Binding German (In)direct objects: Spell-Out strategies for disambiguation

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Abstract. Despite Grewendorf's (1988) well-known German binding data with the double-object verb *zeigen* 'show', which suggests that the direct object (DO) is generated higher than the indirect object (IO), this paper argues for the canonical surface order of IO>DO as base order. Highlighting the exceptional status of Grewendorf's examples, building on Featherston & Sternefeld's (2003) quantitative acceptability rating study, and exploiting the fact that *zeigen* can also be used as inherently reflexive with idiomatic meaning, and we appeal to Bruening's (2010) theory of idiom formation as well as the Encyclopedia within Distributed Morphology (Marantz 1997, Embick & Noyer 2007) and propose a flexible Spell-Out mechanism within a derivational approach to binding (e.g. Hornstein 2001 and Zwart 2002) that can override narrow syntactic case licensing by realizing nominals with different morphological case.

Keywords. reflexive binding; double-object construction; structural accusative case; inherent dative case; object coreference; inherent reflexivity; Encyclopedia; Spell-Out

1. Introduction. The base order of internal arguments in German double object constructions has been argued to be determinable by binding facts (see e.g. Müller 1995 and Anagnostopoulou 2003). For instance, given Grewendorf (1988)'s examples in (1) and assuming that the order of internal arguments satisfies standard binding conditions, it has been argued, in line with grammatical function hierarchies like SUBJ>DO>IO>… (see e.g. Primus 1987), that accusative (ACC) direct objects (DOs) must be generated above dative (DAT) indirect objects (IOs).

(1) a. Der Arzt   zeigte   den   Patienten$_i$ sich$_i$/*ihm$_i$ im   Spiegel.
         the doctor showed the.ACC patient   himself.DAT/him.DAT in.the mirror
     b. Der Arzt   zeigte   dem   Patienten$_i$ *sich$_i$/ihn$_i$ im   Spiegel.
         the doctor showed the.DAT patient   himself.ACC/him.ACC in.the mirror
         'The doctor showed the patient himself in the mirror.'

The canonical surface order of German internal arguments (IO>DO) in other examples would then have to be derived via obligatory scrambling of the IO above the DO (into a DAT-case-licensing A-bar position, according to Müller 1995). The goals of this paper are to argue against conclusions along these lines. We start by revisiting Grewendorf's data in section 2. Then, in section 3, we provide support for the canonical German surface order of IO>DO as base order. Section 4 explains how interference of inherent reflexive readings and the nature of the mirror image scenario in (1) can lead to DO>IO order. Finally, in section 5, we tentatively take a derivational approach to binding and propose a flexible Spell-Out mechanism that eliminates interference from the inherently reflexive use of ditransitive verbs. Among the Spell-Out options is the DAT-ACC case reversal evident in (1). Section 6 concludes the paper.

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2. Shedding light on Grewendorf's (1988) mirror image data. For native speakers, who have not read about examples like (1a-b) in the literature, the first and only possible reading of (1a) that comes to mind is that the doctor showed himself to the patients (plural!) in the mirror, as shown in (1').

(1') Der Arzt$_i$ zeigte   den   Patienten   sich$_i$ im   Spiegel.
      the doctor$_i$ showed   the.**DAT** patient**s** himself$_i$ in.the   mirror
      'The doctor showed himself to the patients in the mirror.'

Here, the anaphor *sich*, which is uninflected for case, number, and gender, is referring to the subject, as expected, given that reflexive pronouns typically are subject-orientated. And the non-anaphoric object *den Patienten* is understood not as ACC singular masculine but as DAT plural. To eliminate the syncretism involved with these two forms and thereby force speakers to interpret the anaphor as getting its reference from the object (and also to avoid V2 word order effects), we changed Grewendorf's examples as shown in (2).

(2)   a. dass der   Arzt$_i$ die   Patient**in**$_j$ sich$_{*i/j}$/ihr$_{*j}$ im   Spiegel zeigte.
          that the.NOM doctor$_i$ the.ACC patient.**F**$_j$ REFL$_{*i/j}$/her$_{*j}$.DAT   in.the   mirror   showed
          'that the doctor showed the patient$_j$ herself$_j$ in the mirror.'
      b. dass der   Arzt$_i$ der   Patient**in**$_j$ sich$_{i/*j}$/sie$_{?j}$ im   Spiegel zeigte.[1]
          that the.NOM doctor$_i$ the.DAT patient.**F**$_j$ REFL$_{i/*j}$/her$_{?j}$.ACC   in.the   mirror   showed
          'that the doctor$_i$ showed himself$_i$ to the patient / the patient$_j$ her$_{?j}$ in the mirror.'

The non-anaphoric object in the (a)-example is now unambiguously ACC-marked, which has the welcome consequence that speakers interpret the anaphor *sich* as being able to refer to only the object in the (a)-example and only the subject in the (b)-example. Still, speakers tend to want to rephrase (2a) entirely in order to express the intended meaning. This confirms that object orientation of the anaphor is a very marginal possibility that speakers generally avoid.

