

# Idiosyncrasy, Regularity, and Synonymy in Derivational Morphology: Evidence for Default Word Interpretation Strategies<sup>1</sup>

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## Abstract

Perhaps the biggest challenge in derivational morphology is to reconcile morphological idiosyncrasy with semantic regularity. How can it be explained that words with dead affixes and irregular allomorphy can nonetheless exhibit straightforward and stable semantic relations to their etymological bases (cf. *strength* 'property of being **strong**', *obedience* 'act of **obeying**', 'property of being **obedient**')? Theories based on the idea of capturing regularity in terms of synthetic rules for building up complex words out of morphemes along with rules for interpreting such structures in a compositional fashion have not made – and arguably cannot make – sense of this phenomenon. Taking the perspective of the learner in acquisition, I propose an alternative approach to meaning assignment based, not on syntagmatic relations among their constituent morphemes, but on paradigmatic relations between whole words. This approach not only explains the conditions under which meaning relations between words are expected to be stable but also accounts for another notorious mystery in derivational morphology, the frequent occurrence of total synonymy among affixes, as opposed to words.

## Introduction

The meanings of complex words are mostly described in one of two ways. On one approach all morphemes are treated as signs, combined into complex words much like words are combined into phrases and sentences in syntax, where the complex syntagmatic structures are interpreted in a compositional fashion (cf. Halle 1973, Lieber 2004). Noting that a parallel treatment of morphology and syntax fails to capture the idiosyncrasy characteristic of morphology, others have linked compositionality to productivity or to novel coinages, claiming a direct causal link between lexicalization and semantic drift (Aronoff 1976). Yet, entirely fossilized morphology by no means precludes regular semantics, in fact, semantic idiosyncrasies often give way to more regular meanings over time. Apart from failing to reconcile morphological idiosyncrasy with semantic regularity, neither of these approaches explains why total synonymy is common in the relation among affixes, yet all but non-existent among other morphemes or words. Nor is the ques-

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tion addressed of why some affixes appear to carry meaning in some words but not in others with comparable morphological structures (cf. the reversative meaning of the prefix *de-* in *deflate*, *decrease*, as opposed to *defeat* or *defy*).

The approach to lexical semantics proposed here is to ask under what conditions morphemes are assigned meanings to begin with (as opposed to being pure word class markers or mere relicts of historical morphology). In particular, I will present evidence for a default strategy for interpreting words based not on syntagmatic relations among their constituent morphemes, but on paradigmatic relations between whole words. On this approach total synonymy among affixes results from their not playing any part in interpretation. Conditions under which meanings are assigned to affixes are also paradigmatic in nature, involving the availability of choice in a given phrasal or sentential context.

The paper is organized as follows. In section 1 I motivate a range of generalizations pertaining to form and meaning in English nominalizations, focusing on the evidence for default strategies of meaning assignment. A word-based model to account for these generalizations, including a case study, is presented in section 2. In section 3 I discuss the evidence for alleged meaning differences between the suffixes *-ness* and *-ity* in English (cf. Riddle 1985), concluding that in fact neither has any meaning. In section 4 I briefly sketch some conditions under which affixes are assigned meaning. In section 5 I conclude with a brief comparison to the approach to lexical semantics proposed by Lieber (2004).

## 1 Form and meaning in English nominalizations: basic generalizations

In this section I will first investigate the synchronic evidence for attributing a default status to word interpretation based on base recognition. The significance of cohesiveness in base relations, a diachronic phenomenon, is discussed in 1.2.

### 1.1 Evidence for a default strategy of interpretation

Syntactically, the words to the left of the hyphen in (1) share their ability to occur both as bare noun phrases, without a determiner, and to combine with a separate noun phrase introduced by *of*, in which case a determiner is obligatory (cf. *reasoning about likelihood* / *the likelihood of an attack*; *they like warmth* / *the warmth of the soil*). The words to the right of the hyphen are adjectives.

(1)

normalcy - <i>normal</i>	scarcity - <i>scarce</i>	intricacy - <i>intricate</i>
freedom - <i>free</i>	exactitude - <i>exact</i>	decency - <i>decent</i>
subtlety - <i>subtle</i>	height - <i>high</i>	innocence - <i>innocent</i>
likelihood - <i>likely</i>	modesty - <i>modest</i>	squalor - <i>squalid</i>
pride - <i>proud</i>	depth - <i>deep</i>	contrition - <i>contrite</i>

The relations among the words in each pair are marked by morphological idiosyncrasy and semantic regularity. Morphological idiosyncrasy is indicated by the fact that none of the suffixes in (1) are interchangeable. The vowel alternation in *pride - proud* does not recur. While most of the suffixes illustrated in (1) may play a role in analysis in that they function as word class markers (cf. 1.3) only the suffix *-ness* plays a role in the synthesis of novel nouns based on simplex adjectives in Modern English. Given a loanword such as *kaputt* from German *kaputt* 'broken', for instance, the speaker will have to resort to *-ness*-suffixation as in (2a). Only adjectives which end in the modal suffix *-able/-ible* are nominalized by *-ity*- suffixation.<sup>2</sup> The morphological rules used in (2a) are informally stated in (2b) (the category N/NP means that the nouns in question can be used without a determiner, corresponding to complete noun phrases).

