Implicit Arguments in English Double Object Constructions

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Abstract

Pesetsky (1995) argued that both objects in the double object construction must be selected arguments of the lexical verb, based on patterns of optionality. A closer examination shows that this is not correct. The second object of the double object construction and both the NP and PP of the PP frame behave like selected arguments of the lexical verb: the lexical verb determines both whether they can be implicit or not, and how they are interpreted when they are (indefinite versus definite). In contrast, particular lexical verbs determine whether the first object of the double object construction can be dropped, but not how it is interpreted. All implicit first objects are interpreted as pragmatically recoverable definites. Implicit first objects also do not license sluicing, unlike all other implicit objects. I propose a purely syntactic account of these patterns, using the ApplP analysis of double object constructions (Marantz 1993, Bruening 2001). In the analysis, arguments of functional heads like Voice and Appl can only be implicit in the presence of a Pass(ive) head, but arguments of lexical verbs are left implicit through adjunction of an operator to the lexical V. I show that implicit arguments are not projected as NPs in the syntax, contra works like Landau (2010). The failure of sluicing with implicit first objects is then analogous to the failure of sluicing with active-passive pairs. I also suggest that the identity condition on ellipsis makes reference to maximal projections, not to heads as in Rudin (2019).

1   Introduction

There is no shortage of analyses of English double object constructions, exemplified in (1):

(1)   The teacher assigned the students a lot of homework.

One major point of contention is what projects each of the NP objects. In some accounts, both NPs are arguments of the lexical verb (e.g., Larson 1988, Pesetsky 1995); in small clause accounts, neither is (they form a small clause; e.g. Kayne 1984, Aoun and Li 1989, den Dikken 1995, Harley 2008, Pylkkänen 2008). In another variation, the second object is an argument of the lexical verb, but the first object is not, it is instead projected by a functional head Appl(icative) (Marantz 1993, Bruening 2001, 2010a). (I know of no analysis where the first object is treated as an argument of the lexical verb but the second is not.)

Pesetsky (1995) looks at patterns of argument optionality and argues that both objects must be selected arguments of the lexical verb. This is because particular lexical verbs determine whether each object is obligatory or optional. There are verbs like *wish*, *hand*, and *lend* that require both objects:

(2)   a.   I wish you all the best.

       b.   * I wish all the best.

       c.   * I wish you.

Verbs like *assign*, *pass*, and *sell* require the second object but permit the first to be absent:

(3)   (Pesetsky 1995: 157, (421))

       a.   The teacher assigned the students the homework.

       b.   The teacher assigned the homework.

       c.   * The teacher assigned the students.

Verbs like *feed*, *fine*, and *spare* require the first object but permit the second to be absent:

(4)   a.   They fined the offender an astronomical amount.

       b.   * They fined an astronomical amount.

       c.   They fined the offender.

Verbs like *teach*, *pay*, and *strike* allow either or both objects to be missing:

(5)   a.   The knight struck his enemy a killing blow.

       b.   The knight struck a killing blow.

       c.   The knight struck his enemy.

       d.   The knight struck.

There are also many more verbs that allow either object to drop but require at least one of them to be present, like *charge, cost, envy, ...*:

(6)   a.   They charge visitors an entrance fee.

       b.   They charge an entrance fee.

       c.   They charge visitors.

       d.   * They charge.

This pattern of facts does seem to indicate that both objects must be selected by the lexical verb, as Pesetsky concluded. To my knowledge, this argument has largely been ignored in subsequent literature, and many current analyses deny that both objects are arguments of the lexical verb.

In apparent contradiction with the above facts, there is a large and productive class of verbs that seem to select only a single object, but which can also be used in the double object construction:

(7)   a.   She melted some ice cream.

       b.   She melted me some ice cream.

(8)   a.   They built a time machine.

b.   They built us a time machine.

With this class of verb, at least, it does not seem to be correct that the first object is a selected argument of the verb. When it is not present, there is no entailment of a first object (an intended recipient). This means that the first object seems to be added by some element other than the lexical verb. At the same time, though, the semantics is the same as with the other double object verbs above: the English double object construction uniformly encodes intended caused possession (Green 1974, Oehrle 1976, Goldsmith 1980; see also Pinker 1989, Gropen *et al.* 1989, Pesetsky 1995, Krifka 2004, Bruening 2018b). This shared semantics makes a unified analysis of all double object constructions desirable, but that is impossible if the first object is selected by the lexical verb with some verbs but is added by some other element with other verbs.

In this paper I attempt to reconcile this conflict, and the conflict with existing analyses of double object constructions, by examining argument optionality in more detail. A closer look at implicit arguments (arguments that are not present syntactically but are semantically entailed) reveals significant asymmetries between the two objects. These asymmetries, I will argue, show that the first object is not solely an argument of the lexical verb, but the second object is, as is a PP if the verb permits the PP frame in addition to (or instead of) the double object construction. This pattern of facts is most consistent with the ApplP analysis first proposed by Marantz (1993) and developed by Bruening (2001, 2010a, 2018b, 2020), and I will propose accounts of the facts within a version of this ApplP analysis.

I begin by establishing the patterns of implicit arguments in double object constructions and prepositional datives in section 2. This section will show that an implicit first object never permits sluicing, but implicit second objects and implicit PPs do. Additionally, implicit first objects are interpreted differently from implicit second objects and PPs. Implicit second objects and PPs can be either definite or indefinite, depending on the verb. In contrast, implicit first objects are uniformly definite, in the same way that implicit external arguments in the passive are uniformly indefinite. There are also two interesting asymmetries involving implicit second objects (themes/direct objects): First, verbs like *bake* that are basically transitive permit an implicit direct object when they are monotransitive, but they never do in the double object construction. Second, implicit direct objects are only ever licensed in one of the double object or PP frames, and not both (with one exception).

Section 3 spells out the ApplP analysis of the double object construction that I assume. It also outlines assumptions regarding passives and selection. Section 4 then proposes a novel analysis of implicit arguments. This section shows that implicit arguments are not projected in the syntax as NPs at all, contra works like Landau (2010). I propose an analysis where arguments of lexical verbs are left implicit by head-adjunction of an $\exists$ or ι operator to the verb itself. In contrast, arguments of functional heads like Voice (Kratzer 1996) and Appl require a functional head like Pass(ive) in order for their argument to be implicit. Section 5 then shows how this analysis when combined with the ApplP analysis of double object constructions can account for the patterns of data discovered in section 2. The failure of sluicing with an implicit first object is treated in the same way as active-passive mismatches in sluicing (e.g., Merchant 2013). I suggest that the syntactic identity condition on ellipsis makes reference to maximal projections rather than to heads as in Rudin (2019). This correctly rules out all argument structure mismatches in sluicing, but permits implicit arguments of lexical verbs to license sluicing. Finally, two appendices discuss further empirical facts regarding implicit arguments in double object and PP constructions. Appendix A goes into more detail on

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the interpretation of implicit first objects, while Appendix B discusses complications arising from multiple implicit arguments.

2   Implicit Arguments in Double Object Constructions

This section comprises the empirical investigation of this paper. Looking closely at implicit arguments in double object constructions, I show that there are two asymmetries where implicit first objects behave differently from implicit second objects and implicit PPs. There are also two important dependencies involving implicit second objects (or themes/direct objects). I begin with sluicing.

2.1   An Asymmetry in Sluicing Licensed by Implicit Arguments

Implicit arguments often license sluicing, where the wh-phrase in the sluiced clause corresponds to the implicit argument in the antecedent clause (this is sometimes called "sprouting"; see, e.g., Chung *et al.* 1995, 2011, Merchant 2001):

(9)   The patient already ate, but we're not sure what.

The elided clause here is interpreted as *what the patient already ate*. The overt wh-phrase *what* corresponds to the implicit argument of *ate* in the antecedent clause.

   Interestingly, the two objects in the double object construction do not behave the same in this respect. An implicit second object can often license sluicing:

(10)   a.   She is going to serve the guests now, but I don't know what.
         b.   She is going to feed the dogs now, but didn't say what.
         c.   Ron has to pay the loan shark, but I don't know how much.
         d.   They charge every visitor, but their website doesn't say how much.
         e.   They are definitely going to fine you, I just don't know how much.
         f.   I think you need to tip the waiter in Germany, but I don't know how much.
         g.   It will cost you, I just don't know how much.
         h.   He teaches high-schoolers, but I'm not sure what subject.

   In contrast, an implicit first object never can. If the verb does not permit the PP frame, sluicing is just ungrammatical without a pronounced indefinite first object:[1]

(11)   a.   They accidentally charged *(someone) way too much, but we can't figure out who.
         b.   That guy once tipped *(a waitress) almost 300%, but I can't remember which waitress.

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[1]Some speakers may allow a preposition to pop up with some of these verbs in order to license sluicing, even when they do not otherwise allow a preposition (on this phenomenon, see Bruening 2010b and footnote 22). These speakers still do not allow sluicing without the P, though. Note also that sluicing is completely acceptable with an overt indefinite, so there is no problem with extracting the first object in the sluiced clause (not surprising, since sluicing can generally violate constraints on extraction).

  c. That guy envies *(one of his neighbors) the big house and the expensive car, but I can't remember which of his neighbors.

  d. The pope once forgave *(someone) blasphemy, but I don't know who.

  e. The court denied *(one of the prisoners) due process, but they won't tell us who.

  f. The warden will permit *(someone) one last conjugal visit, but he didn't say who.

  g. The black knight struck *(one of his opponents) a killing blow, but we couldn't see which opponent.

If the verb does permit the PP frame, then sluicing requires a preposition, unless there is a pronounced indefinite first object:[2]

(12) a. They're going to sell the house, but I don't know who *(to).

  b. They're going to sell someone the house, but I don't know who.

(13) a. She was telling stories last night, but I don't know who *(to).

  b. She was telling someone stories last night, but I don't know who.

(14) a. The coach yelled at her to pass the ball, but he didn't say who *(to).

  b. The coach yelled at her to pass someone the ball, but he didn't say who.

(15) a. The suspect served one glass of poisoned Kool-Aid, but we don't know who *(to).

  b. The suspect served one of these people a glass of poisoned Kool-Aid, but we don't know who.

More examples follow (but condensed), illustrating the full generality of this fact (and that it does not matter whether the preposition is *to* or *for*):

(16) a. They awarded a prize, but we're not sure who *(to).

  b. The secretary forwarded that embarrassing email, but I'm not sure who *(to).

  c. A: They sometimes grant extensions. B *(To) who?!

  d. A: They sometimes guarantee their work. B: *(To) who?!

  e. The UPS man left a package, but I'm not sure who *(for).

  f. They may offer a compromise, but *(to) who?

  g. They reserved a ticket, but I'm not sure *(for) who.

  h. That person is saving a seat, but I'm not sure *(for) who.

  The two objects do not act at all the same when they are implicit, then. The second object can license sluicing when it is implicit, but the first never can. These data also indicate that the first object does not behave like the PP of the PP frame, either, since an implicit PP can clearly license sluicing. Implicit PPs can do this in general, even with verbs that only allow a PP frame and do not permit the double object construction:

(17) a. They donated a sizable tract of land, but the records don't indicate to which charity.

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[2]Chung *et al.* (1995: 248) observe this effect with *serve* and Chung (2013: 3) notes it with *send*, but neither of those works notes its full generality. Note also that the order P NP versus NP P (known as "swiping," Rosen 1976, Culicover 1999, Merchant 2002) is just a matter of personal preference and is irrelevant here. I used the order that sounds most natural to me, but the other order is generally acceptable, too.

> b.　She plans to submit this paper, but doesn't know to which journal yet.

The first object of the double object construction then behaves unlike all other internal arguments of verbs. Unlike direct objects and PPs, it can never license sluicing when it is implicit.

2.2　An Asymmetry in How Implicit Arguments are Interpreted

The second asymmetry involves the interpretation of implicit arguments. Various researchers have shown that implicit arguments divide into two groups, with some implicit arguments being interpreted existentially and others being interpreted as pragmatically recoverable definites (Shopen 1973, Thomas 1979, Fodor and Fodor 1981, Dowty 1981, Fillmore 1986; see Williams 2015: chapter 5 for discussion and references).[3] Which is which depends on the lexical verb. For instance, the optional arguments of *eat* and *steal* are indefinite, and do not need to be identifiable at all. For instance, one can just ask out of the blue, *Have you eaten?*, with no item in the discourse to serve as the object of *eat*. In contrast, *win* and *watch* only permit their internal arguments to be missing if what is won or what is watched is pragmatically identifiable:

(18)　a.　A: Check it out. Ron has a new car!
　　　　　B: He won a contest. / #He won. (Williams 2015: 100, (19))

　　　b.　A: How did Ron do in the big sack race?
　　　　　B: He won!

(19)　a.　A: Why does Fred look very disturbed?
　　　　　B: He's been watching the news. / #He's been watching.

　　　b.　The news has been covering the riots, but Fred hasn't been watching.

As Chung *et al.* (1995: 267) and Williams (2015: chapter 5) point out, sluicing, just discussed, brings out this contrast nicely. Verbs that take indefinite implicit arguments are compatible with sluicing, but verbs that take definite implicit arguments are generally not (but see section 2.2.3 for qualifications):

(20)　a.　The patient already ate, but we're not sure what.

　　　b.　He definitely stole from the convenience store last night, we're just not sure what.

(21)　a.　# Ron won, but I can't remember what.

　　　b.　# Fred watched, but we're not sure what/who.

It will turn out that there is another asymmetry in double object constructions, involving definite versus indefinite interpretations. This asymmetry again picks out first objects as opposed to all others.

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[3]The terms "indefinite" and "definite" are simplifications. There are cases where an indefinite implicit argument can apparently refer to something given, for instance in *John picked up the glass of beer and drank* (Groefsema 1995: 145, (23a)). As Groefsema (1995: 145) points out, the implicit argument is still indefinite in that it refers to an unspecified amount of beer, not to the whole glass of beer (unlike *drank it*, which would require drinking the entire glass of beer). I will ignore this complication here. See also Koenig and Mauner (1999).

2.2.1 Implicit Second Objects

Starting with second objects, the following verbs all seem to allow an implicit second object in the double object construction that is interpreted as an indefinite, judging by the felicity of sluicing:

(22) (repeated from (10))
    a. She is going to serve the guests now, but I don't know what.
    b. She is going to feed the dogs now, but didn't say what.
    c. Ron has to pay the loan shark, but I don't know how much.
    d. They charge every visitor, but their website doesn't say how much.
    e. They are definitely going to fine you, I just don't know how much.
    f. I think you need to tip the waiter in Germany, but I don't know how much.
    g. It will cost you, I just don't know how much.
    h. He teaches high-schoolers, but I'm not sure what subject.

These verbs also allow an implicit second object in out-of-the-blue contexts, with no entity in the discourse:

(23) a. They don't serve customers before noon.
    b. When do they feed the animals?
    c. If you want a ride, you have to pay the wrangler.
    d. Do they normally charge visitors?
    e. If you park there, the police will fine you.
    f. I think you need to tip the waiter in Germany.
    g. Apologizing now will definitely cost you.
    h. He teaches high-schoolers.

In addition to these verbs, however, there are also verbs where an implicit second object seems to be interpreted as a definite. The second object can only be dropped where it is recoverable from the discourse, and sluicing is pragmatically odd without a pronounced indefinite:[4]

(24) a. A: I have bad news. B: Tell me.
    b. She told me #(something), but I couldn't hear what.

(25) a. Bill is guilty of infidelity, and his wife will never forgive him.
    b. The priest forgave Bill #(some sin or other), it doesn't really matter what.

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[4]I have not included the obligatory double object verb *bill* in these lists. This verb does allow sluicing, but only with *how much*:

(i) a. They can't bill you without telling you how much.
    b. * They will bill you, but I don't know what.

Bill only seems to take an amount as its second object (*They billed me $200/*a pint of blood*). The amount does not have to be present in the discourse, but the discourse does have to include that some amount is expected. For this reason I tentatively classify *bill* as taking a definite implicit second object, even though sluicing with *how much* is felicitous.

(26) a. A: I will never leave you. B: Promise me!

b. She promised me #(something), but I can't remember what.

(27) a. A: I have a question. B: Ask me.

b. She asked me #(something), but I couldn't hear what.

(28) a. A: There's something weird in the bathroom. B: Show me.

b. She showed me #(something), but I can't remember what.

This means that particular lexical verbs determine both whether the second object can be dropped, and how it is interpreted when it is. Some verbs have indefinite implicit second objects (*serve, feed*, …), while others have definite implicit second objects (*tell, forgive*, …). The second object behaves in this way as though it is selected by the lexical verb.

2.2.2 Implicit First Objects

When we turn to the first object of the double object construction, however, we find something different. We have to limit ourselves to non-alternating verbs, though, to be sure that what is implicit is not a PP. We already saw that implicit first objects with non-alternating verbs categorically ban sluicing. We can now ask how the missing first object is interpreted. We cannot use sluicing as a diagnostic for an indefinite interpretation, however, because sluicing is ungrammatical. We have to look for other kinds of data.

One context to look at discussed by Williams (2015) involves quantifiers. Definite implicit arguments can have a bound reading in the scope of a quantifier, but indefinite ones cannot (see also Martí 2006). With the verb *win*, the sentence with and without an overt pronoun are synonymous, but this is not true with *eat*:

(29) (Williams 2015: (81a,b))

a. Every contest turned out to have been rigged by the person who won (it).

b. Every cake turned out to have been baked by the person who ate. $\neq$ Every cake turned out to have been baked by the person who ate it.

So, we can look for bound readings as a diagnostic for definite versus indefinite interpretations. We can also just look at the context for felicitous use of an implicit object.[5]

First, though, among obligatory double object verbs, some do not allow the first object to be missing. These include *begrudge, bill, fine,* and *spare* (on the relevant meaning). *Afford* and *lose* allow the first object to drop, but there is no entailment that it is present; these just seem to be able to be used as simple transitives:

(30) a. The judge could not afford a fair trial. $\neq$ The judge would not afford him/anyone a fair trial.

b. He lost the game. $\neq$ He lost his team the game.

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[5]Another way to tell the difference is with negation. With an indefinite implicit object and negation, for instance *They weren't eating*, the interpretation is that they were eating nothing. With a definite, for instance *They weren't watching*, the interpretation is instead that there is a particular thing that they weren't watching, not that they weren't watching anything. The reader can use this test to verify the facts reported here (as an example, *They haven't charged the entrance fee yet* means there is a particular person they haven't charged yet, not that they have charged no one).

I believe that *bet* is similar. If there is no first object representing the person with whom the wager is made, no such person is entailed. What is entailed is that there is some sort of contest the outcome of which forms the basis for the wager. World knowledge tells us that there must be some individual with whom the bet is made, but this could be an online betting service or some other shadowy entity that is not linguistically entailed by the sentence.

(31)   a.   She bet a lot of money.
             $\approx$ She bet a lot of money on something.
             $\neq$ She bet him/her/someone a lot of money.
       b.   A: Do you have something riding on this game? B: I bet a lot of money.

Other obligatory double object verbs do allow the first object to be missing and still entail it. With all such verbs, a paraphrase with an indefinite does not seem to be appropriate. What does seem to be appropriate in many cases is either a generic *you/one* or a unique definite appropriate to and recoverable from the situation, or perhaps an NP bound by the subject:

(32)   a.   Tourist destinations always charge a lot.
             $\neq$ Tourist destinations always charge someone a lot.
             $\approx$ Tourist destinations always charge you/one/their visitors a lot.
       b.   You're supposed to tip at least 20% now.
             $\neq$ You're supposed to tip someone at least 20% now.
             $\approx$ You're supposed to tip the/your server at least 20% now.
       c.   Many catholics believe God will never forgive premarital sex.
             $\approx$ Many catholics believe God will never forgive you/one/his followers premarital sex.
       d.   Courts in other countries often deny due process.
             $\approx$ Courts in other countries often deny you/one/their charges due process.
       e.   The warden will usually permit one last conjugal visit.
             $\approx$ The warden will usually permit you/one/his prisoners one last conjugal visit.

Strike and *envy* seem to require a pragmatically recoverable definite:

(33)   a.   A: Why is this sword dented? B: #The black knight managed to strike a heavy blow.
       b.   A: Why is the white knight bleeding so badly? B: The black knight managed to strike a heavy blow.
(34)   a.   A: What's up with Bill? B: #He envies the big house and expensive car.
       b.   A: Why does Bill dislike Monty? B: He envies the big house and expensive car.

I will investigate the interpretation of the missing first object with these verbs more fully in Appendix A.