What adds to the marginality of Grewendorf's data is the order of DO(ACC) > IO(DAT) because the unmarked order of objects in constructions involving a ditransitive verb is the opposite, IO(DAT)>DO(ACC), as in *jemandem etwas geben* 'give somebody something'. Also, taking a step back from the morpho-syntax of these sentences, it is worth noting that the situation of showing people themselves in the mirror is rather unusual. People are either shown something or someone other than themselves or, if they look into a mirror, no third party is involved. The one setting where this mirror image scenario might be considered normal is a hair salon: The hair stylist looks at and talks to the client in the mirror and shows them their hair, so that the mirror image is treated like the actual person, and the actual person is treated like the mirror image – an interesting role reversal that we return to in section 4. First, in section 3, we examine double object binding data involving ditransitive verbs other than *zeigen* 'show' and reconstruction effects to show that there is ample evidence for IO>DO, as opposed to DO>IO, as base order.

3. Evidence against DO>IO and for IO>DO as base order. Notice that constructions with classic ditransitive verbs like *schicken* 'send' and *schenken* 'give as a gift', as well as *empfehlen* 'recommend', which lends itself more naturally to object coreference involving animate entities, do not pattern like Grewendorf's (1988).

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[1] We judge the pronominal options as badly degraded (the second author of this paper is a native speaker of German), but Grewendorf marks the non-reflexive pronoun in (1b) as grammatical.

(3) a. * dass sie die Sängerin$_i$ sich$_i$ als Wachsfigur schicken wollten.
　　　 that they the.ACC singer.FEM REFL.DAT as wax.figure send wanted
　　　 intended: 'that they wanted to send the singer herself as a wax figure.'

　　 b. * dass ich meinen Vater$_i$ zum Geburtstag sich$_i$ als Statue geschenkt habe.
　　　 that I my.ACC father for.the birthday REFL.DAT as statue given have
　　　 intended: 'that I gave my dad himself as a statue for this birthday.'

　　 c. * dass man die Angeklagte$_i$ sich$_i$ als Anwältin empfohlen hat.
　　　 that I the.ACC accused REFL.DAT as attorney recommended has
　　　 intended: 'that people recommended to the accused herself as the attorney.'

In all of (3a-c), DO(ACC) > IO(DAT) is ungrammatical, and, importantly, all these examples are good if ACC and DAT case marking on the objects is switched, so that the order is IO(DAT) > DO(ACC), especially when *sich* is intensified with *selbst* 'self'.

　　Furthermore, scope reconstruction effects strongly suggest that the base order of arguments in non-reflexive contexts is IO>DO, not DO>IO (see e.g. Frey 1993 and Lechner 1998). Assuming that a quantifier can be interpreted either in its surface or its base position, we expect it to cause scope ambiguity if it moves from a position lower than another quantifier to a position higher than this other quantifier. Likewise, if the moving quantifier originates higher than the other quantifier, we do not expect scope ambiguity. These expectations are borne out in (4) and (5), respectively.

(4) Genau **einen** Gast hat sie **jedem** Freund vorgestellt (*einen* > *jedem*; *jedem* > *einen*)
　　 exactly **one.ACC** guest has she **each.DAT** friend introduced
　　 (Sternefeld & Featherston 2003: 242)

(5) Genau **einem** Freund hat sie **jeden** Gast vorgestellt (*einem* > *jeden*)
　　 exactly **one.DAT** friend has she **each.ACC** guest introduced
　　 (Sternefeld & Featherston 2003: 241)

Example (4) is ambiguous, the interpretations being that (i) there was one guest who was introduced to every friend or (ii) for every friend, there was a potentially different guest who was introduced to this friend. Example (5), on the other hand, is unambiguous, the only possible interpretation being that there was one friend to whom every guest was introduced. Thus, in (4), where the ACC-marked quantificational DP has been topicalized, it takes scope over the DAT-marked quantifier only in its landing site, not in its origin site, while, in (5), where the DAT-marked quantificational DP has been topicalized, it takes scope over the lower ACC-marked quantifier in both its origin and its landing site. This leads us to conclude that, in their base positions, the DAT-marked IO must be structurally higher than, i.e. must c-command, the ACC-marked DO, yielding IO>DO as base order.

　　Finally, a quantitative study by Featherston & Sternefeld (2003), an acceptability rating experiment, suggests that Grewendorf's (1a) / our (2a) is only one of several possible double object formulations German speakers use to express 'showing someone to themselves' and that it is a rather exceptional one. The study produces three relevant generalizations (tendencies) about the Spell-Out possibilities for object coreference. They are given in (6a-c).

(6) a. DAT antecedents are more accepted than ACC antecedents.
　　 b. Reflexives are more accepted than non-reflexive pronouns as anaphoric elements.
　　 c. Speakers prefer use of the intensifier *selbst* with both reflexive and non-reflexive pronouns.

Taking greater grammaticality as evidence for underlying syntactic structures, generalization (a) suggests that antecedents originate in (rather than move to) the inherent DAT-licensing position (contra Müller 1995), and since DAT marks IOs, the antecedent should be the IO, and the anaphoric element, the DO. Generalizations (a) and (b) combined suggest that the DO is a reflexive rather than a non-reflexive pronoun, and since reflexives must be c-commanded by their antecedents, we arrive at the order of IO>DO.