- (2) a. *kaputt* ⇔ *kaputtness*                      b.  $[X]_A \Leftrightarrow [X[n\grave{a}s]]_{N/NP}$   
       *pursuable* ⇔ *pursuability*                       $[X[\grave{a}b\grave{a}]]_A \Leftrightarrow [X[\grave{a}b\grave{r}\grave{e}l\grave{a}t\grave{r}i]]_{N/NP}$

The rules in (2b) qualify as productive because their respective domains can be defined intensionally, that is, by referring to features shared by a class of words such as word class or even a particular affix. All other morphological rules historically involved in the derivation of the nouns in (1) are not productive because their domains would have to be defined extensionally, that is, by listing all of the actual stems (cf. Rainer (2005: 335)). Occasional novel deadjectival nouns formed by a rule other than those given in (1) are typically based on analogy to an actual word.<sup>3</sup> The rather low acceptability of the nonce formations in (3) shows that the status of potential analogies differs significantly from the status of the rule-based formations illustrated in (2a).<sup>4</sup>

(3)

	Phonologically similar base	Semantically similar base
<i>normalcy - normal</i>	formal - ?formalcy	usual - ?usualcy
<i>freedom - free</i>	new - ?newdom	loose - ?loosedom
<i>subtlety - subtle</i>	brittle - ?brittlety	fine - ?finety
<i>likelihood - likely</i>	lonely - ?lonelihood	probable - ?probablehood
<i>exactitude - exact</i>	correct - ?correctitude	precise - ?precisitude
<i>height - high</i>	shy - ?shyt	low - ?lowt
<i>modesty - modest</i>	earnest - ?earnesty	timid - ?timidy
<i>depth - deep</i>	cheap - ?chept	thick - ?thickth

<sup>2</sup> Marchand (1969) asserts that other nouns in *-ity* and the respective etymologically related adjectives in English are by and large separate loans (1969: 313).

<sup>3</sup> Cf. *bankruptcy* based on *insolvency*, *coolth* based on *warmth*, according to the OED.

<sup>4</sup> The nonce formations in (3) differ widely in the degree of acceptability: *earnesty* used to be common and is still retained in the phrase *in all earnesty*. Formations like *chept*, *polition*, *avor* or *lide* are not even remotely recognizable as deadjectival nouns.

	Phon. similar base	Semant. similar base
intricacy - <i>intricate</i>	desolate - ?desolacy	difficult - ?difficulcy
decency - <i>decent</i>	ancient - ?anciency	upright - ?uprigh(t)cy
squalor - <i>squalid</i>	avid - ?avor	sordid - ?sordor
contrition - <i>contrite</i>	polite - ?polition	penitent - ?penitention
pride - <i>proud</i>	loud - ?lide	

The fact that most adjectives ending in *-al* or *-ic* correspond to a noun ending in *-ity* (cf. *fatality*, *authenticity*) may suggest sensitivity to the presence of suffixes other than *-able* (cf. Baayen & Lieber 1991). However, analogous nonce formations involving bases in *-al* or *-ic* tend to be rejected, whereas the respective *-ness*-formations are readily accepted.<sup>5</sup>

(4) a.	dismal	b.	?dismality	c.	dismalness
	primeval		?primevality		primevalness
	natural		?naturality		naturalness
	frantic		?franticity		franticness
	terrific		?terrificity		terrificness
	hectic		?hecticity		hecticness
	caustic		?causticity		causticness

The flip side of the sharp difference in productivity between *-ity* and *-ness* observed in (4) is demonstrated in (5): the obsolescence of adjectives causes the obsolescence of the corresponding *-ness*-suffixations without affecting the relevant *-ity*-suffixation:

(5) a.	†asper	b.	asperity	c.	†asperness
	†propense		propensity		†propenseness
	†fidele		fidelity		†fideleness

While there may be considerable differences in the **degree** of (un)acceptability among the nonce formations in (3) or (4b) there is a noticeable difference in **kind** between those cases and nonce words derived by *-ness*-suffixation. Since this difference in acceptability can hardly be explained on extralinguistic grounds, it should be represented in grammar by encoding productivity in rule form as in (2b) and by listing fossilized forms as complete words. Such a representation accounts for the fact that synchronically, such nouns become part of the lexicon of an individual only if they are encountered as wholes.<sup>6</sup> The claim that words like those in (1) are not “synthesized” does not mean that they are not

<sup>5</sup> Noting that only *-ity* occurs after the suffixes *-ic* and *-al* in their corpus Baayen & Lieber (1991) conclude that “to some extent the rivals divide up the range of possible bases and show productivity in disjoint segments of this range” (1991: 826). The evaluation of the nonce forms in (4b) suggests that this conclusion is incorrect.

<sup>6</sup> Historically, such nouns, including those listed in (1), have mostly entered the language through native coinage at earlier stages, when the affixes in question were productive, or as loan-words (cf. the relevant entries in the OED).

analysable (cf. Jackendoff 1975, Aronoff 1976). Evidence for morphological decomposition, the criteria for segmentation, and the function of affixes are discussed in section 4.

