The distinction between adjectival and verbal passives has become a familiar one in generative studies (Siegel (1973), Wasow (1977), Williams (1981), Bresnan (1982b)). It has long been noticed that passive participles have adjectival properties, and some linguists (for example, Freidin (1975)) have suggested that all passive participles are in fact adjectives. Wasow (1977) was the first to distinguish systematically between two kinds of passives, one that exhibits adjectival properties—the adjectival passive—and one that exhibits verbal properties—the verbal passive. Since the distinction between the two participles was established and the properties of the phrases they head set forth, the task has been to formulate the rule of Adjectival Passive Formation (APF), which relates APs headed by adjectival passive participles to their verbal counterparts.¹

An analysis of the process of APF should meet three requirements. (a) It should be descriptively adequate. Not all VPs headed by passive participles have AP counterparts, and adjectival passives corresponding to certain types of passive VPs are systematically excluded. Any generalization concerning possible and impossible adjectival passives must be accounted for in an analysis of APF. The generalizations should either be encoded explicitly in the rule deriving adjectival passives or (perhaps preferably) follow from well-formedness conditions imposed by general principles of grammar. (b) The form of the rule of APF should be consistent with universal principles constraining the form of morphological processes. (c) The analysis should be explanatory. Adjectival passive participles are associated with the same affix as verbal passive participles, which we will represent as -ed. An account of the process deriving the adjectival passive participle should be able to explain why it is associated with this particular affix and not,
say, the active participial suffix -ing. Optimally, the account should also provide a connection between the operation of the rule and the change in categorial status. This article presents an analysis that we believe fulfills these requirements.

Within the Government-Binding (GB) framework (Chomsky 1981) the process that derives an adjectival passive participle from the base verb is usually assumed to effect the following changes (see Borger 1984).

1. Properties of APF
   a. Affixation of the passive morpheme -ed
   b. Change of category: [+V, -N] \rightarrow [+V, +N]
   c. Suppression of the external role of the base verb
   d. Externalization of an internal role of the base verb
   e. Absorption of Case
   f. Elimination of the [NP,VP] position

(See below for a more detailed explanation of these changes.) In previous GB accounts (Borger 1984, Williams 1981) many of these properties are explicitly stipulated in the rule of APF. Accounts in other frameworks have included analogous stipulations (Bresnan 1982b, Wasow 1977, 1980). In contrast to previous studies, the analysis of APF that we introduce here relies heavily on general principles of grammar that figure prominently in the GB framework, and it involves a minimal number of stipulations.

A central concern of all generative analyses of APF has been the identification of the argument of the base verb that an adjectival passive modifies or is predicated of. (effect (1d). We will call this argument the external argument, using the term introduced by Williams (1980, 1981), since it appears external to the AP headed by the related adjectival passive participle. In the earliest studies this argument was identified by its syntactic position. With the development of theories of lexical representation in which argument structures figure prominently, attention has been focused on what seem to be thematic restrictions on this argument. Some analyses (Bresnan 1982b, Wasow 1977, 1980, Williams 1981) have incorporated the apparent restrictions directly into the rule deriving adjectival passives by identifying this argument by the thematic role it bears.

These analyses are briefly reviewed in section 2.

In our analysis the identification of the external argument is seen as part of the larger problem of accounting for the syntactic expression of the arguments of an adjectival passive participle. In section 3 we show that the descriptive generalization that led to the formulation of a rule of APF that incorporates a thematic restriction on the external argument of an adjectival passive does not hold. Additional evidence demonstrates that in some instances it is altogether impossible to state the well-formedness condition on adjectival passives in terms of any property of the external argument. Our account dispenses with the thematic restriction. Instead, as demonstrated in section 4.2, the effect of the apparent thematic restriction is achieved by appealing to the Projection Principle and the 8-Criterion (Chomsky 1981), which together ensure that arguments receive an appropriate syntactic expression.

Our rule of APF, presented in section 4.3, simply states that an adjective is created from a verbal passive participle, which is surely the minimum any formulation of the rule must specify. The properties of adjectival passives thus created are determined by the lexical properties of the base verb and the features of the passive morpheme, in conjunction with general properties of adjectives, the Projection Principle, and the 8-Criterion. In the final section we consider the advantages of our account from the perspective of the theory of lexical representations.

The approach adopted here reflects a more general conceptual shift within the framework of generative grammar from the study of rules to the study of principles constraining rules and governing representations. The results achieved here support theories of morphology such as those developed by Marantz (1984) and Sproat (1985), which preclude morphological rules that effect externalization or a change in grammatical function. The result is a theory with greater explanatory adequacy, since the effects of previously formulated rules follow from the interaction of independently motivated principles of grammar.

A catalogue of the differences

1. The Properties of the Two Passives between adj. and verbal passives — very useful

Although adjectival passive participles and verbal passive participles are morphologically identical (in English) and the semantic distinction between them is subtle, certain morphological and syntactic environments clearly distinguish between the categorially distinct participles, because they select either for verbs or for adjectives. On the assumption that certain passive participles are adjectival and others verbal, any differences in distribution between the two passives presumably follow from the categorial difference between the forms.

We will briefly review three of the diagnostic environments for adjectival passives, since we will use them throughout the article to ensure that the examples involve unambiguous instances of adjectival passives. The first of these contexts is a morphological one. Negative un- attaches to a fair number of passive participles, as in unopened, unshaven, unmarked, and untouche. In addition, negative un- attaches to adjectives—unfriendly, unhappy, unspectacular—but not to verbs (Siegel 1973). This leads to the

3 Verbal passives are associated with an event reading; adjectival passives are associated with a state reading.

4 Although this is the common assumption, Hoekstra (1984) presents an alternative that is also compatible with the data: passive participles, although specified as [+V], are unspecified for a value of the feature [N] and therefore are free to occur in environments appropriate to either verbs or adjectives.

5 See Wasow (1973) and Fabb (1984) for a more extensive catalogue of these contexts.

6 Negative un- is to be distinguished from what has been called "reversive" un-, which attaches to verbs (as in unload the truck, ambitions the short). For example, John unloaded the truck does not exhibit the meaning that would be linked to negative un-, that John did not load the truck. Rather, it means that someone first loaded the truck and John then undid this action. See Allen (1978) for discussion.

footnotes 3 & 6 are gold

hang onto these tools
conclusion that passive participles that are prefixed with an are categorially adjectival and never verbal. A number of verbs in English that select adjectival—but not verbal—complements provide a second context. Among these are seem, remain, sound, and look. A passive participle appearing as the complement to such a verb is therefore taken to be adjectival, not verbal. Third, only adjectives and not verbs may occur as prenominal modifiers. Any passive participle found in prenominal position is therefore also adjectival, not verbal.

More important for an account of APF are certain characteristics of adjectival passives that cannot simply be ascribed to their categorial status. Consequently, these properties have been said to follow from the nature of the rule that derives the form. They concern the range of interpretations that can be attributed to the NP of which the phrase headed by the passive participle is predicated. In particular, adjectival passives, unlike verbal passives, appear to impose thematic restrictions on this NP.

There are clear instances in which the NP of which the passive participle is predicated is an idiom chunk or is interpreted as an argument of a lower clause. But, as Wason (1977) first noted, it appears that all such passive participles can be shown to be verbal. Unlike verbal passive participles, passive participles that are unquestionably adjectival by the distributional criteria permit neither idiom chunks (as in (2)-(3)) nor subjects of embedded verbs (as in (4)-(5)) as the NP of which the phrase headed by the passive participle is predicated. Note the use of adjectival diagnostic environments in the (b) sentence of each pair to ensure that the passive is adjectival.

(2) a. Tabs; seem t; to have been kept on the suspect.
   b. *Tabs; remain t; kept on the suspect.
(3) a. Not much headway; seems t; to have been made today.
   b. *Not much headway; seems t; made today.
(4) a. Ralph; is known t; to be a reactionary.
   b. *Ralph; is unknown t; to be a reactionary.
(5) a. Smith; is believed t; to have fled the country.
   b. Smith; seems believed t; to have fled the country.

The generalization that emerges is simple: the NP of which the adjectival passive is predicated must be thematically related to the base verb; that is, it must be an argument of this verb. We refer to this NP as the argument as well as the internal arguments in his argument structures, but he marks the external argument with a diacritic indicating its special status. Marantz (1984) and Chomsky (1981) take the other position. They do not consider the external argument to be an argument of the verb. Marantz's argument structures do not include the external argument at all, but they do include a diacritic indicating whether or not a verb participates in the compositional assignment of a 6-role to an external argument. See Lapointe (1985) for some discussion of Marantz's view. We do not take a position on this issue. The notation adopted in the lexical representation of verbs should not be interpreted as an implicit endorsement of either point of view.