We thus argue for the base configuration of the verbal argument domain shown in Figure 1 (see also McFadden 2006, Bruening 2010, and Lee-Schoenfeld 2018), regardless of whether an anaphor is involved or not.
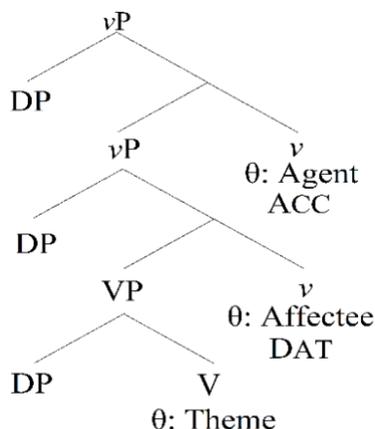

Figure 1: Base structure of the verbal domain including Agent (SUBJ), Affectee (IO)[2], and Theme (DO)

Each verbal head assigns its theta-role to the DP in its projection. Affectee *v* licenses inherent DAT on the Affectee/Goal/Recipient DP (IO), agentive *v* licenses structural ACC on the Theme/Patient DP (DO), and T licenses structural NOM on the Agent DP (SUBJ).

4. The exceptional status of object coreference in (1a)/(2a): Interference from inherent reflexivity.

The question is why the ACC-marked antecedent is grammatical in Grewendorf's (1a) / our (2a), with the verb *zeigen* 'show', but not in the other object coreference examples in (3), with the verbs *schicken* 'send', *schenken* 'give (as a gift)', and *empfehlen* 'recommend'.

Notice that *zeigen* can be used to express two different meanings: (i) 'show someone something', which corresponds to the ditransitive use of the verb, *jemandem etwas zeigen*, and (ii) 'let oneself be seen (by someone) / appear (in public)', which corresponds to the inherently reflexive, idiomatic use of the verb, *sich (jemandem) zeigen*, with an DAT dative argument, as in (7).

(7) dass (sich) die Königin sich der Menge zeigte.
     that (REFL) the.NOM queen REFL.ACC the.DAT crowd showed
     'that the queen appeared to the crowd.'

Meaning (ii) is the only readily available meaning expressed by Grewendorf's (1b) / our (2b), where the anaphor refers to the subject. The higher position of *sich* (in parentheses) in (7) as an alternative to the lower one (not in parentheses) is also an option in (2b), repeated here as (2'b).

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[2] By "Affectee *v*P", we mean an ApplP/*v*applP introducing an applicative argument (Recipient, Beneficiary, etc.).

(2') b. dass (sich) der Arzt der Patientin sich im Spiegel zeigte.
　　　 that (REFL) the.NOM doctor the.DAT patient.F REFL.ACC in.the mirror showed
　　　 'that the doctor showed himself to the patient in the mirror.'

This suggests that we are dealing with the inherent reflexive use of *zeigen* in Grewendorf's (1b) / our (2b). Importantly, in its pre-subject position, *sich* cannot be intensified with *selbst*. This is shown in (2"b).

(2") b. dass (*sich selbst) der Arzt der Patientin sich im Spiegel zeigte.
　　　 that (REFL self) the.NOM doctor the.DAT patient.F REFL.ACC in.the mirror showed
　　　 'that the doctor showed himself to the patient in the mirror.'

This clearly indicates the lexicalization of *sich* to function as part of the verb (Gabriele Diewald p.c., see also König & Gast 2012), despite its possible occurrence in the direct object slot.
　　Based on everything we have laid out thus far, our hypothesis is as stated in (8).

(8) **Hypothesis**: The order of DO(ACC) > IO(DAT) in (1a)/(2a) is only acceptable because the preferred order of IO(DAT) > DO(ACC) in double-object constructions resembles the inherently reflexive use (meaning ii) of the verb in that the non-reflexive object is DAT-marked, and when this meaning is not intended, the best alternative is DO(ACC) > IO(DAT), where the non-reflexive object is ACC-marked.

　　Interestingly, given the hair salon mirror image scenario (see section 2), this alternative even works semantically. The mirror image (normally DO(ACC)) is treated like the actual person, and the actual person (normally IO(DAT)) is treated like the mirror image, so that the roles of Goal and Patient/Theme are reversible, allowing for misalignment of case and theta-roles. Vogel (2014: 376) would argue against this because his claim is that, when antecedent and anaphor refer to different entities (like the actual person and the wax figure of this person), "only the real person may be the antecedent and the statue/image the bound element, not the other way around". He calls this the "Ringo constraint". To support his claim and equating wax figures with mirror images, he provides the examples in (9) (taken from Jackendoff 1992) and (10).

