The papers in this roundtable cover so wide a range of topics under the heading «Word formation and Meaning», that it is difficult in a short reply to respond to all, or even some of them, in an adequate or interesting way.

I would like to thank Isaak Walton Killam Memorial Fund for their support during the development of many of the ideas on this paper. I am also grateful to Mark Aronoff, whose provocative work inspired this response.
I will limit my comments, therefore, to one paper in whose area I have
done some thinking and to which I can hope to make the most coherent
and perhaps stimulating remarks: Aronoff’s, *Word Formation and Lexical
Semantics*.

Aronoff outlines what an ideal system accounting for the relation be­tween word formation and meaning would look like. In such a system, the
set of English derivational morphemes would constitute a coherent class
with, at best, each member expressing a systematic meaning, distinct from
the meanings expressed by the other members, or at worst, the whole set
expressing a systematic range of meanings, for instance, those meanings
allowed by universal semantic operators. The actual derivational system of
English, however, falls somewhat short of the ideal.

In fact, Aronoff claims that it is more or less chaotic. It allows for more
than one instance of each affix type, with many competing affixes available
to turn verbs into nouns, nouns into adjectives, and so on. Further, it is
idiosyncratic with respect to the kinds of semantic distinctions that these
affixes express — distinctions that cause us to choose one affix over another in
a particular context. English morphological operations, he argues, must be
able to refer to at least three types of semantic distinctions: (1) abstrat/
concrete, (2) mass/count and (3) thematic role. If none of these distinc­
tions can be made to follow from one another or from more general
principles or distinctions — and he claims that they cannot — we must
resign ourselves to the fact that derivational morphology and semantics are
related in rather arbitrary ways.

I will argue, counter to Aronoff, that the disarray that seems to hold in
the relationships between affixes and their meanings is merely apparent.
There is a great deal more order to the system than at first appears. I will
show that Aronoff’s three semantic distinctions can be reduced to the last
— distinctions in thematic role — though at the same time one further
distinction must be added: grammatical function. The result is a morpholo­
gical component which has access to three basic information types: (1) sub­
categorization information (which includes transitivity and optionality of
complements), (2) thematic role, and (3) grammatical function. With the
information types constrained in this way the apparent disarray begins to
look quite a bit more orderly.

1. *θ*-roles

Let me begin by reviewing Aronoff’s evidence for a claim with which I
concur: that the thematic role distinction is a necessary one. The argument
is based on the affix pair *-ee/-er*. Though the three derived nouns of (1a)

1 My focus will be English, as this reply is of a limited length, but the essential claims
may be applicable to other morphological systems as well.
all bear different grammatical functions to their underlying verbs, (subject, object and indirect object, respectively), they bear one of two thematic roles. The first, Aronoff would call Patient; I will refer to it as the Theme (following Anderson [1977] and others). The second qualifies as a Goal. In (1b), the derived nouns all refer to the Agent of the base verb.

(1) a. standee  
nominee  
payee  

b. climber  
writer  
dancer

Other -ee- forms follow this pattern. While they may range over subjects, direct objects and indirect objects, they are all Themes (2a, c) of Goals (2b).

(2) a. direct objects  
divorcee  
confirmee  
examinee  
internee  
deporteé  
appointee  
employee

b. indirect objects  
donee  
vendee  
mortgagee  
consignee  
dedicatee  
lessee  
addressee

c. subjects  
standee  
escapee  
absentee

But the -er forms behave similarly. An -er form may refer not only to Agents but to Themes as well. Here, though, what is crucial is that the argument that corresponds to the -er form be a subject.

(3) a. Agents:

mixer  
diver  
flier  
autographer  
reader  
painter  
dancer  
sleeper  
The Cuisinart mixes.  
Dan dives.  
This airplane flies.  
Someone will autograph that.  
Sally can read.  
Rembrandt painted.  
She dances.  
The baby sleeps.

b. Themes:

mixer  
fryer  
roaster  
breeder  
Ginger-ale mixes well.  
Chickens fry well.  
Chickens roast well.  
This nuclear reactor breeds too.

2 I differ slightly from Aronoff in that I will assume that the term 'Agent' subsumes both animate and inanimate, or what he calls 'instrumental', agents.
To call the two affixes -ee and -er a pair, then, is somewhat misleading. If they were a pair, we might expect a correspondence to hold between the sets: every transitive verb taking -er would take -ee, and vice versa. The latter seems to be true: -ee nouns based on transitive verbs (as those in (2a) and (b), above) do have counterparts in -er ((4a) and (b), respectively).

