf im Wildpark?

53. Im Wildpark hat der Bär dem Wolf imponiert. Später hat er/der/dieser plötzlich einen Zeckenbiss gespürt.

  - Wurde ein Mückenstich gespürt?

54. Im Restaurant ist dem Ehemann der Detektiv aufgefallen. Dort hat er/der/dieser wie jeden Abend ein Glas Rotwein getrunken.

  - Ist dem Ehemann der Detektiv aufgefallen?

54. Im Restaurant ist der Detektiv dem Ehemann aufgefallen. Dort hat er/der/dieser wie jeden Abend ein Glas Rotwein getrunken.

  - Wurde ein Glas Wasser getrunken?

55. Letztes Jahr ist dem Ermittler der Betrüger entgangen. Danach ist er/der/dieser dann auf die Bahamas geflogen.

  - Ist dem Ermittler der Betrüger letztes Jahr entgangen?

55. Letztes Jahr ist der Betrüger dem Ermittler entgangen. Danach ist er/der/dieser dann auf die Bahamas geflogen.

- Ist jemand nach London geflogen?

56. Im Zirkus hat dem Jungen der Clown imponiert. Während der Pause hat er/der/dieser dann einen Schluck Wasser getrunken.

    - War der Clown im Zirkus?

56. Im Zirkus hat der Clown dem Jungen imponiert. Während der Pause hat er/der/dieser dann einen Schluck Wasser getrunken.

    - Wurde eine Flasche Sekt getrunken?

57. Im Biergarten hat dem Touristen der Einheimische gefallen. Dort hat er/der/dieser gerade ein Weizenbier getrunken.

    - War der Einheimische im Biergarten?

57. Im Biergarten hat der Einheimische dem Touristen gefallen. Dort hat er/der/dieser gerade ein Weizenbier getrunken.

    - Wurde eine Apfelschorle getrunken?

58. Auf dem Sportfest ist dem Lehrer der Schüler entgangen. Kurz darauf ist er/der/dieser dann in den Urlaub gefahren.

    - Ist dem Lehrer der Schüler entgangen?

58. Auf dem Sportfest ist der Schüler dem Lehrer entgangen. Kurz darauf ist er/der/dieser dann in den Urlaub gefahren.

    - Ist jemand nach Hause gefahren?

59. Beim Konzert hat dem Zuhörer der Trommler behagt. Im Anschluss hat er/der/dieser noch eine Bratwurst gegessen.

    - War der Zuhörer beim Konzert?

59. Beim Konzert hat der Trommler dem Zuhörer behagt. Im Anschluss hat er/der/dieser noch eine Bratwurst gegessen.

    - Wurde eine Brezel gegessen?

60. Gegen Mittag ist dem Rentner der Hundebesitzer aufgefallen. In diesem Augenblick ist er/der/dieser gerade aus einer Sackgasse gekommen.

    - Ist dem Rentner der Hundebesitzer gegen Mittag aufgefallen?

60. Gegen Mittag ist der Hundebesitzer dem Rentner aufgefallen. In diesem Augenblick ist er/der/dieser gerade aus einer Sackgasse gekommen.

    - Ist jemand aus der Haustür gekommen?

61. An der Kreuzung ist dem Ermittler der Passant aufgefallen. Dort hat er/der/dieser gerade an einer roten Ampel gewartet.

- War der Ermittler im Wald?

61. An der Kreuzung ist der Passant dem Ermittler aufgefallen. Dort hat er/der/dieser gerade an einer roten Ampel gewartet.

    - Ist dem Ermittler der Passant aufgefallen?

62. Im Hafen ist dem Kapitän der Fischer aufgefallen. Danach ist er/der/dieser wieder aufs Meer rausgefahren.

    - Ist dem Kapitän der Fischer im Kino aufgefallen?

62. Im Hafen ist der Fischer dem Kapitän aufgefallen. Danach ist er/der/dieser wieder aufs Meer rausgefahren.

    - War der Fischer im Hafen?