(9) a. All of a sudden Ringo started undressing himself.
　　　 (*himself* = person or statue)
　　b. All of a sudden I accidentally bumped into the statues, and
　　　 *Ringo toppled over and fell on himself.
　　　 (*Ringo* = statue; *himself* = person)
　　　 (Jackendoff 1992: 4)

(10) a. I showed John himself in the mirror.
　　 b. *I showed John to himself in the mirror.
　　　 (Vogel 2014: 376)

(10b) is supposed to be a Ringo constraint violation because the antecedent (*John*) is the mirror image, and the anaphor (*himself*) is the real person. Contra Vogel 2014, we argue that (10b) is perfectly fine given the hair salon scenario. A mirror image is much more like the actual person than a wax figure and therefore escapes the Ringo constraint.

4.1. DITRANSITIVE VERBS BESIDES *ZEIGEN*.[3] If there are other exceptional ditransitive verbs like *zeigen* 'show', which allow object coreference with DO(ACC) > IO(DAT) order but without involving a mirror image situation, the hair-salon-induced role reversal cannot be the whole story. This brings us back to our hypothesis in (8), i.e. interference from inherent reflexivity.

In this subsection, we walk the reader through examples with several other ditransitive verbs that allow for object coreference with DO(ACC) > IO(DAT) order. We conclude that what they all have in common is an inherent reflexive use and that this is what leads to the non-canonical order of DO(ACC) > IO(DAT).

The other ditransitive verb (besides *zeigen* 'show') that shows up in Grewendorf's (1988) examples which suggest that object coreference is only possible given DO(ACC) > IO(DAT) order is *vorstellen* 'introduce'. Its (di)transitive use, which I will label (i), (*jemandem*.DAT) *jemanden/etwas*.ACC *vorstellen* 'introduce someone/something (to somebody / one another)', has the canonical IO>DO order as its unmarked order. It is really a transitive verb with an optional DAT argument. This is illustrated in (11).

(11) dass der   Junge bei der Feier (seinen Eltern)   seine   Freundin   vorstellte.
     that the.NOM boy   at the party (his.DAT parents) his.ACC girl.friend introduced
     'that the boy introduced his girlfriend (to his parents) at the party.'

Its other uses are inherently reflexive: (ii) *sich* (*jemandem/einander*.DAT) *vorstellen* 'introduce oneself (to someone / one another)', again, with an optional dative argument, as in (12):

(12) dass sich die   Lehrer-in   (den   Schülern) vorstellt.
     that REFL the.NOM teacher-FEM   (the.DAT students) introduces
     'that the teacher is introducing herself (to the students).'

and (iii) *sich etwas*.ACC *vorstellen* 'imagine something', as in (13):

(13) dass sich der   Junge so   etwas   nicht vorstellen kann.
     that REFL the.NOM boy   such a.thing.ACC not   imagine   can
     'that the boy can't imagine something like that'

Notice the pre-subject position of *sich* in both (12) and (13), supporting the analysis of uses (ii) and (iii) of the verb as being inherently reflexive. In (11), the order of the DAT and ACC objects can, of course, be switched, but this does not speak against IO> DO as base order and is to be expected in a language where scrambling motivated by information structure is quite common (see e.g. Lenerz 1977 and Haider 2017).

However, Grewendorf's (1988) and Vogel's (2014) examples in (14) and (15), where only DO>IO is grammatical when a reciprocal or reflexive is involved, are problematic in that they seem to fall into the category of Grewendorf's (1a) / our (2a).

(14) a. dass man   die   Gäste_i   einander_i   vorgestellt hat.
        that one.NOM   the.ACC guests_i   one-another.DAT_i   introduced has
        'that the guests were introduced to each other.'
     b. * dass man   den   Gästen_i   einander_i   vorgestellt hat.
        that one.NOM   the.DAT guests_i   one-another.ACC_i   introduced has
        'that the guests were introduced to each other.'

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[3] The translations of the various verb uses and the grammaticality judgments on the given examples in this section are based on the native speaker intuitions of the second author.

(15) a. Ich habe die Gäste$_i$ sich$_i$ gegenseitig vorgestellt.
      I have the.ACC guests$_i$ REFL.DAT$_i$ each-other introduced
      'I introduced the guests to each other.'

    b. * Ich habe den Gästen$_i$ sich$_i$ gegenseitig vorgestellt.
      I have the.DAT guests$_i$ REFL.ACC$_i$ each-other introduced
      'I introduced the guests to each other.'

Assuming that the reciprocal *einander* functions as an anaphor, Grewendorf treats it just like the reflexive *sich* and therefore takes examples (14a-b) to make the same point as his examples (1a-b) / our (2a-b), namely that only the order of DO(ACC) > IO(DAT) is possible when object coreference is involved.

    We side with Sternefeld & Featherston (2003), who show that *einander* is in fact not an anaphoric argument but just an adjunct that can be added to the transitive and inherent reflexive uses of *vorstellen* (uses (i) and (ii)) and therefore does not provide evidence against IO(DAT) > DO(ACC) because (14a-b) are not actually double-object constructions.