(4) a. divorcer b. donor
    confirmer vendor
    examiner mortgager
    deporter consigner
    appointer dedicator
    employer leaser
    boycotter promiser
    mesmerizer referrer
    addresser loaner (lender)

But -er nouns based on transitive verbs do not have corresponding -ee forms. The transitive uses of some of the verbs in (3a) illustrate this:

(5) * mixee Mix the batter.
    * flyee Fly the plane.
    * autographee Autograph the program.
    * readee Read the book.
    * paintee Paint the wall.
    * drivee Drive the car.

One might argue that the problem lies with animacy. All of the -ee forms in (2) are animate while the -ee forms in (5) are inanimate. But as the cases in (6) illustrate, there are many verbs which take animate direct or indirect objects but which do not have corresponding -ee forms:

(6) a. animate object b. animate indirect object
    * kissee * readee
    * hittee * giveee
    * massagee * sendee
    * strokee * donatee
    * shampooee * deliveree
    * bathee * passee
    * feeede * throwee
    * informee
Thus, \(-ee\) does not form a pair with \(-er\). It does not refer to the same grammatical primitives nor is it as productive. But it does provide a case which illustrates how thematic roles may be necessary for determining the meanings of derived forms, a point to which I will return below.

Consider once again \(-er\) affixation. As we have seen, thematic role is not relevant. What is crucial, however, is subcategorization information. Transitivity \emph{per se} does not influence \(-er\) affixation: the subjects to which the \(-er\) noun corresponds may be subjects of transitive verbs (\emph{autographer}) or intransitive verbs (\emph{sleeper}). They may also be subjects of ergatives, claimed to be derived lexically (\emph{sinker}, \emph{breeder}) or subjects of middle verbs, also derived (\emph{seller}, \emph{reader} as in \emph{primer}, \emph{roaster}, \emph{fryer}) \(^3\). But while transitivity itself is not crucial, the optionality or obligatoriness of transitivity is crucial. An obligatorily transitive verb cannot be made into an \(-er\) noun \emph{unless} its obligatory object is included, either in post-verbal object position or as a member of a compound \(^4\).

\[(7) \begin{array}{lll}
\text{a. maker of coffee} & \text{b. coffee-maker} & \text{c. maker} \\
\text{doer of deeds} & \text{deed-doer} & \text{doer} \\
\text{teller of stories} & \text{story-teller} & \text{teller} \\
\text{meeter of dignitaries} & \text{dignitary-meeter} & \text{meeter}^5 \\
\end{array} \]

There are, in addition, semantic factors which affect \(-er\) affixation. For example, among intransitive verbs, only those which refer to either protracted or repeated action can form \(-er\) nouns. Compare \((8a)\) and \((8b)\):

\[(8) \begin{array}{ll}
\text{a. sleeper} & \text{b. dier} \\
\text{dreamer} & \text{faller} \\
\text{snorer} & \text{disappearer} \\
\end{array} \]

This fact, however, is not one which should be incorporated into the

\(^3\) In Keyser and Roeper’s analysis, middle verbs, unlike ergatives, are syntactically derived. If this is so then the morphology would have to have access to the output of a syntactic operation. This would require, in a level-ordered morphology: a looping back from the syntax into, in this case, level 2 morphology. See Kiparsky [1982] for proposals along these lines.

\(^4\) There are some counterexamples, for example \emph{owner} but * \emph{John owns} and \emph{examiner} but * \emph{Mary examined}. Notice that the exceptions all go in one direction; that is, there is no transitive verb which cannot take \(-er\) if its object is incorporated in some way. Lexical forms of all kinds, however, can be created to fill needs. \emph{Owner} and \emph{examiner} arise from the need to refer to the generic subject of their related verbs.

\(^5\) Further support comes from the fact that plural subjects are allowed with an intransitive use of \emph{meet}: \emph{The men met}. From this it is predicted that (i) but not (ii) will be grammatical:

\[(i) \quad \text{They were meeters.} \\
\text{He was one of the meeters.} \\
(ii) \quad * \text{He was a meeter.} \]

See Roeper and Siegel [1977] for a more detailed discussion.
statement of the -er affixation rule, since it is the result of a more general property of the verb classes to which the verbs of (8a) and (8b) belong. Another reflex of the same distinction can be seen with present tense constructions. The verbs in (8a) can appear in the present tense without adverbial modifiers (either present or supplied from context) those in (8b), in contrast, require them.