2. The Theme Analysis

A stronger claim has been made concerning the external argument of adjectival passives. According to Wasow's (1980) formulation of APF, which incorporates a suggestion made in Anderson (1977), the external argument of an adjectival passive must be interpreted as an argument standing in a specific thematic relation—that of theme—to the base verb. In Wasow (1980) and other studies the thematic sensitivity has been taken as central to the formulation of the rule of APF.

The use of a thematic restriction on APF is supposed to account for the fact that when a verb has two arguments, either of which may appear as its direct object, usually only one may become external as a result of APF. The generalization is prompted by the study of adjectival passives related to verbs that participate in the dative alternation (henceforth, dative verbs).

(6) a. Smith sold the car to the first customer.
   b. Smith sold the first customer the car.

The theory of thematic roles as developed in any of the standard studies such as Gruber (1965) and Jackendoff (1972; 1976) associates the verb sell with three arguments bearing the agent, theme, and goal roles, as indicated in the argument structure in (7).10

(7) sell: agent (theme, goal)

We indicate which of the arguments is the external argument by placing the role associated with this argument outside the brackets. The remaining arguments—the theme and the goal—are internal arguments: they are expressed internal to the VP headed by sell. A commonly held view is that the dative alternation arises because either the theme or the goal argument may be realized as direct object.11

Whereas both variants in (6) have verbal passive counterparts, as shown in (8), only one has an adjectival passive counterpart, as shown in (9).

9 There is a controversy in discussions of argument structure over whether the external argument is actually an argument of the lexical head itself or of the entire predicate, and whether this argument should consequently appear in the lexical representation of the head. For example, Williams includes the external argument as well as the internal arguments in his argument structures, but he marks the external argument with a diacritic indicating its special status. Marantz (1984) and Chomsky (1981) take the other position. They do not consider the external argument to be an argument of the verb. Marantz's argument structures do not include the external argument at all, but they do include a diacritic indicating whether or not a verb participates in the compositional assignment of a 6-role to an external argument. See Lapointe (1985) for some discussion of Marantz's view. We do not take a position on this issue. The notation adopted in the lexical representation of verbs should not be interpreted as an implicit endorsement of either point of view.

10 The term argument structure is used loosely to designate a representation that includes the number and roles of the arguments associated with a verb. See section 4.1 for a sketch of the conception of lexical representation assumed here.

11 See footnote 33 for other views of the alternation.
What do (8)–(9) tell us? (What hypothesis can we reject?)

(8) a. The car was sold to the first customer.
b. The first customer was sold the car.
(9) a. The car remained unsold.
b. *The first customer remained unsold.

The rule of APF must account for which internal argument of the base verb is eligible for expression external to the related adjectival passive. This argument cannot be identified by the grammatical function it bears, since both of the internal arguments can be realized as the direct object. The adjectival passives of the two variants can, however, be distinguished in terms of the thematic role borne by the external argument. The external argument bears the theme role in the grammatical (9a) and the goal role in the ungrammatical (9b). This pattern is typical of dative verbs.

(10) a. a recently offered deal; *a recently offered customer
b. a recently rented apartment; *a recently rented tenant
c. a recently given medal; *a recently given winner

This contrast has been taken as an indication that the rule of APF imposes thematic restrictions on the external argument of adjectival passives. Analyses incorporating this insight, which we refer to collectively as the Theme Analysis, are adopted by Williams (1981) and Bresnan (1982b), among others.

(11) a. Adjectival Passive Formation (Williams (1981))
   Externalize(theme).
   = make the theme into a subject
b. Participle-Adjective Conversion (Bresnan (1982b))
   Morphological change: \[ V_{[\text{Part}]} \rightarrow [V_{[\text{Part}]}]A \]
   Operation on lexical form: \[ P \ldots \text{(SUBJ)} \ldots \rightarrow \text{STATE-OF} \ P \ldots \text{(SUBJ)} \ldots \] aspect to stative
   Condition:
   \[ \text{SUBJ} = \text{theme of} \ P \]

Williams's rule of APF, (11a), involves the externalization of an argument. This rule specifies that the theme argument that is expressed internal to the VP headed by a verb is expressed external to the AP headed by the morphologically related adjectival passive participle at D-Structure. In Williams's theory of morphological rules externalization is one of the two types of operations that morphological processes can perform on argument structure; the second is internalization. Both operations are stated as functions on arguments identified by their thematic roles. (In what follows we use the term externalization descriptively to refer to a process that results in an argument of a predicate being expressed external to the XP headed by that predicate. Unless otherwise indicated, it is not meant to be seen as a process embedded in Williams's theory.) Rule (11a) encodes the thematic restriction on APF by identifying the argument to be externalized as the one bearing the theme role.

Bresnan's (1982b) lexical rule of Participle-Adjective Conversion, (11b), converts a verbal passive participle to an adjective. This rule incorporates an explicit condition on the subject of the adjectival passive: the subject must bear the theme role. By relating the participles in this way, Bresnan provides a unified analysis of the use of a single morpheme for the two passives. Her rule also captures the generalization, noted by Lieber (1980), that although the passive morpheme has a number of allomorphs, the verbal and adjectival passive participles of any given verb always involve the same allomorph: the food was eaten, the eaten food; the ballad was sung, a badly sung ballad. This fact is simply an accident on Williams's account, which presents two separate and independent rules of passive participle formation.

In addition to accounting for the contrasts in (9) and (10), the condition on the external argument (or the argument bearing the subject grammatical function) also accounts for the absence of raising adjectival passives and adjectival passives predicated of idiom chunks: in a raising construction the subject is an argument not of the matrix predicate but of the embedded predicate, and an idiom chunk is assumed not to be an argument of the predicate. The subject of a lower clause and an idiom chunk cannot then meet the thematic restriction imposed by either Bresnan's or Williams's rule.

3. Empirical Difficulties for the Theme Analysis

Before moving to §3, state the theme analysis

The Theme Analysis predicts that adjectival passives will show what Williams (1981) calls thematic constancy: the external argument of the adjectival passive should always be associated with a designated role, the theme role. However, examination of the dative verbs and other verbs taking two internal arguments, either of which may be expressed as the direct object, shows that the generalization behind the Theme Analysis is invalid: adjectival passives do not display the predicted thematic constancy. The Theme Analysis alone fails to account for the full range of possibilities for the syntactic expression of the arguments of the adjectival passive participle. A generalization does emerge from the surveyed verb/adjectival passive pairs, however, which may be stated without reference to thematic roles. This generalization is the basis of the new analysis.

3.1. Dative Verbs

Wasow (1977) and Bresnan (1982b) note that the verb teach, which participates in the dative alternation (as in (12)), presents a potential problem for the Theme Analysis, precisely because it does not show thematic constancy. APF can externalize either the theme argument or the goal argument of this verb, as in (13).

b. John taught children manual skills.
(13) a. untaught skills
b. untaught children

To preserve the Theme Analysis, Wasow and Bresnan conclude that although manual skills bears the theme role assigned by teach in (12a), children bears that role in (12b). (They do not suggest what role manual skills might bear in (12b) if children bears the theme role.) As evidence, Wasow notes that (12a), the putative source for (13a), does not entail that the children have in fact learned any skills, but (12b), the source for (13b),
does entail that the children have learned the skills. This alternate assignment may permit the Theme Analysis to be maintained, but in the absence of clear criteria for identifying the theme of a verb, the analysis is greatly weakened. In fact, this assignment is incompatible with the notion of theme in the original sense of Gruber (1965) and Jackendoff (1972; 1976), where the term refers to the argument that undergoes the actual or abstract movement indicated by the verb or whose location is specified by the verb. Using this criterion, only manual skills qualifies as theme in (12).

A survey of the entire range of dative verbs reveals that teach is not an isolated example of a verb that fails to conform to the generalization underlying the Theme Analysis. At least two other dative verbs, serve and pay, show the same paradigm as teach. They participate in the dative alternation and permit either internal argument to be the external argument of the adjectival passive.

> (14) a. Max paid the money to the agent.
  b. Max paid the agent the money.
> (15) a. Bill served food to the customer.
  b. Bill served the customer food.
> (16) unpaid money; a badly paid agent
> (17) sloppily served food; unserved customers

There is even less evidence that the alternations in (14) and (15) involve an alternative assignment of thematic roles, since with these verbs the alternation is not accompanied by the semantic difference that accompanies the alternation in (12). Both (14a) and (14b) entail that money reached the agent, and both (15a) and (15b) entail that the food reached the customer.

The adjectival passives of teach, serve, and pay might be considered idiosyncratic lexical exceptions to an otherwise general rule, were it not for the existence of a syntactic property that distinguishes just these verbs from most other dative verbs. Unlike other dative verbs, pay, teach, and serve permit the goal argument—as well as the theme argument—to stand as sole NP complement in D-Structure.