All of these verbs appear to allow bound readings with an implicit first object in the scope of a quantifier:

(35)   a.   No traveler should expect tourist destinations to charge (them) very little.
       b.   No waitress wants a customer to tip (her) less than 20%.

c.   No teenage catholic actually believes that God won't forgive (him/them) premarital sex.

d.   No US citizen taken into custody in the Middle East is shocked when the court denies (them) due process.

e.   No man on death row expects the warden to permit (him) one last conjugal visit.

f.   No duelist wants his opponent to be able to strike (him/them) a killing blow.

g.   No successful investor is unhappy if his neighbors envy (him/them) the big house and expensive car.

It therefore appears that missing first objects in the double object construction are either not entailed at all, or they are definite if they are. This contrasts with a missing second object, which can be either definite or indefinite, depending on the verb.

Going back to sluicing from the previous section, one might suggest that sluicing is not possible with a missing first object *because* missing first objects are not indefinite. Chung *et al.* (1995: 267–268) suggest a way that we can test this. They note that definite implicit objects are generally not felicitous with sluicing, but become much better when the verb with an implicit object is embedded in a clause that helps to neutralize the speaker's assumptions:

(36)   (Chung *et al.* 1995: 267–268, (66b), (67b), judgments theirs)
   a.   * They applied yesterday. I wonder what for.
   b.   ? They claimed to us that they had applied, but they refused to say for which jobs.

Attempting to do this with implicit first objects does not appear to have any salutary effect:

(37)   a.   She reported that she had accidentally charged way too much, *but she didn't report who.

   b.   That guy claims he once tipped 300%, *but he won't tell us who.

   c.   Bob's therapist reported that he envies the big house and the expensive car, *but she wouldn't say which co-worker.

   d.   The pope claimed that he once forgave blasphemy, *but he didn't say who.

   e.   A whistleblower alleged that a secret military court denied due process, *but the allegation didn't reveal who.

   f.   The warden has let it be known that he will permit one last conjugal visit, *but no one knows who.

   g.   The black knight claimed that he struck a killing blow in yesterday's melee, *but he wouldn't say which opponent.

I therefore conclude that it is not the case that implicit first objects fail to license sluicing because they are interpreted as definites. Sluicing actually seems to be categorically ungrammatical. The asymmetry in sluicing and the asymmetry in interpretation are therefore not the same fact. Implicit first objects in double object constructions categorically ban sluicing; and, in a separate finding, they are all interpreted as definites.

2.2.3 Implicit PPs

Implicit first objects contrast in this respect with implicit PPs. As we saw in section 2.1, many implicit PPs licensing sluicing. One might take this to indicate that these implicit PPs are all therefore indefinite. However, the facts turn out to be a little more complicated. First, some of these implicit PPs do indeed seem to be indefinite. Sluicing is felicitous, with no larger set required in the discourse; no goal needs to be present in the discourse in a simple declarative; and a bound variable reading requires an overt pronoun (the star in the (c) examples means, on the bound reading):

(38) a. They're going to sell the house, but I don't know who to.
　　b. I just sold the house! (no buyer necessary in discourse)
　　c. [Everyone who places a bid at an auction]$_1$ wants them to sell the item *(to him/her/them$_1$).

(39) a. She was telling stories last night, but I don't know who to.
　　b. She was telling stories last night. (no listeners necessary in discourse)
　　c. Every child$_1$ was entranced by the person who told a story *(to him/her$_1$) last night.

(40) a. The coach yelled at her to pass the ball, but he didn't say who to.
　　b. She wouldn't pass the ball. ('to anyone'; no goal necessary in discourse)
　　c. [No player on the sidelines]$_1$ wants the goalie to pass the ball *(to him/her/them$_1$).

(41) a. That person is saving a seat, but I'm not sure who for.
　　b. That person is saving a seat. (no individual necessary in discourse)
　　c. No usher$_1$ wants any ticketholder to save a seat *(for him/her/them$_1$).

In contrast, some others of the verbs that did license sluicing in section 2.1 actually seem to require a definite implicit PP. This means that the simple acceptability of sluicing is not a reliable diagnostic for indefinite implicit arguments. With sluicing, however, the wh-phrase has to range over a discourse-salient set. As with implicit first objects, above, the implicit PP is a generic *you/one* or the speech act participants, or it is a unique definite appropriate to and recoverable from the situation (often, in some salient relation with the subject NP). A bound variable reading also does not require an overt pronoun.

(42) a. The suspect served one glass of poisoned Kool-Aid, but we don't know who to. (presupposed set of possibilities)
　　b. A: Why is there a slice of cake on the table? B: They just served dessert. (to us/the people present at the tables)
　　c. Every customer$_1$ got offended at the waiter who served the wrong dish (to him/her/them$_1$).

(43) a. They awarded a prize, but we're not sure who to. (presupposed set of possibilities)
　　b. They will award a prize. (presupposed set of possibilities, e.g., the contest entrants)
　　c. Every blue-ribbon winner$_1$ thanked the judge who awarded the prize (to him/her/them$_1$).

(44) a. The secretary forwarded that embarrassing email, but I'm not sure who to. (presupposed set of possibilities)
　　b. She didn't forward the email. (to the speaker/a particular person)
　　c. No boss$_1$ would get upset if the secretary fails to forward spam (to him/her/them$_1$).

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(45) a. A: They sometimes grant extensions. B: To who?! (B's response denies knowledge of the presupposed set)

     b. They almost never grant extensions. (to applicants)

     c. Few applicants$_1$ asked the agency to grant an extension (to them$_1$).

(46) a. They may offer a compromise, but to who? (presupposed set)

     b. They offered a compromise. (to us or salient discourse referent)

     c. No prisoner$_1$ would refuse to see a DA who came to offer a deal (to him/her/them$_1$).

(47) a. They reserved a ticket, but I'm not sure who for.

     b. The secretary reserved a ticket. (salient individual presupposed)

     c. Every business traveler$_1$ gets upset when someone fails to reserve a ticket (for him/her/them$_1$).

(48) a. A: They sometimes guarantee their work. B: To who?! (denies presupposition)

     b. They guarantee their work. (their customers)

     c. Every customer$_1$ was satisfied with the contractor who guaranteed his work (to them$_1$).

(49) a. The UPS man left a package, but I'm not sure who for. (presupposed set of possibilities)

     b. The UPS man left a package. (speech act participants, or salient individual)

     c. Every housewife$_1$ was angry at the delivery man who left a package (for her$_1$) on the porch.

Note that all of the above verbs alternate between the PP frame and the double object construction, and it is unclear whether the implicit argument is the first object of the double object construction, or the corresponding PP. There are two reasons to conclude that it can be a PP, however, and implicit PPs can therefore be definite. First, as can be seen in the (a) examples above, sluicing is possible with an overt preposition and a presupposed set of possible answers. This means that the antecedent clause with an implicit goal/recipient has to be the PP frame, because sluicing is not licensed when argument structures mismatch (see Levin 1982, Chung *et al.* 1995, Merchant 2001, 2013, Chung 2005, 2013 and sections 2.3.1 and 5.5). The second reason is that there are also verbs that cannot appear in the double object construction, but which also seem to take definite implicit PPs. For instance, *contribute*, *explain*, and *introduce* are infelicitous without the PP if there is no salient individual in the context:[6]

(50) a. # Teri contributed $5.

     b. A: Have you raised any money for the hospital ward? B: Yes, Teri contributed $5.

(51) a. # Barry explained the contract.

     b. A: What happened in the board meeting today? B: Barry explained the contract.

(52) a. # Samantha is nervous, she's going to introduce her girlfriend tonight.

_____

[6]Some may find it relatively easy to accommodate with *explain* and *introduce*. Nevertheless, I believe these PPs are definite, as negation indicates: *Barry didn't explain the contract* does not mean that he explained it to no one, it means there is some particular individual he did not explain it to (possibly the speaker). The other verbs behave similarly.

b.   Samantha is nervous about going to her parents tonight, she's going to introduce her girlfriend.

Implicit PPs can be either definite or indefinite, then, depending on the lexical verb. With alternating verbs, it is possible that an implicit definite goal/recipient is either a PP, or the first object of the double object construction.

In addition to the verbs listed above, Fillmore (1986) noted that the missing goal argument of *give* has to be pragmatically recoverable in the discourse:

(53)   a.   A: Why does Samantha look so smug? B: #She just gave $100.
       b.   A: Did you donate to the koala chlamydia ward? B: Yes, I gave $5.

Fillmore just assumed that the missing argument is a PP and not the first object of the double object construction, but, as with the other alternating verbs, it is actually impossible to tell. As we would expect, sluicing is ungrammatical without the preposition:

(54)   * She gave $5, but we don't know which charity.

Still, outside of sluicing, the implicit argument could be either a PP, or the first object of the double object construction.

Assign behaves similarly to *give*. An implicit goal must be present in the discourse, and a bound reading does not require an overt pronoun:

(55)   a.   The teacher assigned an essay. (to us/the students)
       b.   No student$_1$ would be happy with a teacher who assigns thirty pages of reading (to him/her/them$_1$).

Implicit PPs, then, behave just like implicit second objects: the particular lexical verb determines whether or not the PP can be implicit, and it also determines how it is interpreted when it is implicit. There is one complication with alternating verbs, which is that we cannot tell whether a definite implicit goal/recipient is an implicit PP, or an implicit first object of a double object construction. With sluicing with an overt preposition, it must be a PP.

2.2.4   Summary

To summarize, the second asymmetry lies in how implicit arguments are interpreted. An implicit first object in a double object construction is always definite. In contrast, implicit second objects and implicit PPs can be either indefinite or definite.

At this point we can provide a tentative classification of ditransitive verbs, in the form of a table:

(56)

Second Object	First Object		PP		
	Implicit: Def	*Implicit	Implicit: Def	Implicit: Indef	*Implicit
Implicit: Definite	forgive ask email/text/…	promise show spare lose (bill)	guarantee	tell pass throw sell	
Implicit: Indef	charge cost envy fine pay strike tip	feed fine write(?)	give serve	teach	
*Implicit	assign deny permit	afford begrudge bet wish	assign award forward grant leave offer reserve send	rent save	hand lend

Note that the entire column "PP: Implicit: Def" could also be a definite implicit first object. Additionally, the alternating verbs that allow neither argument to be implicit (e.g., *hand, lend*) are listed under the heading "PP," but they can also appear in the double object frame (still allowing neither argument to be implicit).

I have also not been able to find many alternating verbs that do not permit the PP to be implicit. This is probably because there are not many verbs that take the PP as an obligatory argument. There are many verbs that do not require the PP, but when it is absent there is no entailment of a goal (e.g., *she kicked the ball/the wall*). I therefore do not take the emptiness of the top two rightmost cells to be significant. If it is not, then all possible combinations are attested, other than the missing indefinite first object interpretation.

2.3 Two Dependencies Involving Implicit Second Objects

Moving on, there are also two interesting dependencies involving implicit second objects. First, the productive class of verbs that are simple transitives but can have a first object added never allow the second object to be implicit when a first object is added. Second, the ability of the second object to drop depends on what frame the verb appears in.

2.3.1 Implicit Second Object Not Allowed with Base Transitives

As noted above, there are many verbs that are simple transitives in their base use, with just a single object. They can have an additional object added to them as the first object of the double object

construction, with the meaning of intended caused possession. Some of these verbs allow their sole object in the simple transitive to be implicit. However, they can never form a double object construction when it is:

(57) a. We're baking them a cake.

     b. We're baking right now.

     c. We're baking *(for) them right now. (where 'them' is intended recipient)

(58) a. She mixed them a drink.

     b. She's busy mixing right now.

     c. She's busy mixing *(for) them right now. (where 'them' is intended recipient)

(59) a. The tenor sang us an aria

     b. The tenor sang.

     c. The tenor sang *(for/to) us.

(60) a. The dog barked us a greeting.

     b. The dog barked.

     c. The dog barked *(at) us.

It is important to note that it is not the case that the double object construction bans an implicit second object across the board. Verbs that always appear with either a PP or in the double object construction do permit an implicit second object. A couple of examples are repeated from (10) above:

(61) a. She is going to serve the guests now, but I don't know what.

     b. Ron has to pay the loan shark, but I don't know how much.

One could suggest that *serve* and *pay* can be used as monotransitives with the goal as the sole argument of the verb, but then one would not expect sluicing to be licensed. The sluiced clause in (61a), for instance, must be *what ~~she is going to serve the guests now~~*, with struck through material elided. This clause must have a ditransitive argument structure, since it has two objects, *the guests* and *what*. We know that clauses with differing argument structure do not license sluicing, for instance active-passive pairs or double object/PP pairs (Levin 1982, Chung *et al.* 1995, Merchant 2001, 2013, Chung 2005, 2013):

(62) a. * Someone hacked my computer, but I'm not sure by who.

     b. * She gave someone a car, but we're not sure to who.

If the first clause in (61a) were a simple transitive, it would not license ellipsis in the second clause. The first clause therefore also has to be a double object construction, with an implicit second object. (See more on sluicing in section 5.5.)

The generalization is then that a verb permits the second object in the double object construction to be implicit only if it always takes an additional argument as either a PP or the first object of the double object construction. Stated another way, a simple transitive verb that can appear in the double object construction cannot if its base object is implicit.

2.3.2 Implicit Direct Object Depends on DOC versus PP

Additionally, the direct object behaves differently depending on whether the other argument is a PP or an NP. There is a relatively large class of verbs that allows the second object to drop only if the other argument is the first object of the double object construction, and not a PP:

(63)   a.   She didn't show (*to) us yet.

       b.   She didn't ask (*of) us yet.

       c.   She didn't email/text/telegraph (*to) me yet. (whole class of verbs of instrument of communication behaves the same)

       d.   She didn't pay (*to) me yet.

       e.   They didn't serve (*to) us yet.

       f.   You promised (*to) me!

       g.   She teaches (*to) special-needs children.

       h.   They're feeding (*to) the seals right now.

I have been able to find three verbs that permit the second object to drop only if the other argument is a PP and not the first object of the double object construction:

(64)   a.   She wouldn't pass *(to) me.

       b.   She wouldn't throw *(to) me.

       c.   She gives *(to) the Red Cross.

There are also non-alternating verbs with PPs that permit the direct object to be implicit: *She doesn't submit (papers) to that journal, She doesn't donate (money) to any charities, She wouldn't contribute (anything) to our fund drive.*

There is one verb that appears to permit the second object to drop in the presence of either a first object or a PP:

(65)   a.   She wrote to me.

       b.   She wrote me.

If this is genuinely what is going on with *write*, then it may only be an accidental lexical gap that few verbs permit an implicit direct object in either frame. It would just happen to be the case that every verb other than *write* allows the direct object to be implicit in only one frame. I will take this to be the case, and design the analysis so that this is an accidental gap. However, it will be important to be able to model the fact that individual verbs only allow an implicit direct object in one particular frame, and not the other.[7]

---

[7]An alternative that I will not pursue is that *She wrote me* is actually the PP frame but has a null preposition. For many speakers this construction is quite marked. It also does not passivize without the P: *I was written *(to)*. One could propose that the P can be null just when the PP and its complement are pronounced together adjacent to the verb. If this sort of analysis is correct, then *write* falls into the same class as *pass*, and it might be significant that no verb allows an implicit direct object in either frame.

2.4 Summary of Empirical Facts

This section has observed several unexpected patterns, summarized below:

1. Implicit second objects and implicit PPs license sluicing, but implicit first objects do not.

2. Implicit second objects and implicit PPs can be either definite or indefinite, but implicit first objects are only definite.

3. A simple transitive that allows an implicit object does not if it is used in the double object construction.

4. An implicit direct/second object is licensed only in the double object construction for some verbs, and only in the PP frame for other verbs.

In subsequent sections, I will develop an analysis that will attempt to explain these patterns. One thing that I will not be able to explain, and will essentially have to stipulate, is which verbs license implicit arguments, and which implicit objects are interpreted as definite versus indefinite. While my account will therefore not explain why an implicit first object is definite (pattern 2), it will explain why there is no variation depending on the lexical verb. The analysis will also propose explanations for the failure of sluicing (pattern 1) and patterns 3 and 4 in the list above, although part of pattern 4 will also have to be stipulated. I believe some stipulations are going to be necessary, in any account, since many of these facts are idiosyncrasies of particular lexical items (see section 4.4 for discussion).

3   The ApplP Analysis of Double Object Constructions

In this section, I lay out my assumptions regarding the structure of the PP frame and the double object construction, preparatory to building an analysis of the facts discovered in the previous section. I start with choosing among possible approaches to double object constructions.

3.1   Selection and Analyses of Double Object Constructions

Based on their treatment of the relation between the lexical verb and the NP arguments, analyses of double object constructions can be divided into roughly three categories: (1) analyses that say that both NP arguments are selected arguments of the lexical verb; (2) analyses that say that neither NP is an argument of the lexical verb, instead the two NP arguments form a small clause; and (3) analyses that say that the second object is a selected argument of the lexical verb, but the first object is instead projected in the specifier of a functional projection.

In the first category are the analyses of Pesetsky (1995) and Larson (1988, 2014, 2017). Recall that Pesetsky (1995) concluded that particular lexical verbs must select both NP objects in the double object construction, and that particular lexical verbs must also select both the NP and the PP in the PP variant. Pesetsky therefore proposed an analysis where all four are arguments of the lexical verb, through the mediation of a preposition (*to* in the PP frame, a null preposition *G* in the double object construction). In Larson's (1988, 2014, 2017) analysis, the NP and PP of the

PP frame are specifier and complement of the lexical verb underlyingly, and the double object construction is derived from this by syntactic operations.

Having re-evaluated the facts, it appears that Pesetsky's conclusion was too hasty. All of the data presented in section 2 indicates that the first object of the double object construction behaves differently from the second object and from both arguments in the PP frame. As we have seen, an implicit first object in the double object construction can only be definite and does not license sluicing, while implicit second objects and PPs can be either definite or indefinite and do license sluicing. The second object in the double object construction, and both arguments in the PP frame, act like they are selected arguments of the verb in this respect, but the first object does not. It is true that the lexical verb determines whether the first object can be dropped or not, but sluicing is never allowed when it is, and the interpretation seems to be uniformly definite. This indicates that the treatment of the first object is not entirely up to the lexical verb, and there seems to be a role for something else besides the lexical verb regarding the first object. Given this, I conclude that the first object is alone in not being entirely a selected argument of the lexical verb. I therefore will not pursue an analysis like Pesetsky's or Larson's where both objects are selected by the lexical verb.

Let me now turn to small clause analyses. The small clause analysis appears to have been first proposed by Kayne (1984). Aoun and Li (1989), Johnson (1991), den Dikken (1995), Hornstein (1995), Oba (2002), Pylkkänen (2008) all propose versions of a small clause analysis. The most prominent small clause analysis, however, is the HaveP version proposed by Harley (1997) and adopted by numerous others (Harley 2002, 2008, Beck and Johnson 2004, Ramchand 2008, Harley and Jung 2015). In small clause analyses, the two NP objects are not arguments of the lexical verb. Instead, the verb combines with a small clause that has the first NP as the subject of a predicate that includes the second NP. In many versions, including the HaveP version, this small clause is headed by an element that indicates possession.

Small clause analyses seem particularly ill-equipped to deal with the facts discussed here. As we have seen, the second object of the double object construction behaves like it is a selected argument of the lexical verb. The small clause analysis denies this. In the small clause theory, the only thing that is an argument of the lexical verb is the small clause itself (and even that is not true in the HaveP theory, where the lexical verb is just a manner modifier). It should be noted that verbs that truly do select small clauses never permit implicit arguments, of either the subject or any nominal inside the predicate (note that Have is considered to be of category P in Harley's work):

(66) a.   I want [the workers at their desks]!

b.   * I want [at their desks]!

c.   * I want [the workers at]!

(67) a.   I consider [him beneath contempt].

b.   * I consider [beneath contempt].

c.   * I consider [him beneath].

(68) a.   We can never permit [adults on the playground].

b.   * We can never permit [on the playground].

c.   * We can never permit [adults on].

This is exactly what we would expect, if the lexical verb does not select either of these NPs directly, and only selects the small clause itself. The lexical verb should never be able to determine anything

about what is inside the small clause, given the locality of selection.[8] (Note that *consider* when it takes only a single NP as object permits that NP to be implicit: *I will consider (the request) and get back to you*.)

For this reason, I will not pursue a small clause analysis. We need an analysis where the second object, at least, is a selected argument of the lexical verb.[9] (Other data point to the same conclusion: see Bruening 2010a, 2020 on idioms and collocations, and Bruening 2018a on depictive secondary predicates.)