(9) a. This baby sleeps. b. The baby dies *(in the play).
   Some people dream. Susan falls *(constantly).
   Charles snores This woman disappears *(often).

A second construction in which the two classes pattern differently is the «away» construction (see Williams [1979]). The base verbs of (8a) but not (8b) may appear with «away»:

(10) a. The baby slept away. b. *John died away.
    The baby dreamt away. *Susan fell away.

As these cases show, a verb’s semantic compatibility with -er is one of a cluster of properties. It is appropriate, therefore, for the grammar to express this not in individual rules in which the distinction arises, -er affixation or away, but as a semantic distinction among the verb classes themselves. In sum, then, the information which remains as necessary for -er affixation to express is subcategorization information. Semantic information need not be written into the -er rule.

2. Mass/count

So far, we have seen instances in which θ-role and subcategorization information are necessary in affixation. We have also seen one type of semantic information which is not necessary. There is a second type of semantic information which Aronoff claims should be available to affixation rules. The -ation suffix, he claims, attaches to verbs to form «mass» nouns with the meaning, «the fact that or extent to which or manner in which the action of the verb takes place» (p. 47). His examples appear in (11) (his (4)):

(11) a. devastation The devastation was terrible.

Aronoff himself does not propose to incorporate such information into the statement of -er affixation. I offer this example only to illustrate my main point, that it is important to avoid duplicating in multiple grammatical components information which belongs in one, but which is merely reflected in others.
b. integration  I believe in sexual integration.
c. mollification  His mollification of the crowd impressed us all.
d. fossilization  Fossilization is a great boon to paleobotanists.

In contrast, the null affix (Ø), he claims, attaches to verbs to form «count» nouns which have the meaning, «an individual instance of the complete action of the base verb» (p. 47). His examples are given in (12) (his (13)):

(12) glance  One glance revealed the truth.
hit  Can she hit? One hit will show you.
try  He failed on two tries.
win  They have a record of two wins.
move  It's your move.
light  Gimme a light.

A problem arises when we consider additional examples. Cases such as (13) and (14) show that although there is a tendency in this direction, a one-to-one identity of -ation with mass and Ø with count nouns does not hold. The -ation forms in (13) are count nouns; the Ø forms in (14) are mass entities.

(13) The construction is not painted.
The creation took up a whole room at the museum.
The validation on my passport was smudged.
The recommendation arrived in yesterday's mail.
The application sat on the top of the pile.

(14) the despair  two * despairs
the progress  * progresses
the resolve  * resolves
the torment  * torments
the worship  * worships
the decay  * decays

In addition, certain forms allow both mass and count readings:

(15) alarm  He rang two alarms.
The memo was received with alarm.
torture  They invented several tortures.
They inflicted torture.
protest  NOW staged three simultaneous protests.
The decision caused a great deal of protest.

The problem lies with attributing the mass/count distinction in deverbal
nouns to particular affixes. A look at further cases reveals that this distinc-
follows from something which holds much more generally of deverbal
nouns: the distinction between the derived noun's «process» (or «event»)
and its «result» reading. These readings do not depend on which particular
affix is involved but, as I will show below, on a number of other factors.

2.1 Themes

Consider, first, nouns derived from verbs which are optionally transitive,
in particular, verbs whose subcategorization is V (NP), where the NP is the
Theme. These forms illustrate how both a process interpretation and a
result interpretation are available for the same derived noun. Which reading
occurs is determined by the presence of the Theme. When the Theme is
present, the process reading arises; when it is absent, the result reading arises.

(16) a. The construction *(of the tower) took ages.
The creation *(of the sculpture) took 3 years.
The organization *(of the delegates) was a formidable task.
The popularization *(of literary works) is difficult in certain geo-
raphical areas.
b. The construction (*of the tower) is painted blue.
The creation (*of the sculpture) took up an entire room at the
museum.
The organization (*of the delegates) is corrupt.
The popularization (*of literary works) can be shown on TV.

(In these cases, the Theme is in object position. It can also appear preno-
minally, with the same effect: The tower's construction took ages/*is painted
blue).