63. Auf dem Boot hat dem Taucher der Helfer imponiert. Wieder an Land hat er/der/dieser dann eine Cola getrunken.

    - War der Helfer im Bus?

63. Auf dem Boot hat der Helfer dem Taucher imponiert. Wieder an Land hat er/der/dieser dann eine Cola getrunken.

    - Hat dem Taucher der Helfer auf dem Boot imponiert?

64. Auf der Konferenz hat dem Zuhörer der Redner behagt. Nach dem Vortrag hat er/der/dieser dann ein Plätzchen gegessen.

    - Hat dem Zuhörer der Redner in der Kirche behagt?

64. Auf der Konferenz hat der Redner dem Zuhörer behagt. Nach dem Vortrag hat er/der/dieser dann ein Plätzchen gegessen.

    - War der Redner auf der Konferenz?

65. In Indien hat dem Pilger der Begleiter behagt. Unterwegs hat er/der/dieser plötzlich eine schlimme Erkältung bekommen.

    - War der Pilger in Neuseeland?

65. In Indien hat der Begleiter dem Pilger behagt. Unterwegs hat er/der/dieser plötzlich eine schlimme Erkältung bekommen.

    - Hat dem Pilger der Begleiter behagt?

66. Beim Elternabend hat dem Vater der Lehrer missfallen. Auf dem Parkplatz hat er/der/dieser im Anschluss eine Zigarre geraucht.

    - Hat dem Vater der Lehrer im Supermarkt missfallen?

66. Beim Elternabend hat der Lehrer dem Vater missfallen. Auf dem Parkplatz hat er/der/dieser im Anschluss eine Zigarre geraucht.

- War der Lehrer beim Elternabend?

67. Beim Abendessen hat dem Politiker der Professor behagt. Zu Hause hat er/der/dieser noch einen Krimi gelesen.

    - War der Professor beim Arzt?

67. Beim Abendessen hat der Professor dem Politiker behagt. Zu Hause hat er/der/dieser noch einen Krimi gelesen.

    - Hat dem Politiker der Professor beim Abendessen behagt?

68. Im Park ist dem Journalisten der Tierfänger entgangen. Wenig später ist er/der/dieser dann mit dem Auto weggefahren.

    - Ist dem Journalisten der Tierfänger am Strand entgangen?

68. Im Park ist der Tierfänger dem Journalisten entgangen. Wenig später ist er/der/dieser dann mit dem Auto weggefahren.

    - War der Polizist im Park?

69. Im Restaurant hat dem Holländer der Deutsche behagt. Dort ist er/der/dieser schon mehrmals gewesen.

    - War der Holländer am Strand?

69. Im Restaurant hat der Deutsche dem Holländer behagt. Dort ist er/der/dieser schon mehrmals gewesen.

    - Hat dem Holländer der Spanier behagt?

70. Bei der Schulaufführung hat dem Zuschauer der Junge imponiert. Beim Buffet hat er/der/dieser anschließend ein Stück Kuchen genommen.

    - Hat dem Zuschauer der Junge auf dem Spielplatz imponiert?

70. Bei der Schulaufführung hat der Junge dem Zuschauer imponiert. Beim Buffet hat er/der/dieser anschließend ein Stück Kuchen genommen.

    - War der Astronaut bei der Schulaufführung?

71. Auf der Autobahn hat dem Kommissar der Räuber imponiert. Zu Hause hat er/der/dieser wie immer eine Zeitung gelesen.

    - Hat dem Kommissar der Räuber in der Bankfiliale imponiert?

71. Auf der Autobahn hat der Räuber dem Kommissar imponiert. Zu Hause hat er/der/dieser wie immer eine Zeitung gelesen.

    - War Zitkusartist auf der Autobahn?

72. Im Regionalexpress hat dem Touristen der Kontrolleur gefallen. Gegen Mittag hat er/der/dieser dann den Zug verlassen.

- War der Kontrolleur im Raumschiff?

72. Im Regionalexpress hat der Kontrolleur dem Touristen gefallen. Gegen Mittag hat er/der/dieser dann den Zug verlassen.

