Nominative case as a multidimensional default[*]

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Abstract

The present paper addresses a current view in the psycholinguistic literature that case exhibits processing properties distinct from those of other morphological features such as number (cf. Fodor & Inoue, 2000; Meng & Bader, 2000a/b). In a speeded-acceptability judgement experiment, we show that the low performance previously found for case in contrast to number violations is limited to nominative case, whereas violations involving accusative and dative are judged more accurately. The data thus do not support the proposal that case per se is associated with special properties (in contrast to other features such as number) in reanalysis processes. Rather, there are significant judgement differences between the object cases accusative and dative on the one hand and the subject nominative case on the other. This may be explained by the fact that nominative has a specific status in German (and many other languages) as a default case.

1. Introduction

A widely discussed problem in the psycholinguistic literature is based on the observation that, in a speeded-grammaticality judgement paradigm (i. e., under time pressure), the detection of ungrammaticalities induced by case apparently functions

differently to that of ungrammaticalities induced by number. Consider the following examples given by Meng & Bader (2000b):

(1)   * ..., **welcher Politiker**   die Minister   getroffen **haben**.
       ..., which politician (Nom, Sg) the ministers (Nom/Acc, Pl) met have (Pl)
(2)   * **Welcher Politiker**, glaubst Du, traf   **der Minister**?
       which politician (Nom, Sg)   do you believe met (Sg) the minister (Nom, Sg)

Both (1) and (2) are ungrammatical subject-initial constructions in which the initial NP is case marked for nominative. In (2), the ungrammaticality is induced by the second NP, which is unambiguously marked for nominative case. In (1), by contrast, ungrammaticality is effected by the verb, which shows person and number agreement with the second but not with the first NP in the clause. Meng & Bader (2000a/b) found a high accuracy in ungrammaticality detection for constructions such as (1). By contrast, violations such as (2) were detected with chance level accuracy. The fact that a clear effect of ungrammaticality is visible in only one of these constructions may therefore lead one to ask whether there is a fundamental difference between the detection of ungrammaticalities induced by number and those induced by case. This is exactly the conclusion that was drawn by Meng & Bader (2000a/b) and Fodor & Inoue (2000). The latter authors put forward a proposal to account for differences in the strength of garden-path effects. Their *diagnosis model* assumes that differences in reanalysis or repair effects should be explained in terms of differing diagnosis rather than revision costs, as the revision itself is assumed to be more or less costless. Cost of diagnosis is variable and depends on the transparency of the processing conflict. Evidence contrary to a preferred analysis that is detected in the ongoing parsing process is not always equally telling in that, in certain cases, the feature giving rise to the processing problem (the "symptom") also provides a possible solution. Under other circumstances, by contrast, the symptom will not provide any helpful information whatsoever.

    Fodor & Inoue (1998) assume that the parser follows a principle referred

to as *Attach Anyway* when encountering a word that cannot be attached into the current phrase marker in accordance with the rules of the grammar. This principle states that the parser simply undertakes the "least unacceptable attachment" in a situation where no acceptable attachment can be made. As a consequence, the structure already built must be made to fit the current input and not vice versa. This means that, once *Attach Anyway* has applied, the grammar must determine what is wrong with the tree as it stands so that the parser can apply changes to it that will hopefully render it acceptable.

In the spirit of this approach, Fodor & Inoue (2000) proposed an interesting explanation for the findings of Meng & Bader (2000b) referred to above, that is for the accuracy differences between number and case violations. Fodor and Inoue propose that the high acceptability of ungrammatical double nominative structures arises as follows. The nominative case marking of the second NP leads to this phrase being attached into the subject position of the clause. As a consequence of this attachment, and because the parser is assumed to consider the current input more valid than the preceding parse, the case of the first NP must be modified by a repair process. The case information of the second argument is, according to Fodor & Inoue, a very informative symptom, as it directly signals the grammatical function (and, thereby, the syntactic position) of that argument to the parser. In other words, it is a type of *positive* evidence. For this reason, the structure is judged to be acceptable in so many instances and why the reanalysis of a preferred reading in an analogous ambiguous structure is more effortless when based on case than when based on number (cf. Meng & Bader, 2000a/b). A mismatch in number is negative evidence as it signals a problem but does not provide a direct way out of it. Accordingly, the ungrammaticality is detected more reliably and the revision of an ambiguity on the basis of number information is more difficult (cf. Meng & Bader, 2000b).[1]

Despite the initial appeal of this approach, there are several problems associated with it. The first concerns the assumption that it is the case of the first argument which is overlooked (revised) rather than that of the second (i. e. more