The fossilization of the noun morphology observed in (1) contrasts starkly with the highly “productive” semantic relations to the respective (etymological) bases. All abstract nouns in (1) are (at least) two-place predicates, which, in addition to the referential argument, predicate about an external argument. This external argument, which is specified by a possessive construction (cf. the of-PP in (6)), corresponds to what is sometimes referred to as the parasitic argument of the related adjective (cf. Löbner 2002).

(6)

the <i>decency</i> of her neighbors	her neighbors are <i>decent/decent</i> neighbors
the <i>squalor</i> of the slums	the slums are <i>squalid/squalid</i> slums
the <i>height</i> of the mountains	the mountains are <i>high/high</i> mountains
the <i>exactitude</i> of the results	the results are <i>exact/exact</i> results
the <i>contrition</i> of the thief	the thief is <i>contrite/contrite</i> thief

The notion of “correspondence” referred to above is based on logical equivalence and can be tested by embedding the relevant phrases in certain sentence frames as shown in (7).

- (7) a. I’m convinced of [the decency of her neighbors]  
 ⇔ I’m convinced that [her neighbors are decent]  
 ⇔ I’m convinced that she has [decent neighbors]
- b. I doubt [the decency of her neighbors]  
 ⇔ I doubt that [her neighbors are decent]  
 ⇔ I doubt that she has [decent neighbors]

Adjectives in predicative constructions can have complements specified by a prepositional phrase. Those complements also correspond regularly to additional arguments taken by the abstract nouns, such that the prepositions match.

(8)

the <i>similarity</i> of her attitude to yours	her attitude is <i>similar</i> to yours
the <i>difference</i> from previous policies	<i>different</i> from previous policies
his <i>pride</i> of his children	he is <i>proud</i> of his children
his <i>responsibility</i> for the massacre	he is <i>responsible</i> for the massacre
their <i>shortage</i> of food	they are <i>short</i> of food

Adjectival complements consisting of *to*-infinitive clauses also correspond, where the correspondent may also be expressed as a deverbal abstract noun.

(9)

<i>freedom to leave</i>	<i>free to leave</i>
the <b>likelihood of occurrence</b> of an attack	an attack is <i>likely to occur</i>

In addition to the correspondences in the argument structures we also find regular correspondence in the modifications of adjectives and nominalizations, including adverbial modification<sup>7</sup> and modification by measure phrases.

(10) a.

the <b>high likelihood</b> of an attack	an attack is <b>highly likely</b>
the <b>striking similarity</b> of her attitude to	her attitude is <b>strikingly similar</b> to
the <b>clear difference</b> from	<b>clearly different</b> from
the <b>disturbing normalcy</b> of fear	fear is <b>disturbingly normal</b>

(10) b.

<b>depth of three inches</b>	<b>three inches deep</b>
<b>height of three inches</b>	<b>three inches high</b>

Adjectives and the respective (etymologically) related nouns do not always correspond. Two types of causes can be distinguished here: the problem either concerns certain semantic restrictions on the adjectives, which block the use of related nouns as in (11a) or the associability of the noun and the adjective, which appear to have drifted apart historically, as in (11b).<sup>8</sup> Note that the nominalizations in (11a) are either ungrammatical or distinctly jocular (e.g. *?I'm concerned with the modesty of his progress*)

(11) a.

decent prices / the prices were decent	⇒	the decency of the prices
modest progress / the progress was modest	⇒	the modesty of the progress
they are free of lice	⇒	their freedom of lice
they are high (on drugs)	⇒	their height (on drugs)

(11) b.

vicious comment / the comment is vicious	⇒	the vice of the comment
slow movements / the movements are slow	⇒	the sloth of the movements
dry skin / the skin is dry	⇒	the drought of the skin
she is anxious to leave	⇒	her anxiety to leave

The claim that the problem in (11a), but not in (11b), lies in the specific meanings of the adjectives in the respective constructions is supported by the fact that

<sup>7</sup> Here only adjectives and the respective adverbs suffixed with *-ly* correspond (e.g. *very high* / *\*the very height*, *almost innocent* / *\*almost innocence*).

<sup>8</sup> The meaning changes in (11b) will be discussed in section 2.

nouns derived by productive *-ness*-suffixation are also objectionable (cf (12a)). By contrast, *-ness*-derivations are perfectly acceptable replacements for the nouns in (11b):

(12) a.	?the decentness of the prices	b.	the viciousness of the comment
	?the modestness of the progress		the slowness of the movements
	?their freeness of lice		the dryness of the skin
	?their highness (on drugs)		her anxiousness to leave

I will not discuss the question of what blocks the use of nouns in (11a) or (12a) other than noting that the cause concerns the base adjectives in certain constructions (e.g. *decent prices*). It is merely important here to separate such cases from those in (11b), where the cause of the lacking correspondences concerns the semantic drift among the nouns and their historical bases. In particular, it is important to note that semantic drift is by no means a typical characteristic of fossilized morphology. The regularity of semantic relations is also reflected in standard dictionary definitions illustrated in (13) (all definitions are adopted from the American Heritage Dictionary).