    Turning to Vogel's examples (15a-b), however, which express the same meaning as (14a-b) but avoid use of *einander*, we are indeed faced with a use of *vorstellen* that works like that of *zeigen* in (1a-b) / our (2a-b), suggesting that DO(ACC) > IO(DAT) is the only grammatical order when one of the co-referent objects is the reflexive *sich*. Crucially, no mirror image scenario is involved here, so an appeal to the hair-salon-induced role reversal is not an option. We can still, however, fall back on our hypothesis in (8) and appeal to interference of inherent reflexivity. As corroborated by examples like (16), even when the reflexive is not used in its high position (here after *man* 'one') but following the other object, DAT-marking on that other object invokes subject-orientation of the reflexive.

(16) dass man den Gästen nicht nur sich sondern auch sein Konzept
      that one.NOM the.DAT guests not only REFL but also one's.ACC concept

      vorstellen musste.
      introduce must

      'that one needed to introduce to the guests not only oneself but also one's concept.'

Given our hypothesis, in order to disambiguate between meanings (i) and (ii), i.e. to avoid meaning (ii) and thus subject-orientation of the reflexive in (15), the non-reflexive object needs to be ACC-marked.[4]

    Another verb with both ditransitive and inherently reflexive uses that can be found in the literature on object coreference is **überlassen**. Use (i) of this verb, *jemandem*.DAT *jemanden/ etwas*.ACC *überlassen*, comes with the meaning 'leave someone/something (as a task) to somebody', as in (17).

(17) dass niemand einem Kleinkind eine wichtige Aufgabe überlassen würde.
      that nobody.NOM a.DAT toddler an.ACC important task leave would
      'that nobody would leave an important task to a toddler.'

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[4] This argumentation is more immediately convincing when the subject is 3rd person SG/PL (not 1st person as in (15)) because of agreement with *sich*, but any verb that has an inherent reflexive use and occurs with a non-reflexive DAT-argument may lead speakers to go with subject-orientation of the reflexive, even when there is a person mismatch between subject and anaphor.

The order of DO>IO sounds equally good here, but, again, this alternative word order option can easily be derived via non-case-related scrambling.

Use (ii), *sich jemandem*.DAT *überlassen* 'surrender or abandon oneself to somebody', is the inherently reflexive, idiomatic version of this verb and is illustrated in (18), where *sich* can once again occur in pre-subject position.

(18) dass   sich   der   Gläubige voll   dem   Herrn   überlässt.
      that   REFL   the.NOM believer   fully   the.DAT Lord   surrenders
      'that a believer fully surrenders to the Lord.'

Use (iii), *jemanden/etwas*.ACC *sich*.DAT *selbst überlassen* 'leave an animate entity to its own devices' is interesting in that it also comes with idiomatic meaning but is ditransitive instead of inherently reflexive. Here, the reflexive is not subject but object-oriented. An example is provided in (19). Both the object-orientation of *sich* and the intensification of *sich* with *selbst* 'self' make it impossible for the reflexive to occur in pre-subject position in sentences like this.

(19) dass   der   Vater   die   Kinder$_i$ einfach   sich$_i$ selbst   überlässt.
      that   the.NOM father   the.ACC children$_i$ simply   REFL.DAT self   leaves
      'that the father simply left the children to their own devices.'

The ditransitive idiomatic use of *überlassen*, which requires the order of DO(ACC) > IO(DAT), may make this otherwise marked word order particularly common with this verb. In fact, Featherston & Sternefeld (2003), referencing Reis 1976, give the example in (20). They note that it is better when *sich* occurs with *selbst*, but that it is not ungrammatical as is.

(20) Hans   überlässt die   Schwester$_i$ sich$_i$.
      Hans.NOM   leaves   the.ACC sister   REFL.DAT
      'Hans leaves his sister to herself.'
      (Featherston & Sternefeld 2003: 28)

The (marginal) acceptability of this example seems to be due to a combination of the normal ditransitive use (i) and the idiomatic use (iii) of *überlassen*. If the first object were DAT instead of ACC-marked, the inherent reflexive use (ii) would be invoked, as it is in (21).

 (21) dass   man   dem   lieben Gott   nicht nur   sich   sondern   auch   seine
      that   one.NOM the.DAT dear   God   not   only   REFL   but   also   one's.ACC

      Familie   überlassen sollte.
      family   surrender   should

      'that people should surrender to their dear God, not only themselves but also their families.'

Thus, again, DO>IO order and therefore ACC-marking of the first object in examples like (20) might be a way to ensure expression of meaning (i), associated with the ditransitive use, and avoidance of meaning (ii), associated with the inherent reflexive use.

Another verb that allows for both IO>DO and DO>IO order, similar in meaning to *überlassen*, is **anvertrauen**. Its use (i), *jemandem*.DAT *jemanden/etwas*.ACC *anvertrauen* is ditransitive and comes with the meaning 'entrust somebody with someone/something', as in (22).

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(22) dass   niemand   einem Fremden   ein   Geheimnis   anvertrauen   sollte.
    that   nobody.NOM   a.DAT stranger   a.ACC   secret   entrust   should
    'that nobody should entrust a stranger with a secret.'

Once again, there is a use (ii) of this verb, *sich jemandem*.DAT *anvertrauen* 'confide in somebody', that is inherently reflexive and idiomatic. As expected and shown in (23), the inherent reflexive use of the verb allows *sich* to occur in pre-subject position.