The third class of analysis is the only one that seems consistent with the patterns of implicit arguments that we have seen. This type of analysis says that the second object is the complement of the lexical V, but the first object is projected in the specifier of an Appl(icative) Phrase above the lexical VP:

(69)

```
        ApplP
       /    \
     NP     Appl
           /    \
        Appl     VP
                /  \
               V   NP
```
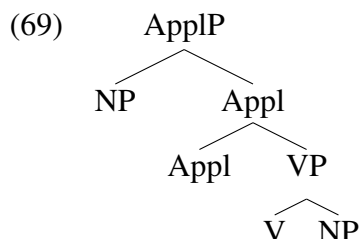
This analysis was proposed by Marantz (1993) for Bantu languages and developed for English by Bruening (2001, 2010a, 2020).[10] In this analysis, the PP frame has a different structure, without ApplP. In the PP frame, both the NP and PP arguments are arguments of the lexical verb. Notice that this analysis has the right character to capture the implicit argument data: the second object of the double object construction, and the NP and PP of the PP frame, are all selected directly by the lexical verb; but the first object is not. This type of analysis then has the potential to account for the facts we have seen, which all pick out the first object of the double object construction as exhibiting distinct behavior. I will therefore adopt this analysis, and pursue explanations of the facts within its framework. The rest of this section spells out this analysis in detail, as well as some other assumptions regarding passives and selection.

## 3.2   The ApplP Analysis: The PP Frame

I will propose a modified version of the ApplP analysis from Bruening (2001, 2010a, 2020). In this analysis, the PP frame and the double object frame have a different syntax and a different semantics. In the PP frame, both the NP and the PP are arguments of the lexical verb. The external

---

[8]A reviewer notes that when prepositions permit implicit objects, they are generally definite: *On Mondays, I'm not in (the office)*; *He has a hat on (his head)*; *He took his clothes off (his body)*. This is unlike what we have seen with implicit second objects, which can be either definite or indefinite, so it is unlikely that licensing an implicit second object could be attributed to a null P within the small clause.

[9]In some versions of small clause analyses, a verb like *give* is analyzed as 'cause to have', with the verb *have* heading the small clause. This analysis might try to relate the licensing of implicit arguments to the verb *have*. As a reviewer points out, however, *have* does not license implicit arguments: *Do you have *(anything/something)? Where's the screwdriver—Do you have *(it)?* The analysis of double object constructions as 'cause to have' therefore does appear to be a viable one.

[10]There is another ApplP analysis of double object constructions, namely the "low applicative" analysis of Pylkkänen (2008). This is a variety of small clause analysis, and I do not adopt it for the reasons enumerated immediately above. See also Larson (2010) on issues with the semantics of the low applicative analysis.

argument, following Kratzer (1996), is not; it is projected by a functional head Voice. Given that constituency tests put the PP higher than the NP (see Janke and Neeleman 2012), I adopt the following structure, rather than the one proposed in Bruening (2010a):

(70)
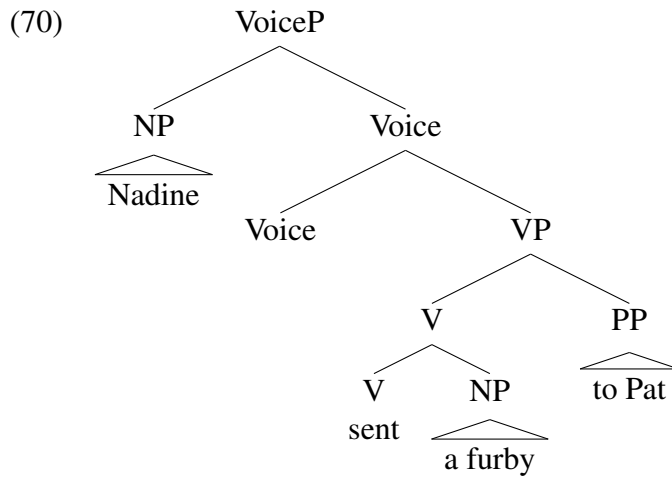
The verb moves from V to Voice, where it is pronounced.

This structure might appear to be inconsistent with the binding data, which seem to indicate that the NP is hierarchically higher than the PP (Barss and Lasnik 1986, Larson 1988). However, Bruening (2014a) shows that binding depends not on c-command but on *precede-and-command*. Precede-and-command is the conjunction of precedence and a looser notion of hierarchical command, phase-command:

(71)   Phase-Command: X phase-commands Y iff there is no ZP, ZP a phasal node, such that ZP dominates X but does not dominate Y. (Bruening 2014a)

(72)   Phasal nodes: CP, VoiceP, NP

In (70), the NP and the PP phase-command each other, since every phasal node that dominates one also dominates the other (just VoiceP here). However, the NP precedes the PP, but the PP does not precede the NP. Therefore the NP can bind (into) the PP, but not vice versa.
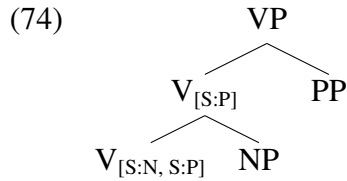
As for the semantics, the PP is interpreted as a goal of the event described by the verb (in this example, a sending event):

(73) $[\![send]\!]^{w,g} = \lambda x \lambda y \lambda e.sending(e,x)$ in w & goal(e,y) in w

In the semantics, I will treat PPs as being individuals; the preposition itself is basically vacuous. I assume that it is there purely for c-selectional reasons (see next paragraph). The verb then denotes a sending eventuality where the internal argument (the theme or patient, more or less) is the first argument (x) and the goal is y (following Kratzer 2002, I do not have a "theme" predicate but instead have this argument (x) as an argument of the event description itself). Voice will then add an external argument (see Kratzer 1996). The definition of "goal" is prospective; it is therefore not necessarily reached (see more on this below).
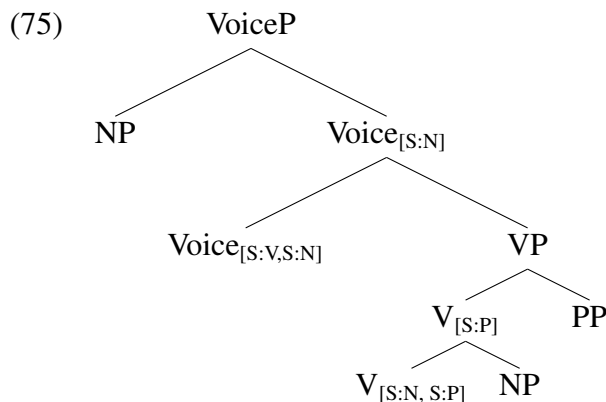
As we will see, we need to distinguish predicate-argument relations in the semantics from syntactic selection. I will borrow the system of selectional features from Bruening (2013). In this account, syntactic heads have selectional features, notated [S:X] to indicate that the head selects for

something of category X. These features are checked off by merging something of the appropriate category. For instance, a verb that selects an NP object will have the selectional feature [S:N], and this feature will be checked off by merging something of category N. What it means to be checked off is that the feature does not project to the dominating node. Consider the following structure:

(74)

$$
\begin{array}{c}
\text{VP} \\
\diagup\diagdown \\
\text{V}_{[S:P]} \quad \text{PP} \\
\diagup\diagdown \\
\text{V}_{[S:N,\,S:P]} \quad \text{NP}
\end{array}
$$

In the PP frame, the lexical verb selects something of category N, and something of category P. It therefore has two selectional features, [S:N,S:P]. When an NP is merged, the [S:N] feature is checked off and so does not percolate to the mother node. The [S:P] feature is not yet checked off, so it does percolate to that node. However, a PP is then merged, satisfying the [S:P] feature, and so the maximal projection VP then does not have any features. They have all been satisfied and checked off.

Voice has the selectional features [S:V,S:N], which will be checked off by merging first with a VP and then with an NP:

(75)

$$
\begin{array}{c}
\text{VoiceP} \\
\diagup\diagdown \\
\text{NP} \qquad \text{Voice}_{[S:N]} \\
\diagup\diagdown \\
\text{Voice}_{[S:V,S:N]} \qquad \text{VP} \\
\diagup\diagdown \\
\text{V}_{[S:P]} \quad \text{PP} \\
\diagup\diagdown \\
\text{V}_{[S:N,\,S:P]} \quad \text{NP}
\end{array}
$$

When Voice combines with the VP, the [S:V] feature does not project, but the [S:N] feature does. When the intermediate projection of Voice then merges with an NP, the [S:N] feature is also checked off, and the VoiceP has all selectional features checked off. I assume that by the end of the phase (Chomsky 2000), which is VoiceP in this example, all selectional features must be checked off. This means that no selectional features can be present on VoiceP. In this example, there are none. The selectional features of V have all been checked in VP, while the selectional features of Voice are checked within VoiceP. Note that the locality domain for the checking of selectional features being the phase both imposes a tight locality condition on selection (the phase) and also allows some limited instances of non-local selection. This will be relevant below.
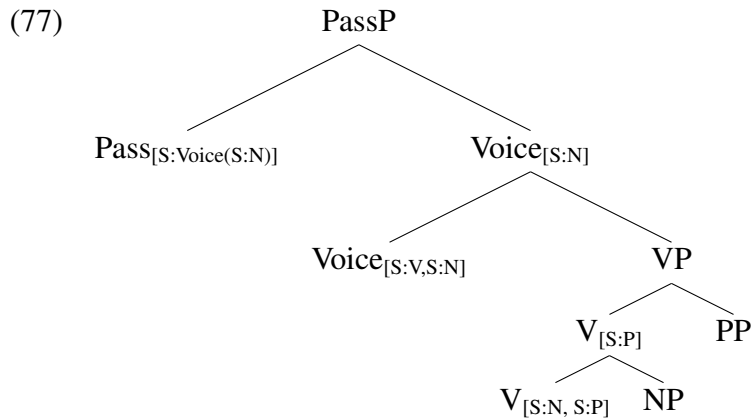
In the case under discussion, the semantics of a verb like *send* in (73) line up with the syntactic selectional features: the V takes two semantic arguments, x and y, one of which must be an NP and the other of which must be a PP. Merging an NP and a PP, in that order, checks off the selectional features and provides appropriate arguments for the predicate. Ditto for Voice, which takes an f as first argument, corresponding to VP, and an individual as second argument, corresponding to NP:

(76) $[\![\text{Voice}]\!]^{w,g} = \lambda f_{\langle s,t \rangle} \lambda x \lambda e. f(e)$ in w and initiator(e,x) in w

(Departing from Kratzer 1996, Voice combines by function application, not a rule of Event Identi-fication; and I use the term "initiator" as a cover for external argument roles in general.)

3.3 The Passive

Bruening (2013) proposes that certain functional heads can also select for projections with an unchecked feature. For instance, the passive head Pass selects for Voice with an unsatisfied [S:N] feature. This is notated [S:Voice(S:N)]. When the passive head merges with a Voice projection that has the unchecked [S:N] feature, it checks it off, meaning that it does not project:
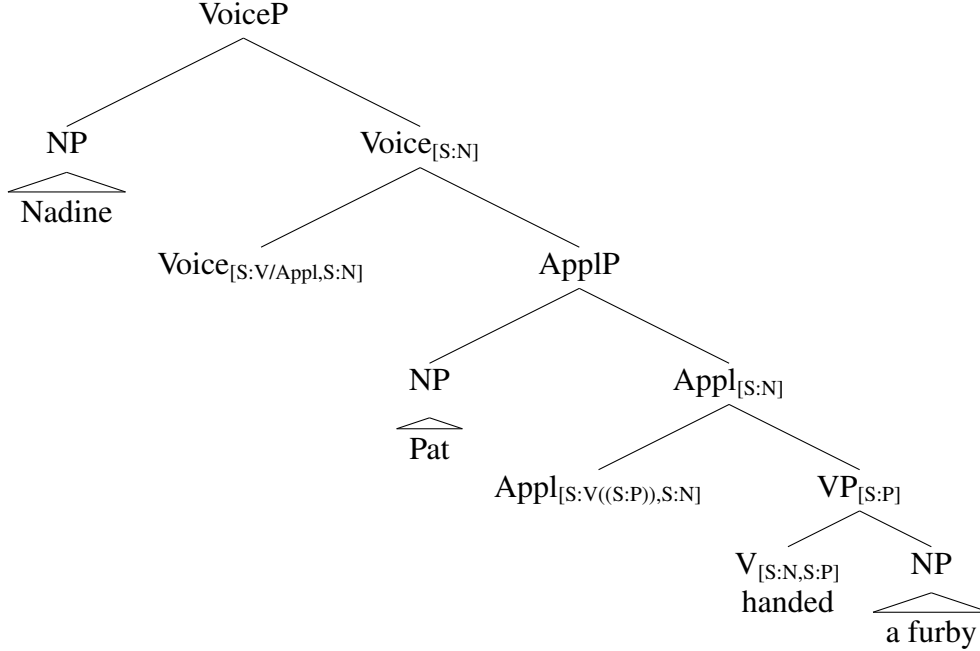
(77)

$$
\begin{array}{c}
\text{PassP} \\
\diagup\diagdown \\
\text{Pass}_{[\text{S:Voice(S:N)}]}\text{Voice}_{[\text{S:N}]} \\
\diagup\diagdown \\
\text{Voice}_{[\text{S:V,S:N}]}\text{VP} \\
\diagup\diagdown \\
\text{V}_{[\text{S:P}]}\text{PP} \\
\diagup\diagdown \\
\text{V}_{[\text{S:N, S:P}]}\text{NP}
\end{array}
$$

If a head with a feature [S:Y(S:X)] merges with a Y with feature [S:X], both selectional features are checked off. The resulting PassP in (77) then has no selectional features. In a dynamic theory of phases (e.g., Bošković 2014, Wurmbrand 2017), PassP, as the highest functional head in the extended VP, is the phasal node, and so this phase converges. (In the passive, an NP must move to become subject; the PP, although hierarchically higher than the NP, is not an NP, and so is ineligible to move. The NP then moves to become the subject.)

One thing to notice right now is that this is one way an argument can be left implicit. If there is no by-phrase, the logical argument of Voice is implicit and is interpreted as an indefinite. In Bruening (2013), this is because the head Pass can existentially bind the individual argument of Voice. I will suggest below that arguments of functional heads like Voice and Appl can only be left implicit through the addition of further functional heads like Pass.

3.4 The Double Object Construction

First, though, let me turn to the double object construction. In the ApplP analysis, the double object construction has a different structure from the prepositional frame in (70), and a different semantics. In the PP frame, the NP and the PP are both arguments of the lexical verb. In the double object construction, in contrast, the first object is projected by a head Appl(icative) above VP and below Voice, while the second object is still an argument of the lexical V:

(78)

VoiceP
- NP: Nadine
- Voice$_{[S:N]}$
  - Voice$_{[S:V/Appl,S:N]}$
  - ApplP
    - NP: Pat
    - Appl$_{[S:N]}$
      - Appl$_{[S:V((S:P)),S:N]}$
      - VP$_{[S:P]}$
        - V$_{[S:N,S:P]}$: handed
        - NP: a furby

The verb moves through Appl to Voice; it is pronounced in Voice, so that it precedes the first object.

As in the PP structure in (70), the verb selects for both an N and a P. It merges with an NP, checking off the [S:N] feature. However, it does not merge with a PP. Instead, Appl selects for a V that optionally has an open [S:P] feature. This checks off both the [S:V(S:P)] feature of Appl and the [S:P] feature of VP, as explained above, so that the intermediate projection of Appl has only an [S:N] feature. This is checked off by merging an NP in the specifier of Appl. Voice then attaches as before, except that we now have to allow Voice to select either for V or for Appl (notated [S:V/Appl]).

Now the syntactic features do not line up nicely with the semantic predicate-argument relations. The V has two individual arguments but only one is merged with it. I propose that Appl has the following denotation:
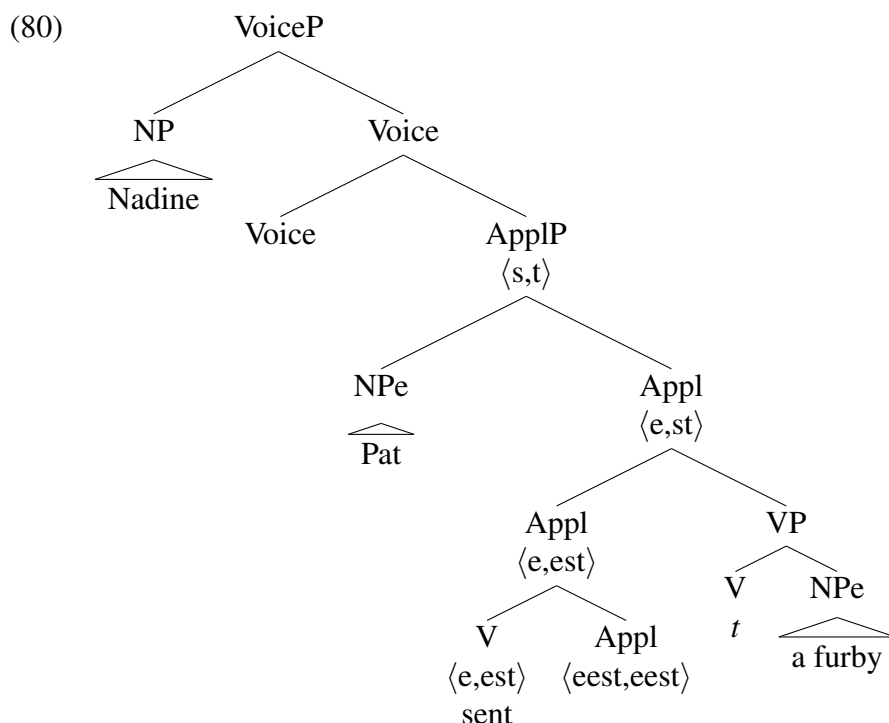
(79) $\llbracket \text{Appl} \rrbracket^{w,g} = \lambda f_{\langle e,(e)st \rangle} \lambda x \lambda y \lambda e.f(e,x(,y))$ in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow$ $\exists e'$[possession(e',x) in w' and possessor(e',y) in w' & CAUSE(e,e') in w']]

An "i-world" is an *inertia world* (Dowty 1979, Portner 1998; for an overview, see Martin 2019). The idea is that, if the event e is not interrupted, it will lead to (or cause) a further eventuality, in this case a possession eventuality. Some verbs in the double object construction entail the possession eventuality, while others do not (Oehrle 1976); see Beck and Johnson (2004), Beavers (2011), Harley and Jung (2015) for discussion. For instance, it is possible to say something like *Nadine sent me a package but I never got it*. The idea of i-worlds is meant to account for this: in possible worlds where the verbal event continues without interruption, the possession eventuality will be caused by the verbal event. However, this causal relation can be interrupted in the actual world (for instance, by someone stealing the package from my porch before I get home). I will return in a moment to verbs that do entail the possession relation.

First, it is important to explain how the predicates and arguments combine. Notice that Appl and V share their x and y arguments in this denotation, such that x and y are now participants in both eventualities. The argument x is the internal argument of the verbal event, and the possessum

of the possession eventuality, while the y argument is the possessor of the possession eventuality and (in the case of an alternating verb) the goal of the verbal event.

Notice second that the first semantic argument of Appl is a function f, which comes from the verb. As stated above, I assume that V moves through Appl to Voice, where it is pronounced. I now assume that V is interpreted in Appl, although it starts in V and is pronounced in Voice. The following structure shows this intermediate position where it is interpreted, along with the semantic types involved:

(80)

```
                          VoiceP
                         /      \
                      NP          Voice
                     /  \        /     \
                  Nadine      Voice      ApplP
                                         ⟨s,t⟩
                                        /     \
                                     NPe        Appl
                                    /  \       ⟨e,st⟩
                                   Pat         /     \
                                           Appl        VP
                                          ⟨e,est⟩      /  \
                                          /    \      V    NPe
                                         V      Appl  t    /  \
                                     ⟨e,est⟩ ⟨eest,eest⟩   a furby
                                       sent
```

Appl takes the verb as its first argument, and by doing so unifies their two individual arguments. If the trace of the verb in VP is semantically vacuous, the sister of Appl will then be type e, so the NP daughter of VP can fill in the first argument of Appl and V. The intermediate Appl will then combine with the specifier of Appl, which will fill in the second argument. ApplP will then be of type ⟨s,t⟩, which is the right type for Voice to combine with. (Alternatively, the trace of the V can be a higher type, abstracted over by movement of V; the outcome would be the same. For simplicity, I treat the trace of the V as vacuous.) Once Appl has combined with V and the two NPs, the denotation of ApplP will be the following:

(81) $[\![\text{ApplP}]\!]^{w,g} = \lambda e.\text{sending}(e, \text{furby})$ in w & goal(e, Pat) in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'$[possession(e', furby) in w' and possessor(e', Pat) in w' & CAUSE(e,e') in w']]

Voice will then add an external argument, as usual. The end result will be a set of sending events of a furby with initiator *Nadine* and goal *Pat*, which in all i-worlds leads to a possession eventuality with possessor *Pat* and possessum the same furby.