   - Hat dem Touristen der Straßenmusiker im Regionalexpress gefallen?

73. Gestern Morgen hat dem Spaziergänger der Angler behagt. An diesem Tag hat er/der/dieser wie immer einen Hund dabeigehabt.

   - War der Spaziergänger um Mitternacht unterwegs?

73. Gestern Morgen hat der Angler dem Spaziergänger behagt. An diesem Tag hat er/der/dieser wie immer einen Hund dabeigehabt.

   - Hat dem Spaziergänger der Reiter behagt?

74. Im Flugzeug hat dem Griechen der Däne missfallen. Dort hat er/der/dieser wieder den Fensterplatz gehabt.

   - Hat dem Griechen der Däne im Zug missfallen?

74. Im Flugzeug hat der Däne dem Griechen missfallen. Dort hat er/der/dieser wieder den Fensterplatz gehabt.

   - War der Däne im Flugzeug?

75. Im Biergarten ist dem Kellner der Gast entgangen. Daraufhin hat er/der/dieser dann eine Zigarette geraucht.

   - War der Gast im Kino?

75. Im Biergarten ist der Gast dem Kellner entgangen. Daraufhin hat er/der/dieser dann eine Zigarette geraucht.

   - Ist dem Kellner der Hund im Biergarten entgangen?

76. Im Neubaugebiet ist dem Anwohner der Räuber entgangen. Damals ist er/der/dieser noch ein weißes Auto gefahren.

   - Ist dem Anwohner der Räuber im Neubaugebiet nachgelaufen?

76. Im Neubaugebiet ist der Räuber dem Anwohner entgangen. Damals ist er/der/dieser noch ein weißes Auto gefahren.

   - War der Polizist im Neubaugebiet?

77. Auf dem Pausenhof hat dem Hausmeister der Schüler missfallen. Dort hat er gerade unter einem Baum gestanden.

   - Hat dem Hausmeister der Schüler nachspioniert?

77. Auf dem Pausenhof hat der Schüler dem Hausmeister missfallen. Dort hat er gerade unter einem Baum gestanden.

- Hat dem Direktor der Schüler missfallen?

78. Auf der Kunstmesse hat dem Gönner der Zeichner imponiert. Leider hat er/der/dieser vorzeitig abreisen müssen.

  - Hat der Zeichner dem Gönner aufgelauert?

78. Auf der Kunstmesse hat der Zeichner dem Gönner imponiert. Leider hat er/der/dieser vorzeitig abreisen müssen.

  - War der Präsident auf der Kunstmesse?

79. Im Wald ist dem Fuchs der Hase aufgefallen. Kurz danach ist er/der/dieser wieder in einen unterirdischen Bau gekrochen.

  - Ist der Hase dem Fuchs nachgelaufen?

79. Im Wald ist der Hase dem Fuchs aufgefallen. Kurz danach ist er/der/dieser wieder in einen unterirdischen Bau gekrochen.

  - Ist dem Jäger der Hase im Wald aufgefallen?

80. Im Großmarkt hat dem Händler der Einkäufer gefallen. Dort ist er/der/dieser zum ersten Mal gewesen.

  - Hat der Einkäufer dem Händler gratuliert?

80. Im Großmarkt hat der Einkäufer dem Händler gefallen. Dort ist er/der/dieser zum ersten Mal gewesen.

  - War der Bürgermeister im Großmarkt?

81. Bei der Preisverleihung hat dem Kritiker der Sänger imponiert. Beim anschließenden Essen hat er/der/dieser noch lange mit Kollegen gesprochen.

  - Hat der Sänger dem Kritiker geholfen?

81. Bei der Preisverleihung hat der Sänger dem Kritiker imponiert. Beim anschließenden Essen hat er/der/dieser noch lange mit Kollegen gesprochen.

  - Hat dem Astronauten der Sänger imponiert?

82. Im Restaurant hat dem Kellner der Barkeeper imponiert. An diesem Tag hat er/der/dieser dort zum ersten Mal gearbeitet.