> (18) a. teach the children; teach manual skills
  b. pay the money; pay the agent
  c. serve the food; serve the customers

Contrast the behavior of these verbs with that of more typical dative verbs such as those in (9) and (10), which permit only the theme argument to stand as sole NP complement.

> (19) a. offer a deal; *offer a customer
  b. rent a house; *rent a tenant
  c. give the prize; *give the winner
  d. sell the car; *sell the customer

The ungrammatical adjectival passives in (9b) and (10) can thus be correlated with the ungrammatical VPs in (19), and the exceptional adjectival passives based on teach, serve, and pay can be correlated with the exceptional complement structure associated with these verbs.

This observation suggests the following generalization, which we will refer to as the Sole Complement Generalization (SCG).

> (20) Sole Complement Generalization (SCG)
  An argument that may stand as sole NP complement to a verb can be externalized by APF.

On this approach a potential external argument is identified by means of properties of the complement structure of the base verb without reference to thematic roles.

The SCG is corroborated by the behavior of the verb feed. This verb, like other dative verbs, takes both a theme argument and a goal argument as internal arguments. Yet it is unique in that the goal—but not the theme—can stand as sole NP complement to the verb. As the SCG predicts, only the goal may be externalized by APF.

> (21) a. feed some cereal to the baby
  b. feed the baby some cereal
  c. *feed some cereal
  d. feed the baby
> (22) a. *unfed cereal
  b. unfed baby

The behavior of this verb is striking: not only can the goal argument be externalized; the theme argument cannot. This is quite incompatible with the Theme Analysis, but it is precisely what the SCG predicts, since the unique complement structure is correlated with a unique interpretation of the related adjectival passive. One could try to argue that baby is the theme of feed in (21b), but this leaves unexplained the ungrammaticality of (22a). Surely, in (22a) cereal is the theme of the predicate. In its supposed source, (21a), cereal is to be analyzed as the theme argument and baby as the goal argument, since they have the typical realizations for theme and goal arguments, respectively.

The SCG predicts that if there is a verb with two internal arguments, neither of which can stand alone as direct object in the absence of the other, then neither argument can be externalized. This appears to be true. The internal arguments of the dative verbs hand and slip manifest this property (see (23)-(24)), and neither of them may appear as the external argument of an adjectival passive (see (25)-(26)).
Although stuff, cram, spray, smear, sprinkle, crowd. may appear as the object of a locative preposition. This analysis is not an instrumental argument, since it can cooccur with a true instrumental as in *he loaded the wagon with hay with a pitchfork. See Rappaport and Levin (1986) for discussion of the properties that distinguish the two kinds of PPs.

This survey of dative verbs gives reason to believe that APF does not display the thematic constancy predicted by the Theme Analysis. Before offering a new analysis, we examine another verb class to illustrate further the validity of the SCG and the untenability of the Theme Analysis.

### 3.2. Spray/Load Verbs

Like the dative verbs, the verbs in the class we explore in this section have two internal arguments, either of which may be expressed as direct object. This class, which includes verbs such as *load, pack, crowd, stuff, cram, spray, smear, sprinkle*, and *pile,* has been discussed from various perspectives by Hall (1965), Fillmore (1968), Anderson (1971), Fraser (1972), Schwartz-Norman (1976), and Rappaport and Levin (1986). We refer to it as the *spray/load class*, after two of its prototypical members. The alternation that typifies the class is illustrated in (27) and (28).

(27) a. Jones loaded hay on the truck.
    b. Jones loaded the truck with hay.

(28) a. Smith sprayed water on the plants.
    b. Smith sprayed the plants with water.

Without attaching any significance to the particular labels, which are used solely for the purposes of identification, let us say that these verbs take three arguments, one bearing the *agent* role, another bearing the *material* role, and the third bearing the *location* role.14 The argument structure of a verb in this class, *load*, is given in (29).

(29) load: agent (material, location)

Again, placing the agent role outside the brackets indicates that it is designated as the role of the external argument. In purely descriptive terms, the alternation characteristic of these verbs arises from the fact that the internal arguments, the material and location arguments, have two options for syntactic expression; each can be realized either as the direct object or as the object of a preposition, as illustrated in (27) and (28). In the (a) sentences it is the material argument and in the (b) sentences the location argument that is expressed as the direct object. It is this property that distinguishes the *spray/load* verbs from other verbs like *put or fill* that appear to have very similar argument structures but do not participate in a comparable alternation.

To evaluate whether the behavior of the *spray/load* verbs provides support for the Theme Analysis, we must ask what thematic constancy might mean with respect to these verbs and, in particular, how the notion of theme might be defined over this class. We will describe what appear to be two plausible characterizations, drawing on two conceptions of theme found in the literature. Besides the conception proposed by Gruber and Jackendoff, we consider one discussed in Anderson (1977). As neither leads to the right prediction with respect to APF, we conclude that the adjectival passives of *spray/load* verbs do not show thematic constancy.

Under the theory of thematic roles developed by Gruber and Jackendoff, the argument that most naturally qualifies as theme with the *spray/load* verbs would be the material argument, since for verbs involving motion the theme is usually defined as the argument denoting the entity that moves. Furthermore, these works assume that the preposition marking an argument provides strong evidence for which thematic role it bears: choosing the location argument as theme would be incompatible with this assumption, since it may appear as the object of a locative preposition. This analysis predicts that for adjectival passives based on the *spray/load* verbs only the material argument should be able to be expressed external to the adjectival passive, since it is always analyzed as theme.

Another thematic analysis of the *spray/load* verbs could be motivated by the observation that the *spray/load* alternation is accompanied by a change in interpretation similar to the one noted for the verb *teach*. When the location argument is realized as the direct object, it is understood to be holistically (that is, totally) affected by the action denoted by the verb (see Anderson (1971; 1977), Schwartz-Norman (1976)). When this argument is realized as the object of a preposition, a partially affected interpretation is also possible. Anderson (1977) suggests that the different available interpretations may be due to the effects of what he calls the *Theme Rule*, an interpretive process that identifies the direct object of a transitive sentence as theme. Although he does not give a precise characterization of *theme*, he apparently intends it to mean something like "affected object." For the verbs under consideration it would be a lexical property that either the material argument or the location argument could be analyzed as theme, giving rise to the alternation. When the location argument is analyzed as theme, it appears as direct object and receives a holistic interpretation. When the material argument is analyzed as theme, it appears as direct object and the location argument does not necessarily receive the holistic interpretation. If the alternation arises because either argument could be interpreted as theme, then either should be a candidate for externalization.

If it is true that APF displays thematic constancy, then the external argument of adjectival passives derived from the *spray/load* verbs should conform to one of these two notions of theme. This expectation is not borne out since, as demonstrated below, the verbs display all of the logical possibilities for choice of external argument. It is not

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13 The appendix of Rappaport and Levin (1986) for a more complete list of the verbs in this class.
14 Although *with* frequently indicates an NP bearing the instrumental role, the object of *with* in these examples is not an instrumental argument, since it can cooccur with a true instrumental as in *he loaded the wagon with hay with a pitchfork. See Rappaport and Levin (1986) for discussion of the properties that distinguish the two kinds of PPs.
the case that for each verb in the class only the material argument may be externalized, as predicted by the first conception of theme. Nor is it the case that for each verb either argument may be externalized, as predicted by the second. A number of the spray/load verbs, among them stuff, cram, and wrap, have adjectival passives in which only the location argument may be external.15

(30) a. The pillow remained stuffed.
(c.f. We stuffed the pillow with feathers.)
   b. *The feathers remained stuffed.
(c.f. We stuffed feathers into the pillow.)
(31) a. The freezer remained crammed.
(c.f. We crammed the freezer with food.)
   b. *The food remained crammed.
(c.f. We crammed food into the freezer.)
(32) a. The baby remained snugly wrapped.
(c.f. He wrapped the baby in the blanket.)
   b. *The blanket remained snugly wrapped.
(c.f. He wrapped the blanket around the baby.)

With others, including load and pack, either argument may be external.

(33) a. the recently loaded truck
(c.f. We loaded the truck with hay.)
   b. the recently loaded hay
(c.f. We loaded hay onto the truck.)
(34) a. the recently packed suitcase
(c.f. She packed the suitcase with shirts.)
   b. the recently packed shirts
(c.f. She packed shirts into the suitcase.)

The third possibility, that only the material argument may be externalized by APF, is instantiated by pile, stack, and smear.

(35) a. carefully piled books
(c.f. I piled books onto the shelf.)
   b. *carefully piled shelf
(c.f. I piled the shelf with books.)

15 Many of the adjectival passives in the examples are qualified since, as is well known, some adjectival passives sound peculiar unless qualified, for reasons that are not entirely clear. Speakers exhibit a certain amount of variation in their grammaticality judgments concerning adjectival passives derived from verbs in the spray/load class. What is important for our analysis is that, as expected, these judgments correlate with a corresponding difference in the possible sole NP complements that the verbs involved permit. That is, the grammaticality judgments reflect a variation in the class to which speakers assign a particular verb. As a verb's class membership is a lexical property, this type of idiosyncrasy should not be surprising.