(13)	normalcy:	the state or fact of being normal
	likelihood:	the state of being likely
	subtlety:	the quality or state of being subtle
	freedom:	the condition of being free of restraints
	exactitude:	the state or quality of being exact
	modesty:	the state or quality of being modest
	height:	the quality of being high; dimension [relating to the meaning of high]
	complexity:	the state or condition of being complex
	innocence:	the state, quality, or virtue of being innocent
	squalor:	the state or quality of being squalid
	intricacy:	the condition or quality of being intricate
	decency:	the state or condition of being decent
	precision:	the state or quality of being precise

An additional generalization indicated by these definitions is that particular semantic properties are not linked to individual affixes. The claim that the meanings of the derived nouns are strictly functions of the meaning of their bases, without any independent contribution by the affixes, is reflected both by the apparent polysemy of single affixes as in (14a) and by the synonymy of distinct affixes as in (14b). For instance, the omission of the term 'state' in the definition of *suddenness* is determined by the meaning of the base adjective *sudden*. Similarly, the term 'dimension' in all definitions in (14b) reflects the fact that the base adjectives can combine with measure phrases (e.g. *three feet deep*).

(14) a.	[evenness] <sub>N/NP</sub> :	the quality or state of ...
	[suddenness] <sub>N/NP</sub> :	the quality of ...

- b. [depth]<sub>N/NP</sub>: the quality of ...; measurement or distance from ...  
 [height]<sub>N/NP</sub>: the quality of ...; distance or measurement from ...  
 [thickness]<sub>N/NP</sub>: the quality or condition of ...; measurement or extension of ...

Affix meanings could in principle be computed in a top-down fashion, based on the category of the complex noun and the meaning of the base. However, there is no evidence that learners do assign meanings to these affixes. Instead the meanings of the nouns appear to be computed entirely based on the recognition of paradigmatic relations, that is, the relations between the nouns and their respective adjectival base. The rule of semantic interpretation stated in (15) accordingly makes no reference to affixes.<sup>9</sup>

- (15) If  $X]_{N/NP} \rightarrow Y]_A$  then  $M(X) = \text{"state / property / quality / condition of being Y"}$

The absence of any independent meaning contribution by the affix observed here has led some researchers to posit a special category of word formation rules called 'transposition', which is associated with no meaning changes other than those following necessarily from the change in word class (cf. Kuryłowicz (1936), Beard (1995)). The data reviewed here indicate that the effect in question should not be ascribed to certain word formation rules but rather concerns the recognizability of a relation among individual words from an analytic, rather than a synthetic, perspective. For instance, unless one posits a (transpositional) word formation rule for deriving *pride* from *proud*, the meaning of *pride* ('state, condition, quality of being *proud*') would not be accounted for. Note that the relevant word formation rule would hardly be learnable since the formal changes seen in this pair do not even recur in English. From the analytic perspective expressed in (15) the meaning of *pride* is accounted for as soon as the conditions for establishing the base relation  $\text{pride}]_{N/NP} \rightarrow \text{proud}]_A$  are explained. Also the sort of correspondences in argument structure and modification illustrated in (5) – (10) follow from these relations. The conditions for recognizing base relations are treated in section 2.

The independence of meaning not only from specific affixes but from any sort of morphological regularity is supported by the data in (16). Again, the meanings of the abstract nouns appear to be simply functions of the meanings of the paradigmatically related verbs, even when the formal changes recur in no other noun-verb pair (cf. *hatred - hate*, *loss - lose*, *comparison - compare*, etc).

- (16)

development - <i>develop</i>	avoidance - <i>avoid</i>	pursuit - <i>pursue</i>
laughter - <i>laugh</i>	occurrence - <i>occur</i>	growth - <i>grow</i>
failure - <i>fail</i>	refusal - <i>refuse</i>	divorce - <i>divorce</i>

<sup>9</sup> The line in (26a) reads as follows: If for a noun / noun phrase X a paradigmatic relation to an adjective Y is recognized, then X is interpreted as 'state / property / quality / condition of being Y'.

behavior - <i>behave</i>	consultation - <i>consult</i>	belief - <i>believe</i>
rebellion - <i>rebel</i>	ouster - <i>oust</i>	loss - <i>lose</i>
hatred - <i>hate</i>	qualification - <i>qualify</i>	thought - <i>think</i>
comparison - <i>compare</i>	repetition - <i>repeat</i>	success - <i>succeed</i>

Semantically, the deverbal nouns in (16) differ from the deadjectival nouns considered earlier in that they are typically interpreted as processes, acts, or results, rather than qualities or states, a difference, which again appears to be a function of the more dynamic verb semantics compared to the more static adjective semantics. Also the choice among the expressions ‘act’, ‘process’ or even ‘state’ is determined by the meaning, especially by aspectual properties, of the base verb. Some definitions from the American Heritage Dictionary are given in (17).<sup>10</sup>