Verbs that pattern with *send* and do not entail possession include verbs of sending (*send, mail, ship*), verbs of ballistic motion (*toss, throw, hurl, lob*) verbs of instrument of communication (*email, fax*), and verbs of future having (*bequeath, leave*); see, e.g., Beavers (2011). Other

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verbs, including *give, hand, sell, slip, pass (the salt), trade* do entail possession. Since this is not my main concern here, I will simply assume that these take not a "goal" argument, but an "actualized goal" argument, or *a-goal* for short. An a-goal is a goal that is reached, like an endpoint with change of location predicates. I will assume that this is part of the lexical semantics of these verbs, as shown here for *hand* (for much more detail on culmination entailments, see Martin 2019):

(82) $[\![hand]\!]^{w,g} = \lambda x \lambda y \lambda e.handing(e,x)$ in w & a-goal(e,y) in w

Since the PP argument is an actualized goal, the NP argument of the verb is entailed to have reached the goal in the actual world.

When a verb like *hand* is combined with Appl, for instance in *Nadine handed Pat a furby*, the a-goal predicate is still included:

(83) $[\![ApplP]\!]^{w,g} = \lambda e.handing(e, furby)$ in w & a-goal(e, Pat) in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'$[possession(e', furby) in w' and possessor(e', Pat) in w' & CAUSE(e,e') in w']]

Appl still introduces i-worlds, so it is only in those worlds where there is a possession eventuality. However, the a-goal is part of w, and so is entailed in the actual world. Note that this account says that an entailment of successful transfer of possession in the double object construction comes from the lexical semantics of the verb, which is basic in the PP frame, and therefore predicts that no verb would differ in its entailments from the PP frame to the double object construction. As far as I am aware, this is correct.[11]

Let me now turn to verbs that do not take PP arguments, but can appear in the double object construction. These are predicted to never entail successful transfer of possession, which is also correct. These are verbs like *bake* and *melt* which take only one argument. They lack a goal (or a-goal) altogether. However, they can still be used in the double object construction, for instance in *She melted me some ice cream*. The verb *melt* does not take a goal PP at all (**She melted some ice cream to me*). In the ApplP analysis, the goal/P argument is optional; Appl can also combine with a verb that does not take a goal PP. In that case, the x argument will be the only argument of the verbal event, and the y argument will be a participant only in the possession eventuality:

(84) She melted me some ice cream.
$[\![ApplP]\!]^{w,g} = \lambda e.melting(e, ice\ cream)$ in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'$[possession(e', ice cream) in w' and possessor(e', me) in w' & CAUSE(e,e') in w']]

This denotes a set of melting-of-ice-cream events, which in all i-worlds result in a possession eventuality with possessor *me* and possessum the ice cream. The possession is only intended with all such verbs, since there is no a-goal predicate for the actual world w with such verbs (nor any goal).

An important point to note about the analysis here is that, while the semantic computation proceeds from a derived position (by the verb moving to Appl), checking of the syntactic selectional features is always done in the base position. So checking of selectional features takes place in the tree in (78), as previously outlined. As has been recognized for decades, selection is something that takes place in base positions.

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[11]Oehrle (1976) claims that entailments of successful transfer of possession can depend on the choice of external argument (see also Martin and Schäfer 2017). I find these effects weak to non-existent with ditransitive verbs in English, and do not discuss them here (Martin and Schäfer 2017: note 1 cite an unpublished 2013 manuscript by Hans Kamp that also argues that any apparent such effects are cancellable).

3.5   Lexical Entries and Lexical Idiosyncrasies

I also need to spell out my assumptions about lexical entries, and how lexical idiosyncrasies are encoded. I will do this with reference to non-alternating verbs, those which can only appear in the double object construction and not in the PP frame. These include verbs like *charge, cost, envy, forgive, permit*. I adopt the view that lexical entries can include syntactic structure in them (which is clearly necessary for phrasal idioms). A verb like *charge* is then listed as occurring only embedded under an Appl:

(85)   *lexical entry for* charge *specifies that it is only well-formed in the following context:*

```
        Appl
       /    \
    Appl     VP
            /  \
           V    NP
        charge
```
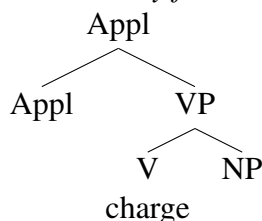
There will obviously be much other information in the lexical entry, but the important point is that it can include structure. In this case, it can specify that *charge* never occurs as a V by itself, but only in a VP that is sister to Appl. Any derivation that includes *charge* will then only be licit if it includes at least the substructure in (85).

   Now that we have an analysis of double object constructions, and some assumptions about lexical entries and selection, we can proceed to analyze implicit arguments.

4   The Analysis of Implicit Arguments

Before we can address the patterns of implicit arguments in ditransitive constructions, we need an analysis of implicit arguments in general. I build such an analysis in this section. I start with the question of whether implicit objects are represented in the syntax as null NPs, or not. I conclude that they are not present in the syntax at all, and propose a formal analysis of how they work in the syntax. This analysis is then used in section 5 to account for the ditransitive patterns uncovered in section 2.

4.1   The Syntactic Status of Implicit Arguments

Implicit objects in English have been the topic of extensive investigation. Some early references include Shopen (1973), Bresnan (1978), Thomas (1979), Fodor and Fodor (1981), Dowty (1981), Mittwoch (1982), Fillmore (1986). For overviews, see Bhatt and Pancheva (2006), Williams (2015). In order to build a theory that accounts for the data we have seen in double object constructions, we first need to decide what the syntactic status of implicit objects is. The question here is whether they are projected in the syntax, as some sort of null NP, for example. Most of the above literature has concluded that implicit arguments are not present in the syntax, but some recent publications, most importantly Landau (2010), have argued that implicit arguments must be syntactically present in some way. I show that this proposal is problematic, and implicit objects act like they are not present in the syntax at all.

Landau (2010) proposes that implicit objects are null NPs which occupy normal argument positions. There are numerous reasons to think that this is not correct for the types of implicit objects discussed here. First, the implicit objects under investigation here can never serve as binders for anaphors, unlike, for instance, null objects in instruction (or recipe) contexts (on which see Massam and Roberge 1989):

(86)   *Implicit Objects:*

    a.   I drink *(whiskey) by itself.

    b.   I stir *(chemicals) into each other all day long.

    c.   See those two suspicious characters leaving in opposite directions? You should follow *(them) back to each other.
        (cf. See those two suspicious characters leaving in opposite directions? You should follow.)

(87)   *Null Objects in Instructions:*

    a.   Do not take by itself, take with food. [instructions on bottle of ibuprofen]

    b.   Roll dough out to about 1/4" thick. Fold over on itself and use a biscuit cutter to make shortbreads.

    c.   Take two eggs. Whip into each other until fully blended.

Implicit objects also cannot be modified by depictive secondary predicates, unlike null objects in instructions:

(88)   *Implicit Objects:*

    a.   Do you drink *(white wine/anything) chilled?

    b.   Have you eaten *(meat/anything) raw?

    c.   She served them *(bits of meat) raw.

    d.   Did you see the big game? I watched *(it) muted.

(89)   *Null Objects in Instructions:*

    a.   Serve chilled. [instructions on bottle of white wine]

    b.   Do not consume raw. [instructions on package of meat]

    c.   Watch muted. [instructions on DVD]

Null objects in instructions do seem to be syntactically represented, since they can do everything an overt NP can. In contrast, implicit objects of the type investigated here cannot bind and cannot be modified by a secondary predicate.

Landau (2010) proposes that the null objects he hypothesizes as implicit arguments cannot bind or be modified by secondary predicates because they lack the functional element "D." D is required for binding and for an NP to act as an argument of a predicate. This proposal is incoherent: If the null NP cannot be an argument without D, then there is no way it could serve as an implicit argument. After all, implicit arguments are arguments of predicates.

There are further empirical arguments against a null NP, as well. Numerous authors have shown that verbs with implicit objects behave as though they are intransitive, not transitive, for instance Postal (1977) for French and Japanese. This is also true in English: verbs with implicit objects act like intransitive unergatives. For instance, they allow the prepositional passive:

(90) a.   This table has never been eaten on.

b.   This hem has been sewn through!

If there were a null object in the passive, it should be impossible for the object of the preposition to cross it. This is absolutely impossible with any overt object:[12]

(91) a.   * This table has never been eaten anything on.

b.   * This hem has been sewn heavy thread through!

Verbs with implicit objects also behave like intransitives in permitting resultative constructions with a non-selected object:

(92) a.   They drank the pub dry.

b.   Late every night she ate herself full to bursting.

This is never possible with an overt object, presumably because the selected object and the non-selected object are competing for the same syntactic position (Carrier and Randall 1992, Kratzer 2005; cf. Bresnan 1982 on *out*-prefixation):

(93) a.   * They drank something/whiskey the pub dry.

b.   * Late every night she ate food/things herself full to bursting.

If there were a null object, we would expect the resultative construction to be ill-formed, contrary to fact. In contrast, if a verb with an implicit object is intransitive, and has no projected internal argument, then the facts are as expected.[13]

Implicit objects do not seem to be present in the syntax, then. They cannot bind anaphors and they cannot be modified by secondary predicates, unlike syntactically present but null objects in instruction contexts. The verbs they are arguments of behave as though they are intransitive in various respects. Importantly, implicit objects do not block A-movement and they do not block non-selected objects in resultative constructions. This indicates that they are not present in the syntax in any form.[14]

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[12]A reviewer suggests that Case Theory might account for some of these facts. I believe the idea is that a proposed null NP in (90) might not need, or even cannot receive, Case, and so another NP can move across it. In contrast, in (91), the overt direct object would not receive Case from anything, ruling the sentences out. The proposed null NP is now really a non-entity: it cannot bind, it cannot be modified by secondary predicates, it cannot receive Case,.... I cannot see any advantage to positing such a null NP, since it seems to be equivalent to nothing.

[13]Martí (2011) proposes that implicit indefinite objects are null objects that incorporate into the verb. Since in at least some languages, verbs with incorporated objects are treated as intransitive, this proposal is potentially compatible with the data just discussed, which indicates that verbs with implicit objects behave as intransitive. However, there are many problems for an incorporation account. One is that PPs can be implicit objects, but PPs do not typically incorporate in the world's languages. Another is that some verbs permit multiple implicit objects (see Appendix B), but again multiple incorporation is not generally attested. For these reasons I reject an incorporation analysis.

[14]Implicit objects do seem to be able to control PRO, at least in some contexts. See Landau (2010) and the references there. The implicit objects under discussion here do not seem to be capable of this; see Rizzi (1986). I do not discuss control of PRO here because it is not clear that control really does require a syntactic relation, contra Landau (2010). There are clearly many instances of control where the controller is not syntactically represented at all. See Williams (1987) and McCourt *et al.* (2015), among many others. In addition, Pearson (2016) shows that partial control, the basis for Landau's argument that control must be syntactic, is actually amenable to a semantic account.

At the other end of the spectrum, a very different sort of analysis proposes that implicit arguments are governed by nothing but pragmatics. Purely pragmatic theories are proposed by Groefsema (1995), Carston (2002), Récanati (2002), among others. As we have seen here, patterns of implicit arguments are clearly grammatically determined. In the double object construction, the first object behaves very differently from the second object. This calls for a syntactic theory, not a pragmatic one. See also Martí (2011) against purely pragmatic theories.

I conclude that we need a syntactic theory of implicit objects, but those objects are not actually present in the syntax as NPs. The rest of this section strives to build such a theory.

4.2   How Implicit Arguments are Licensed and Interpreted

The previous subsection decided that implicit objects are not present in the syntax as NPs at all. To begin to approach the facts from section 2, we now need to know what licenses such non-projected arguments and what determines their interpretation. In the case of implicit objects of verbs like *eat* and *watch*, it appears that it is simply the lexical verb that does both. Particular lexical verbs determine both whether their object can be implicit, and how it is interpreted when it is.

In contrast, external arguments of verbs can never be implicit without the passive. It is not good enough to rule this out through a syntactic requirement for a syntactic subject. In the passive, this requirement can be satisfied by moving some other NP to subject position, for instance the object of a preposition, but this is never possible in the active:

(94) a.   This hat was stepped on.
      b.   * This hat stepped on. (to mean either 'someone stepped on this hat' or 'a pragmatically recoverable individual stepped on this hat')
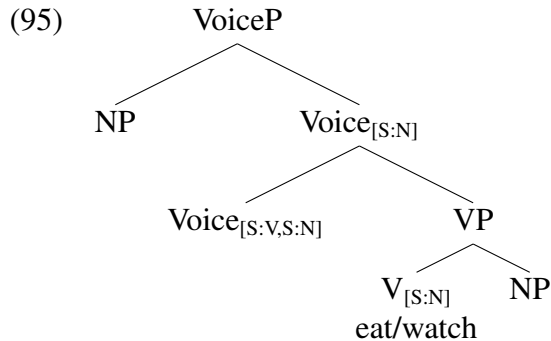
It is also not good enough to say that the existence of the passive pre-empts this, because the implied argument of the passive is always indefinite. The passive would then not be expected to pre-empt some verb taking an implicit *definite* external argument. But no verb does.

I take this asymmetry between internal arguments and external arguments to show that there is a fundamental difference between the two in how they are projected. As described in section 3.2, I adopt the Voice theory of Kratzer (1996), where internal arguments are arguments of the lexical verb, but external arguments are not, they are arguments of the functional head Voice. This accounts for why external arguments cannot be left implicit at the discretion of the lexical verb: they are not arguments of the lexical verb. Instead, it appears that arguments of functional heads require something additional like the passive in order to be implicit. As described in section 3.3, the passive involves an additional functional head, Pass, which combines with a projection of Voice that has not yet combined with its NP argument. The Pass head existentially quantifies over the missing argument. I will suggest below that something similar is required for the functional head Appl.

4.3   Implicit Objects of Transitive Verbs

As just stated, implicit direct objects of transitive verbs seem to be licensed by the lexical verb itself. I will start to develop an analysis of how this works with the simple cases of *eat* (indefinite) and *watch* (definite). As described in section 3.2, I assume with Kratzer (1996) that transitive verbs

have the internal argument projected by V and the external argument projected by Voice. I also adopt the selectional feature checking theory of Bruening (2013), as described in sections 3.2–3.4. When both arguments of a transitive verb are projected, we then have the following VoiceP, with all selectional features checked off:

(95)

```
              VoiceP
             /      \
           NP      Voice[S:N]
                   /       \
            Voice[S:V,S:N]   VP
                            /   \
                       V[S:N]    NP
                      eat/watch
```
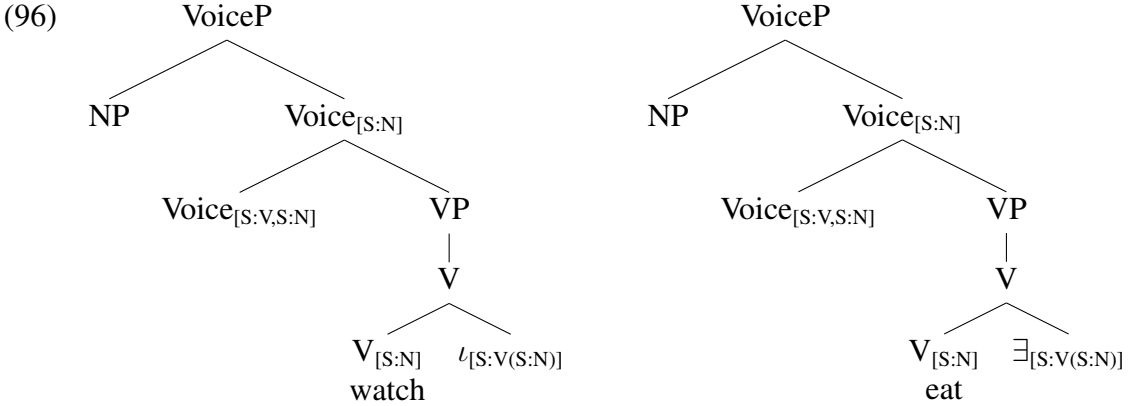
I concluded above that implicit objects like those of *eat* (indefinite) and *watch* (definite) are not projected as NPs. The question now is how this should be modeled formally.

Let me start by ruling out what would seem to be the simplest analysis. This would say that particular verbs' lexical entries say that their argument is optional; in featural terms, they can have an [S:N] feature, or not. The unprojected argument is then interpreted in one of two generally available ways (definite, or indefinite). The problem with this is that it has no way of distinguishing verbs like *bake* from those like *serve* and *tell*, which allow an implicit second object in the double object construction. Recall that *bake* allows its sole argument to be implicit (*they bake a lot*); it does not, however, when an additional argument is added (**they bake me a lot*). Consider how *serve* must work as a double object verb in this analysis: The V is allowed to lack an [S:N] feature, and no NP is merged; the VP consisting solely of the V then combines with Appl; the V moves to Appl and combines with it, thereby unifying its unprojected argument with one argument of Appl. The other argument of Appl (the recipient) then merges as normal, to yield, e.g., *They're going to serve the guests now*. Since this is well-formed, it must be possible for an unprojected argument of V to unify with an argument of Appl. But then if this composition can work for *serve*, then there is no reason it could not work with *bake*, which, like *serve*, specifies that its theme argument is optional.

I take this difference between *bake* and *serve* to show that we need a syntactic theory of the licensing of implicit arguments, where something is involved besides just individual verbs' lexical entries.

I propose that verbs do not take optional arguments; instead, there is a syntactic element that combines with the verb, checks its selectional feature, and closes off the semantic argument of the verb. In fact there are two such elements, the functional heads ι and $\exists$. ι is an iota operator and results in the unprojected argument being interpreted as a pragmatically recoverable definite. $\exists$ is just like the Pass head in existentially quantifying over the unprojected argument. Syntactically, both heads have the feature [S:V(S:N)], which checks off the selectional feature on the V when they merge with the V to form a complex head:

(96)

```
        VoiceP                                    VoiceP
       /      \                                  /      \
     NP     Voice[S:N]                         NP     Voice[S:N]
            /        \                                /        \
    Voice[S:V,S:N]    VP                     Voice[S:V,S:N]     VP
                      |                                         |
                      V                                         V
                    /   \                                     /   \
            V[S:N]   ι[S:V(S:N)]                      V[S:N]   ∃[S:V(S:N)]
            watch                                     eat
```

Voice then combines as it normally does.

The semantic denotations of these heads are as follows:

(97)   a. $[\![\iota]\!] = \lambda f_{\langle e,st\rangle}\lambda e.\iota x.f(e,x)$

       b. $[\![\exists]\!] = \lambda f_{\langle e,st\rangle}\lambda e.\exists x.f(e,x)$

They will combine with *watch* and *eat*, respectively, as follows:

(98)   a. $[\![watch]\!] = \lambda x\lambda e.watching(e,x)$

       b. $[\![watch\ \iota]\!] = \lambda e.\iota x.watching(e,x)$

(99)   a. $[\![eat]\!] = \lambda x\lambda e.eating(e,x)$

       b. $[\![eat\ \exists]\!] = \lambda e.\exists x.eating(e,x)$

Particular verbs will specify in their lexical entries whether they can combine with one of these elements, and which one they combine with, if they can. The verbs *watch, choose, follow,* ... specify in their lexical entries that they can combine with ι. A different set of verbs, *eat, drink, sew,* ..., specify that they can combine with $\exists$.

In this theory, implicit direct objects are the result of merging a syntactic head, either ι or $\exists$, with the verb. This blocks the syntactic projection of the internal argument, and binds the semantic argument as either a definite (ι) or indefinite ($\exists$). The two heads ι and $\exists$ are functional heads, they are not NPs, and so we see no evidence of any NP in the syntax (binding, secondary predicates, etc.).[15]

4.4   Definite Versus Indefinite Interpretations

In this analysis, particular lexical verbs state in their lexical entries whether they can combine with ι or $\exists$. Making this an unpredictable lexical fact follows Fillmore (1986), who argues that it is impossible to predict which verbs will allow implicit objects, and which ones take definite versus indefinite implicit arguments. Groefsema (1995), in contrast, argues that verbs do not have to

---

[15]A reviewer asks why one of the functional heads $\exists$ and ι does not block a resultative secondary predicate, while a projected NP seems to (*drink (*whiskey) the pub dry*). What I suggested in the text was that *the pub* and *whiskey* compete for the same position. Apparently, adjoining $\exists$ or ι does not stop an NP from occupying the object position (sister of V); this just has to be the argument of some other predicate, like a resultative secondary predicate. For lack of space, I will have to leave the syntax of resultative secondary predicates unexplored.

be listed but can be predicted based on semantic properties. However, her proposal is problematic. She proposes that verbs that impose selectional restrictions on the "type" of "THING" that is their object have indefinite implicit objects, while verbs that impose selectional restrictions on an "instance" of a THING that is their object will be definite (she adopts the kind of lexical decomposition of Jackendoff 1990, where verbs can take THINGS or EVENTS or other primitives). However, she does not propose any way to determine whether a verb requires an "instance" or a "type" of THING, so the account is not predictive at all. As an example, she says that *read* and *eat* require "types" of objects, specifically, symbolic representations and food, respectively. However, the verb *watch* takes a definite implicit object and so, in her analysis, must require an "instance" of a thing. But *watch* is intuitively identical to *read*: reading is reading of a symbolic representation, while watching is watching of a pictorial (video) representation. If anything, one might expect that *read* would also require an "instance" of a THING (namely, an instance of a symbolic representation), and so should take a definite implicit argument. Without an explicit means of determining whether an object is a "type" versus an "instance," then, this theory has no explanation to offer.