The process forms, in (16a), show further ambiguities. They have the three
readings cited above, called «mass» readings by Aronoff and attributed to
-ation nouns in general (a) the fact that the event occurred (b) the extent
to which the event occurred or (c) the manner in which the event occurred
and a fourth reading, which Aronoff does not mention (d) the event
itself:

7 Not all deverbal nouns have result readings, of course, since it is not the case that a
result necessarily arises from a verbal action. Bach's [1979] distinction of 4 verb
classes — process, event, accomplishment and achievement — is relevant here, to distin-
guish the properties that the nouns derived from particular verb class may have.
8 Note that The Creation took 7 days is grammatical, but only because the proper
noun, Creation, has a separate lexical entry which is non-compositional.
9 Not all verbs are amenable to all four -ation meanings. Where verbs describe actions
that are not protracted it is not meaningful to discuss the extent of the verbal action. For
(17) a. The restoration of the tower was a surprise.
   b. The restoration of the tower pleased even the purists.
   c. The restoration of the tower proceeded at a slow but steady pace.
   d. The restoration of the tower took years.

In mass/count terminology, these process forms are perhaps closer to mass than count nouns, but this is due to the process meaning, which refers to an ongoing event (or aspects of it) and not to a completed event. While the latter would be countable, the former is not. Thus the mass/count distinction is not the relevant one for process forms.

For result -ation forms, such as those in (16b), the mass/count distinction is relevant. But counter to Aronoff's claim — that -ation nouns are mass nouns — we find mass interpretations for these cases odd. They are count forms, as can be seen, for example, in their ability to be counted:

(18) a. The constructions are painted blue.
   b. Those two creations took up an entire room at the museum.
   c. These three organizations are corrupt.
   d. Only one of the popularizations can be shown on TV.

Other examples which have a count but no mass result reading appear in (19):

(19) a. three citations configurations
   b. * a lot of citation configuration
      instantiations instantiation
      revelations revelation
      bastardizations bastardization

This is not to say that mass interpretations for result nouns are impossible. Certain of the count nouns in (18) can have mass interpretations as well: a great deal of construction, a lot of organization. Along with these we find:

(20) a. no amount of civilization simplification
   b. many civilizations simplifications
      vocalization vocalizations
      realization realizations
      explanation explanations
      representation representations

example, the capitalization of the letter amenable to (a) and (d) and perhaps (c), cannot mean b unless letter is plural; the derivation is also amenable to (a), (c) and (d) but not (b).
Other cases, such as appear in (21), have mass readings but no count reading:

\[(21)\]
\[
\begin{array}{ll}
a. \text{no amount of destruction} & b. * \text{many destructions} \\
\text{gentrification} & \text{gentrifications} \\
\text{lexicalization} & \text{lexicalizations} \\
\text{desecration} & \text{desecrations} \\
\text{segregation} & \text{segmentations} \\
\text{reallocation} & \text{reallocations}
\end{array}
\]

Three of the four examples that Aronoff cites as mass -ation nouns (see (11) above) belong to this type: devastation, integration, and fossilization. His fourth example, mollification, in his mollification of the crowd, refers to an event, not a result, and is parallel to the cases in (17), above.

In sum, the mass/count distinction is not applicable per se to -ation forms. Rather, the mass or count character of a particular -ation noun follows from other properties. When an object Theme appears in a derived noun, the form refers to a process and is neither mass nor count. When the Theme does not appear, it refers to a result, which may be either mass or count or both, depending on a variety of pragmatic factors, which, due to space limitations, I will not discuss here.

2.2. Intransitives

The Ø affix is used to form nouns from intransitive verbs. With one exception (light, which is arguably non-derived), all of Aronoff's examples fall into this category. I repeat them here:

\[(22)\]
\[
\begin{array}{ll}
\text{glance} & \text{One glance revealed the truth.} \\
\text{hit} & \text{Can she hit? One hit will show you.} \\
\text{try} & \text{He failed on two tries.} \\
\text{win} & \text{They have a record of two wins.} \\
\text{move} & \text{It's your move.}
\end{array}
\]

Like -ation, the Ø affix can be used to derive nominals of two distinct types. One is the process nominal, with the meaning «the act of V-ing». These cases are based on intransitive verbs and thus do not inherit a Theme; otherwise, they are parallel to the cases in (16a) above:

\[(23)\]
\[
\begin{array}{ll}
a \text{climb} & a \text{paddle} \\
a \text{walk} & a \text{whisk} \\
a \text{spit} & a \text{scrub} \\
a \text{shit} & a \text{sweep} \\
a \text{sweat}
\end{array}
\]
As was the case with the -ation forms, the mass/count distinction is not the relevant one here.