- (17)
- avoidance: the act of avoiding sth.
  - occurrence: an act or instance of occurring
  - refusal: the act of refusing
  - pursuit: the act or an instance of pursuing
  - growth: the process of growing, the result of growth
  - laughter: the act of laughing
  - ouster: the act of ousting
  - consultation: the act or procedure of consulting
  - repetition: the act or process of repeating
  - development: the act of developing
  - comparison: a comparing or being compared
  - hatred: the condition or state of relations in which one person hates another; the emotion or feeling of hate
  - loss: the act or an instance of losing

Systematic correspondences in argument structure and in modification are illustrated in (18):<sup>11</sup>

(18)

their failure of the exam	they failed the exam
his comparison of the new proposal with the standard model	he compared the new proposal with the standard model
their bad behavior	they behaved badly
his hatred of doctors	he hated doctors
their dependence on oil	they depended on oil

<sup>10</sup> The definition of *hatred* is adopted from the OED.

<sup>11</sup> More care would be required here to separate the peculiarities of nominalizations which necessarily reflect recognition of a verbal base from independent properties of nominal constructions. For instance, constructions such as “*the efforts by the U.S. to reform the criminal justice system*” show that agenthood can be expressed in *by*-phrases without any sort of recourse to verbs. The most convincing instances of the peculiarities in question are particle correspondences (e.g. *succeed in* - *success in*, *depend on* - *dependence on*) and concern strictly lexical structure. For a defense of the transformationalist view see Roeper (2005), cf. also the discussion by Lieber (2005: 406ff).

their withdrawal from Iraq	they withdrew from Iraq
her success in winning the gold medal	she succeeded in winning the gold medal
her thought that life was passing her by	she thought that life was passing her by

The claim that the meanings of the nouns in (16) are solely functions of the paradigmatically related base verbs is supported not only by the synonymy among the distinct affixes observed in (17) but also by the sort of polysemy of identical affixes illustrated in (19). Both of these phenomena indicate that there simply is no independent semantic contribution by the affixes.

- (19)   existence:   the fact or state of existing  
           repentance:  the act or process of repenting  
           severance:  the act of severing

The respective effects of base recognition on the meaning assigned to an abstract noun can accordingly be summarized as in (20):

- (20) a.  If  $X]_{N/NP} \rightarrow Y]_A$  then  $M(X) =$  "state / property / quality / condition of being Y"  
           b.  If  $X]_{N/NP} \rightarrow Y]_V$  then  $M(X) =$  "act / process / state / result of Y'ing"

The expressions used in (20a) are meant to reflect the staticness of adjectives whereas the expressions in (20b) are meant to reflect the dynamic or temporal nature of verbs. The rules in (20) are meant to express universal default mechanisms for interpretation centering on recognizable relations to base words. Crucially, this mechanism presupposes a hearer-based, rather than a speaker-based, perspective. There is no reference to affixes.

The relational character of the generalizations in (20) is supported by the polysemy in (21) where nouns with phonologically identical suffixes are associated with different types of meanings, depending on the category of the base (all definitions, except for the definition of *discovery*<sup>12</sup>, are adopted from the OED):

(21)

<b>truth]</b> <sub>N/NP</sub>	$\rightarrow$ true] <sub>A</sub>	the quality of being true
<b>growth]</b> <sub>N/NP</sub>	$\rightarrow$ grow] <sub>V</sub>	the action, process, or manner of growing
<b>precision]</b> <sub>N/NP</sub>	$\rightarrow$ precise] <sub>A</sub>	the fact, condition, or quality of being precise
<b>decision]</b> <sub>N/NP</sub>	$\rightarrow$ decide] <sub>V</sub>	the action of deciding
<b>ignorance]</b> <sub>N/NP</sub>	$\rightarrow$ ignorant] <sub>A</sub>	the fact or condition of being ignorant

<sup>12</sup> In the OED *discovery* is defined as 'the finding out or bringing to light of that which was previously unknown', a definition, which, however, closely reflects the one given for the verb *discover* ('to obtain sight or knowledge of (something previously unknown) for the first time).

<b>severance</b> ] <sub>N/NP</sub>	→ sever] <sub>V</sub>	the act or fact of severing
<b>justice</b> ] <sub>N/NP</sub>	→ just] <sub>A</sub>	the quality of being just
<b>service</b> ] <sub>N/NP</sub>	→ serve] <sub>V</sub>	the action of serving
<b>shortage</b> ] <sub>N/NP</sub> (of)	→ short] <sub>A</sub>	the condition of being short (of) <sup>13</sup>
<b>shrinkage</b> ] <sub>N/NP</sub>	→ shrink] <sub>V</sub>	the act or fact of shrinking
<b>difficulty</b> ] <sub>N/NP</sub>	→ difficult] <sub>A</sub>	the quality, fact, or condition of being difficult
<b>discovery</b> ] <sub>N/NP</sub>	→ discover] <sub>V</sub>	the act or fact of discovering

Nouns, which relate to both an adjective and a verb are associable with both kinds of meanings as is shown in (22a). This sort of flexibility in the interpretation of nouns is curtailed only when the base words differ sharply in meaning as in (22b), where deverbal and deadjectival readings block one another. The particular base relations in (22b) are presumably historically conditioned since both nouns were borrowed already with the distinct meanings given there, which are stabilized synchronically by base recognition.