When we turn to the first object of the double object construction or the PP of the PP frame, the facts seem to be even more unpredictable. Many of the verbs that allow an implicit first object involve monetary transactions, for instance *pay, charge, fine, tip, cost*. When they have an implicit first object, it is always definite, as we saw. However, *sell* allows an implicit PP that is indefinite, but it also involves a financial transaction. With all of these verbs, the implicit first object or PP is a recipient/intended possessor of something that undergoes the transaction. Yet *sell* behaves unlike the rest (and note that *buy* does not entail a first object or PP if one is not present, meaning that it does not allow an implicit first object/PP at all).[16] Similarly, the verb of communication *ask* allows a definite implicit first object, but *tell* takes an indefinite implicit PP. *Pass* and *throw* allow an indefinite PP goal, but *hand* does not allow its PP to be implicit at all.

I therefore conclude that Fillmore (1986) was correct, and which verbs license implicit arguments is completely idiosyncratic, as is that implicit argument's interpretation when it is licensed. For this reason I list in the lexical entries of particular verbs whether ι or $\exists$ can combine with them. (Of course, if it turns out that there is a way of predicting the facts, then the analysis can be amended to incorporate it.)

4.5 Summary

We now have an analysis of implicit arguments. Implicit arguments of the lexical V are licensed by merging a head ι or $\exists$; particular Vs specify which they can combine with. ι determines a definite interpretation, while $\exists$ determines an indefinite one.

In contrast to direct objects, implicit external arguments are not licensed by particular lexical verbs. It takes the passive to license an implicit external argument. This is because the external argument is introduced not by the lexical verb, but by the functional head, Voice. The passive is effected by a functional head Pass that combines with a projection of Voice that has not yet combined with its NP argument (see 77). For whatever reason, Pass uniformly determines that the interpretation is an indefinite one.

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[16]Notice also that verbs that have a recipient thematic role for the subject still have an indefinite in the passive: *The package was received; Even the obsolete computer was bought.* If something about the verb or its thematic role was what determined the interpretation of an implicit argument, then we might expect that some implicit external arguments of passives would be interpreted as definites. None are.

5 How to Account for the Ditransitive Patterns

Now that we have an analysis of implicit arguments in general, we can go on to explain the patterns of implicit arguments in ditransitive constructions uncovered in section 2. To remind the reader, the patterns that we need to account for are the following:

1. Implicit second objects and implicit PPs license sluicing, but implicit first objects do not.

2. Implicit second objects and implicit PPs can be either definite or indefinite, but implicit first objects are only definite.

3. A simple transitive that allows an implicit object does not if it is used in the double object construction.

4. An implicit direct/second object is licensed only in the double object construction for some verbs, and only in the PP frame for other verbs.

I will begin with base transitive verbs like *bake* that permit an implicit direct object when transitive, but do not in the double object construction.

5.1 Double Object Constructions: Verbs of the *Bake* Class

Recall that verbs like *bake* permit an implicit direct object when they are simple transitives, but do not when they are used in the double object construction:

(100)   a.   We're baking them a cake.
           b.   We're baking right now.
           c.   * We're baking them right now. (where 'them' is intended recipient)
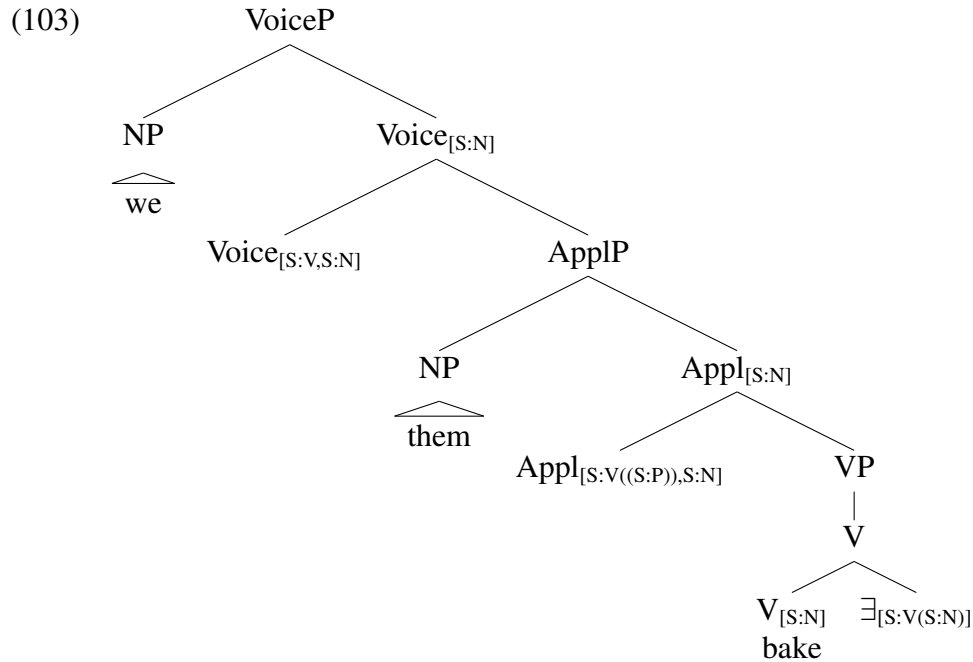
Since *bake* can have an implicit object in the transitive, and this object is interpreted as an indefinite, it must specify in its lexical entry that it can combine with ∃ as follows:

(101)   VoiceP
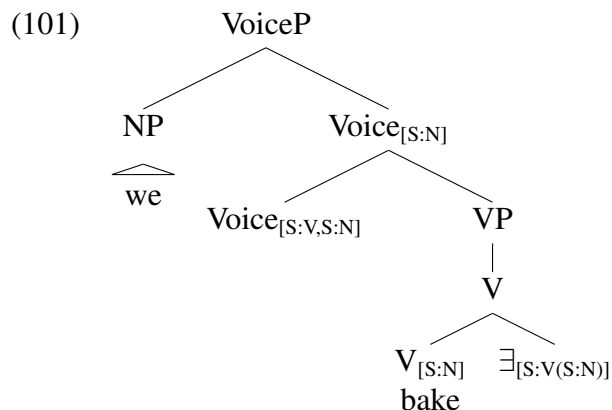
The head ∃ existentially quantifies over the argument of *bake*:

(102)   a.   ⟦bake⟧= $\lambda x \lambda e.\text{baking}(e,x)$
           b.   ⟦bake ∃⟧= $\lambda e.\exists x.\text{baking}(e,x)$

The task now is to explain why this is incompatible with the double object construction. Suppose the VP in (101) were to combine with Appl. This would yield the following structure:

(103)

VoiceP
- NP: we
- Voice$_{[S:N]}$
  - Voice$_{[S:V,S:N]}$
  - ApplP
    - NP: them
    - Appl$_{[S:N]}$
      - Appl$_{[S:V((S:P)),S:N]}$
      - VP
        - V
          - V$_{[S:N]}$ bake
          - $\exists_{[S:V(S:N)]}$

There is nothing syntactically wrong with this structure; all the selectional features are checked (recall that V having an unchecked [S:P] feature is optional). What goes wrong is the semantics. Since V and $\exists$ form a complex head, they have to move together to Appl (and on to Voice):

(104)

Appl
- Appl
  - V$_1$
    - V: bake
    - $\exists$
  - Appl
- VP
  - t_1
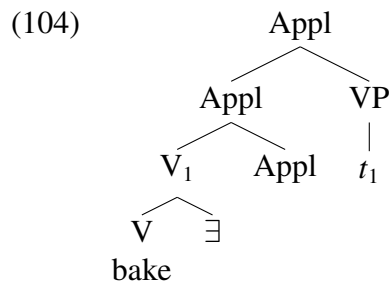
Recall that the V is interpreted at Appl. At Appl, the argument of V is normally unified with the argument of Appl. However, the argument of V in this case has already been existentially closed, by $\exists$ (see 102b). It is not available for unification with the argument of Appl. Recall that the denotation of Appl is the following:

(105) $[\![Appl]\!]^{w,g} = \lambda f_{\langle e,(e)st\rangle}\lambda x\lambda y\lambda e.f(e,x(,y))$ in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow$ $\exists e'$[possession(e',x) in w' and possessor(e',y) in w' & CAUSE(e,e') in w']]

Appl requires a verb with an open individual argument as its first argument. In the tree above, it does not have one; [$_V$ V $\exists$] is type $\langle s,t\rangle$ (see 102b). This derivation therefore crashes in the semantics.

This explains why verbs like *bake*, which allow an implicit object as a simple transitive, can never have the same object be implicit when they are embedded under Appl.

5.2 Verbs that Allow Implicit Direct Objects in the Double Object Frame

The analysis in the previous subsection would seem to have the consequence that no verb could ever have an implicit object in the presence of Appl. Nevertheless, many verbs do allow implicit second objects in the double object construction, as we have seen. Some have indefinite interpretations, while others have definite ones:

(106)   a.   They are going to serve the guests now, but I don't know what.

   b.   A: I have bad news. B: Sandy already told me.

In (106a), the missing second object is interpreted as an indefinite (and then licenses sluicing), while the missing second object in (106b:B) is interpreted as definite.

Since these clauses have a first object (interpreted as an intended recipient), they must have Appl in between Voice and V. Moreover, these same objects are not allowed to be implicit when there is a PP instead of Appl:

(107)   a.   * They are going to serve to the guests now.

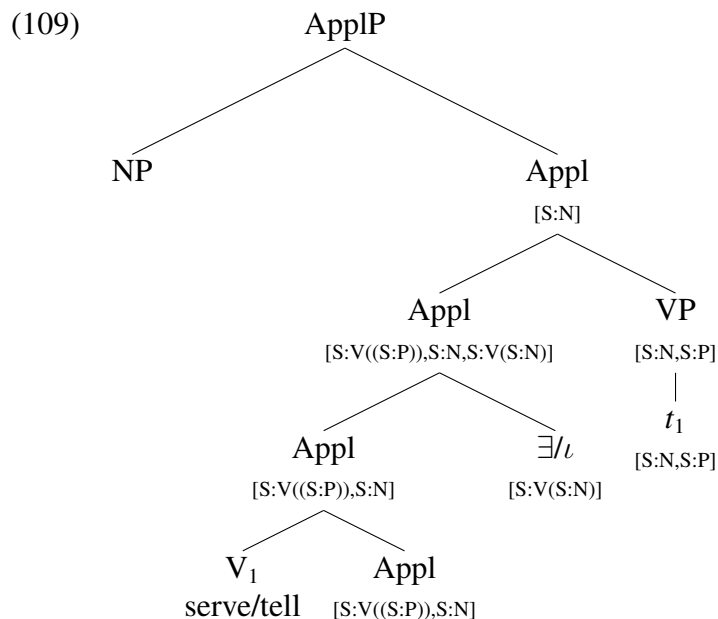   b.   A: I have bad news. B: *Sandy already told to me.

This means that the implicit argument of the V is only licensed in the presence of Appl, and not without it.

As stated in section 3.5, I adopt the view that lexical entries can include syntactic structures within them. I propose that verbs that allow an implicit second object only in the presence of Appl specify in their lexical entries that they can occur in the following substructure, in addition to occurring as just the head of a VP:

(108)
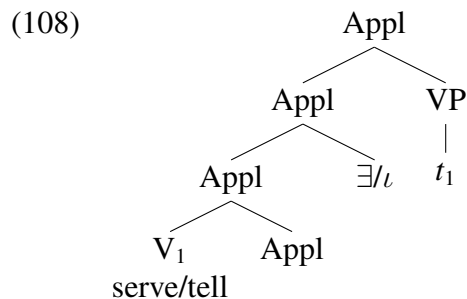
That is, the lexical entries for these verbs specify that they can form a complex head with Appl, and this complex head can then combine with either $\exists$ or ι.

Once this substructure is embedded in a full ApplP, with an NP in Spec-ApplP, we will have the following structure, with the selectional features indicated:

(109)

ApplP

NP   Appl
         [S:N]

Appl   VP
[S:V((S:P)),S:N,S:V(S:N)]   [S:N,S:P]

Appl $\exists/\iota$ t_1
[S:V((S:P)),S:N]   [S:V(S:N)]   [S:N,S:P]

V_1 Appl
serve/tell   [S:V((S:P)),S:N]

Selectional features are always checked in the base position, never in a moved position (section 3.4). This means that the features of the V must be checked in VP. In the representation, I leave them off of the moved copy, and write them with the trace (which is really a copy). Nothing merges with V in this tree, so the selectional features of the V, [S:N,S:P], percolate to VP. Meanwhile, Appl has [S:V((S:P)),S:N] features (78). Moving the V to Appl cannot check these off. $\exists/\iota$ merges with Appl, but its features do not match those of Appl's, so all the features of Appl and $\exists/\iota$ percolate to the higher Appl node (the sister of VP). This node merges with VP. Both the [S:V((S:P))] and [S:V(S:N)] features of Appl are now checked off, because VP has both [S:N] and [S:P] features. Both of these are also checked off, so the mother node only has an [S:N] feature. This is checked off by merging the first object in the specifier of Appl.

This derivation therefore converges syntactically (Voice and its argument will be merged on top of ApplP, not shown). As for the semantics, V is interpreted adjoined to Appl, as before. The arguments of V and Appl can unify, prior to either of them being saturated. $\iota/\exists$ can then close the first argument of V+Appl:

(110)   a. $[\![\text{Appl}]\!]^{w,g} = \lambda f_{\langle e,(e)st\rangle}\lambda x\lambda y\lambda e.f(e,x(,y))$ in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'[\text{possession}(e',x)$ in w' and possessor(e',y) in w' & CAUSE(e,e') in w']]

     b. $[\![\text{serve}]\!]^{w,g} = \lambda x\lambda y\lambda e.\text{serving}(e,x)$ in w & a-goal(e,y) in w

     c. $[\![\text{serve Appl}]\!]^{w,g} = \lambda x\lambda y\lambda e.\text{serving}(e,x)$ in w & a-goal(e,y) in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'[\text{possession}(e',x)$ in w' and possessor(e',y) in w' & CAUSE(e,e') in w']]

     d. $[\![[\text{serve Appl}]\ \exists]\!]^{w,g} = \lambda y\lambda e.\exists x.\text{serving}(e,x)$ in w & a-goal(e,y) in w & $\forall w'$ [w' is an i-world for w w.r.t. e $\rightarrow \exists e'[\text{possession}(e',x)$ in w' and possessor(e',y) in w' & CAUSE(e,e') in w']]

As can be seen, the derivation can be interpreted, with existential quantification over both the patient/theme of the verbal event, and the possessed NP of the caused possession eventuality (which have been unified).

One thing to note about this proposal is that, although $\exists$ and ι merge with a projection of Appl, they are still syntactically selecting for a V. Their features are the same: [S:V(S:N)]. When their selectional features are checked, they are checked by combining with a VP. There is no sense in which they are selecting Appl or check their features against Appl. It is also the lexical entry of the V, not the lexical entry of Appl, that says that they can appear in this position.

This might appear to be an instance of non-local selection, of the kind that syntacticians generally want to rule out. However, this kind of limited non-local selection is allowed in the feature checking system adopted here, as can be seen from the successful checking of features in (109). In the system adopted here, selectional features need to be checked off inside the phase, but this requirement is met in current instance. We also seem to have selection of one head ($\exists/\iota$) by another head (V) through a third head (Appl). I assume that this is also going to need to be allowed. In the domain of morphology, we see a similar specification of irregular morphology by one head (T) on another (V) through an intervening head in cases of derivational morphology like *undertake-undertook* and *oversee-oversaw*). We also see not-strictly-local selection whenever two predicates combine and unify their arguments, prior to combining with those arguments; this happens in every case of predicate modification, for instance. I therefore assume that this kind of quite local but still not strictly local selection is allowed. In the case at hand, where lexical entries can include syntactic structure, we just need a verb to specify something about a head that it can combine with as complement and then form a complex head with. Since the two heads form a head-complement relation and form a complex head together, I assume that this is possible.

Moreover, putting this information in the lexical entry for the verb now permits us to explain why verbs like *bake* do not allow this kind of combination. Verbs like *bake* cannot combine with $\exists$ and ι in this manner because their lexical entries do not specify that they combine with Appl. They are base transitive verbs which combine with Appl productively in the syntax. Since $\exists$ and ι only combine with verbs whose lexical entries say that they can, this combination is impossible for them.

Thus, the proposed account successfully distinguishes verbs like *serve/tell* from verbs like *bake*. The former can have an implicit direct object in the double object construction because their lexical entries specify that they can combine with Appl, and they specify that they can combine with either $\exists$ or ι when they do. Verbs like *bake* are not lexically specified to combine with Appl, and so they cannot be lexically specified to combine with $\exists$ or ι when they do. If they combine with $\exists$ or ι first, the derivation fails to converge, as described in section 5.1.

5.3   Verbs that Allow Implicit Direct Objects in the PP Frame

There are also verbs that allow the direct object to be missing in the PP frame:

(111)   a.   She wouldn't pass to me.

      b.   She wouldn't throw to me.

      c.   She wrote to me.

The missing argument of *pass* and *throw* seems to be definite, since it requires a salient entity and does not license sluicing: *She passed to me. Oh? #What kind of ball?* In contrast, the missing argument of *write* seems to be indefinite: *She wrote to me. Oh? What kind of letter?* Importantly, *pass* and *throw* do not permit the missing object in the presence of Appl, but only with a PP (recall that *write* does):

(112)   * She wouldn't pass/throw me. (where I am the intended recipient of a ball)

In the current analysis, the PP frame lacks Appl. Both the NP and the PP are projected by the V. As with *bake*, above, ι and $\exists$ must then attach to the lexical V:

(113)

```
                        VoiceP
                       /      \
                     NP        Voice[S:N]
                     |          /      \
                    she   Voice[S:V,S:N]    VP
                                          /    \
                                    V[S:P]      PP
                                   /    \        |
                            V[S:N,S:P]  ∃/ι     to me
                            write/pass [S:V(S:N)]
```
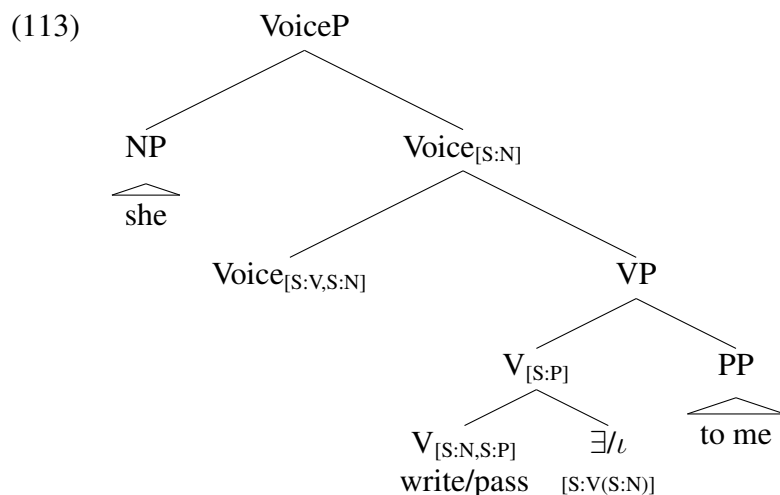
All selectional features are satisfied in this derivation, and the semantics is interpretable as well. As with *bake*, attempting to embed the above VP under Appl will lead to an uninterpretable semantics, for the same reason ($\exists/\iota$ would close the argument of V before it could unify with the argument of Appl).

Once again, the verbs that permit this specify in their lexical entries that they can combine with one of $\exists$ and ι. Verbs like *write* specify that they can combine with $\exists$, while verbs like *pass* and *throw* specify that they can combine with ι.