The second type of nominalization that $\emptyset$ may derive has been characterized by Kiparsky [1982] as referring to either «effected object implement or agent». The examples in (24) include cases from his (27) $^{10}$:

(24) a. «that which is V-ed»
   climb
   spit
   shit
   sweat

   b. «implement for V-ing»
   paddle
   whisk

   c. «one who V-s»
   scrub
   sweep

These forms, like the result forms of the nominalized transitive verbs, refer to entities and may therefore, be either mass or count:

(25) count mass
    a. climb spit
       walk shit

    b. paddle sweat
       whisk

    c. scrub
       sweep

$\emptyset$, as these cases show, cannot be lexically specified as a count affix.

2.3 Another affix

A brief look at an additional body of data supports the claim that the mass/count distinction is not tied to individual affixes. Consider the -ing affix, which may be added to verbs that are obligatorily or optionally transitive. The process/result contrast described for -ation and $\emptyset$ also occurs with -ing.

$^{10}$ Clark and Clark [1979] argue that the $\emptyset$ denominal verb rule is extremely productive. In their terms, once a verb of this type is created, its «... use is regulated by a convention: in using such a verb, the speaker means to denote the kind of state, event, or process that, he has good reason to believe, the listener can readily and uniquely compute on this occasion, on the basis of their mutual knowledge, in such a way that the parent noun (e.g. porch or Houdini) denotes one role in the state, event, or process, and the remaining surface arguments of the denominal verb denote others of its roles».
(26) a. The cooking (of soul food) takes hours.
b. The typing (of the manuscript) was an ardous task.
c. The sewing (of the blouse) required an expert.
d. The opening (of the door) required great strength.

(27) a. The cooking (* of soul food) tasted awful.
b. The typing (* of the manuscript) is on the desk.
c. The sewing (* of the blouse) was on display.
d. The opening (* of the door) was too small for the piano.

Here again, when the Theme appears the process reading is the only one available; when it is deleted, the result reading is available. In (26a, b and c), the Theme is not necessary in contrast to (d) and to the -ation cases above. This is because the base verbs underlying the -ing forms are optionally rather than obligatorily transitive. Again, the result nouns vary as to whether they are mass or count nouns. Of the forms of (27), cooking, typing and sewing are mass; opening is count.

2.4 Pluralizations of the processes/process-pluralizations

One could still make the objection that the two classes of process nominals — those formed in -ation and those formed in Ø — differ in their ability to be counted. The forms of (16a) are ungrammatical when pluralized; the cases of (23), in contrast, form plurals quite naturally:

(28) a. * the constructions of the tower
    * the creations of the sculpture
    * the organizations of the delegates
    * the popularizations of literary works

b. the climbs «the acts of climbing»
    the walks
    the whisks
    the sweeps

One might, therefore, be tempted to claim that indeed, the two types of processes differ semantically, along mass/count lines.

It can be seen, however, that this difference is not a semantic fact. It is a syntactic difference, as the contrasts between (29a) and (b) suggest:

(29) a. * the reconstructions of the bridge  b. the bridge reconstructions
    * the renovations of the house     the house renovations
    * the reorganizations of the drawers the drawer reorganizations
    * the completions of the projects  the project completions
The cases of (29) are all formed from verbs whose actions may be repeated. But only the forms in (29b) are grammatical.  

It appears that where the Theme is inherited into the nominal the derived form is opaque to further operations. Since the plural marker cannot appear inside a nominal, it would have to be added to the whole process form:

(30) [[[the reconstruction] of the bridge] s]

But since the affixation may apply to words and not phrases, forms such as (30) (and the cases in (29a)) are ruled out.

In contrast, where the incorporation of the Theme applies at an earlier lexical level and creates a compound word, an appropriate base for pluralization exists:

(31) [[[bridge-reconstruction] s]

The affix applies at the word level, not the phrase level, and the resulting plural forms (like those in 29b) are grammatical.

Since the $\emptyset$ affixed nominals are formed from intransitive verbs, the parallel problem does not arise. No objects are necessary for the process readings. Pluralization is, therefore, not phrasal and consequently, will be fully productive, yielding cases such as (28b), above.