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[1] For an alternative account see Schlesewsky & Bornkessel (2003).

recent). Although this assumption may appear intuitively plausible, it is difficult to reconcile with independent empirical evidence (see Schlesewsky, Fanselow & Frisch, this issue). Moreover, the categorical distinction between case and other (syntactic) features presupposes that case in general – and, consequently, its processing behaviour – may be conceived of in a unitary manner. As already shown in the Meng & Bader (2000a) study, violations involving accusative case are judged differently from those involving nominative case. Alternatively, though, it is also possible that the findings for sentences such as (2) are attributable to the specific properties of the nominative case. This tentative hypothesis does not appear unlikely in view of the fact that nominative case has an exceptional status in many languages – German being no exception. Consider, for example, left dislocations such as in (3).

(3)   Dem Pfarrer / der Pfarrer / *den Pfarrer, dem helfen wir alle.

   [the priest]$_{DAT/NOM/ACC}$, [the one]$_{Demonstr-pron/DAT}$ help [we all]$_{NOM}$
   'The priest is the one we all help.'

The left dislocated dative object NP in (3) may be realized with either dative or nominative case marking, but not with accusative. Thus, the nominative (and only the nominative) can be inserted as a default case even if a different case is required for grammatical reasons (e.g. Primus, 1999; Fanselow, 2000). Under the assumption that this special status of the nominative is also brought to bear during sentence comprehension, processing differences between the nominative and the two object cases (dative and accusative) appear quite likely. Thus, in analogy to the left dislocation phenomenon exemplified in (3), it may be easier to process a nominative in a position which it cannot occupy according to grammatical principles, thereby resulting in the 'illusion of grammaticality' described above.

In the following experiment, we directly compare speeded acceptability judgements for double case ungrammaticalities involving all three argument cases[2] in the German case system, i. e. nominative, accusative and dative.

2. The Present Study

In the present experiment, we are going to extend the paradigm used by Meng & Bader (2000b) as to compare ungrammatical sentences with two nominative arguments to comparable ungrammaticalities involving accusative and dative case. This will allow us to differentiate between an account assuming that the 'illusion of grammaticality' observed for nominative case generalizes to other cases and one which attributes this phenomenon to specific properties of the nominative case.

2.1 Method

2.1.1 Participants Twenty undergraduate students from the University of Potsdam participated. Participants were aged between 17 and 21 years (mean 19 years), were monolingual native speakers of German and had normal or corrected-to-normal vision.

2.1.2 Materials The four incorrect conditions and their correct counterparts are exemplified in (4a) to (4h).

(4a)   NOMINATIVE-ACCUSATIVE (NOM-ACC)
        Welcher Kommissar aus der Vorstadt lobte <u>den Detektiv</u>?
        [which inspector]$_{NOM}$ from the suburbs commended [the detective]$_{ACC}$

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[2] Note that object arguments in German may also be marked with genitive case. However, this case only marks the objects of a very limited number of verbs (e.g. *gedenken / to remember*), thereby precluding the experimental examination of similar ungrammaticalities involving genitive case.

(4b) ACCUSATIVE-NOMINATIVE (ACC-NOM)

Welchen Kommissar aus der Vorstadt lobte <u>der Detektiv</u> ?

[which inspector]$_{ACC}$ from the suburbs commended [the detective]$_{NOM}$

(4c) NOMINATIVE-NOMINATIVE (NOM-NOM)

*Welcher Kommissar aus der Vorstadt lobte <u>der Detektiv</u> ?

[which inspector]$_{NOM}$ from the suburbs commended [the detective]$_{NOM}$

(4d) ACCUSATIVE-ACCUSATIVE (ACC-ACC)

*Welchen Kommissar aus der Vorstadt lobte <u>den Detektiv</u> ?

[which inspector]$_{ACC}$ from the suburbs commended [the detective]$_{ACC}$

(4e) NOMINATIVE-DATIVE (NOM-DAT)

Welcher Kommissar aus der Vorstadt half <u>dem Detektiv</u> ?

[which inspector]$_{NOM}$ from the suburbs helped [the detective]$_{DAT}$

(4f) DATIVE-NOMINATIVE (DAT-NOM)

Welchem Kommissar aus der Vorstadt half <u>der Detektiv</u> ?

[which inspector]$_{DAT}$ from the suburbs helped [the detective]$_{NOM}$

(4g) NOMINATIVE-NOMINATIVE (NOM-NOM)

*Welcher Kommissar aus der Vorstadt half <u>der Detektiv</u> ?

[which inspector]$_{NOM}$ from the suburbs helped [the detective]$_{NOM}$

(4h) DATIVE-DATIVE (DAT-DAT)

*Welchem Kommissar aus der Vorstadt half <u>dem Detektiv</u> ?