As we saw above, most verbs take an implicit direct object either in the double object construction, or in the PP frame, but not in both. Only *write* seems to allow both. I will assume that this is an accidental gap, and in principle, a verb can say in its lexical entry that it can either combine with $\iota/\exists$ directly, or it can combine as a complex head [[V Appl] $\iota/\exists$]. This is exactly what *write*'s lexical entry says. Other verbs, however, only specify one of them, and not both. This is admittedly a stipulation in the analysis, but since it appears to be due to lexical idiosyncrasy, it seems that such a stipulation is unavoidable.

5.4   Implicit PPs

Verbs can also allow implicit PPs, as we saw in section 2. Some of them are interpreted as indefinite:

(114)   a.   They just sold the house. (no buyer necessary in discourse)

         b.   She was telling stories last night. (no listeners necessary in discourse)

         c.   She passed the ball before she got hit. (no goal necessary in discourse)

         d.   That person is saving a seat. (no individual necessary in discourse)

Others are interpreted as definite:

(115)   a.   They are going to serve dessert now. (to salient set of individuals)

b. The secretary forwarded that embarrassing email. (to individual salient in discourse)

c. They may offer a compromise. (to speech act participants, or other salient individuals)
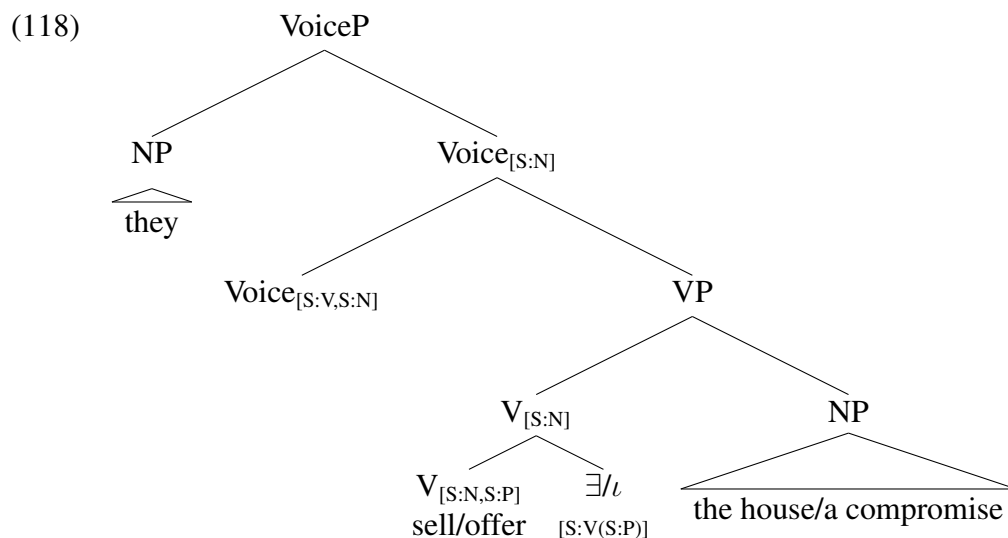
As stated in section 3.2, I treat the goal argument of such verbs as an individual, with the P being essentially contentless and present only for c-selectional reasons. The same heads $\exists$ and ι can then bind them exactly as they can an NP argument. However, they do need to be able to select a verb with an [S:P] feature rather than one with an [S:N] feature. They also need to be able to bind the second argument of the verb (the goal), rather than the first. $\exists$ and ι must then have an additional option in their lexical entries:

(116) a. $[\![\exists_{[S:V(S:N)]}]\!] = \lambda f_{\langle e,st \rangle} \lambda e.\exists x.f(e,x)$

b. $[\![\mathbf{\exists_{[S:V(S:P)]}}]\!] = \lambda \mathbf{f_{\langle e,est \rangle}} \lambda \mathbf{e} \lambda \mathbf{x}.\exists \mathbf{y}.\mathbf{f(e,x,y)}$

(117) a. $[\![\iota_{[S:V(S:N)]}]\!] = \lambda f_{\langle e,st \rangle} \lambda e.\iota x.f(e,x)$

b. $[\![\mathbf{\iota_{[S:V(S:P)]}}]\!] = \lambda \mathbf{f_{\langle e,est \rangle}} \lambda \mathbf{e} \lambda \mathbf{x}.\iota \mathbf{y}.\mathbf{f(e,x,y)}$

These entries say that the version with the feature [S:V(S:P)] binds the second individual argument of the verb rather than the first (or only).[17]

Once again, particular verbs will specify in their lexical entries whether they can combine with $\iota_{[S:V(S:P)]}$ or $\exists_{[S:V(S:P)]}$. The verbs *sell, tell, pass, save, ...* specify that they can combine with $\exists_{[S:V(S:P)]}$; the verbs *serve, forward, offer, ...* specify that they can combine with $\iota_{[S:V(S:P)]}$. (Appendix B discusses the possibility of multiple implicit arguments, and whether a verb can combine with both $\iota/\exists_{[S:V(S:N)]}$ and $\iota/\exists_{[S:V(S:P)]}$.)

We then have the following representation for implicit PPs:

(118)

```
                    VoiceP
                   /      \
                  NP      Voice[S:N]
                  |        /      \
                they   Voice[S:V,S:N]   VP
                              /      \
                           V[S:N]     NP
                          /    \     /        \
                  V[S:N,S:P]  ∃/ι  the house/a compromise
                  sell/offer  [S:V(S:P)]
```

The semantic computation works as follows, illustrating with $\exists$ (recall that *sell* entails successful transfer of possession, so it takes an actualized goal argument):

---

[17]While multiplying lexical entries appears undesirable, it is probably unavoidable. The verb *believe*, for instance, can combine with a CP or a raising-to-object IP/TP; it can also combine with just an NP. When it combines with just an NP, it seems to mean something slightly different from when it combines with a clause. Many other lexical items (if not most) are similar. It is then not surprising that ι and $\exists$ would have multiple (but related) lexical entries.

(119)   a. $[\![\text{sell}]\!]^{w,g} = \lambda x \lambda y \lambda e.\text{selling}(e,x)$ in w and a-goal(e,y) in w

         b. $[\![\text{sell} \exists]\!]^{w,g} = \lambda x \lambda e.\exists y.\text{selling}(e,x)$ in w and a-goal(e,y) in w

         c. $[\![\text{VP}]\!]^{w,g} = \lambda e.\exists y.\text{selling}(e,\text{house})$ in w and a-goal(e,y) in w

5.5 Sluicing with Implicit Arguments

As we have seen, implicit second objects and PPs (and implicit arguments of monotransitive verbs) can license sluicing:

(120)   a.   They're going to serve us now, but I don't know what.

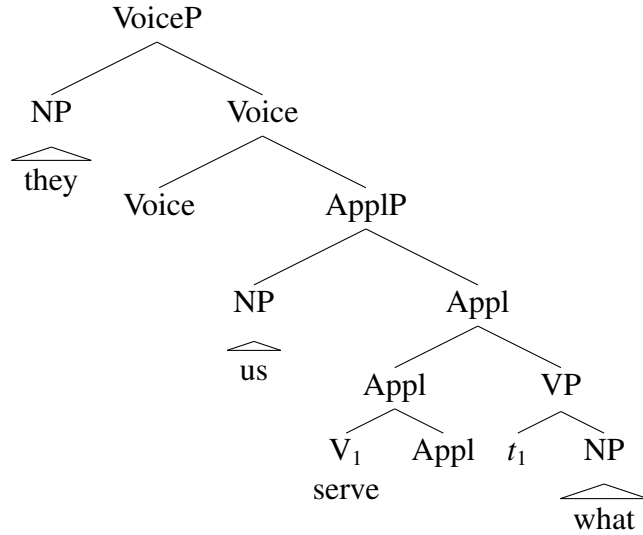   b.   They're going to sell the house, but I don't know who to.

In the theory proposed here, the elided and antecedent clause for the second object case (120a) must have the following structures (with the V shown in the position in which it is interpreted):

(121)   They're going to serve us now, but I don't know what.

     a. *Antecedent Clause:*
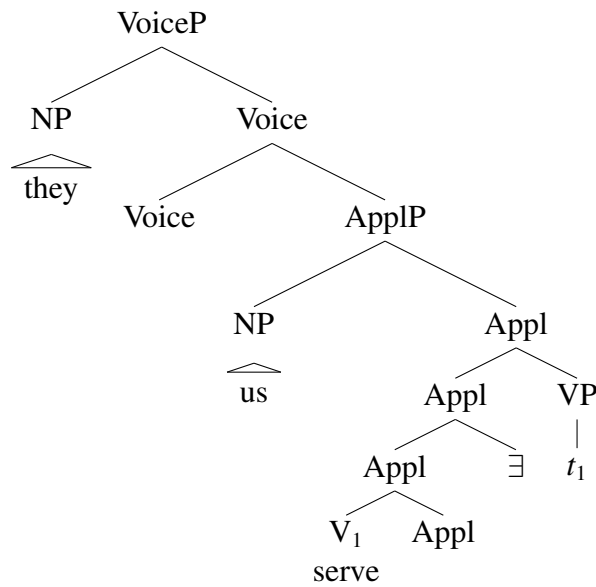
     b. *Elided Clause:*

The antecedent clause and the elided clause must be sufficiently identical to license ellipsis of the elided clause (after wh-movement), but there are two differences between these two structures that might make that look unlikely. First, the antecedent clause has a head ∃ that is not present in the elided clause; second, the elided clause has a maximal projection NP (*what*) that is not present in the antecedent clause. The wh-phrase is probably not a problem, since it is focused and undergoes wh-movement outside of the ellipsis site. Such elements can generally be ignored for evaluating ellipsis licensing. The problematic difference here is the head ∃, which is present in the antecedent but not the elided clause.

Much recent work has argued for at least some strict syntactic identity conditions on sluicing (e.g., Chung 2013, Merchant 2013, Rudin 2019). Rudin (2019), in particular, argues for a head-based identity condition on sluicing. I suggest instead that we should adopt a maximal-projection-based identity condition on ellipsis. I modify Rudin's (2019: 258–259) conditions as follows:

(122)   Syntactic Condition on Ellipsis
        Given a prospective ellipsis site E and its antecedent A, ellipsis of E is licit only if every maximal projection XP ∈ E that is not a nonhead member of a movement chain has a structure-matching correlate YP ∈ A, and every maximal projection ZP ∈ A that is not a nonhead member of a movement chain has a structure-matching correlate WP ∈ E.

(123)   A node n in domain d structure-matches a node n′ in domain d′ iff n and n′ are dominated by an identical sequence of immediately dominating nodes within d and d′. (Rudin 2019: 258, (9))

(124)   A maximal projection XP can be a correlate for a maximal projection YP only if XP and YP are headed by tokens of the same lexical item, or XP and YP are covalued.[18]

---

[18]The covalued option is for cases where an NP in the antecedent seems to have as its correlate an NP with some other form in the elided clause (see Rudin 2019, section 1.3). For instance, it is possible to have apparent violations of Condition C in sluicing:

(i)   They rejected Sandy$_1$, but she$_1$ doesn't know why.

If the elided clause were identical to the antecedent, *she* would c-command an R-expression with which it is covalued. If the R-expression can instead be a pronoun in the elided clause (*they rejected her$_1$*), then a Condition C violation

Under this identity condition, the maximal projections in the elided clause and the antecedent clause have to match.[19] In (121), the maximal projections in the antecedent clause are VoiceP, the NP *they*, ApplP, the NP *us*, and VP. In the elided clause they are VoiceP, the NP *they*, ApplP, the NP *us*, VP, and the NP *what*. All of these match, except the NP *what*. This NP moves to Spec-CP, outside the ellipsis domain, so it is the nonhead member of a movement chain. It can therefore be ignored. Crucially, ∃ can be ignored because it is not a maximal projection.

This identity condition also permits sluicing with implicit arguments of simple transitive verbs, for instance *The patient already ate, but we're not sure what*. The maximal projection NP headed by *what* can be ignored, because it undergoes wh-movement, while ∃ can also be ignored, because it is not a maximal projection.

In contrast, mismatches in argument structure that are not allowed are correctly ruled out. Sluicing with an implicit PP is not permitted if the P is not pronounced (Chung 2005: 80, (18e), (19e)):

(125)   We're donating our car, but it's unclear *(to) which organization.

In the theory proposed here, the antecedent clause and the elided clause have the following structures:
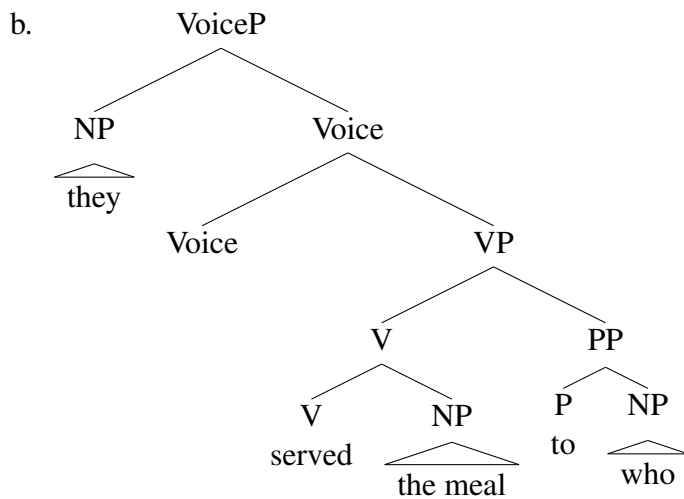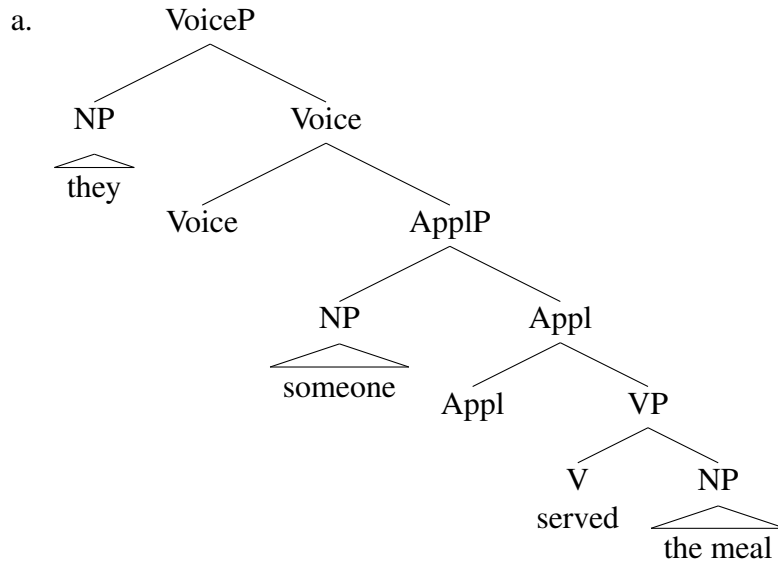
(126)
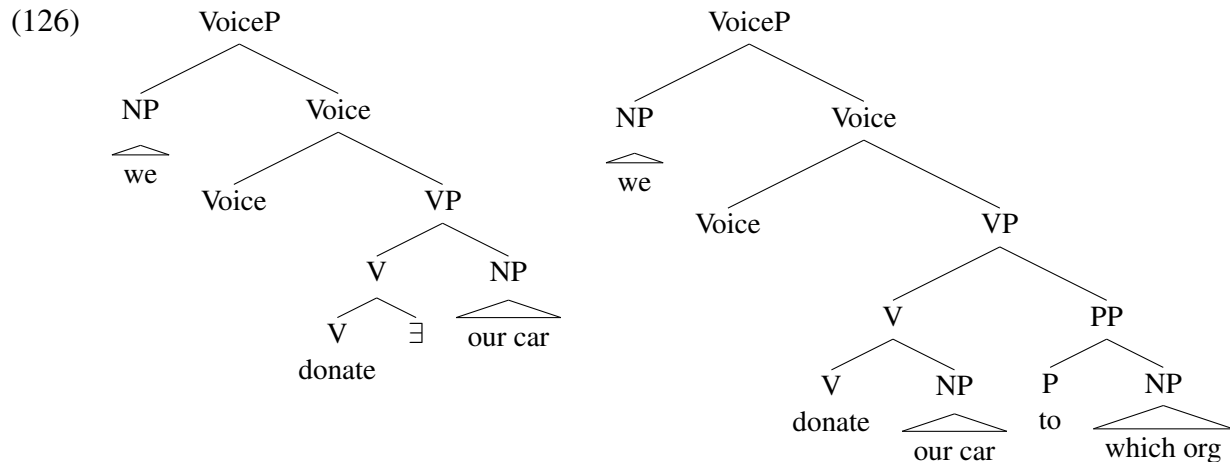
If the entire PP moves, then it can be ignored, as the nonhead member of a movement chain. The P is pronounced in this case, since it is outside the ellipsis site. However, if only the NP *which organization* moves, then only it can be ignored. There is then a maximal projection, PP, that does not have a correlate in the antecedent clause, and ellipsis is not licensed.

Other cases are also correctly ruled out. For instance, a double object construction as antecedent cannot license sluicing in the PP frame:

(127)   They served someone the meal, but I don't know (*to) who(m). (Merchant 2013: 99, (38c), (39a))

---

can be avoided. Note that requiring identity of maximal projections might make specifying this option unnecessary, if pronouns involve ellipsis of the lexical material of their antecedent (e.g., Elbourne 2001). Then *her* in the elided clause would be something like *[the Sandy]*, and it would be headed by a token of the same lexical item as its antecedent.

[19]Note that inflectional elements outside of the VoiceP or PassP can often differ; see Rudin 2019: section 2. I ignore this complication here.

a. VoiceP

NP Voice

they

Voice ApplP

NP Appl

someone

Appl VP

V NP

served the meal

b. VoiceP

NP Voice

they

Voice VP

V PP

V NP P NP

served the meal to who

The antecedent clause in (127a) has a maximal projection, ApplP, that is not present in the elided clause, and ellipsis is ruled out.

   Importantly, active-passive pairs also do not license sluicing (e.g., Chung 2005, 2013, Merchant 2013):

(128)   a.   * Someone hacked my computer, but I'm not sure by who.

        b.   * My computer was hacked, but I'm not sure who.

In the analysis of the passive adopted here, that of Bruening (2013), the passive has a maximal projection, PassP, that is not present in the active. This rules out sluicing in (128b):

(129)

```
        PassP                              VoiceP
       /    \                             /      \
     Pass   VoiceP                      NP        Voice
           /      \                    /\        /      \
        Voice     VP                  who      Voice     VP
                 /   \                         /   \    /    \
                V     NP                      V     NP  V     NP
             hacked  /\                    hacked      hacked /\
                   my computer                         my computer
```
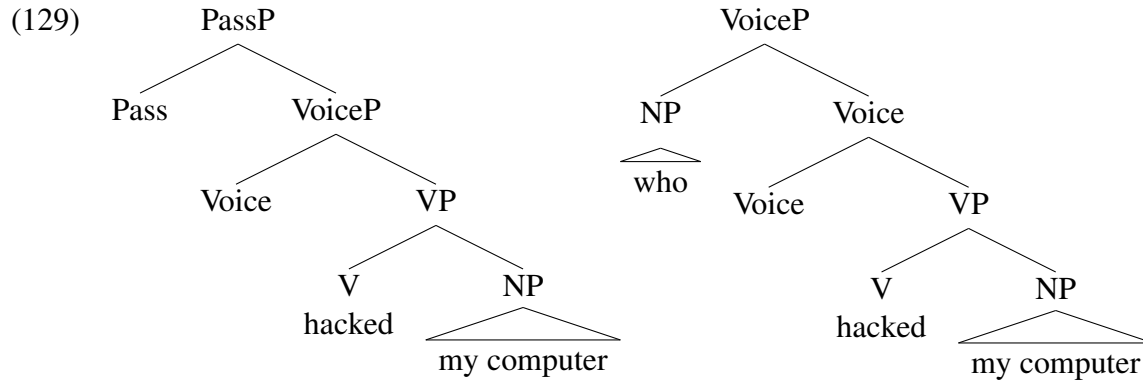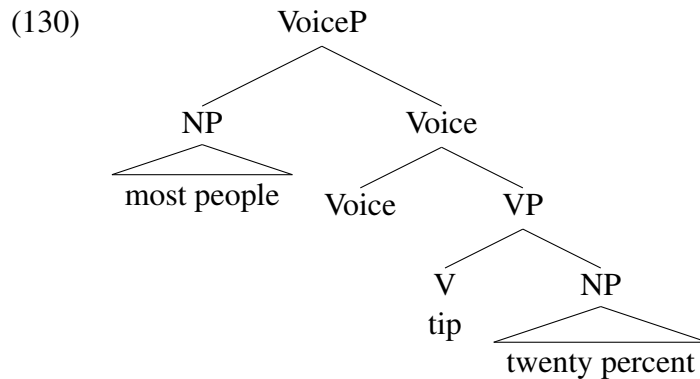
The NP *who* undergoes wh-movement and so can be ignored, but the antecedent clause in this case has a maximal projection, PassP, that is not present in the elided clause. In (128a), PassP is present in the elided clause and not the antecedent clause.