  - Hat der Barkeeper dem Kellner gedroht?

82. Im Restaurant hat der Barkeeper dem Kellner imponiert. An diesem Tag hat er/der/dieser dort zum ersten Mal gearbeitet.

  - War der Obsthändler im Restaurant?

83. Auf dem Feld hat dem Schäfer der Jäger missfallen. An diesem Tag hat er/der/dieser erstmals einen neuen Hund mitgeführt.

  - Hat der Jäger dem Schäfer geschadet?

83. Auf dem Feld hat der Jäger dem Schäfer missfallen. An diesem Tag hat er/der/dieser erstmals einen neuen Hund mitgeführt.

- Hat dem Bauern der Jäger auf dem Feld missfallen?

84. Im Standesamt hat dem Antragsteller der Beamte gefallen. An diesem Tag hat er/der/dieser wie so häufig Zahnschmerzen gehabt.

- Hat der Beamte dem Antragsteller im Standesamt wehgetan?

84. Im Standesamt hat der Beamte dem Antragsteller gefallen. An diesem Tag hat er/der/dieser wie so häufig Zahnschmerzen gehabt.

- War der Antragsteller im Standesamt?

85. In der Tankstelle ist dem Maler der Schreiner aufgefallen. Dort ist er/der/dieser gerade zur Kasse gegangen.

- Ist der Schreiner dem Maler in der Tankstelle ausgewichen?

85. In der Tankstelle ist der Schreiner dem Maler aufgefallen. Dort ist er/der/dieser gerade zur Kasse gegangen.

- Ist dem Maler der Schreiner aufgefallen?

86. Im Wald hat dem Reiter der Jäger missfallen. Dort hat er/der/dieser gerade eine Abzweigung genommen.

- Hat der Jäger dem Reiter verziehen?

86. Im Wald hat der Jäger dem Reiter missfallen. Dort hat er/der/dieser gerade eine Abzweigung genommen.

- War der Reiter im Wald?

87. Im Wartezimmer hat dem Bankangestellten der Hausmeister behagt. Dort hat er/der/dieser bereits seit einiger Zeit auf ein Rezept gewartet.

- Ist der Hausmeister dem Bankangestellten gefolgt?

87. Im Wartezimmer hat der Hausmeister dem Bankangestellten behagt. Dort hat er/der/dieser bereits seit einiger Zeit auf ein Rezept gewartet.

- Hat dem Bankangestellten der Hausmeister im Wartezimmer behagt?

88. Gestern Abend ist dem Kunden der Fleischer entgangen. Später hat er/der/dieser noch eine Verabredung gehabt.

- Ist der Fleischer dem Kunden gestern Abend entgegengekommen?

88. Gestern Abend ist der Fleischer dem Kunden entgangen. Später hat er/der/dieser noch eine Verabredung gehabt.

- Ist dem Kunden der Fleischer entgangen?

89. In Afrika ist dem Kameramann der Assistent entgangen. Kurz darauf ist er/der/dieser schon wieder abgereist.

   - Hat der Assistent dem Kameramann verziehen?

89. In Afrika ist der Assistent dem Kameramann entgangen. Kurz darauf ist er/der/dieser schon wieder abgereist.

   - War der Kameramann in Afrika?

90. In der Imbissbude hat dem Belgier der Holländer behagt. Dort hat er wie immer eine Bratwurst bestellt.

   - Hat der Holländer dem Belgier in der Imbissbude geglaubt?

90. In der Imbissbude hat der Holländer dem Belgier behagt. Dort hat er wie immer eine Bratwurst bestellt.

   - War der Belgier in der Imbissbude?

Filler sentences

1. In der Englischstunde hat dem Lehrer die Schülerin geantwortet. An diesem Tag hat sie wie immer alle Vokabeln gewusst.

   - Hat die Schülerin alle Vokabeln gewusst?

2. Beim Frühstück hat die Tochter dem Vater gratuliert. Am Abend hat er noch eine Geburtstagsparty geschmissen.

   - Hat der Vater eine Geburtstagsparty geschmissen?