(23) dass   sich   Teenager   selten   ihren   Eltern   anvertrauen.
    that   REFL   teenagers.NOM   rarely   their.DAT   parent   confide
    'that teenagers rarely confide in their parents.'

As with *überlassen*, if the ditransitive use (i) is intended and the second object is a reflexive, ACC-marking of the first object, as shown in (24), is the best way to push object-coreference and thereby ensure that the inherently reflexive use (ii) does not get in the way with the intended meaning.

(24) Man   sollte   Kinder$_i$ nicht   sich$_i$ selbst   anvertrauen.
    One.NOM   should   children.ACC   not   REFL.DAT   self   entrust
    'One shouldn't entrust children with themselves.'

If the first object is DAT-marked, the inherent reflexive use (ii) of the verb and thus subject-orientation are unavoidable, even if the reflexive occurs in a normal internal argument position, as in (25).

(25) dass   die   junge Frau$_i$ dem   Therapeuten   sich$_i$ und   ihre   gesamte
    that   the.NOM young woman   the.DAT therapist   REFL   and   her.ACC   whole

    Lebens-geschichte   anvertraut   hat.
    life-story   entrusted   has

    'that the young woman confided in the therapist with her whole life story.'

    The last verb to be discussed here is ***aussetzen***, which is known for obligatory ACC>DAT order of the internal arguments in its ditransitive use (i), *jemanden/etwas*.ACC *einer Substanz / einem Zustand*.DAT *aussetzen* 'expose someone/something to a substance/state, as in (26).

(26) dass   man   niemanden   der   Kälte   aussetzen   sollte.
    that   one.NOM   nobody.ACC   the.DAT cold   expose   should
    'that one shouldn't expose anybody to the cold.'

This might appear to be evidence against IO(DAT) > DO(ACC) as the base order for all double-object constructions, but, as laid out in Lee-Schoenfeld 2018, it is not. Looking back at Figure 1, repeated here as Figure 2, with an added argument slot, it is easy to see how exceptionally patterning verbs like *aussetzen* and *unterziehen* 'cause to undergo' can be analyzed while maintaining IO(DAT) > DO(ACC) base order.
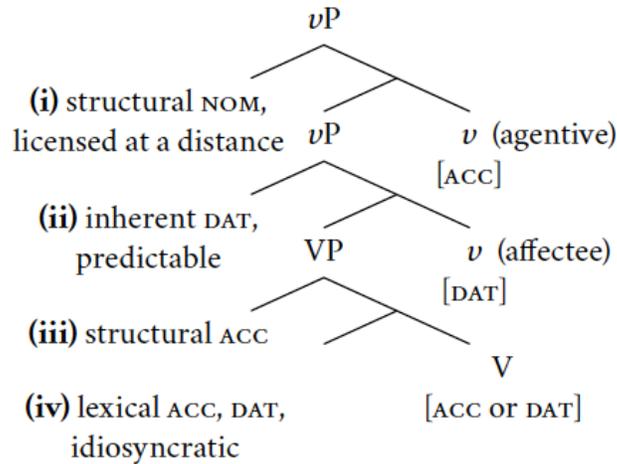
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                                        vP
                                      /    \
(i) structural NOM,                 /        \
licensed at a distance   vP          v (agentive)
                        /   \           [ACC]
(ii) inherent DAT,     /       \
     predictable   VP          v (affectee)
                  /   \          [DAT]
(iii) structural ACC /    \
                    /        \
(iv) lexical ACC, DAT,        V
     idiosyncratic         [ACC or DAT]
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Figure 2: Base structure of the verbal domain including a lexical case position

In (26), the first (ACC-marked) object is the structurally case-licensed DO in Spec VP (see position (iii) in Figure 2). There is no IO because the second object is not an inherently case-marked DAT-argument, i.e. it is not an Affectee (animate Goal or Recipient), so position (ii) in Figure 2 is not used – there is no affectee *v*P projection. The second (DAT-marked) object is a lexically (idiosyncratically) case-marked nominal in sister-to-V position (see position (iv) in Figure 2). Object-coreference with *aussetzen* or *unterziehen* is virtually impossible to construe.

Finally, use (ii) of *aussetzen*, *ein*.ACC *Lebewesen aussetzen* 'abandon/leave someone / an animal (on the street)', is monotransitive and is thus incompatible with object coreference.

To conclude this section, all the potentially ditransitive verbs discussed here, which have also been used in the literature to argue for DO(ACC) > IO(DAT) as underlying order based on object coreference binding facts like those discovered by Grewendorf (1988), have an inherently reflexive use. This supports our hypothesis in (8), namely that the order of DO(ACC) > IO(DAT) is only acceptable because the preferred order of IO(DAT) > DO(ACC) in double-object constructions resembles the inherently reflexive use of the verb in that the non-reflexive object is DAT-marked, and when this meaning is not intended, an alternative is DO(ACC) > IO(DAT), where the non-reflexive object is ACC-marked. Section 5 offers a formal account of this.