2.5 Summary

At this point, a summary may be prove useful. Rather than a mass/count distinction, the systematic distinction which has emerged for deverbal nouns is between processes (or events) and results. Deverbal process nouns arise when the Theme of the underlying verb is present. Deverbal result nouns arise when the Theme is absent. When no Theme exists, as with intransitives, processes and results converge in the same form. The presence or absence of a noun bearing a particular thematic relation to the verb, then, is what controls the reading that a noun derived from that verb may have. Once again it is thematic roles that are crucial in determining the semantic distinctions that we find in morphological derivation.

While this much is clear, a more interesting question remains. Why should the presence or absence of a Theme have the effect that it does? Perhaps this follows from more general properties of the system. It is this question which I address below.

11 Certain of the forms of (29a) may be acceptable on another reading, where the noun is a lexicalized, non-derived form with no internal bracketing, and the prepositional object does not bear the direct object relation to the verb. These readings are parallel to other non-derived nouns with PPs. eg., the fixtures of the house.
3. θ structure

The question can be considered in terms of an approach based on the thematic structure of particular forms and general properties of thematic roles, an approach I proposed in my earlier contribution to this Roundtable (hereafter θS & I). To review, briefly, the relevant forms discussed there were cases identical in structure to those of (16b), (19), and (27); they are result nominals such as (32).

(32) a. the finding appeared in the journal
   the typing is stacked on the desk
   the cooking is starchy
   the cutting rooted in water.
   b. the discovery arrived at the museum
      the construction weighs 11 tons
      the proposal is on the top of the pile

It was found that the thematic structures of these nominals were different from the thematic structures of their underlying verbs, in that the Agent role could not appear:

(33) a. *the finding by the scientists appeared in the journal
       *the typing by the secretary is stacked on the desk
       *the cooking by the chef is starchy
       *the cutting by the gardener rooted in water
   b. *the discovery by Leakey arrived at the museum
       *the construction by the masons weighs 11 tons
       *the proposal by the committee is on the top of the pile.

And, just as with the -ation and -ing cases examined above, when the Theme appeared, a process reading was required:

(34) a. the finding of the fossils
       the typing of the manuscript
       the cooking of Indian food
   b. the discovery of the new element
       the construction of the sculpture
       the proposal of the idea

The interpretations of the two types of nominals were accounted for there by the θ-hierarchy and the Thematic Inheritance Principle, (35) and (36):

(35) θ-hierarchy:
    1. Theme
    2. Agent
    3. Goal. Source, Location, Instrument, etc.
(36) **Thematic Inheritance Principle**: a category-changing operation which blocks the assignment of a θ-role blocks the assignment of all roles lower on the θ-hierarchy.

The effect of (36) will differ depending on two factors (a) the thematic function of the particular affix and (b) the subcategorization of the base form.

With respect to (a), recall that affixes may affect the thematic structures of bases in a variety of ways. They may allow all θ-roles to be transmitted or ‘inherited’ from the base to the derived form or they may block θ-role assignment — and at any level of the θ-hierarchy.

The process nominals of (34) provide an illustration of a case of inheritance. The *-ing* affix, (34a), is one which allows full inheritance; i.e., it does not block the assignment of any θ-role on the hierarchy. Consequently, verbs with any subcategorization may be realized as *-ing* nominals. The argument structures of the derived forms will parallel the argument structures of the base verbs and so will their meanings, resulting in process nominals such as (34a), or, with still additional, optional thematic roles included, cases such as (37):

(37) the finding of fossils in shale pits 
the typing of manuscripts by competent secretaries on word processors 
the cooking of Indian food without the proper ingredients

The nominalizing affixes in (34b), unlike *-ing*, block the assignment of a θ-role; in particular, they block the assignment of Agent. By (36), therefore, they block all θ-roles lower on the hierarchy. Because of this (see ΘS & I for full details) the derived forms of (34b), by constrast, may take at most one argument. *Theme* only:

(38) the discovery of new stars (*with computer technology) 
the construction of the sculpture (*in stages) 
the proposing of the idea (*to the committee)

Comparing these with *-ing* versions of the same structures reveals the contrast strikingly:

(39) the discovering of new stars with computer technology 
the constructing of the sculpture in stages 
the proposing of the ideas to the committee

The cases of (38) and (39) range over verbs with both optional and obligatory objects. It is useful to look at these groups separately, since as
we have seen, certain properties of the derived nominals depend on the optionality of this argument.