3. Am Freitag hat dem Jubilar die Chefin gedankt. An diesem Tag hat er wie immer einen Anzug getragen.

   - Hat der Jubilar einen Anzug getragen?

4. Am Vatertag hat dem Vater die Mutter geholfen. An diesem Tag hat sie morgens Rührreier gemacht.

   - Hat die Mutter Rührreier gemacht?

5. Am Dienstag ist die Verkäuferin dem Kunden nachgelaufen. An der Kasse hat er wieder einmal sein Portemonnaie vergessen.

   - Hat der Kunde sein Portemonnaie vergessen?

6. Auf dem Feldweg ist dem Traktorfahrer die Reiterin entgegengekommen. Am Rand hat er dann kurz angehalten.

   - Hat der Traktorfahrer kurz angehalten?

7. Auf dem Spielplatz hat dem Mädchen der Rentner gedroht. Dort hat sie gerade geschaukelt.

   - Hat das Mädchen geschaukelt?

8. Im Sommerurlaub hat die Tante dem Patenkind eine Postkarte geschrieben. In diesem Jahr hat sie wieder Urlaub in Italien gemacht.

   - Hat die Tante Urlaub in Italien gemacht?

9. Kurz vor der Feier hat dem Gastgeber die Kellnerin abgesagt. An diesem Tag hat er bereits mehrere Absagen erhalten.

   - Hat der Gastgeber mehrere Absagen erhalten?

10. Auf der Wanderung ist dem Touristen die Bergsteigerin begegnet. An diesem Tag hat sie zum ersten Mal neue Wanderschuhe getragen.

    - Hat die Bergsteigerin neue Wanderschuhe getragen?

11. Vor der Operation hat dem Vater die Mutter beigestanden. Kurz nach der Operation hat er schon wieder gelacht.

    - Hat der Vater kurz nach der Operation gelacht?

12. Auf der Strandpromenade ist dem Jungen die Hündin gefolgt. An dem Tag hat sie wie immer nach Futter gesucht.

    - Hat die Hündin nach Futter gesucht?

13. Bei der Besprechung hat dem Chef die Angestellte widersprochen. Daraufhin hat sie dann viel Beifall bekommen.

    - Hat die Angestellte viel Beifall bekommen?

14. An der Bar hat sich die Deutsche dem Italiener genähert. Dabei hat sie mehrmals ihre Haare geschüttelt.

    - Hat die Deutsche ihre Haare geschüttelt?

15. Auf dem Fest hat dem Ritter die Bedienstete gedient. An diesem Abend hat sie wie immer viel Rotwein serviert.

    - Hat die Bedienstete viel Rotwein serviert?

16. Während der Beichte hat dem Beichtvater die Gläubige vertraut. An diesem Tag hat sie zum ersten Mal gebeichtet.

    - Hat die Gläubige zum ersten Mal gebeichtet?

17. Nach der Aussprache hat die Ehefrau dem Ehemann verziehen. Danach hat sie dann glücklich gewirkt.

    - Hat die Ehefrau glücklich gewirkt?

18. Bei der Behandlung hat dem Jungen die Ärztin wehgetan. Danach hat er noch lange geschmollt.

    - Hat der Junge geschmollt?

19. Beim Abendessen hat die Mutter dem Sohn zugehört. An diesem Abend hat er wie immer über Fußball gesprochen.

- Hat der Sohn über Fußball gesprochen?

20. Bei der Betriebsversammlung hat die Angestellte dem Betriebsrat zugestimmt. An diesem Tag hat sie zum ersten Mal an der Versammlung teilgenommen.

    - Hat die Angestellte an der Versammlung zum ersten Mal teilgenommen?

21. Nach der Geburt hat dem Vater die Tochter geähnelt. In den darauffolgenden Wochen hat er stets über beide Ohren gestrahlt.

    - Hat der Vater über beide Ohren gestrahlt?

22. Am Telefon hat die Vermieterin dem Studenten eine Wohnung angeboten. Daraufhin hat er sofort zugesagt.

    - Hat der Student zugesagt?