With this much in place, we can now turn to implicit first objects of double object constructions, and explain how they work and why they do not license sluicing.

5.6 Implicit Arguments of Appl

Recall that when we looked at verbs that do not allow the PP frame, we found two patterns that need explaining: First, sluicing with an implicit first object is unacceptable; and second, implicit first objects are never indefinite, they are always definite.

Let me begin by ruling out a possible analysis. This would say that when the first object is missing, ApplP is missing altogether. The verb would be being used as a simple transitive:

(130)

```
              VoiceP
             /      \
           NP        Voice
          /  \       /    \
    most people   Voice    VP
                         /    \
                        V      NP
                       tip    /  \
                          twenty percent
```

This proposal would explain why sluicing is never allowed: the sluiced clause would have to have ApplP in it (because the wh-phrase originates in Spec-ApplP), but the antecedent clause would lack ApplP, and ellipsis would then not be licensed because the clauses do not meet the identity condition on ellipsis (122).

I see two problems with this. The first is that a clause like *Most people tip twenty percent* still entails intended caused possession. If this semantics comes from Appl, then this idea could not be correct (note that these verbs do not even appear in the PP frame). The second problem is that this analysis has no way of specifying that the missing argument is semantically present but definite. An implicit argument is an argument of a head, bound by $\exists$ or ι. The first object in a double object construction is the argument of Appl. In the alternative in (130), however, there is no Appl, and

therefore no argument for an ι operator to bind. If anything, then, the structure in (130) would only have an interpretation where it does not entail a recipient at all.

I will therefore pursue a different analysis, one where Appl is present even when its argument is not. Note that a missing applicative argument behaves as though it is not present syntactically, just like implicit direct objects. It cannot bind an anaphor, for instance:

(131)   a.   She will permit you each other.

      b.   * She will permit each other.

The first object of a double object construction cannot normally be modified by a depictive secondary predicate (Williams 1980), so that test is mostly inapplicable. However, it can if the verb is light verb *give* (Maling 2001, Pylkkänen 2008). In that case, we can see that an implicit first object cannot be modified by a depictive secondary predicate:

(132)   (modified from Maling 2001: (14c–d))

      a.   The nurse always gives *(her patients) medication still-groggy/half-asleep.

      b.   Victorian doctors preferred to give *(patients) a physical exam fully-dressed.

(These sentences have an acceptable but irrelevant reading where the secondary predicate modifies the subject.)

The second object can also be passivized across an implicit first object, which indicates that the first object is not present at all:

(133)   a.   An entrance fee will be charged.

      b.   Crimes will be forgiven.

      c.   The right to assemble is sometimes denied.

      d.   One personal possession will be permitted.

If there were a null NP present, it should block A-movement across it. I therefore conclude that implicit first objects, like implicit objects of verbs, are not projected in the syntax in any way.
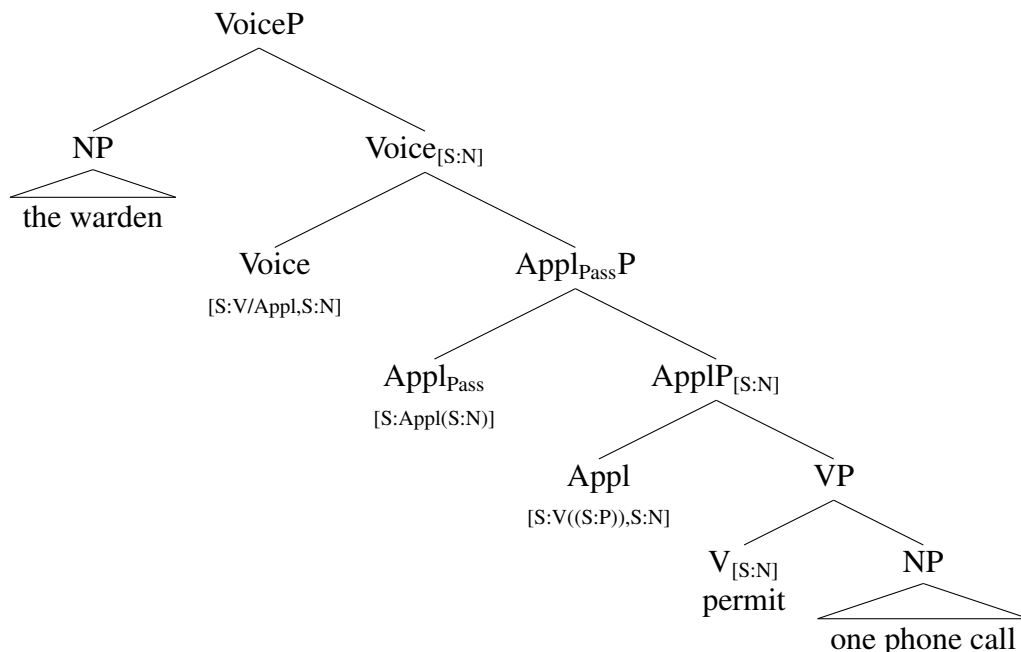
In the theory being developed, there are two ways to license an implicit argument. Implicit arguments of lexical verbs are licensed by merger of the heads $\exists$ and ι. The implicit argument of the functional head Voice is instead licensed by a higher functional head, Pass (section 3.3).

Implicit arguments of Appl have more in common with the passive than they do with implicit objects of lexical verbs. First, they fail to license sluicing, in the same way a passive antecedent fails to license sluicing in an active correspondent (128). Second, they are interpreted in a uniform way. The implicit argument of the passive is always interpreted as an indefinite, regardless of the lexical verb; and the implicit argument of Appl is always interpreted as a definite, regardless of the lexical verb.

I therefore propose that, being a functional head like Voice, Appl can only have its argument left implicit by merger of another functional head that projects to a maximal projection, like Pass. I propose that there is another functional head, an Appl$_{Pass}$, that is like Pass in combining with a functional head with an unchecked [S:N] feature. Pass has an [S:Voice(S:N)] feature and combines with an unsaturated projection of Voice; Appl$_{Pass}$ has an [S:Appl(S:N)] feature and combines with an unsaturated projection of Appl.[20] It itself is also of category Appl, so Voice can combine with it:

---

[20] The idea that an Appl head can be passivized is also proposed in Legate (2014: 133–140).

(134)

```
                              VoiceP
                         ╱            ╲
                       NP              Voice[S:N]
                    ╱──────╲          ╱        ╲
                  the warden       Voice       ApplPassP
                              [S:V/Appl,S:N]   ╱       ╲
                                          ApplPass      ApplP[S:N]
                                        [S:Appl(S:N)]   ╱        ╲
                                                      Appl        VP
                                                  [S:V((S:P)),S:N]  ╱    ╲
                                                              V[S:N]    NP
                                                              permit  ╱──────╲
                                                                  one phone call
```

Appl_Pass contrasts with Pass in that it determines that the missing argument of its complement is interpreted as a pragmatically recoverable definite, not as an indefinite.

It would of course be desirable if we could explain why Pass determines an indefinite interpretation, while Appl_Pass instead determines a definite interpretation. Unfortunately, I can see no way to do that. It is often suggested that the first object of the double object construction tends to be topical (e.g., Goldberg 2014), and one might suggest (as a reviewer does) that this would explain why an implicit first object would be definite.[21] There are two ways of spelling this out, both of which I will reject. In the first, we have the analysis of the double object construction and implicit arguments as developed here. In this analysis, implicit first objects are just like implicit external arguments of passives in how they are licensed. However, external arguments as subjects of active clauses also tend to be topical, according to this view, yet an implicit external argument in the passive is interpreted as an indefinite, not a definite. The passive is also used to change the information structure of the sentence, so that the external argument becomes non-topical, while an internal argument becomes topical. We would then expect something similar to happen in the double object construction, and we would not expect an implicit first object to be definite. We might instead expect it to be indefinite.

In the second way of spelling this out, suggested by a reviewer, we instead adopt a derivational analysis of the double object construction, like that of Larson (1988, 2014, 2017). In this kind of analysis, the PP frame is basic, and the double object construction is derived from it by a "passive-like" operation. This operation has information-structural consequences, such that the derived first object has topic properties. One of these topic properties might be a definite interpretation when it

---

[21] I am very skeptical of the claim that the first object tends to be a topic. It is very easy to have it be a focus or new information, instead. The claim seems to be based almost entirely on the tendency for pronouns to occur as the first object, but this seems to be related to the relative weight of the two objects, not to topicality. Note also that Bruening (2010b, 2018b) argues that some apparent instances of the PP frame are actually heavy-shifted variants of the double object construction (see footnote 22); if correct, then this changes the empirical picture regarding which NPs tend to appear as first objects versus PPs. (I am also skeptical that the notion of a topic plays any role whatsoever in English syntax, but that is a discussion for another place.)

is left implicit. The problem with this analysis is that all evidence indicates that an implicit NP is not present in the syntax as an NP at all. If there is no NP to move, then I see no way to maintain a derivational analysis of the double object construction. Implicit direct objects can never move to become the subject of a passive, for instance. It is not coherent to have an operation target something that is not there.

At this point, then, I can see no explanation for why Pass imposes an indefinite interpretation on the argument of Voice, while Appl$_{Pass}$ imposes a definite interpretation on the argument of Appl. This seems to be lexical idiosyncrasy. I stipulate it in their respective lexical entries:[22]

(135)   a.   ⟦Pass⟧= $\lambda f_{\langle e,st\rangle}\lambda e.\exists x.f(e,x)$ (Bruening 2013: 23, (86))

   b.   ⟦Appl$_{Pass}$⟧= $\lambda f_{\langle e,st\rangle}\lambda e.\iota x.f(e,x)$

In (134), the V moves to Appl and combines with it to unify their arguments. The complex head Appl then combines with the NP inside VP (*one phone call*); ApplP is then a function with one individual argument, type $\langle e,st\rangle$. Appl$_{Pass}$ binds this argument with an iota operator.

Only certain verbs permit an implicit first object in the double object construction. These include *forgive, ask, email, charge* but not *feed, fine, promise, show, spare, lose*. In the current analysis, lexical entries can include specifications of larger syntactic structures that a verb may or must appear in. The verbs that permit an implicit first object must include in their lexical entries an indication that they can appear in a structure with Appl$_{Pass}$ and Appl (the substructure up to Appl$_{Pass}$P in (134).[23]
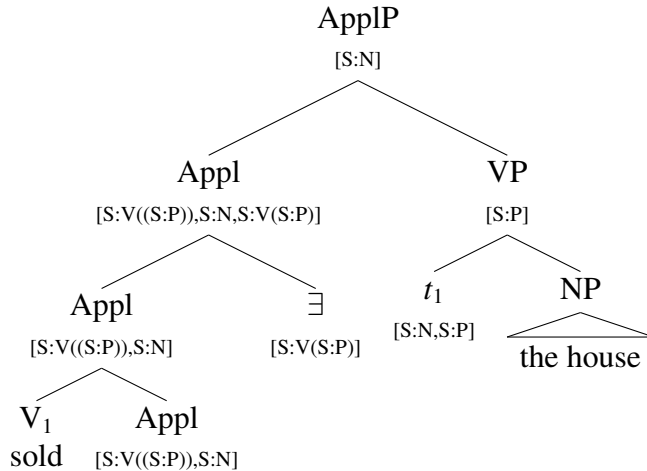
Finally, verbs that allow an implicit second object in the double object construction allow $\exists$ or ι to attach to the complex head [V Appl] (section 5.2). We have to ask whether $\exists$ or ι with features [S:V(S:P)] could also attach to the complex head [V Appl]. If this were possible, then we might expect that an implicit first object could be either definite or indefinite, rather than exclusively definite.

The answer is that this is not possible, for syntactic reasons. If $\exists/\iota$ were to attach to the complex head [V Appl], the [S:N] feature of Appl would never get checked. See the following structure:

---

[22]See Bruening (2013) on the by-phrase. Also, this proposal may offer some insight into the operation of "R-Dative Shift" proposed by Bruening (2010b, 2018b). Those works propose that certain apparent instances of the PP frame (especially those that occur with otherwise obligatory double object verbs) are actually the double object construction, but with the specifier of Appl projected on the right and the preposition *to* appearing. If the current analysis is correct that there is a type of passive head that selects Appl, we could view this instance of a *to* phrase as being analogous to a *by* phrase in the passive. In the current analysis extended to "R-Dative Shift," the *to* phrase would adjoin to ApplP prior to Appl$_{Pass}$ combining with it.

[23]One might wonder why Pass seems to differ from Appl$_{Pass}$ in this respect, such that Appl$_{Pass}$ only combines with certain verbs, while Pass is not selective. Two observations are relevant: First, Appl$_{Pass}$ occurs lower in the tree, and the V moves to (and through) it. Pass, as the highest head, and the phase head, might have to be less restricted. Second, Pass may be more selective and idiosyncratic than people think: there are many verbs that cannot passivize (e.g., Postal 1990), and there actually are some verbs that occur either exclusively in the passive, or with different meanings or properties in their active and passive variants (e.g., *be born, say*). See Bruening (2014b) for discussion and references.

(136)

```
                              ApplP
                              [S:N]
                     ┌──────────┴──────────┐
                   Appl                    VP
        [S:V((S:P)),S:N,S:V(S:P)]        [S:P]
          ┌───────────┴───────┐      ┌─────┴─────┐
        Appl                  ∃     t₁          NP
    [S:V((S:P)),S:N]     [S:V(S:P)]  [S:N,S:P]   ╱╲
     ┌─────┴─────┐                            the house
    V₁          Appl
   sold    [S:V((S:P)),S:N]
```

It is not clear if merging a VP with a node with two [S:V] features could check both of those features; but even if it does, the [S:N] feature of Appl will never get checked off in this structure, and the derivation will crash at VoiceP. If an NP were merged in Spec-ApplP, the [S:N] feature would be satisfied, but then the NP would get no semantic interpretation, because $\exists/\iota$ would have closed the second argument of V/Appl. The NP *the house* saturates the first argument, so no interpretation is left for the NP in Spec-ApplP.

It therefore follows that the only way to derive an implicit first object in the double object construction is to use the functional head Appl$_{Pass}$. This explains why all implicit first objects have a uniform interpretation (definite), and it will also explain why implicit first objects never license sluicing, next.

5.7   The Failure of Sluicing

This proposal is now able to account for the unacceptability of sluicing with an implicit first object as a failure of ellipsis licensing. It treats the failure of sluicing as analogous to the unacceptability of active-passive mismatches in sluicing. Consider a case of sluicing with an implicit first object, which is ungrammatical:

(137)   The warden will permit one last conjugal visit, *but he didn't say who.

In the analysis proposed here, the antecedent clause in (137) has an Appl which does not project its argument in its specifier; the missing argument is bound by the functional head Appl$_{Pass}$:

(138)

```
                    VoiceP
            _____|_____
          NP               Voice
         _|_          _____|_____
     the warden    Voice         Appl_Pass P
                          _____|_____
                       Appl_Pass          ApplP
                                    _____|_____
                                  Appl              VP
                                             _____|_____
                                            V               NP
                                          permit          __|__
                                                    one last conjugal visit
```
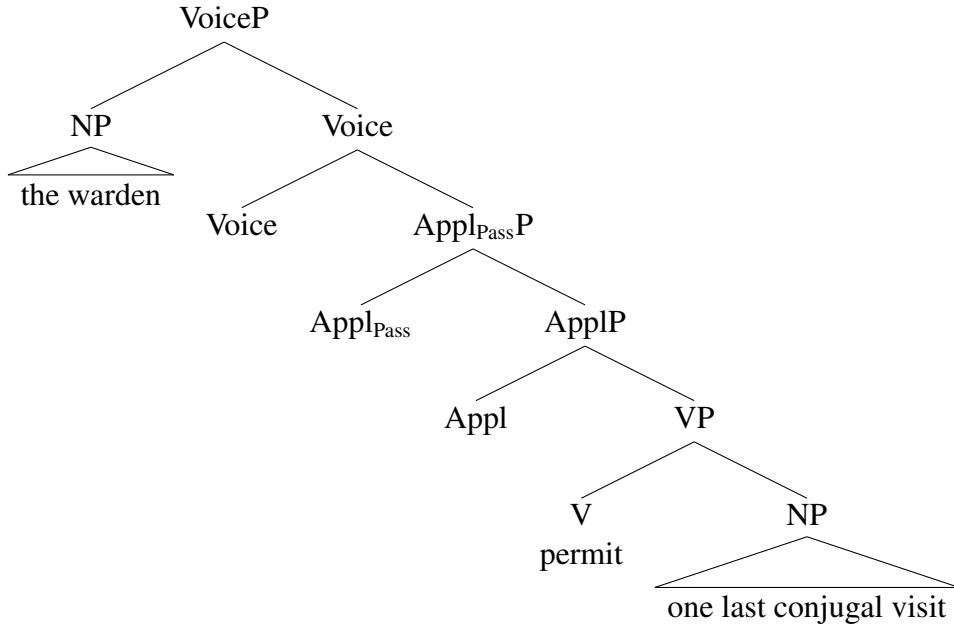
In contrast, the sluiced clause lacks Appl$_{Pass}$, and the wh-phrase is projected in the specifier of Appl, as in (139):

(139)

```
                    VoiceP
            _____|_____
          NP               Voice
         _|_          _____|_____
     the warden    Voice          ApplP
                          _____|_____
                        NP               Appl
                       _^_         _____|_____
                       who       Appl            VP
                                          _____|_____
                                         V               NP
                                       permit          __|__
                                                 one last conjugal visit
```
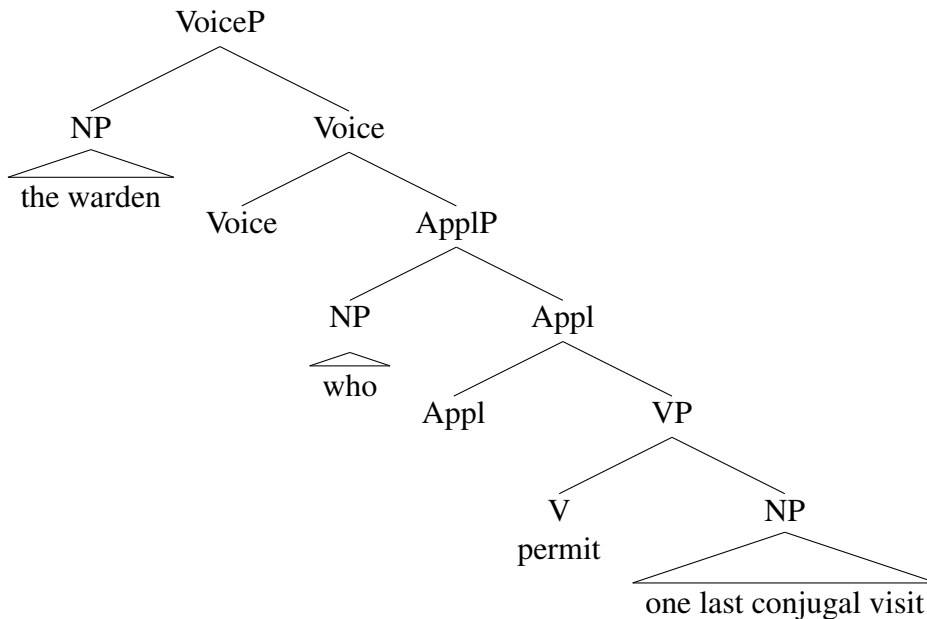
The sluiced clause therefore does not match the antecedent clause, since there is a maximal projection Appl$_{Pass}$P in one but not the other, and ellipsis (following wh-movement) is not licensed. This accounts for why the sluiced clause in (137) is unacceptable: ellipsis is not licensed. Note that full pronunciation is acceptable:

(140)   The warden will permit one last conjugal visit, but he didn't say who he will permit one last conjugal visit.

This is slightly odd, since the missing argument of *permit* is supposed to be pragmatically recoverable. There is nothing odd if the pragmatically identifiable first object is a pragmatically

identifiable group, and then the wh-phrase ranges over that group (see more on this in Appendix A). Since complete pronunciation is grammatical (if pragmatically odd), it is clear that the problem is specifically the ellipsis in sluicing. The current analysis accounts for this in the same way it accounts for the failure of sluicing with an active-passive pair (128): the antecedent clause and the elided clause do not have the same maximal projections in them. (Note that full pronunciation with active-passive pairs is also possible: *My computer was hacked, but I'm not sure who hacked my computer; Someone hacked my computer, but I'm not sure by who(m) my computer was hacked*.)