[which inspector]$_{DAT}$ from the suburbs helped [the detective]$_{DAT}$

Seventy-two data blocks of the four different forms exemplified in the sentences presented in (4) were constructed. All experimental sentences contained an unambiguously case marked initial DP (nominative, accusative or dative) followed by a prepositional phrase, a transitive verb and a second DP that was also morphologically marked for nominative, accusative or dative case. Only masculine singular NPs were used, because only masculine determiners are unambiguously marked for case in German. In order to avoid influences of additional case information, we controlled the degree of inflection of the nouns. This is necessary since some German inflection paradigms require different noun forms for nominative vs. accusative/dative case, for example *Richter-Richter* (*judge* Nom-Acc/Dat) versus *Junge-Jungen* (*boy* Nom-Acc/Dat). Thus, only nouns which do not differ in form between nominative, dative and accusative

case were chosen, i.e. all case information was provided via the definite determiners *der* ('the$_{NOM}$'), *dem* ('the$_{DAT}$') and *den* ('the$_{ACC}$').

For each single experimental session, 80 experimental items (10 sentences per condition) were combined with 160 fillers. The fillers consisted of approximately the same number of phrases as the critical sentences and were counterbalanced concerning the degree of ungrammaticality and the number of object initial phrases in analogy to the experimental material. A chance function chose 10 sentences per condition and constructed a list only as the participant started the experimental program. After every six participants, all experimental sentences had been presented in a counterbalanced way.

2.1.3 Procedure The sentences were presented word by word in a speeded acceptability judgement task. Every word appeared in the middle of a computer screen for 250 ms with an inter-stimulus interval (ISI) of 100 ms. In order to fixate the eyes at the centre of the screen, an asterisk was presented before the presentation of the first word of a sentence. After the last word, a question mark appeared as a prompt for the participants to decide on the acceptability of the sentence as quickly as possible.

2.1.4 Data analysis All data with reaction times greater than 4000 ms were excluded from the analysis; these made up about 1% of the data in the experiment and were evenly distributed across conditions. In addition, only the data with correct responses were included in the analysis of the reaction times. An analysis of variance (ANOVA) was performed on the means of correct responses and the means of reaction times. The ANOVA design crossed the two factors *ORDER* (*nominative* versus *accusative* versus *dative*) and *CORRectness* (*correct* versus *incorrect*).

2.2 Results
The percentages of correct answers and the mean reaction times (for correct answers only) for each experimental condition are given in Table 1.

Table 1. Mean accuracies (in %) and mean response latencies (in ms) for each experimental condition.

Condition	Mean accuracies % (stdev)	Mean latency (stdev)
NOM-ACC	92.9 (8.2)	441 (380)
ACC-NOM	94.8 (7.1)	480 (274)
NOM-DAT	87.8 (9.6)	510 (410)
DAT-NOM	93.8 (7.8)	460 (294)
NOM-NOM	53.3 (19.9)	904 (581)
ACC-ACC	66.1 (26.0)	713 (487)
DAT-DAT	71.9 (23.2)	606 (371)

In the statistical analyses of the accuracies, we found a main effect of CORR ($F(1,19)=44.8$, $p<.01$) due to higher accuracies in the grammatical conditions. The NOM-NOM condition differed significantly from the other two incorrect conditions ($F(1,19)=11.8$, $p<.01$), but there was no difference between the DAT-DAT and the ACC-ACC condition ($F(1,19)=1.5$, $p=.23$). Within the correct conditions, sentences with nominative first were judged less accurately than sentences with nominative as the second argument ($F(1,19)=7.5$, $p< .05$).

The statistical analysis of the response latencies (correct answers only), also revealed a main effect of CORR ($F(1,19)= 20.7$, $p<.01$). Again, double nominatives differed from the two other incorrect conditions ($F(1,19)=15.6$, $p<.05$), but ACC-ACC and DAT-DAT did not differ from one another ($F(1,19)=2.7$, $p=.12$). No differences obtained between the correct conditions.

3. Discussion

The results of the experiment show a clear distinction between the three types of double case violations in acceptability judgements. Participants judge double nominative sentences as more grammatical than their accusative and dative counterparts. The analysis of the response times shows that this effect is not due to a speed-accuracy trade-off, seeing that participants not only make more errors in the double nominative condition, but also need more time for their judgement compared with the other two conditions.