(22) a.

<b>persistence</b> ] <sub>N/NP</sub>	→ persistent] <sub>A</sub>	the quality or virtue of being persistent
	→ persist] <sub>V</sub>	the action or fact of persisting
<b>corruption</b> ] <sub>N/NP</sub>	→ corrupt] <sub>A</sub>	the condition or quality of being corrupt
	→ corrupt] <sub>V</sub>	the action of corrupting

(22) b.

<b>exaction</b> ] <sub>N/NP</sub>	→ exact] <sub>V</sub>	'the action of exacting' (i.e. demanding and enforcing payment of fees, taxes, penalties, etc.)
<b>exactitude</b> ] <sub>N/NP</sub>	→ exact] <sub>A</sub>	'the quality of being exact' (i.e. precise, accurate)

The approach to the interpretation of abstract nouns based on paradigmatic relations is also supported by historical data. The historically deverbal suffix *-ion*, for instance, is originally associated with dynamic interpretations. The loss of this meaning in the data in (23) correlates with the loss of the related verbs. In case adjectives based on participles survive, the meaning will become static, in accordance with the rule in (20a) (both obsolete meanings and obsolete words are marked by the diacritic '†'. Obsolete meanings are cited directly from the OED. Reference to antonyms marked by '↔' serves only the conciseness of the definitions.)

<sup>13</sup> This definition is not adopted literally from the OED. It is, however, consistent with the OED definition of *shortage* as 'deficiency in quantity' and the definition of *short (of)* as 'having an insufficient quantity of'.

(23)

repletion] <sub>N/NP</sub>	†‘the <b>action</b> of filling up’	†replete] <sub>V</sub> ‘to fill up’
	‘ <b>condition</b> or <b>fact</b> of being replete’	replete] <sub>A</sub> ‘full’
discretion] <sub>N/NP</sub>	†‘the <b>action</b> of distinguishing and separating’	†discrete] <sub>V</sub> ‘to distinguish and separate’
	a. ‘the <b>condition</b> or <b>fact</b> of being discrete’ b. ‘the <b>quality</b> of being discreet’	a. discrete] <sub>A</sub> ↔ continuous b. discreet] <sub>A</sub> ↔ blabbermouthed
destitution] <sub>N/NP</sub>	†‘the <b>action</b> of deserting or forsaking’	†destitute] <sub>V</sub> ‘to forsake, desert, abandon, leave to neglect’
	the <b>condition</b> of being destitute	destitute] <sub>A</sub> ‘without the very necessities of life’

The reverse change from a static to a dynamic interpretation due to a change in paradigmatic relations is shown in (24). As a result of the (strictly phonologically conditioned) rules of schwa loss and degemination learners interpreting the noun *forgiveness* apparently no longer access the adjective *forgiven*, but rather the verb *forgive*, as a base. Evidence for this change in base relations, represented as Stage I and Stage II in (24), comes from the new dynamic interpretation of the noun, adopted from the American Heritage Dictionary.<sup>14</sup>

(24) a.

[fɔrgɪvənnəs] <sub>N/NP</sub> ‘forgiveness’	I	‘the condition of being forgiven’	forgiven] <sub>A</sub>
--	---	-----------------------------------	------------------------

(24) b.

[fɔrgɪvnəs] <sub>N/NP</sub> ‘forgiveness’	II	‘the act of forgiving’	forgive] <sub>V</sub>
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The change observed in (24) is remarkable because, unlike the suffixes involved in the cases considered earlier, *-ness* is highly productive and restricted to adjectival bases in word formation. *Forgiveness* is in fact the only word where this suffix is found in combination with a verb; analogous coinages are completely unacceptable (cf. *\*forgetmess*, *\*forsakeness*). *-ness*-suffixations are special only in that deverbal interpretations are ruled out whenever adjectival bases are available (e.g. *corruptness* can only mean ‘condition of being corrupt’, not ‘act of corrupting’). This property, which appears to be connected to productivity, is addressed again in section 2.3.

<sup>14</sup> The adequacy of this definition is supported by corpus data. Using Google, I found various instances of the collocation ‘forgiveness happened’ (e.g. *And in that moment, forgiveness happened*) whereas static nouns preceding the verb *happened* are typically embedded in dynamic constructions (e.g. *an act of kindness happened*).