5. Towards an account of the form of object coreference. At the core of our analysis is that object-oriented anaphors in German are generated within the VP, [VP sichACC verb], which forces the interpretation of the verb as an inherently reflexive (idiomatic) predicate in line with Bruening's (2010) theory of idiom formation. Thus, the structure [VP sichACC zeigen], when morphologically realized as marked, forces the interpretation of *zeigen* as 'appear' rather than the ditransitive 'show'. The other realizations of object coreference – with ACC>DAT order or the addition of *selbst* – presented in previous sections are alternative structures which are used to prevent the inherently reflexive, subject-oriented interpretation of the *sich*.

In the formal implementation of this, we must take interpretation and lexical meaning to result from at least the output of PF (and LF). It is the contents of (the extended) VP which are responsible for encoding meaning differences. Based on the case-marking of the anaphor and its antecedent or the inclusion of *selbst*, the verb's lexical meaning shifts. If interpretation is read off the structure and form of the expression, then these differences are perhaps expected. The Encyclopedia in Distributed Morphology (Halle and Marantz 1993) is a list of special/idiomatic meanings that can be associated with single lexical items (terminal nodes) or with larger

structures (Marantz 1997, Embick & Noyer 2007). This list is consulted after the output of PF and LF functions. Given the regularity of the lexical semantic force for inherently reflexive verbs, relegating their meaning to the Encyclopedia might seem concerning. However, as Marantz (1996) and Embick & Noyer (2007) point out, all words and phrases in Distributed Morphology may involve Encyclopedic knowledge. As roots themselves lack specific lexical semantic meaning, it is only in their morpho-syntactic context that they are evaluated.

In the case of German reflexive ditransitive constructions, inherently reflexive predicates have unique meaning based on the combination of V and the accusative anaphor.[5] When not used ditransitively, verbs with [$_{VP}$ sich$_{ACC}$ V]-structure introduce both necessary components for interpretation within the same domain, VP. This does not prevent further movement of the anaphor, as is evident from the high position of *sich* in many of the examples in previous sections. We assume that, despite movement, the anaphor can still be interpreted locally to the verb. This may be via reconstruction based on any structure or features remaining after linearization. Encyclopedic interpretation, then, can be based on both syntactic structure and surface morphology.

If the Encyclopedia interprets [$_{VP}$ sich$_{ACC}$ zeigen] or [antecedent$_{DAT}$ [$_{VP}$ sich zeigen]], it yields the (idiomatic) inherently reflexive meaning. If the force of the sentence is (non-idiomatic) non-inherently reflexive, a crash results and the sentence will not be interpreted.

Consider the structure we propose for reflexive double-object constructions (DOCs) like *dem.DAT Patienten$_i$ sich.ACC$_i$ zeigen* 'show the patient himself' in Figure 3.
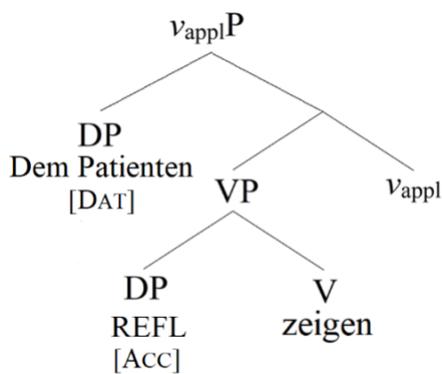

Figure 3: Structure for German reflexive DOC

If this structure is reconstructed and fed into the Encyclopedia, it yields an interpretation consistent with the inherently reflexive meaning because the anaphor is interpreted to have ACC case. In order to prevent the mismatch between idiomatically assigned meaning and the conceptual force of the sentence, another form of the sentence must be selected for interpretation.

What other structures are available for interpretation? If we broaden the scope of evaluation for these options to include Encyclopedic interpretations, then we can derive the variety of options available for binding in German DOCs. Within the narrow syntax, German reflexive DOCs are built as in Figure 3, with the anaphor c-commanded by the coreferential R-expression.

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[5] Although it is clear that the third person anaphor *sich* does not display any true morphological distinctions between its DAT and ACC forms, we still assume the ACC-marking of the anaphor is interpreted in the context of a DAT-marked antecedent. *Zeigen* is not a double-ACC verb (see e.g. Lee-Schoenfeld 2018) and is therefore expected to have differently marked internal arguments.

In this configuration, we are able to uphold the standard assumptions about binding theory dating back to at least Chomsky (1981). While the exact series of operations which builds or licenses the anaphor is not the same as on this early approach (see below for some discussion), we are nonetheless able to maintain the same configuration of binding. Building on other c-command diagnostics for argument structure, like scope discussed in section 3, we can presume this is the stable structure for introducing arguments in German.

If the structure in Figure 3 is correct and the mapping of arguments and case features is always the most direct, then we predict that [vp sichACC zeigen] and its inherent reflexive interpretation is the sole realization of such a structure. However, as discussed in previous sections, there are a variety of different realizations of reflexive DOCs. More specifically, there are three: (a) a sentence strictly faithful to the narrow syntactic representation, (b) a sentence with an element interrupting the idiomatic VP, and (c) a sentence marked morphologically to prevent reconstruction of the idiomatic VP.