16 The SCQ also derives support from the class of verbs of removing, such as clear, strip, and wipe, which denote actions that are the reverse of those denoted by the spray/load verbs. These verbs also have two internal arguments, either of which can be the direct object.

(i) Clear the dishes from the table.
(ii) Clear the table of dishes.
3.3. The Inadequacy of a Condition on the External Argument

The data just reviewed suggest that the Theme Analysis is to be rejected. The condition that must be placed on APF cannot be the one that this analysis incorporates. In this section we demonstrate that the well-formedness condition cannot be stated solely in terms of any property of the argument externalized by APF. The presence or absence of other internal arguments can affect the acceptability of an adjectival passive.

Consider once again the adjectival passives derived from stuff and cram. From the data in (30) and (31), repeated as (44) and (45), we concluded that for these verbs only the location argument can be externalized.

(44) a. The pillow remained stuffed.
   b. *The feathers remained stuffed.
(45) a. The freezer remained crammed.
   b. *The food remained crammed.

Notice, however, that the ungrammatical APs in the (b) sentences can be salvaged; when the location argument is expressed internal to the AP, these APs become acceptable.

(46) a. The feathers remained stuffed in the pillow.
   b. The food remained crammed in the freezer.

The acceptability is somehow tied to the presence or absence of the prepositional complements.

This effect is found with verbs like stack or smear as well. On the basis of the pairs in (36) and (37), repeated as (47) and (48), it appeared that only the location argument could be expressed external to the adjectival passive.

(47) a. The dishes remained carefully stacked.
   b. *The rack remained carefully stacked.
(48) a. * recent smeared paint
   b. *a recently smeared wall

The examples appear to be problematic for the SCG as well since it too is stated in terms of the externalization of an argument. The SCG, however, reflects a more basic insight: the properties of an AP headed by an adjectival passive participle are determined by the complement structure of the base verb. And indeed, this insight extends to the examples under consideration. The complement structure of stuff and cram can be used to predict the grammaticality of the adjectival passives in (46), as it could be in the simpler examples involving sole NP complements. We correlated the ungrammaticality of *The feathers remained stuffed with the ungrammaticality of *Stuff the feathers. Just as the former can be rendered grammatical by the addition of the location argument, so can the latter.

(50) a. *Stuff the feathers.
   b. Stuff the feathers in the pillow.

Similarly, with verbs like stack, the presence or absence of the material argument has an impact on grammaticality.

(51) a. *Stack the rack.
   b. Stack the rack with dishes.

If the complement structure of a verb determines the properties of the adjectival passive, then in order to properly formulate the rule of APF, we must first look more closely at the principles that determine the well-formedness of complement structures.

4. The Analysis of APF

In this section we present our analysis of APF. We begin in section 4.1 by laying out our conception of lexical representation. In section 4.2 we show how the principles that determine the well-formedness of complement structures also determine the well-formedness of adjectival passives, eliminating the need to refer to a thematic restriction. In section 4.3 we further extend the analysis, demonstrating that the statement of APF can be reduced to a rule of category conversion, rendering an explicit rule of externalization unnecessary. The effects of externalization are derived from general principles of grammar and category-specific properties of adjectives.

4.1. A Sketch of Lexical Representation

In accordance with the program initiated by Chomsky (1981), we eschew the explicit use of subcategorization frames in lexical entries as a representation of the complement
structure of verbs. Instead, the complement structure of a verb may be derived by
general principles, given an appropriate lexical representation for the verb that includes
what we term its lexical-thematic properties. These properties determine the manner in
which thematic roles are assigned to the arguments of the verb.

Much current work in the GB framework assumes not only that NP arguments bear
thematic (or 0-) roles but also that they bear these roles as a consequence of a process of
6-role assignment. This process may be thought of as one that associates the arguments of
the verb in a sentence with the 6-roles in the verb's lexical representation. Therefore,
we will say that the assignment of a 6-role to an NP results in its 6-identification. Every
NP argument must be 6-identified in order for the sentence to be well-formed.

Besides including a specification of its 6-roles, the lexical entry of a verb must make
explicit how these roles are assigned. Given the assumption that a verb itself may assign
at most one 6-role (Marantz (1984)), some of the 6-roles selected by a verb may need
to be assigned by other 6-role assigners, typically prepositions. Therefore, an NP may
be an argument of a verb yet receive its 6-role from a 6-role assigner other than the
verb. An NP assigned its role directly by the verb will be called its direct argument. An
NP that is an argument of a verb but is assigned its 6-role indirectly through the use of
some other 6-role assigner will be called an indirect argument (Marantz (1984)). An NP
may also receive its 6-role from the entire VP via predicate and be construed as the
subject of the VP (Williams (1981), Rothstein (1983)).

Subcategorization frames can be dispensed with since the grammatical relations
between the constituents of a sentence are determined by the way in which 6-roles are
assigned to the arguments of the predicate. 6-roles are assigned under government, so
each NP must be governed by the constituent that assigns it its 6-role. The direct
argument of a verb must be governed by the verb, and the indirect arguments must be
governed by their respective 6-role assigners. The argument to which a predicate assigns
a 6-role is always realized external to it, as required by the theory of predication, so the
external 6-role of a verb will always be assigned to an NP outside its maximal projection.

The syntactic realization of these grammatical relations is determined to a large degree
by language-particular parameters concerning the position of heads and the direction of
6-role and Case assignment (Koopman (1984), Travis (1984)).

As an illustration, consider the lexical representation for the verb put.

(52) put: agent (theme, location)

The representation in (52) encodes not only the 6-roles associated with the verb but also
how each 6-role is assigned. The placement of the agent role outside the brackets marks it
as external, so it is assigned via predication to the agent argument. The italic type
indicates that put assigns the theme role directly; thus, the theme argument, being the
argument governed by the verb, will be its direct object. The location role is assigned
indirectly through the use of an appropriate preposition, which then governs the location
argument in the syntax.

Like the verb put, the verb sell is associated with three arguments, but sell differs
from put in that, as a dative verb, it shows an alternation in the expression of its
arguments. This is attributed to the existence of two 6-role assignment options for the
verb, shown in (53); in pattern A the theme role is directly assigned, whereas in pattern
B the goal role is directly assigned (see Marantz (1984)).

(53) sell: A. agent (theme, goal)
B. agent (theme, goal)

As the direct argument of a verb is always realized as its direct object, either internal
argument of a dative verb may be its direct object. We sidestep the issues of how the
theme role is assigned when the goal role is directly assigned by the verb and also of
whether there is a single lexical entry for the verb sell or two related entries.

The lexical representation must be further augmented to account for another contrast
in the paradigms of the verbs put and sell. As has frequently been noted, both internal
arguments of put, but not of sell, must be syntactically realized. Compare (54) and (55).

(54) a. Brown put the keys on the table.
b. *Brown put the keys.
c. *Brown put on the table.
(55) a. Esau sold his birthright to Jacob.
b. Esau sold his birthright.
c. *Esau sold to Jacob.
d. Esau sold Jacob his birthright.
e. *Esau sold Jacob.

The ungrammaticality of (54b-c) can be attributed to the absence in each of a noun
phrase bearing one of the 6-roles specified in the lexical representation of put, the location
and theme roles, respectively. The paradigm for sell, however, is more complicated.
Alongside (55a,d), in which all the arguments of sell are expressed, there is the equally
grammatical (55b), in which the goal argument is not expressed. These sentences contrast
with the ungrammatical (55e,c), in which only the goal argument is expressed. The
generalization that suggests itself is that the theme role is obligatorily assigned and the
gal role is optionally assigned. We indicate this distinction in our lexical representations
by putting parentheses around 6-roles that are optionally assigned.

(56) sell: agent (theme, (goal))

Notice, however, that we cannot merely label the 6-roles as optionally or obligatorily
assigned as in (56). This is because when a verb has more than one pattern of 6-role

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17 For more extensive elaboration, see Stowell (1981). His lexical entries include G-grids, similar to the
predicate-argument structures of Williams (1981), Bresnan (1978; 1982a), and Marantz (1984), from which he
derives the subcategorization properties of predicates.