The data reviewed here argue strongly for a purely relational, paradigmatic approach to word meaning as expressed in the rules in (20). On such an approach not only the seeming synonymy and polysemy of affixes but also the compatibility of fossilized morphology with 'productive' semantics are explained as natural consequences of a default strategy for interpreting words, which – apart from the productivity effect just mentioned – appears to be insensitive to the presence of affixes. Consider in this regard Clark's hypotheses concerning the acquisition of affix meanings cited below:

"Identifying a particular word-part as an affix may require exposure to several instances of that affix, or possibly only to one, provided the root is already familiar. When an affixal form has been isolated, children can map some meaning onto it. They may create possible meanings through comparison with the meanings of other words with the same affix." (Clark 1993: 110)

In her study, Clark takes for granted that affixes are assigned meanings, speculating on how this learning is achieved. It is of course true that learners *could* map meanings onto affixes but there is simply no evidence in the data reviewed so far, that this is done.<sup>15</sup> It is presumably the bias towards an exclusively syntagmatic view of morphology, which underlies Clark's assumptions. The same bias is also reflected in the quote below (with 'hypothesis B' Enger refers to rules of transposition briefly discussed above (cf. Beard 1995)):

"... if linguistic theory is assumed to have anything to do with psychological plausibility, one wonders if it is realistic, in terms of language acquisition, to assume that an audible element does not have a meaning, except indirectly as a trace of an 'invisible' operation, which is what really carries meaning, according to hypothesis B." (Enger 2005:29)

Enger's point would be valid if one were to assume that morphologically complex words are naturally interpreted in a compositional fashion.<sup>16</sup> However, assuming that the default strategy of word interpretation is paradigmatic, involving whole words and reference to a base, the assignment of meaning to individ-

<sup>15</sup> As will be discussed below, even cases where affixes are assigned meaning do not necessarily involve any comparison with other affixed words (e.g. the nonrecurring modifying prefix *ab-* in *abnormal*, which is assigned a privative meaning).

<sup>16</sup> The bias towards compositionality appears to be at the root of some highly questionable analyses. For instance, Roeper (2005: 137) claims that the suffix *-ence* differs from the suffix *-ance* in predominantly denoting qualities rather than actions, missing the generalization that his examples for *-ence*-suffixation, *dependence*, *existence*, *persistence*, *violence*, *subservience* and *prudence*, involve base relations to adjectives or stative verbs (i.e. *exist*), whereas the *-ance*-suffixations cited, *assistance*, *resistance* and *connivance*, are based on action verbs (e.g. *assist*]<sub>v</sub>, *resist*]<sub>v</sub>, *connive*]<sub>v</sub>, but \**assistant*]<sub>A</sub>, \**connivant*]<sub>A</sub>). (Roeper also includes *pretense* here, which however has final secondary stress and does not belong in the list of *-ence*-suffixations.) *Transference* is analysed as an exception as this noun ends in *-ence*, yet denotes actions. The meaning of this noun, however, is entirely regular as it simply reflects recognition of the verbal base *transfer*: A quality reading is ruled out because there is no adjective \**transferent*.

Roeper's other claims about suffix meanings are similarly questionable. His analysis of the suffix *-th* in *growth* as an inchoative marker misses the fact that the predominantly intransitive use of the base *grow* is the source of the inchoative meaning. The rare cases of deverbal *-th*-suffixation in the history of English do not confirm any link between the suffix and inchoative meaning (*spilth* 'the action or fact of spilling', *stealth*, originally 'the action of stealing').

ual parts of words amounts to an additional effort. Surely, it would be easier for learners to assign meaning to whole words only and not to each recognizable morpheme. As for affixes, assuming they are recognized to begin with, it would be easier to analyze them as mere word class markers based on the syntactic distribution of the relevant words, than to assign meanings to them. It is this path of least effort, which appears to be chosen consistently in the cases considered so far. Reasons to deviate from this path, that is, conditions under which meanings are assigned to affixes, are discussed in section 4.

## 1.2 Paradigmatic meaning relations: cohesiveness and idiosyncrasy

The mere similarity in meaning between the related words illustrated above does not necessarily motivate the rules for paradigmatic interpretation stated in (20). This is because meaning similarity is common for etymologically related words even in distinct languages as is shown in (25):

- (25) English *freedom* – German *frei* ‘free’  
 English *depth* – Swedish *djup/djupt* ‘deep’  
 English *innocence* – French *innocent/innocente* ‘innocent’  
 English *modesty* – Spanish *modesto/modesta* ‘modest’

The examples in (25) are significant in that they show that close meaning relations between words can persist without any sort of association in the minds of speakers. Word meanings that are similar at some point in time will obviously remain similar for as long as none of them undergo significant change. This simple insight could in principle suffice to explain the meaning similarity in many English word pairs, including those in (26).

- (26) heat - hot, papal - pope, dental - tooth, gubernatorial - governor,  
 duchess - duke, frost - freeze, French - France, stellar - star

What motivates the paradigmatic meaning assignment rules in (20) is evidence for a dependence relation where the interpretation of one word is strictly based on the meaning of another. The strongest evidence for such a dependence concerns cases of historical semantic change in one word, which is reflected in a corresponding meaning change of another. Examples based on entries cited from the OED are given in (27). Importantly, the markers in the left column hold for both columns: they are meant to indicate that meanings or meaning nuances disappear or come into being simultaneously in the nouns and the respective base adjectives. Assuming that this parallelism could not be coincidental, it proves the existence of the paradigmatically based rule of interpretation in (20). For instance, the meaning of *proud* appears to figure consistently as a central ingredient in the meaning of *pride*, the latter merely reflecting whatever concepts speakers choose to associate with the former:

(27)