23. Am Montagmorgen hat die Nachbarin dem Postboten die Tür aufgemacht. Danach hat sie dann ein Paket angenommen.

    - Hat die Nachbarin ein Paket angenommen?

24. Im Geschäft hat die Mutter dem Sohn ein Paar Schuhe ausgesucht. Danach hat er dann die Schuhe anprobiert.

    - Hat der Sohn die Schuhe anprobiert?

25. In der Boxengasse ist die Motorradfahrerin dem Mechaniker ausgewichen. Dort ist sie wie immer zu schnell gefahren.

    - Ist die Motorradfahrerin zu schnell gefahren?

26. Im Restaurant hat die Kellnerin dem Gast einen Wein empfohlen. Dort hat sie bereits seit einigen Jahren gearbeitet.

    - Hat die Kellnerin seit einigen Jahren dort gearbeitet?

27. Im Krankenhaus hat dem Jungen die Fee einen Wunsch erfüllt. Dort hat er seit Längerem eine Lungenentzündung auskuriert.

    - Hat der Junge eine Lungenentzündung auskuriert?

28. In der Nachhilfestunde hat die Studentin dem Fünftklässler eine Matheaufgabe erklärt. Seit dem ersten Schuljahr hat er bereits Nachhilfeunterricht genommen.

    - Hat der Fünftklässler seit dem ersten Schuljahr Nachhilfeunterricht genommen?

29. Vor dem Zubettgehen hat die Mutter dem Sohn eine Geschichte erzählt. Dabei hat er mehrfach gegähnt.

    - Hat der Sohn gegähnt?

30. Vor der Schule hat die Großmutter dem Enkel einen Kuss gegeben. Daraufhin hat er dann die Augen verdreht.

    - Hat der Enkel die Augen verdreht?

31. Im Freibad hat die Tante dem Jungen eine Portion Fritten geholt. An diesem Tag hat sie wie immer einen gelben Badeanzug getragen.

    - Hat die Tante einen gelben Badeanzug getragen?

32. Zum Geburtstag hat dem Bruder die Schwester einen Fußball gekauft. Nach dem Auspacken hat er sofort damit gespielt.

    - Hat der Bruder damit gespielt?

33. Am Abend hat dem Jungen die Großmutter einen Pudding gekocht. Dafür hat sie wie immer ein Rezept gebraucht.

    - Hat die Großmutter wie immer ein Rezept gebraucht?

34. Letzten Sommer hat dem Nachbarsjungen die Frau einen Tennisschläger geliehen. Im Herbst hat sie dann den Tennisschläger zurückbekommen.

    - Hat die Frau den Tennisschläger im Herbst zurückbekommen?

35. Gestern Morgen hat die Ärztin dem Patienten eine gute Nachricht mitgeteilt. Daraufhin hat er dann einen Freudensprung gemacht.

    - Hat der Patient einen Freudensprung gemacht?

36. In der Kantine hat die Köchin dem Angestellten das Essen gereicht. An diesem Tag hat sie zum ersten Mal ein neues Rezept ausprobiert.

    - Hat die Köchin ein neues Rezept ausprobiert?

37. Auf dem Flohmarkt hat dem Studenten die Rentnerin ein Sofa verkauft. Daraufhin hat er dann das Sofa nach Hause geschleppt.

    - Hat der Student das Sofa nach Hause geschleppt?

38. Im Sachkundeunterricht hat die Viertklässlerin dem Klassenlehrer alle Bundesländer genannt. Daraufhin hat sie dann ein Lob bekommen.

    - Hat die Viertklässlerin ein Lob bekommen?

39. Beim Sportfest hat dem Jungen die Kindergärtnerin zugeschaut. In diesem Moment ist er gerade über über eine Hürde gesprungen.

    - Ist der Junge über eine Hürde gesprungen?

40. Am Flughafen hat dem Austauschschüler die Gastmutter zugewinkt. In diesem Moment ist er gerade durch die Drehtür gegangen.