Thus, the judgement results replicate the findings by Meng & Bader (2000a/b) in that double nominative constructions were judged to be ungrammatical very unreliably (i.e. with near chance performance). However, the finding that judgement accuracy differed between double nominative ungrammaticalities on the one hand and double accusatives and datives on the other, but not between accusative and dative, is difficult to reconcile with accounts assuming that case in German – as opposed to other linguistic features such as number - behaves in a uniform way (Fodor & Inoue, 2000).

Furthermore, the results appear problematic for any theoretically driven distinction between the three argument cases in German. Specifically, we will discuss two prominent accounts of case in German and show that neither of them is able to derive the present results in a straightforward manner. Firstly, consider the well-known distinction between structural and lexical case (den Dikken 2000, Gorrell 2000, Bader, Meng & Bayer 2000, Bayer, Bader & Meng 2001). It has often been argued that, at least in transitive constructions such as those examined here, nominative and accusative are structural cases (i.e. assigned in a particular structural configuration), whereas dative is a lexical case (i.e. assigned via the lexical requirements of a specific verb). Clearly, this distinction is unable to account for the differences found here, since it would predict similar processing patterns (and, hence, similar judgement accuracies) for nominative and accusative in comparison to dative. Insofar, the present data pattern is also not in line with assumptions based on general markedness hierarchies of case as assumed, for example, in certain optimality theoretic approaches (e.g. Woolford, 1997; Aissen, 2003, see Vogel, 2003, for an alternative OT perspective), since these would predict differences between all three cases[3].

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[3] We must admit that it may be possible that the descriptive differences between accusative and dative in error percentages as well as response latencies might come out to be significant if the number of subject was raised considerably. If this was indeed the case, one might argue that the performance differences do reflect (at least among other things) differences in markedness. However, seeing that in transitive structures, nominative and accusative are default cases whereas dative is not, one would expect nominative and accusative to cluster against dative, which is not true in any case.

Secondly, it has been argued that morphological case in languages such as German is directly associated with thematic (interpretive) properties of the argument relations in a sentence (Primus, 1999; Neeleman & Weerman, 2001). From such a thematically based perspective, nominative and dative should be expected to cluster together against accusative, as only the former are thematically unmarked.[4] Again, it is apparent that the present results are difficult to derive under such a classification.

Thus, although both of the perspectives discussed above fail to capture the findings of the experiment on their own, a combination of both dimensions appears capable of doing so. If both dimensions are assumed to interact during online language comprehension, both should manifest themselves in the judgement ultimately given. In this way, the judgement results observed in our experiment, i.e. the fact that double nominative constructions are judged less accurately than double datives and double accusatives, may be viewed as resulting from the default status of the nominative case on both dimensions. Similarly, the higher judgement accuracies for the other two cases (though statistically indistinguishable amongst themselves) would result from a combination of a default status on one and non-default status on the other dimension. Despite this appealing account of the present grammaticality judgement data, the speeded grammaticality judgement method itself clearly cannot provide further insights with regard to the interaction of different influences during real-time processing, since it only provides a measure of the *outcome* of processing, rather than of its internal dynamics. Accordingly, subsequent investigations in this domain must draw upon an experimental technique that provides more fine-grained measures both in terms of temporal resolution and with regard to the dissociation between qualitatively different

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[4] 'Thematically unmarked' in the sense used here refers to the fact that an argument may realize a (thematically) non-dependent participant in a transitive argument relation. This is the case for both the nominative and the dative case, since both may be associated with the feature [+control], which the accusative may not (Primus, 1999). Such a perspective is compatible with the recent proposal that, even in languages such as German, external arguments may be realized exclusively with either nominative or dative case marking (Fanselow, 2000; Wunderlich, 2003).

processes. First results from studies using event-related brain potentials (ERPs), a highly time sensitive measure, which may be used to continuously trace online language processes as they unfold in time, have found that the three types of ungrammaticalities tested in the present study do not elicit identical brain responses (Frisch & Schlesewsky, 2003). All three types of violations induce a biphasic ERP response of a N400 (indicating thematic hierarchizing problems) followed by a P600 component (reflecting illformedness of the construction) as expected on the basis o0,00cmf the findings of Frisch & Schlesewsky (2001).

However, double accusatives differ from double nominatives in that they elicit a larger N400 (but show no differences with regard to the P600), while double datives engender a larger P600 than double nominatives (but show no differences with regard to the N400). These results support an interpretation of the judgement accuracies in the present paper as resulting from a multidimensional interaction between thematic and general well-formedness requirements. While nominative case is unmarked on both dimensions and may therefore be integrated most easily even in an ungrammatical structure, dative case is syntactically marked and accusative case is thematically marked. An integrative view of both the behavioural and the neurophysiological findings therefore calls for a multidimensional perspective on the role of case in language processing.

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