Consider first verbs with optional objects. As we might expect, nominals derived from these forms will optionally inherit their Themes. Since a verb of this type can refer to the verbal action both with and without its object, the derived noun will have this property as well. For this reason, the process reading of the nominal will be available both when the object is present and when it is absent.

(40) a. the eating (of the celery) was noisy
    the writing (of the grant application) took a long time
    the cooking (of Indian food) was a challenge
    the typing (of the manuscript) required concentration
b. the subtraction (of the numbers) required a calculator
    the observation (of the planets) lasted several days
    the demonstration (of the vacuum cleaner) took 45 minutes

Now consider verbs with obligatory objects.

(41) John cut *(something)
    found
    discovered
    collected
    constructed
    suggested
    arranged

Recall (from (34)) that regardless of a verb's transitivity properties, when the Theme is present, the process reading is required. For obligatorily transitive verbs, when the Theme (here, the direct object) is absent, the process reading is blocked, since the subcategorizational requirements of the verb would be violated. Thus, only a noun reading of the form which is free of the thematic requirements of the verb can be formed — the result reading. Thus the cases in (42) may be given only result interpretations:

(42) the cutting
    the finding
    the discovery
    the collection
    the construction
    the suggestion
    the arrangement

One further fact is relevant. For a nominal to have a result reading, the pragmatics of the base verb must be compatible. Specifically (and informally stated), the verbal action must yield a tangible result. If this is not the
case, then the bare nominal will have no reading at all. The forms in (43) which cannot have process readings, since their objects do not appear, cannot have result readings either, because of this pragmatic incompatibility:

(43) the erasing
    the emptying
    the abolishment
    the obliteration
    the annihilation

In other words, it is not possible to refer to the concrete result of a verb like abolish, since what is abolished is no longer around to be referred to. But these cases aside, for forms like (42) where pragmatics are compatible, we are left with one remaining question: what are their thematic structures?

In each case, (regardless, once again, of the affix), the object, and thus the Theme of the underlying verb is missing. In the terms of the θ-hierarchy, the Theme is blocked; therefore, all roles lower down the hierarchy must also be blocked. But it is possible to think of the nominals themselves in these cases as assuming the role of Theme. Thus cases like (42) would block the Theme of the underlying verb but bear the role of Theme themselves.

Such a proposal is consistent with the predictions of both the θ-hierarchy as well as the Thematic Inheritance Principle. Assuming then the Theme is blocked in these cases predicts that no θ-roles will be able to appear. The forms in (33), above, showed that this was true with respect to Agent; the forms below illustrate other θ-roles:

(44) the cutting (* with the scissors) is in the vase
    the finding (* with the microscope) is published in the journal
    the discovery (* by accident) arrived at the museum
    the collection (* from many sources) is on display
    the construction (* by hand) stands 6 meters high
    the arrangement (* in pairs) satisfied Mary's aesthetic sense.

Further support for this view comes from -er, the Agent nominal affix. If (as suggested in θS & I) -er blocks the Agent role from being inherited, then the nominal itself can assume the Agent role. Here again, the roles higher on the hierarchy should be inheritable, but those lower down should not. And (as was demonstrated in θS & I), this prediction is borne out. In -er agent nominals, the only thematic role that may appear is the Theme. Once again, with Agent as with Theme, an affix's blocking of θ-role assignment is independent of its assuming a particular θ-role. The independence of the two processes can be seen with other affixes as well.
Many affixes besides -er block Agent: -able, -ment, -tion, -al, and -y; but only -er assumes the Agent role.

4. Conclusions

In trying to clarify and refine the distinctions that morphological operations must take into account, I have shown that three types of information are essential: information about grammatical function, subcategorization, and thematic role. The semantic mass/count distinction follows from the distinction between process and result interpretations of deverbal nouns. The process/result distinction, in turn, is itself not an arbitrary one to be identified lexically with individual affixes. Rather, it follows in a predictable way from particular thematic properties of these affixes and central properties of the thematic system: the θ-Hierarchy (35), and the Thematic Inheritance Principle (36).

This is an encouraging result, as Aronoff's investigation was looking for systematicity in the semantic distinctions available to derivational processes. I hope, in this paper, to have found some.

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