    - Ist der Austauschschüler durch die Drehtür gegangen?

41. Auf dem Konzert hat dem Musikfan die Taschendiebin das Portemonnaie gestohlen. Daraufhin hat er dann die Polizei kontaktiert.

    - Hat der Musikfan die Polizei kontaktiert?

42. Im Friseurladen hat dem Bankangestellten die Auszubildende die Haare getrocknet. An diesem Tag hat sie gerade erst mit der Ausbildung begonnen.

    - Hat die Auszubildende gerade erst mit der Ausbildung begonnen?

43. In der Mittagspause hat dem Buchhändler die Kundin das Geld überwiesen. Danach hat sie noch einige Einkäufe erledigt.

    - Hat die Kundin noch einige Einkäufe erledigt?

44. Im Reisebüro hat die Reisekauffrau dem Augenarzt ein Reiseziel vorgeschlagen. Daraufhin hat er dann die Reise gebucht.

    - Hat der Augenarzt die Reise gebucht?

45. Im Stadion hat die Kanzlerin dem Weitspringer zugesehen. An diesem Tag hat sie wie immer eine Bluse getragen.

    - Hat die Kanzlerin eine Bluse getragen?

46. Im Café hat die Aushilfe dem Stammgast einen Kaffee gemacht. An diesem Tag hat sie wie immer eine schwarze Hose getragen.

    - Hat die Aushilfe eine schwarze Hose getragen?

47. In der Pause hat dem Mitschüler die Klassensprecherin gedroht. Daraufhin hat er dann geweint.

    - Hat der Mitschüler dann geweint?

48. Vor drei Jahren hat dem Deutschen die Italienerin ein Ferienhaus in Venedig vermietet. Seitdem hat er dort häufiger Ferien gemacht.

    - Hat der Deutsche dort häufiger Ferien gemacht?

49. Jeden Abend hat dem Bruder die Schwester eine Geschichte vorgelesen. Dabei hat sie immer viel gelacht.

    - Hat die Schwester viel gelacht?

50. Lange Zeit hat dem Ehemann die Ehefrau eine Affäre verheimlicht. Dann hat sie plötzlich die Scheidung eingereicht.

    - Hat die Ehefrau die Scheidung eingereicht?

51. Im Auktionssaal hat dem Verkäufer die Bieterin einen hohen Betrag geboten. Daraufhin hat sie dann die Ware erhalten.

    - Hat die Bieterin die Ware erhalten?

52. Im Stadion hat dem Fußballfan die Polizistin das Rauchen verboten. Daraufhin hat er dann die Zigarette ausgedrückt.

    - Hat der Fußballfan die Zigarette ausgedrückt?

53. An der Fleischtheke hat die Metzgerin dem Jungen eine Scheibe Fleischwurst geschenkt. Kurz darauf hat er plötzlich die Fleischwurst fallen gelassen.

- Hat der Junge die Fleischwurst fallen gelassen?

54. Vor Weihnachten hat die Enkelin dem Großvater ein Paket gesendet. An Heiligabend hat er dann das Paket geöffnet.

- Hat der Großvater das Paket geöffnet?

55. Letzten Dienstag hat die Versicherungsfrau dem Autofahrer das Cabriolet versichert. Kurz darauf hat er bereits einen Unfall gebaut.

- Hat der Autofahrer einen Unfall gebaut?

56. Letzten Mittwoch hat die Maklerin dem Lehrling die Wohnung gezeigt. Am nächsten Tag hat er bereits den Mietvertrag unterschrieben.

- Hat der Lehrling den Mietvertrag unterschrieben?

57. Während des Auslandssemesters hat dem Studenten die Freundin gefehlt. Daraufhin hat sie spontan einen Besuch geplant.

- Hat die Freundin einen Besuch geplant?

58. Vor zwei Monaten hat die Chefin dem Angestellten gekündigt. Kurze Zeit später hat er bereits eine neue Stelle gefunden.

- Hat der Angestellte eine neue Stelle gefunden?