18 Note that we refer to the elements in the lexical representations as 0-roles. Each of these roles is assigned
in the syntax to an NP, which is then referred to as the argument bearing that role.
assignment, the status of its arguments as optional or obligatory may be affected by the choice of argument for direct \( \theta \)-role assignment.

\[
\begin{align*}
(57) & \quad \text{sell:} \\
& \quad \text{A. agent (theme, (goal))} \\
& \quad \text{B. agent (theme, goal)}
\end{align*}
\]

Thus, an argument must be termed optional or obligatory with respect to a particular pattern of \( \theta \)-role assignment.\(^{19}\) The same point can be made with the verb \textit{read}, which shows the paradigm in (58), suggesting the annotated lexical representation (59).

\[
\begin{align*}
(58) & \quad \text{a. I read the book to Jane.} \\
& \quad \text{b. I read the book.} \\
& \quad \text{c. I read to Jane.} \\
& \quad \text{d. I read Jane the book.} \\
& \quad \text{e. *I read Jane.}
\end{align*}
\]

\[
\begin{align*}
(59) & \quad \text{read:} \\
& \quad \text{A. agent ((theme), (goal))} \\
& \quad \text{B. agent (theme, goal)}
\end{align*}
\]

Only when the goal role is directly assigned, as on pattern B, are both arguments obligatory. On the other pattern of \( \theta \)-role assignment both arguments are optional.

We have isolated two properties of verbs that need to be encoded in their lexical representations:

(i) the way in which their arguments are assigned \( \theta \)-roles, and

(ii) whether each \( \theta \)-role is optionally or obligatorily assigned.

It is fairly clear that these properties, which we will call the \textit{lexical-thematic} properties of a verb, are often predictable. For example, the two \( \theta \)-role assignment options permitted by the verb \textit{sell} follow from its membership in the dative class. Furthermore, the external argument and the direct argument of a verb can often be identified by general principles of lexical organization (for instance, the linking regularities of Carter (1976) and Ostler (1979)). One might assume that the predictable properties ought to be factored out of ideal entries, minimizing the use of diacritics within lexical entries. Our representations encode the various properties that are relevant for the determination of complement structure and are not to be taken as representations of ideal lexical entries. What is crucial for the analysis here is that the lexical-thematic properties, however they are encoded, will determine possible complement structures and possible adjectival passives.

Two central principles of grammar, the Projection Principle and the \( \theta \)-Criterion (Chomsky (1981)), enforce the lexical-thematic properties of verbs. Together these principles exclude complement structures that do not satisfy a verb’s lexical-thematic properties. The Projection Principle requires that at every level of representation syntactic structure reflect thematic structure. This means that for every \( \theta \)-role in the lexical representation there must be a corresponding position in all levels of syntactic representation. The \( \theta \)-Criterion guarantees the well-formedness of the \( \theta \)-role assignment process so that each \( \theta \)-role in the lexical representation is uniquely associated with an argument in syntax and each \( \theta \)-position is filled by an argument that is appropriately \( \theta \)-identified.

For example, given the lexical representation of \textit{put} in (60), the examples in (61) violate both the Projection Principle and the \( \theta \)-Criterion.

\[
\begin{align*}
(60) & \quad \text{put: agent (theme, location))} \\
(61) & \quad \text{a. *Brown put the keys.} \\
& \quad \text{b. *Brown put on the table.}
\end{align*}
\]

For instance, in (61a) the absence of a position in syntax corresponding to the location role violates the Projection Principle:\(^{20}\) moreover, since the location role is not assigned in this sentence, it also violates the \( \theta \)-Criterion. To account for the paradigms of verbs such as \textit{sell} and \textit{read}, both the \( \theta \)-Criterion and the Projection Principle must be interpreted in such a way that they are sensitive to the distinction between optionally and obligatorily assigned roles.

Given the Projection Principle, the range of possible complement structures for the \textit{spray} verbs can be derived from appropriately annotated lexical representations. Consider once again verbs like \textit{stuff} and \textit{cram}. Like the dative verbs, these verbs have two options for \( \theta \)-role assignment.\(^{21}\) Although both the location role and the material role can be assigned either directly or indirectly, the location role must be assigned on either pattern of \( \theta \)-role assignment in order for these verbs to enter into a grammatical sentence. The material role is obligatorily assigned only when it is directly assigned.\(^{22}\)

\[
\begin{align*}
(62) & \quad \text{a. Stuff the feathers *(into the pillow).} \\
& \quad \text{b. Stuff the pillow *(with feathers).}
\end{align*}
\]

The lexical representation of \textit{stuff}, indicating the patterns of \( \theta \)-role assignment, is given in (63).

\[
\begin{align*}
(63) & \quad \text{stuff: agent (material, (location))} \\
& \quad \text{B. agent (material, location))}
\end{align*}
\]

\(^{19}\) Essentially the same observation is made in Woolford (1985). We leave aside the question of the possible interpretations of unexpressed arguments. This difficult issue is in general orthogonal to the concerns of this article. See Bresnan (1978; 1980), Fodor and Fodor (1980), Dowty (1981), Mittwoch (1982), and Rizzi (1986) for some discussion.

\(^{20}\) In what follows we will attribute the ungrammaticality of sentences in which an obligatory argument is not expressed to a Projection Principle violation. It should be clear, however, that such sentences also violate the \( \theta \)-Criterion.

\(^{21}\) For a comprehensive treatment of the \( \theta \)-role assigning properties of the \textit{spray} verbs, see Rappaport and Levin (1986).

\(^{22}\) It is of course possible to collapse the two parts of the representation as in (i), but this would fail to exclude sentences such as *\textit{Stuff in the drain}.

(i) stuff agent (material, (location))

These examples, like the example with \textit{sell} and \textit{read}, show that the status of arguments as optional or obligatory can be affected by the argument chosen for direct \( \theta \)-role assignment.
When the location role is directly assigned, the location argument can stand as the sole NP complement since the Projection Principle is satisfied by the expression of this argument alone. This is because the material role is optionally assigned when the location role is directly assigned by the verb (pattern B). But although the material role may also be directly assigned (pattern A), the material argument cannot stand as sole NP complement. As the location role is obligatory on both patterns of θ-role assignment, if it is not assigned the Projection Principle will not be met.

Representative annotated entries for the two other types of *spray/load* verbs, characterized by the paradigms in (64) and (66), are given in (65) and (67).

\[(63) \text{stuff:} \quad \left\{ \begin{array}{l}
A. \text{agent (material, location)} \\
B. \text{agent ((material), location)}
\end{array} \right. \]

An examination of the paradigm of verbs like *stack* shows that these verbs, in contrast to verbs like *stuff* and *cram*, obligatorily assign the material role on both patterns of θ-role assignment. Therefore, by the Projection Principle, only the argument bearing the material role can be a sole NP complement. Finally, verbs like *pack* and *load* obligatorily assign the material and location roles only when they directly assign them. Consequently, these verbs may take either the material or the location argument as the sole NP complement. Again, the pattern of sole NP complements displayed by verbs of each type follows from the lexical-thematic properties of the verbs.

4.2. Satisfaction of the Projection Principle in APs

In section 3 we showed that difficulties arise if the rule of externalization creating adjectival passives refers to a particular role but that there is a correlation between acceptable adjectival passives and acceptable complement structures of related verbs. Here we will show that reference to a particular θ-role can be eliminated from the rule on the assumption that when an adjectival passive is formed from a verb, the lexical-thematic properties of the verb are preserved modulo any changes wrought by APF.23 For instance, Williams's rule of APF could be revised as in (68).24

\[(68) \text{Adjectival Passive Formation (revised)} \]

\[\text{Externalize}(\text{direct argument}).\]

Rule (68), which takes the lexical representation of a verb as input, states that the θ-role assigned to the direct argument internal to the VP headed by a verb is assigned external to the AP headed by the related adjectival passive participle at D-Structure. All other lexical-thematic properties are preserved. A grammatical adjectival passive will result, if the Projection Principle is met and all obligatory arguments are expressed and θ-identified.

We illustrate the operation of the revised rule with the verb/adjectival passive pair for *stuff*. The lexical representation assumed for the active verb, with its two patterns of θ-role assignment, is repeated here.

\[(69) \text{stuff:} \quad \left\{ \begin{array}{l}
A. \text{agent (material, location)} \\
B. \text{agent ((material), location)}
\end{array} \right. \]

If a verb has two θ-role assignment patterns, each can serve as input to the rule. A role is directly assigned by *stuff* on either pattern of θ-role assignment, so the rule may apply to each pattern. We have four possibilities to consider, since the adjectival passive participles resulting from each pattern may be used either predicatively or attributively.

If pattern B is chosen, then the location argument, as direct argument, is externalized and its role is assigned to a position external to the adjectival passive. When the adjective is predicative, the role is assigned to its subject.

\[(70) \text{The pillows remained with the stuffed.} \]

When the adjective is attributive, the location role is assigned to the noun the adjective modifies.
We can now appreciate that, insofar as it is correct, this generalization holds because sole NP complements reflect the lexical-thematic properties that are common to a verb and its related adjectival passive participle. These shared properties are what determine the range of acceptable adjectival passives and complement structures.

4.3. Is a Rule of Externalization Necessary?

Having accounted for the apparent thematic restriction on APF, we return to the changes the rule deriving adjectival passives is assumed to effect. These changes, first introduced in (1), are repeated below.