5.8   Summary

This section has applied the analysis of implicit arguments from section 4 to ditransitives and shown how it accounts for all of the facts from section 2. Implicit first objects are always interpreted in the same way because they are licensed by a special passive head, Appl$_{Pass}$, which uniformly assigns a definite interpretation to the missing argument of its complement ApplP. In this they are like the implicit arguments of passives, which are also interpreted uniformly. Implicit first objects do not permit sluicing for the same reason that active-passive pairs do not: the structures do not match. Structures with an implicit first object have a maximal projection, Appl$_{Pass}$, that is not present in the corresponding elided clause with an overt wh-phrase projected in Spec-ApplP. Since the structures do not match, ellipsis is not licensed.

The analysis also accounts for why verbs like *bake* allow an implicit direct object as a simple transitive, but never do in the double object frame. If the VP with an implicit object is embedded under Appl, it is not interpretable.

The last fact from section 2 was not explained and had to be stipulated as a lexical idiosyncrasy. This was that an implicit direct/second object is licensed only in the double object construction for some verbs, and only in the PP frame for other verbs. Since this seems to be a lexical idiosyncrasy, it was stipulated that some verbs combine directly with $\exists/\iota$, while others combine with them only as a complex head [V Appl]. No verb allows both, other than *write*.

In Appendix A, I discuss the interpretations of implicit first objects in more detail. There I show that different verbs permit different varieties of definite interpretations: familiar definites, unique definites, and addressee definites. Appendix B addresses verbs that allow two implicit arguments at the same time.

6   Conclusion

The study of implicit arguments undertaken here reveals that the first object of the double object construction behaves unlike any other argument. The second object behaves like a selected argument of the lexical verb, as do both the NP and the PP in the PP frame. Particular lexical verbs determine whether the first object can be dropped, but they do not determine how it is interpreted when it is. Implicit first objects can also never license sluicing, while all other implicit arguments can. I proposed accounts of these facts within the ApplP analysis of double object constructions, which is the only analysis that treats the second object but not the first as a selected argument of the lexical verb.

I also proposed a novel analysis of how implicit arguments are licensed and interpreted. In this analysis, implicit arguments are not present syntactically as NPs. Instead, functional heads saturate

their argument roles. ∃ and ι heads adjoin directly with lexical verbs, but a functional projection like PassP is required for the functional heads Voice and Appl. I also suggested a new way of encoding the identity requirement on ellipsis. The data and arguments presented here therefore add to our understanding of two key phenomena in syntax, the phenomenon of implicit arguments and the phenomenon of ellipsis.

Appendix A: More on the Semantics of Implicit First Objects

In the interest of completion, this appendix discusses the interpretation of implicit first objects in more detail. In the paper, I grouped all implicit first objects together as pragmatically recoverable definites. It appears that they actually fall into two groups. First, there is a group that allow an interpretation of the implicit first object as the addressee. With this interpretation, binomial *each* is licensed in the direct object, ranging over the implicit addressees:

(141)   a.   This place will charge $20 each.
        b.   The warden will permit one phone call each.
        c.   The police will allow one phone call each.
        d.   The pope will forgive one sin each.

The verbs that permit this are *charge, permit, allow, forgive*. In contrast, *tip*, *deny*, *strike*, and *envy* do not allow this:

(142)   a.   We had two waiters. *I tipped $5 each.
        b.   * The boss will deny one request each (before permitting anything).

(143)   a.   * The black knight will strike one blow each.
        b.   * He envies one possession each.

In section 2 we saw that *strike* and *envy* require a pragmatically identifiable (familiar) definite:

(144)   a.   A: Why is this sword dented? B: #The black knight managed to strike a heavy blow.
        b.   A: Why is the white knight bleeding so badly? B: The black knight managed to strike a heavy blow.

(145)   a.   A: What's up with Bill? B: #He envies the big house and expensive car.
        b.   A: Why does Bill dislike Monty? B: He envies the big house and expensive car.

In contrast, *tip* and *deny* permit a uniquely identifiable but not necessarily familiar definite:

(146)   a.   You're supposed to tip at least 20% now.
             ≈ You're supposed to tip the waiter/your waiter at least 20% now.
        b.   Courts in other countries often deny due process.
             ≈ Courts in other countries often deny their charges due process.

The implicit first object of *tip* is interpreted as a unique definite, something like 'the unique individual (singular or plural) who serves the subject in the given context.' The same is true for *deny*, where it is plausibly something like 'the unique individual who the subject has power over in

the given context'. Neither of these needs to be a familiar individual established in the discourse, instead they can be identified from the context and knowledge of the world. (Note that this is not the same as an indefinite; a paraphrase with *someone* is not appropriate, as was shown above.) In contrast, the missing first object with *strike* and *envy* does need to be familiar in the discourse.

What these four verbs have in common is that the missing argument is definite; definiteness encompasses both familiarity and uniqueness (in English). The verbs that permit binomial *each*, in contrast, permit a more specific interpretation, where the missing argument is specifically the addressee.

Some other verbs that are not obligatorily double object verbs also have the property of permitting an implicit *you*. Binomial *each* can range over this implicit *you* with these verbs as well:

(147) a. They will provide one meal each.
       b. The teacher will assign one task each.

This means that the functional head that permits this addressee interpretation (Appl$_{Pass}$ in the analysis) is not limited to occurring with obligatorily double object verbs. Some verbs will specify that they can have this interpretation when they occur with Appl$_{Pass}$ and others will not. Some of the ones that do cannot appear in the PP frame and some can.

I will continue to treat this *you* interpretation as an implicit, non-syntactic argument of Appl, licensed by Appl$_{Pass}$. One reason to do this is that, while this implicit *you* licenses binomial *each*, it does not license other things that require a syntactically present NP. For instance, the null *you* in an imperative easily licenses anaphors, but the implicit first object *you* does not:

(148) a. Hug each other!
       b. She will permit you each other.
       c. * She will permit each other.
(149) a. Assign yourself to the team!
       b. I will assign you yourself.
       c. * I will assign yourself.

This means that it is not the case that implicit first object *you* is a null pronoun; it is truly an implicit argument (that is, not syntactically present).

Note also that this special addressee interpretation still does not license sluicing, even if we specify the wh-phrase to range over addressees:

(150) a. This place will charge $20 (each), *but it's not clear which of you.
       b. The warden will permit one phone call (each), *but it's not clear which of you.
       c. The pope will forgive one sin (each), *but it's not clear which of you.
       d. They will provide one meal (each), *but it's not clear which of you.
       e. The teacher will assign one task (each), *but it's not clear which of you.
       f. They will allow one phone call (each), *but it's not clear which of you.

Again, sluicing seems to be ungrammatical, not pragmatically infelicitous. In this case, full pronunciation is much better, and even quite felicitous:

(151)   The warden will permit one last conjugal visit, but he didn't say which of you he will permit one last conjugal visit.

The problem again is the failure of ellipsis licensing. The Appl$_{\text{Pass}}$P that permits the addressee interpretation has no correspondent in the elided clause, where a wh-phrase is projected in the specifier of Appl.

It should be noted that the addressee interpretation is not obligatory for the verbs that allow it. These verbs also permit the implicit first object to be an individual other than the addressee. We saw that for instance with bound readings with quantifiers:

(152)   a.   No traveler should expect tourist destinations to charge (them) very little.

        b.   No man on death row expects the warden to permit (him) one last conjugal visit.

        c.   No teenage catholic actually believes that God won't forgive (him/her/them) pre-marital sex.

(153)   a.   No passenger on a cruise ship should be shocked when they provide (him/her/them) less than three meals a day.

        b.   No student should be shocked when the teacher assigns (him/her/them) a book to read.

I will continue to propose the same analysis. There is an Appl that does not project its specifier. The head Appl$_{\text{Pass}}$ takes this ApplP as its complement and checks its unchecked [S:N] feature. The verb moves to Appl and combines with it semantically. Verbs specify in their lexical entries that they can appear in a structure with Appl$_{\text{Pass}}$. Some of these verbs specify that the unprojected argument can be a pragmatically identifiable (unique) definite (*tip, deny*), while others specify that they permit an interpretation where the unprojected argument is the addressee. The pragmatically familiar definite interpretation seems to be the default for Appl$_{\text{Pass}}$, so that all verbs allow it. Verbs that do not specify an addressee or unique definite interpretation only permit the familiar definite interpretation (*strike, envy*).

I noted in section 5.6 that it is possible to passivize the second object across an implicit first object, and took this to indicate that an implicit first object is not syntactically present in any form. Otherwise it would block A-movement across it. One thing to note now is that not all double object verbs permit passivization of the second object across an implicit first object. For instance, *envy* and *tip* do not:

(154)   a.   * The expensive car is envied.

        b.   * Twenty dollars was tipped.

In contrast, all of the verbs that permit an addressee interpretation permit passivization with pro-motion of the direct object when the first object is implicit:

(155)   *implicit addresssee*

        a.   A fee will be charged.

        b.   A single phone call will be permitted.

        c.   A single phone call will be allowed.

        d.   Sins will be forgiven in the evening.

e. Meals will be provided.

f. Sleeping quarters will be assigned.

(This is further evidence that the implicit addressee object is not syntactically present.)

However, it seems unlikely that the different definite interpretations of the implicit first object are due to a different syntax. First, as was shown above, all of the verbs that allow the implicit argument to be the addressee also allow a definite non-addressee interpretation. In (155), the implicit first object can be the addressee or some other recoverable definite.

Second, *envy* and *tip* differ in their semantics. As we saw, *envy* takes a familiar definite but *tip* permits a unique definite. Two other verbs are the same but *do* permit passivization of the first object, in contrast with *envy* and *deny*:

(156) *familiar definite*

a. A heavy blow was struck.

b. * The expensive car is envied.

(157) *unique definite*

a. The request was denied.

b. * Twenty dollars was tipped.

It therefore appears that the ability to passivize across an implicit first object does not correlate with the semantic interpretation. In principle, the second object can passivize across any implicit first object (addressee, familiar definite, unique definite). For some reason *envy* and *tip* do not permit this. All other verbs do, so the only condition on promotion in the passive seems to be that no other NP is crossed by that promotion. Since Appl's specifier is not projected in the current analysis, there is no other NP in the way in the passive when the first object is implicit, and the lowest object can move to Spec-PassP and on to Spec-TP.

Appendix B: Multiple Implicit Arguments

We saw in the introduction that there are some verbs that allow both arguments to be implicit. It turns out that the data become quite complicated, and some verbs behave differently when both arguments are implicit, compared to when just one is.

First, *strike* and *pass* seem to allow both internal arguments to be implicit at the same time:

(158) a. The knight struck. (definite first object, indefinite second)

b. * The knight struck a heavy blow to his enemy.

(159) a. She almost never passes when she gets the ball (direct object definite, PP indefinite)

b. She wouldn't pass *(to) me.

Since *strike* only occurs in the double object construction and not in the PP frame (158b), it must be a double object construction with two implicit arguments.[24] Verbs that behave like *strike* include *ask* (*You can always ask*), *email* (*Will he email, do you think?*), and *tip* (*I don't tip*). With *pass*, the

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[24]Alternatively, the second object is not entailed at all, and *strike* can be used as a simple transitive whose sole argument can be implicit; it is hard to tell.

direct object can only be implicit in the PP frame and not the double object frame (159b), so it is likely that in this usage we have the PP frame.

Fillmore (1986) notes that the non-alternating verb *contribute* allows both its NP object and its PP object to be implicit at the same time. The NP object is interpreted as an indefinite, and the PP object is interpreted as a pragmatically recoverable definite:
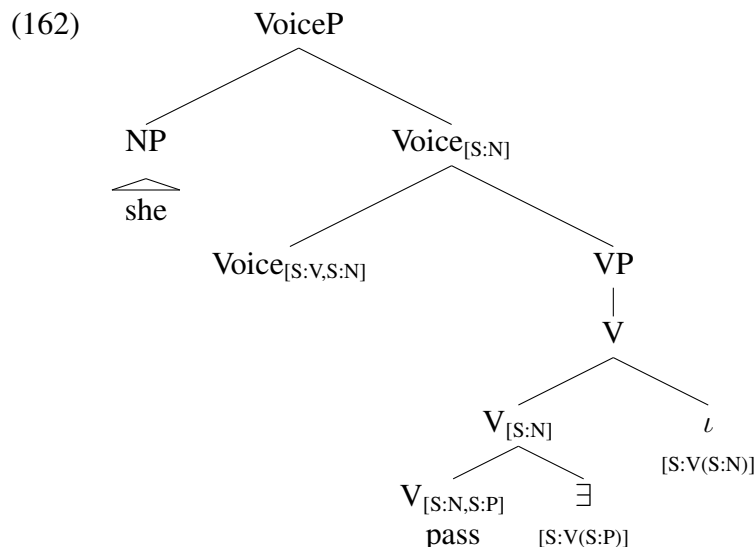
(160)   We're raising money for cancer, but Leo won't contribute (anything) (to the cause).

The possibility of multiple implicit arguments in both frames follows naturally from the analysis. First, in the double object construction, $\exists$ or ι can attach to the complex [V Appl], while Appl$_{Pass}$ combines with Appl prior to it projecting its argument:

(161)
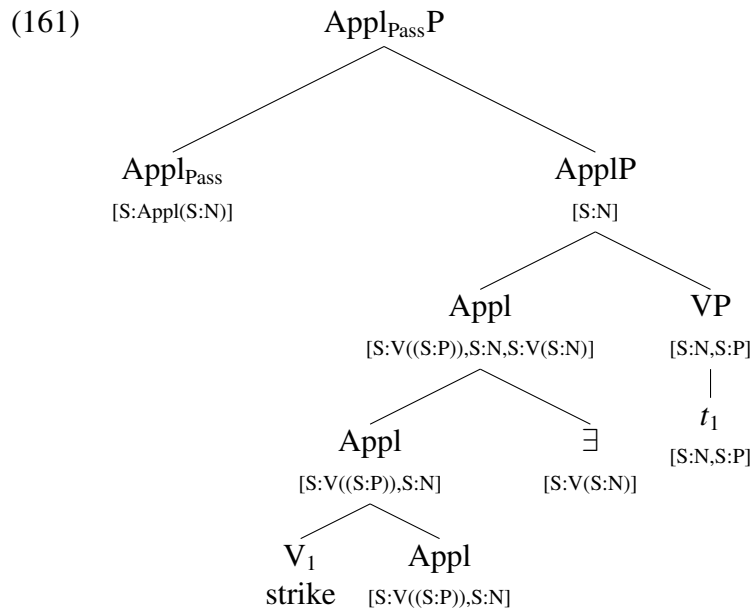
All selectional features are checked off, so this derivation converges syntactically. In the semantics, $\exists$ binds the first argument of Appl/V, making it indefinite, while Appl$_{Pass}$ binds the second, making it definite.

In the PP frame, the $\exists$ or ι with the selectional feature [S:V(S:P)] has to attach first, since it binds the second argument of the V. This means it has to merge while the V still has two arguments, before the other operator merges with it. But then the $\exists$ or ι with the selectional feature [S:V(S:N)] can also attach, saturating the remaining argument (the NP):

(162)

VoiceP
- NP — she
- Voice$_{[S:N]}$
  - Voice$_{[S:V,S:N]}$
  - VP
    - V
      - V$_{[S:N]}$
        - V$_{[S:N,S:P]}$ pass — [S:V(S:P)]
        - ∃
      - ι — [S:V(S:N)]

So far all works as one might expect. However, some verbs that allow multiple implicit arguments have unusual properties that will need to be accounted for. Consider first the verb *teach*. When both arguments are implicit, they both seem to be indefinite (163a):

(163) a. He's teaching right now.

   b. He teaches (*to) first-graders.

   c. He's teaching a student one-on-one, but I'm not sure what.

   d. A: He's teaching French right now. B: Oh? To who?

This should not be the double object frame, then, because we concluded above that an implicit first object is always definite. It would have to be the PP frame. However, if only the direct object is implicit, then the preposition is not allowed (163b); this means that the second object can only be implicit in the double object frame. This seems to be a contradiction. We also cannot say that *teach* is a simple transitive when only one NP is present, because sluicing is licensed (163c–d). The antecedent clauses in both cases must have implicit arguments. However, note that *teach* does allow an implicit PP, in (163d). This means that it is plausible that when both arguments are implicit, as in (163a), what we have is the PP frame. The trick is that an implicit direct object is only licensed in the double object frame in (163b) when it is the only implicit argument; but it can be licensed in the PP frame if the PP is also implicit. This will somehow have to be specified in the relevant lexical entries.

There are also two verbs that seem to behave differently when both arguments are implicit. These are *sell* and *pay*. Consider *pay* first. It allows two implicit arguments (164a). The direct object can only be implicit in the double object construction and not the PP frame (164b), so it is likely that (164a) is a double object construction. What is unusual is that, when both objects are implicit, they both seem to be pragmatically recoverable definites. Yet we concluded above that the implicit second object of *pay* is indefinite, based on sluicing and out-of-the-blue contexts (164c–d):

(164) a. The government is charging her a fine, but she won't pay. (both objects definite)

   b. She paid (*to) the bill collector.

c.   Ron has to pay the loan shark, but I don't know how much.

d.   If you want a ride, you have to pay the wrangler.

It is possible that the listener accommodates in (164d), and we already concluded that sluicing does not necessarily diagnose an indefinite interpretation (especially with *how much*). *Pay* may then always have a pragmatically recoverable implicit direct object. It is also possible, however, that when it is the only implicit argument, it is indefinite, but when both arguments are implicit, it is definite. If this is true, then the analysis will again have to be complicated.

Sell behaves similarly. It is clear that its implicit goal is indefinite in (165a). If it has an implicit direct object (allowed only in the PP frame), that object is definite (165b). When both arguments are implicit, (165c–d), both of them seem to have to be definite. The goal in particular has to be given in the discourse; if it is not, it is infelicitous (165d):

(165) a.   They just sold the house! (no buyer necessary in discourse)

b.   We need this house, but the owner will never sell to a corporation like ours.

c.   We need to buy this house, but the owner won't sell.

d.   I can't believe someone built a house on this toxic waste dump! #But the owner won't sell.

This means that we have a clear case of the interpretation of an implicit direct object changing depending on whether the PP is also implicit or not.

There is also one other oddity about *sell*, which is that both arguments can be implicit only in the presence of a modal. All of the examples in (165) have a modal. If there is no modal, the two objects cannot both be implicit:

(166) a.   A: They need to buy this house soon or the project timeline will be thrown off. B: The owner sold *(it).

b.   A: They need to buy this house soon or the project timeline will be thrown off. Will the owner sell?

c.   A: They needed to buy this house by Friday in order for the project to succeed. Did the owner sell *(it)?

(Note that modals do not license implicit arguments with other verbs: *I asked him for his car *but he wouldn't lend*.) I will have to leave exploration of this to future work.

Additionally, the introduction noted that there is a large class of verbs that permits either argument to be implicit, but does not allow them both to be implicit at once. These inclue *charge, cost, envy, fine, forgive, guarantee, give, serve, throw*:

(167) a.   They charge visitors an entrance fee.

b.   They charge an entrance fee.

c.   They charge visitors.

d.   * They charge.

It is unclear how to capture this in the current analysis, other than by making yet more lexical stipulations. Since the facts do seem to be lexically idiosyncratic, this seems unavoidable.

Finally, the question has arisen at various points whether a ditransitive verb when it seems to have an implicit argument could actually be being used as a simple transitive. Bruening (2014b: note 23) notes one piece of evidence indicating that this is a possibility. This is that resultative secondary predicates cannot be predicated of the first object of a double object construction, but with *feed*, one can be predicated of the first object when the second is implicit:

(168)   (Bruening 2014b: 402, (i))

    a.   * Perhaps feeding the serpents corpses fat again would...

    b.   Perhaps stopping a slaver or two and feeding the serpents fat again would restore their tractability. (*Ship of Destiny*, Robin Hobb)

This seems to indicate that there is no second object; the sole object is the complement of the lexical verb.

At the same time, an implicit second object can license sluicing:

(169)   We need to feed these serpents but we don't know what.

Given that clauses with different argument structures do not license sluicing, the antecedent clause here must have the NP *these serpents* in Spec-ApplP, and an implicit second object, since the elided clause seems to require two NP positions.

Interestingly, sluicing seems unacceptable (at least to this author) if we combine it with a resultative secondary predicate:

(170)   We'll try to feed the serpents fat again *but we don't know what.

This suggests that both options are available to the verb *feed*: it can take a goal as the single argument in a monotransitive use, in which case a resultative secondary predicate is acceptable; or it can have the goal as the first object of the double object construction, with an implicit direct object, in which case it licenses sluicing. Once again, I will have to leave full exploration of this issue to future research.

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