Option (a) is the inherently reflexive (idiomatic) realization: [vp sichACC zeigen] is generated and sent to the Encyclopedia for interpretation. Given that the inherent reflexive meaning is the one intended by the speaker, the sentence is interpreted and produced. If the inherent reflexive meaning is not meant by the speaker, the interpretation of structure will clash with the intended force, producing a crash.

Option (b) is to interrupt the idiomatic VP: [vp sichACC selbst zeigen] is derived by the insertion of the intensifier *selbst* after the anaphoric element.

The use of *selbst* can be selected from the numeration and included in the derivation proper, but because *selbst* is (always) an optional addition to the anaphor (when non-inherently reflexive), *selbst*-insertion may be a last-resort operation to disambiguate the orientation of the anaphor. This may be tied to late insertion of adjuncts (Lebeaux 1991). Featherston & Sternefeld's (2003) quantitative generalization (c) from section 3 states that bound object coreference is most acceptable if the anaphor is intensified with *selbst*. This may be the most minimal alteration to the base structure that prevents a crash at the Encyclopedia. This candidate does not produce inherently reflexive meaning because the Encyclopedic interpretation must be local. As noted in section 4, inherently reflexive anaphors cannot be intensified by *selbst* (see also Müller 1999). The *selbst*-structure, shown in Figure 4, interrupts the idiomatic domain in Figure 3, thus allowing for the non-inherently reflexive, ditransitive interpretation.
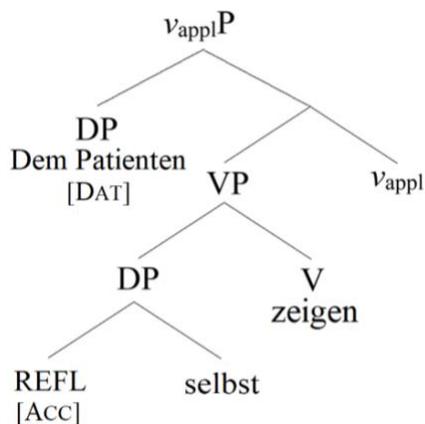

Figure 4: Insertion of *selbst* to interrupt the inherently reflexive (idiomatic) VP

Option (c) involves case switching to yield [$_{VP}$ sich**DAT** zeigen]. Consider again Grewendorf's (1988) (1a), reproduced here as (27).

(27) Der Arzt   zeige   den   Patienten$_i$ sich$_i$ im   Spiegel.
     the doctor   showed   the.ACC patient   himself.DAT   in.the mirror
     'the doctor showed the patient$_i$ himself$_i$ in the mirror'

The IO-antecedent is Spelled Out with morphological ACC despite the IO's inherent DAT case assigned in the narrow syntax. The exact mechanism for the transfer of case features is yet unclear, but there are a few potential solutions if we adopt a derivational account of binding (i.e. one from which anaphors are bound or licensed by movement or agreement). Such a situation would allow the sharing of features along the movement or agreement chain. Movement-based approaches to anaphora (see e.g. Hornstein 2001 and Zwart 2002), license (or rather produce) anaphors by moving a DP to a position within the same domain that c-commands its original position. Subsequently, a Spell-Out rule must be stipulated that alters the realization of a bound DP from its full R-expression to an anaphor. *John$_i$ likes John$_i$* would become *John likes ~~John~~ himself* based on a rule associated with chain reduction (Nunes 2004). Agreement approaches to anaphora (see e.g. Hicks 2009) require a (phi-)agreement process to license an uninterpretable anaphor. The anaphor and the antecedent enter an Agree relationship by which the phi features are shared among the two DPs (Pesetsky and Torrego 2007). In both of these cases, a syntactic relationship is formed between anaphor and antecedent. It is through this relationship that the case features of anaphor and antecedent might be switched. Particularly, movement-based binding accounts might provide the Spell-Out mechanisms that allow switching of the morphological features of the two DPs (or alternating which DP undergoes reduction to an anaphor). Thus, *zeigte dem Patienten den Patienten* is Spelled Out as *zeigte ~~dem Patienten~~ den Patienten sich*. This option is clearly the least minimal way of Spelling Out a structure (relative to at least *selbst*-insertion), thus it is not surprising that it is difficult to find corroborating data, i.e. to replicate Grewendorf's (1988) findings. Left unexplained is a trigger for an operation which functions rather unpredictably. Perhaps in an effort to prevent a crash at the Encyclopedic interface, this operation applies to disambiguate the structure from its inherent reflexive meaning. Under this approach, the faithfully generated morphological string is produced and tested for its meaning, and, if it matches the speaker's intention, is produced. If not, a substitution of the case features applies and meaning is again tested against the speaker's intention. This substitution and testing against levels of meaning may be formulated as a phrasal application of Safir's (2004) morphological competition for anaphora.

6. Conclusion. Ultimately, the solution we propose suggests a broader role of Spell-Out in disambiguating linearization structures. The difficulty of analyzing Grewendorf's (1988) data stems from idiosyncratic variation in the generation of object coreference constructions. Our account allows for a single base structure (IO>DO) in the narrow syntax but a variety of Spell-Out mechanisms.

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