(74) Properties of APF
a. Affixation of the passive morpheme -ed
b. Change of category: [+V, -N] → [+V, +N]
c. Suppression of the external role of the base verb
d. Externalization of an internal role of the base verb
e. Absorption of Case
f. Elimination of the [NP,VP] position

Some of the changes are wrought by the process deriving verbal passives as well. We would of course like to claim that the same suffix is associated with the derivation of both passives, accounting for many of the shared properties. Ideally, the divergent properties of the two forms should be traceable to the categorial difference between them.

We assume along with others (Chomsky (1981), Jaeggli (1984), Marantz (1984)) that the essential property of the passive morpheme is the suppression of the external 8-role. The affixation of the passive morpheme to a verb prevents the verb from assigning its external 8-role to the [NP, S] position. But since the verb's ability to assign an internal 8-role will be unaffected, an [NP, VP] position will be projected for the argument assigned this 8-role. The result is a verb that qualifies as an unaccusative verb (Perlmutter (1978); ergative verb in the sense of Burzio (1981)), since it assigns no external 8-role. By what has become known as Burzio's generalization (Burzio (1981)), the verb can then no longer assign Case. The fact that the direct argument is realized as an S-Structure subject follows from independent principles. Several proposals have been made about what the relevant principles are, and we need not choose among them. Chomsky (1981) and Burzio (1981) suggest that the inability of the verbal passive participle to assign Case is sufficient to ensure that the direct argument must undergo NP Movement in order to receive Case. In this way, a violation of the Case Filter (Chomsky (1980), Rousseret and Vergnaud (1980)), which requires that lexical NPs be assigned Case, can be avoided. Within the framework of Chomsky (1981), NP Movement can also be necessitated by the Extended Projection Principle, which requires that all clauses have subjects. Zagona (1982) and Rothstein (1983) claim that NP Movement is needed to satisfy conditions on predication, from which this principle is said to follow.

25 The Head-Final Filter itself may be subsumed under a more general adjacency condition. See Sprout (1985) for discussion.

\*the carefully stuffed into the pillow feathers
is bad for other reasons. Why is this important?
Suppose now that the rule of APF simply consists of category conversion (effect (74b); compare the morphological change of Bresnan’s rule (11b)).

\[(75) \text{APF} \quad V_{\text{Part}} \rightarrow [V_{\text{Part}}]\lambda\]

Then, two properties the adjectival passive shares with the verbal passive, the affixation of the passive morpheme \(-\text{ed}\), (74a), and the suppression of the external \(\theta\)-role of the base verb, (74c), follow from the fact that the adjectival passive participle is created from the verbal passive participle. The question is whether all the remaining properties of adjectival passives can be ascribed to the conversion of the participle from a verb to an adjective. We think that this is indeed so and that the rule of APF consists solely of the conversion of a verbal passive participle to an adjective. Our proposal is that the externalization of an argument, (74d), like the absorption of Case, (74e), is a consequence of the category change, and that the elimination of the [NP, VP] position, (74f), in turn results from the externalization. With externalization following from general properties of adjectives, an explicit externalization rule, even in the simplified form given in (68), can be dispensed with entirely. In the remainder of this section we demonstrate how the effects of externalization are derived from general principles for verbs with different lexical-thematic properties.

As we have seen, adjectives may function either predicatively or attributively. Williams (1981) notes that when an XP is used predicatively, the NP of which the phrase is predicated is always realized external to it. This is illustrated in (76) for XPs of different lexical categories.

(76) a. We consider Tracy a bore.
   b. I want Bill off the ship.
   c. Nina, remained t, foolish.

The XP assigns a \(\theta\)-role to the NP of which it is predicated, so this NP may be called its external argument. If all predicative XPs have external arguments, adjectives in general, and adjectival passives in particular, must have external arguments in their predicative use. The situation is essentially the same when an adjectival passive is used attributively. Higginbotham (1985) suggests that all attributive adjectives assign external \(\theta\)-roles to the NPs they modify. This means that adjectival passive participles, as adjectives, will assign an external role in their attributive use. The modified NP, then, may be called the external argument.

Consider what happens to the lexical representation of the passive form of a verb such as \textit{break} when it undergoes conversion to an adjective. \textit{Break} assigns two roles: an agent role, the external one, and a patient role.

(77) \textit{break}: agent (patient)

As a consequence of the affixation of the passive morpheme, the agent role becomes ineligible for assignment to an external position. The resultant lexical representation is as in (78).

(78) \[[\text{break}_1\text{-ed}_1]\lambda_1\] (patient)

When the participle is converted to an adjective, the lexical-thematic properties of the verb are “projected” to the adjective.

(79) \[[\text{break}_1\text{-ed}_1]\lambda_1\] (patient)

Since the participle is now an adjective, it must have an external argument. Therefore, the patient role, which is assigned by the verb to a VP-internal position, must be assigned to a position external to the AP headed by the related adjective. When the adjectival passive is used predicatively, the subject of the predicate is interpreted as the NP bearing the patient role.

(80) The vase, remained t, broken.

When the adjectival passive is used attributively, the NP it modifies is understood to be the argument bearing that role.

(81) a broken vase

We have suggested that an explicit rule of externalization can be dispensed with because the externalization of an internal argument that accompanies APF is forced by general properties of adjectives. But the revised externalization rule (68) does not simply state that any internal argument may be externalized; it states that only a direct argument, and not an indirect argument, may be externalized. This is indeed true, as illustrated in (82): the verb \textit{place}, which takes two internal arguments as specified in its lexical representation (83), allows only its direct argument, the theme, and not its indirect argument, the location, to be the external argument of an adjectival passive. (Note that since both the theme and the goal arguments are expressed, the adjectival passives in (82) satisfy the Projection Principle.)

\footnote{The representation is merely intended to show that the verb no longer participates in the assignment of an external \(\theta\)-role to a position external to the predicate. We leave aside the question of the place of this \(\theta\)-role in the lexical representation of the adjectival passive. Again, there are different positions on this issue, reflecting the controversy on the place of the external \(\theta\)-role in the argument structure of a verb alluded to in footnote 9. On Marantz’s account, APF simply removes the diacritic but does not otherwise affect the argument structure, so that there is no longer any indication that the verb is associated with an external argument. Williams’s rule of APF also removes the diacritic, but because the \(\theta\)-role associated with the external argument is included in the argument structure, it now implicitly assumes the same status as the other internal arguments. We also will not address the question of the status of by-phrases in adjectival passives. Such phrases are only sporadically found in adjectival passives; some examples include \textit{unchallenged by experts}, \textit{unprotected by insurance}, \textit{unconvinced by the arguments}, \textit{she remained surprised by their enthusiasm}, and the often-cited \textit{untouched by human hands}. It is not clear to us what factors determine the compatibility of a by-phrase with an adjectival passive, but such phrases usually do not express prototypical agents. In fact, the object of the preposition by is often inanimate.}

(82) a. The vase was broken by human hands.

\footnote{See Higginbotham (1985), Faib (1984), and Roeper (1983) for other analyses making use of projected argument structures or \(\theta\)-grids.}
The books remained neatly placed on the table.

(82) a. The books remained neatly placed on the table.
b. *The table remained neatly placed the books on.

(83) place: agent (theme, location)
(cf. I placed the book on the table.)

It is only possible to dispense with a rule of externalization if the constraints on the external argument need not be stipulated. We will demonstrate that general principles prevent the externalization of an indirect argument, so that an explicit rule of externalization is rendered unnecessary.

Let us consider more carefully what happens when APF is applied to the verb place, assuming that the rule of APF consists of nothing more than category conversion. When the passive morpheme is affixed to the verb, the agent role becomes ineligible for assignment to an external position. The remaining lexical-thematic properties of the verb are unaffected and are projected to the adjective. The resulting lexical representation is as shown in (84).

(84) \[ ([place\_\text{\text{ed}}]_A): \langle \text{theme, location} \rangle \]

Since the participle is now an adjective, one role must be assigned external to the AP, and at most one may be assigned in this way, since all predicates can at most one external argument (see Williams (1980), Rothstein (1983), Higginbotham (1985)). In the absence of a rule of externalization, either internal argument should be eligible for expression external to the adjectival passive. But if the location role is assigned external to the adjectival passive, as in (82b), the theme argument has no way of receiving Case internal to the AP, in violation of the Case Filter. It is a general property of adjectives that they do not assign structural Case, and adjectival passive participles, as adjectives, will share this property (accounting for effect (74e) of APF). Within NPs, an argument of the head bearing the theme role may be expressed as the object of the preposition of, thus circumventing the Case Filter. This option is not available in adjectival passives, since there is no productive rule of Of Insertion in APs.\(^{28}\) Thus, when the indirect argument of place is externalized, a Case Filter violation arises, trivially accounting for the ungrammaticality of (82b).