59. Im Kindergarten hat die Tochter dem Vater ein Bild gemalt. Zu Hause hat sie dann das Bild übergeben.

- Hat die Tochter das Bild übergeben?

60. Beim Spazierengehen hat die Hündin dem Besitzer gehorcht. Zu Hause hat sie dann ein Leckerli bekommen.

- Hat die Hündin ein Leckerli bekommen?

Appendix C: Additional figure (Time course of story development: dative, canonical)

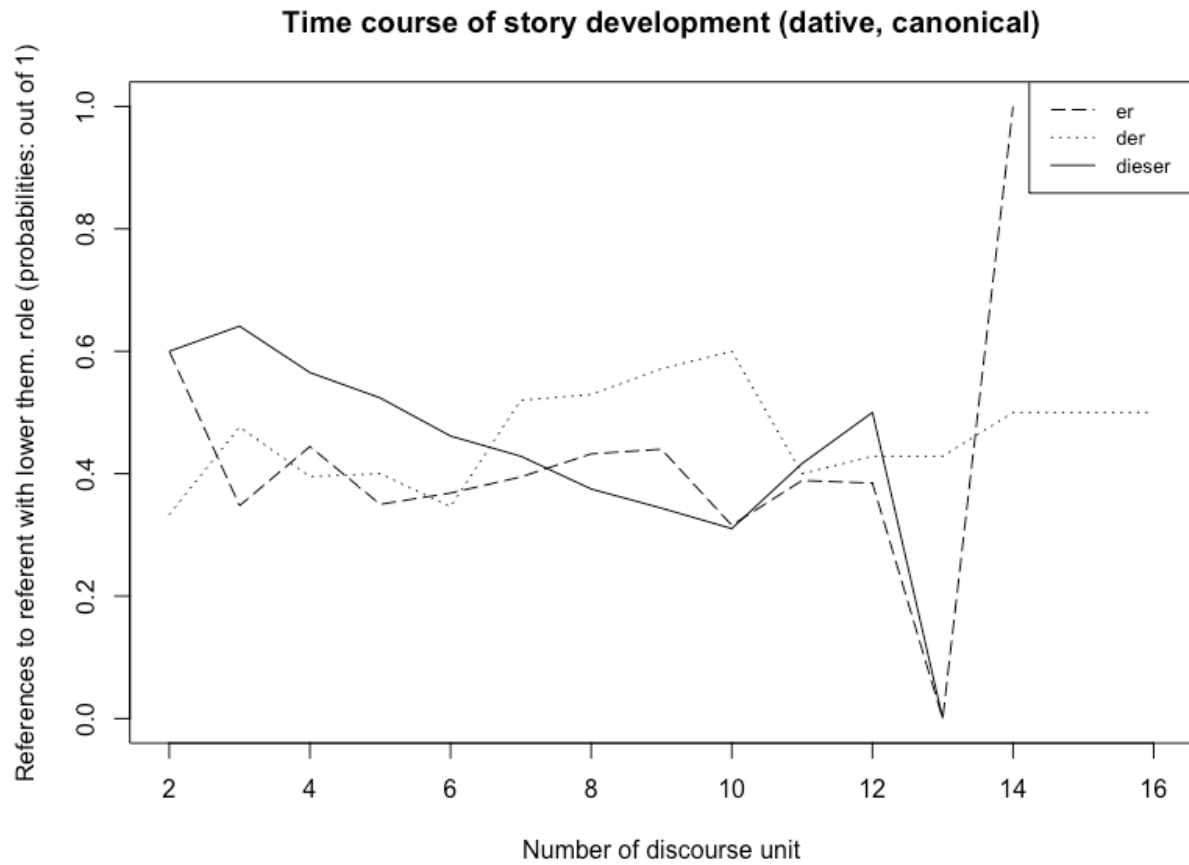## Time course of story development (dative, canonical)

Figure 17: References to the referent with the lower-ranked thematic role in continuations dependent on the pronoun type and the referent that was chosen for the pronoun in the context of dative experiencer verbs and the canonical word order.