But this cannot be the complete explanation for the difference in the behavior of direct and indirect arguments with respect to externalization. Examination of a wider range of verbs reveals that indirect arguments are not eligible for externalization even in contexts where no Case Filter violation arises. Consider a verb such as read, whose lexical representation is repeated below.

(85) \[ \begin{align*}
&\text{read:} \\
&\text{A. agent (theme, goal)} \\
&\text{B. agent (theme, goal)}
\end{align*} \]

If the manner in which an argument is assigned its 8-role by a verb has no effect on the grammaticality of the adjectival passive related to this verb, then one might expect both (86a) and (86b) to involve acceptable adjectival passives based on pattern A.\(^{29}\)

(86) a. The book remained unread.
\hspace{1cm} (theme argument externalized)

b. *The student remained unread.
\hspace{1cm} (goal argument externalized)

Neither of the examples in (86) violates the Case Filter. Furthermore, both meet the Projection Principle, since on pattern A of (85) both 8-roles of read are optionally assigned, so that each argument can be expressed in the absence of the other. This is shown by the fact that either the theme or the goal may appear as a sole complement of the verb, the theme as sole NP complement since it is the direct argument and the goal as sole PP complement since it is the indirect argument.

(87) a. The teacher read the book.
\hspace{1cm} (goal argument externalized)

b. The teacher read to the student.
\hspace{1cm} (theme argument externalized)

Yet the contrast in (86) shows that only the theme argument, and not the goal argument, may be externalized by APF. The ungrammaticality cannot be attributed to the Case Filter or the Projection Principle: it can only be attributed to the fact that an indirect argument, and not a direct argument, has been externalized.

Since direct and indirect arguments are assigned their 8-roles in different manners, a plausible explanation for the contrast between (86a) and (86b) might lie in the principles of 8-theory. A verb can 8-identify its direct argument. This lexical property is inherited by its related adjectival passive participle and passed on to the phrase it heads. Therefore, when an adjectival passive is predicated of the direct argument of the verbal base, that argument is 8-identified by the AP. The indirect argument of a verb cannot be 8-identified by the verb and so requires another appropriate 8-role assigner. If an adjectival passive is predicated of an indirect argument, that argument will not be 8-identified in the absence of a 8-role assigner, resulting in a 8-Criterion violation. If the argument is in a PP external to the adjectival passive and governed by a preposition that will assign it its 8-role, it

\(^{28}\) Phrases such as proud of Jessica and afraid of the dog are often cited as evidence that Of Insertion applies within APs. Since adjectives do not assign Case, each adjective with an internal argument is associated with a preposition for the purposes of Case assignment. Of is by no means the most frequently attested preposition case-marking complements of adjectives: sick with fear, angry at Bill, homesick for New York. In order to argue that a rule of Of Insertion is operative in APs, one must show that a productive process creating adjectives from verbs triggers Of Insertion. But this does not seem to be the case. Strikingly, the adjectives derived from the class of psycho-verbs (for instance, amuse, delight, bore, and amaze), which constitute the largest class of deverbal adjectives, are most often associated with the prepositions at, from, and with.

\(^{29}\) There is of course a second derivation for (86b) based on pattern B. Although this derivation involves the externalization of a direct argument, since the goal role is the direct role on pattern B, the resulting adjectival passive is still ruled out. This is because the obligatory theme argument is not expressed, so that a Projection Principle violation ensues.
cannot c-command the adjectival passive and so can no longer serve as the adjectival passive’s subject. Therefore, externalization of an indirect argument can never result in a well-formed structure. An account of APF involving an explicit rule of externalization, in particular a rule that incorporates the stipulation that only the direct argument may be externalized, is rendered unnecessary.

We then assume that when the passive participle of a verb that has two internal arguments is converted to an adjective, the external argument is freely chosen from among the arguments that are potentially assigned their ɣ-role directly by the verb. Thus, a verb like place presents a single candidate for externalization (see (82)), whereas a verb like stuff presents two.

(88) a. The pillow remained stuffed with feathers.  
b. The feathers remained stuffed in the pillow.

But externalization of a direct argument alone is not sufficient to guarantee the well-formedness of an adjectival passive. As discussed in section 4.2, the adjectival passive must also meet the Projection Principle.

(89) *The feathers remained stuffed.  
(material argument externalized, one obligatory role not assigned)

The overriding requirements are that the adjectival passive have an external argument and that the Projection Principle and ɣ-Criterion be satisfied.

One more effect of APF, the elimination of the [NP, VP] position associated with the direct argument, effect (74f), remains to be discussed. This effect follows from the Projection Principle. In both the active and the verbal passive construction the role of the direct argument is projected, giving rise to the [NP, VP] position. But in an adjectival passive construction this role is assigned external to the AP and can no longer project a predicate-internal position. (See Burzio (1981) for evidence from Italian that adjectival passives in fact do not have an [NP, VP] position.) Internal positions associated with other internal roles, however, are not eliminated by the Projection Principle. When an adjectival passive is formed from a verb with two internal arguments, one of these arguments is expressed externally, and a position for the remaining internal argument ought to be projected. In the case of the spray/load verbs a position for this argument is projected, and the argument appears as the object of a preposition (as in (88b)). With a verb like convince, which has two internal arguments the second of which is realized as an S, this second argument may also be expressed in the adjectival passive, since it need not receive Case.

(90) Jacob remained unconvinced that his sons should return to Egypt.

(cf. No one convinced Jacob that his sons should return to Egypt.)

4.4. The Theme Analysis Revisited

It might be worthwhile at this point to reconsider the dative verb paradigm in light of our analysis. The majority of dative verbs have the same paradigm as sell and share its lexical representation. (91). For these verbs, therefore, only the theme argument can stand as sole NP complement.

(91) sell:  
A. agent (theme, goal)  
B. agent (theme, goal)

This means that the externalization of the theme argument of a dative verb by APF yields a grammatical adjectival passive, as in (92a), but the simple externalization of the goal argument does not, as in (92b).

(92) a. The car remained unsold.  
(theme role externalized, sole obligatory role assigned)  
b. *The customer remained unsold.  
(goal role externalized, one obligatory role not assigned)

The ungrammaticality of (92b) follows because the Projection Principle is not met. On pattern B the goal is the direct argument, so it is a candidate for externalization. But the theme argument, which is obligatory on this pattern, is not expressed in (92b). This differs sharply from the explanation under the Theme Analysis, which attributes the ungrammaticality of (92b) to a violation of a condition on the external argument. The contrasting explanations highlight a conceptual shift from an account of APF using a specific thematically restricted condition to an account that relies on independently motivated principles of grammar.

On the assumption that externalization is available for all direct arguments, the question is why most adjectival passives, unlike verbal passives, do not allow the goal argument to be external. This would be possible if the adjectival passive in (92b) could be saved by expressing the theme argument internal to the AP in a manner analogous
to the examples with spray/load verbs. Although when used in attributive position an adjective passive like the one in (92b) could never be salvaged because of the Head-
Final Filter, in predicative position this possibility might be expected. But there is no way to accomplish this. Two alternate expressions of the theme argument, found else-
where (as a bare NP, as in the double object construction, or as the object of of, as in
adjectives), are given in (93), but neither is realized with the adjectival passive form of
sell, as illustrated in (94).

(93) a. The customer was sold a car.
   b. The customer remained proud of the car.
(94) a. *The customer remained unsold a car.
   b. *The customer remained unsold of a car.

As mentioned in the previous section, neither option is available, since adjectives do
not assign Case and there is no productive rule of Qf Insertion in APs.

An important advantage of our analysis is that it minimizes the differences between
the two passives and accounts for the fact mentioned earlier that a single morpheme is
used to derive both types of passive participles. Neither passive exhibits thematic
constancy. Instead, both must meet the Projection Principle. In fact, the optional or
obligatory status of the arguments influences the well-formedness of verbal passives as
well. Further examination of the verbal and adjectival passives of the verb sell will help
clarify this point. Consider the pairs of verbal passives and adjectival passives in (95)
and (96), respectively; these examples, with the exception of (95b), have been used
previously.

(95) a. The customer was sold a car.
   b. *The customer was sold.
(96) a. *The customer remained unsold a car.
   b. *The customer remained unsold.

Omitting the theme argument in the verbal passive, as in (95b), results in a sentence
whose ungrammaticality is on a par with that of the adjectival passive in (96b). This is
expected since (95b), like (96b), fails to satisfy the Projection Principle because the
obligatory theme argument is not expressed. Both sentences would be saved if this
argument could be realized. Independent properties of adjectives and verbs, mentioned
in the discussion of (93)–(94), are responsible for the fact that the verbal passive, but
not the adjectival passive, may be salvaged (compare (95a) with (96a)).

The other classes of dative verbs discussed in section 3.1 present no special problems
for our analysis since thematic constancy is irrelevant. Although all dative verbs are
associated with the same set of 0-roles, each type of verb has its own patterns of 0-role
assignment. The four types of lexical representations associated with these verbs are
listed below.

(97) sell:  
   A. agent (theme, goal)
   B. agent (theme, goal)
(98) feed:  
   A. agent (theme, goal)
(99) teach:  
   A. agent (theme, goal)
(100) hand:  
   A. agent (theme, goal)
   B. agent (theme, goal)

Assuming that the adjectival passive formed from each retains the lexical-thematic prop-
erties of the base verb, the pattern of possible and impossible adjectival passives ob-
served in section 3.1 will result.34

A further set of data that has previously been used to support the Theme Analysis
may also be explained without recourse to a thematic condition. Bresnan (1982b) points
out that the -ed participle of an intransitive verb may be converted into an adjective,
but only if the verb's argument bears the theme role. Contrary to what is claimed in
Dryer (1985), this appears to be true.

33 The framework developed here also provides an explanation for the ungrammaticality of (96b) that is
compatible with another current analysis of the double object construction. Kayne (1984) suggests that dative
verbs, in their double object forms, do not select two arguments but instead select a small clause, in which
the NP bearing the theme role is predicated of the NP bearing the goal role. Since the NP bearing the theme
role is an argument not of the verb, but rather of the predicate NP, it cannot become the external argument of
the related adjectival passive. On this analysis, then, (96b) is excluded for the same reason adjectival passives
of raising-to-object verbs are excluded. See section 4.5.

Stowell (1981) adopts yet another syntactic analysis of dative verbs, in which the goal argument is not
the direct object of the dative verb in the double object construction but rather an object incorporated into
the verb by a rule of morphology. Details of the syntactic analysis aside, the explanation of the ungrammaticality
of (96b) remains unaffected, since Stowell assumes that the two forms of dative verbs have 0-roles that are
the same in all relevant respects. Therefore, the Projection Principle excludes (96b) on Stowell’s analysis as
it does on ours.

34 In this respect, the dative verbs contrast with spray/load verbs. The latter seem to be more evenly
distributed among the classes that result when the verbs are grouped according to the status of the location
and material argument. See the appendix of Rappaport and Levin (1986).

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unaccusative/unergative distinction is preferable to one that relies on a thematic condition.37

4.5. The Absence of Nonarguments as Subjects of Adjectival Passives

Under the Theme Analysis, the absence of adjectival passives with nonargument subjects, such as raising adjectival passives and those predicated of idiom chunks, was also explained by attributing thematic constancy to the adjectival passives. Such an account is not available on our analysis.

The restriction on idiom chunks follows on our analysis from the 8-Criterion. Since an adjective assigns an external 8-role, the position in which the external argument appears must be a 8-position, a position filled by an NP assigned a 8-role. Because of this, idiom chunks, which as nonarguments never can bear 8-roles assigned by predicates, cannot occupy this position. The ungrammaticality of (103) follows from the fact that tabs, being an idiom chunk, cannot bear the 8-role assigned by kept.

The lack of raising adjectival passives has usually been contrasted with the existence of raising verbal passives.

(104) a. Ralph is known to be a reactionary. (= (4a))

b. *Ralph is unknown to be a reactionary. (= (4b))

We also attribute the systematic absence of sentences such as (104b) to the 8-Criterion.38 In order for movement of an argument from a lower clause to the matrix [NP,S] position to take place between D-Structure and S-Structure, the [NP,S] position may not be a 8-position, since a violation of the 8-Criterion would result (see Chomsky (1981) for discussion). But we claim that adjectives always assign external 8-roles, making the subject position in sentences such as (104b) a 8-position. As a result, these sentences have no feasible source.

Although our analysis accounts for the absence of raising adjectival passives, the existence of raising adjectives such as certain and likely would appear to be inconsistent with the claim that adjectives have an external 8-position. However, there is evidence that raising adjectives such as certain and likely, unlike raising verbs, can assign external 8-roles, so they are not exceptional among adjectives in this respect. When these ad-

37 As discussed in footnote 35, certain verbs of motion, the verbs of manner of motion, pose a problem for a thematic approach. But these verbs do not present any difficulty for an approach based on the unaccusative/unergative distinction, since an examination of the syntactic behavior of these verbs provides evidence that they are unaccusative verbs. As unergative verbs, the syntactic behavior of the verbs of manner of motion resembles that of other intransitive verbs whose argument clearly does not bear the theme role. This property supports the assignment of a nontheme 8-role to the argument of verbs of manner of motion. It is interesting that the status of a verb with respect to the unaccusative/unergative distinction itself probably provides the strongest evidence for determining the 8-role assigned to the argument of an intransitive verb.

38 Explanations of these phenomena that invoke the 8-Criterion are also available on the Theme Analysis, in addition to the explanations presented in section 2 that make use of the label theme.
j ectives take tensed sentential complements, these complements appear external to the AP, as shown by the fact that the head adjective can be deleted without the sentential complement. Tensed sentential complements of raising verbs do not share this property.

(105) a. It is certain that Julia will arrive, but it isn’t that Bill will arrive.
   b. *It seems that Julia will arrive on time, but it doesn’t that Bill will be late.

A tensed sentential complement can also appear in [NP,S] position, external to the AP headed by the adjective, as in (106a), contrasting with similar complements of raising verbs, which cannot, as shown by (106b).

(106) a. That Julia will arrive is certain.
   b. *That Julia will arrive seems.

This indicates that the complement of a raising verb can never be assigned an external θ-role, unlike complements of raising adjectives. Furthermore, whereas raising adjectives may be predicated of derived nominals, raising verbs may not.

(107) a. Julia’s arrival is certain.
   b. *Julia’s arrival seems.

Raising adjectives, unlike raising verbs, permit an external argument, either sentential or nominal.

Thus, the question to address is not why there are adjectives that assign no external θ-role, since there appear to be none, but rather why a few adjectives that do assign external θ-roles also allow raising. Whatever it is that allows raising with the adjectives certain and likely, it appears to be a marked lexical property associated with these adjectives. Adjectives very similar in meaning to certain and likely do not allow raising.

(108) *Julia is probable to leave.

This marked property would not be expected to extend to adjectival passive participles. Since adjectival passive participles are derived by a fairly productive rule, they in effect have no lexical entries of their own where this lexical property can be registered.

5. Conclusion

We have shown that the problem of identifying the external argument of an adjectival passive is part of the larger problem of accounting for the syntactic expression of its arguments. This, in turn, is determined by the interaction of

(i) the lexical-thermatic properties of the base verb,
(ii) the θ-role assigning properties of adjectives,
(iii) other general principles of grammar, such as the Projection Principle and the 0-Criterion.

Since the syntactic expression of the arguments of an adjectival passive participle is completely determined by general principles, given an appropriate lexical representation,
to the process of ə-role assignment but not to the identity of the ə-roles assigned. For instance, the ə-Criterion is a condition on the assignment of ə-roles, but it makes no reference to what ə-roles are assigned. Koopman (1984) and Travis (1984) propose that word order is determined in part by a parameter that indicates the direction of ə-role assignment by heads. But the value of this parameter is independent of the ə-roles assigned. The lack of reference to ə-role labels is what is expected given the shift to principle-based rather than rule-based accounts of syntactic phenomena. We do not intend to imply that reference to particular ə-roles has no place in linguistic theory. For instance, the lexical representations employed here include an explicit specification of the ə-role assignment properties of a verb. As mentioned, these properties are predictable to a large extent, and the relevant generalizations appear to make reference to ə-role labels (Carter (1976), Oster (1979)). ə-roles are also implicated in other aspects of the organization of lexical entries, such as the distribution of inherent cases. Although the identification of ə-roles in lexical representations is well motivated because of their place in the statement of linguistically relevant generalizations, this does not mean that ə-roles might not ultimately turn out to be derived rather than primitive notions, as suggested in the work of Jackendoff (1972; 1976).

We have tried to show that the externalization of an internal argument in APF is a by-product of category conversion, not an operation stipulated by rule. This is a desirable result, for a general theory of category types should ultimately distinguish among the lexical categories in terms of their ə-role assigning properties (see Higginbotham (1985)). It is possible that some instances of internalization, like some instances of externalization, are a consequence of category change. In particular, Williams (1981) considers nominalization to be a rule of morphological internalization. But the fact that the ə-roles associated with a nominal are assigned internal to the NP may follow from more general properties of NPs. The nominalizing affixes, then, do not stipulate the internalization process but merely nominalize verbs (see Sproat (1985)). Again, the effects of category-related ə-role assigning properties surface precisely where category conversion is involved. As further research elucidates the nature of lexical representation and its relation to syntactic representation, many of the previously stipulated effects of these and other morphological processes will be recognized as deriving from more general principles of grammar.

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