	<b>pride</b> ]N/NP	<b>proud</b> ]A
†	magnificence, splendour; pomp, ostentation, display	stately, magnificent, imposing, or splendid in appearance
†	abundant productiveness; luxuriance of growth	of a plant, crop, etc.: full of sap; luxuriant in growth
†	sexual desire	sexually excited; lascivious
☑	the feeling of satisfaction, pleasure, or elation derived from some action, ability, possession, etc., which one believes does one credit	feeling greatly honoured, pleased, or satisfied by something which or someone who does one credit
	<b>contrition</b> ]N/NP	<b>contrite</b> ]A
†	the action of rubbing things together, or against each other; grinding, pounding or bruising	bruised, crushed; worn or broken by rubbing
☑	the condition of being bruised in heart, penitence for sin	penitent, feeling guilty
	<b>scarcity</b> ]N/NP	<b>scarce</b> ]A
†	frugality, parsimony; niggardliness, stinginess, meanness	stingy, sparing, niggardly, parsimonious, penurious
☑	insufficiency of supply; smallness of available quantity, number, or amount, in proportion to the need or demand	existing in limited number; rare existing or accessible in deficient quantity
	<b>likelihood</b> ]N/NP	<b>likely</b> ]A
†	likeness; resemblance; similarity	having a resemblance, like, similar
☑	probability	probable
	<b>subtlety</b> ]N/NP	<b>subtle</b> ]A
†	skill, cleverness, dexterity	skilful, clever, expert, dexterous
☑	a refinement or nicety of thought; a fine distinction	characterized by discrimination, now with implication of (excessive) refinement or nicety of thought
	<b>modesty</b> ]N/NP	<b>modest</b> ]A
†	moderation, temperateness, self control; freedom from excess or exaggeration	avoiding extremes of behaviour; well-conducted, temperate
☑	the quality of being unassuming or of having a moderate opinion of oneself	having a moderate or humble estimate of one's own abilities or achievements; becomingly diffident and unassuming

	<b>decency</b> ] <sub>N/NP</sub>	<b>decent</b> ] <sub>A</sub>
†	appropriateness or fitness to the circumstances or requirements of the case; fitness, seemliness, propriety	appropriate with regard to rank or dignity; becoming, suitable, appropriate, or proper to the circumstances or special requirements of the case; <b>seemly, fitting</b>
☑	compliance with recognized notions of modesty or delicacy; freedom from impropriety	conformable to or satisfying the recognized standard of modesty or delicacy; free from obscenity
	<b>security</b> ] <sub>N/NP</sub>	<b>secure</b> ] <sub>A</sub>
†	carelessness	careless, overconfident
☑	the condition of being protected from or not exposed to danger; safety	rightly free from apprehension; protected from or not exposed to danger; <b>safe</b>
	<b>honesty</b> ] <sub>N/NP</sub>	<b>honest</b> ] <sub>A</sub>
†	honourable position or estate; high rank; respectability	held in honour; holding an honourable position; respectable
†	chastity; the honour or virtue of a woman	chaste, 'virtuous'; usually of a woman
☑	uprightness of disposition and conduct; integrity, truthfulness, straightforwardness: the quality opposed to lying, cheating, or stealing	that deals fairly and uprightly in speech and act; sincere, truthful, candid; that will not lie, cheat, or steal
	<b>truth</b> ] <sub>N/NP</sub>	<b>true</b> ] <sub>A</sub>
†	faithfulness, fidelity, loyalty, constancy, steadfast allegiance	firm in allegiance; faithful, loyal, constant, <b>trusty</b>
☑	conformity with fact; agreement with reality	consistent with fact; agreeing with the reality
	<b>clarity</b> ] <sub>N/NP</sub>	<b>clear</b> ] <sub>A</sub>
†	brightness, lustre, brilliancy, splendour	bright, splendid, brilliant
☑	clearness: in various current uses; e.g. of colour, sky, atmosphere, sight, intellect, judgement, conscience, style	of colour: pure (clear brown) of sky: void of cloud of sight: seeing distinctly etc.

	wisdom] <sub>N/NP</sub>	wise] <sub>A</sub>
†	practical knowledge or understanding, expertness in an art	having practical understanding and ability; skilful, clever; skilled, expert
☑	capacity of judging rightly in matters relating to life and conduct; soundness of judgement in the choice of means and ends	capable of judging truly concerning what is right or fitting, and disposed to act accordingly; having the ability to perceive and adopt the best means for accomplishing an end

I will refer to relations exhibiting the kind of stability in (27) as “cohesive” relations. Accounting for cohesiveness is arguably the most central task to be solved by models of the mental lexicon, since cohesiveness, unlike meaning similarity, could hardly be accidental. Cohesiveness indicates a particular condition on interpretation, that is, a complete determination of meaning assignment to a word A based on the meaning of another word B which has been recognized as the base. The question of whether and to what extent cohesiveness is systematic and predictable is addressed in the next section.

## 2 Base recognition

In this section I will first propose a rough model to capture the conditions for base recognition and cohesiveness. In section 2.2 the model is tested with a particular set of Romance loanwords: abstract nouns ending in /ər/. The findings of this case study are confronted with the additional data in section 2.3, which also includes a brief discussion of Generative approaches to morphophonology. The question of how to explain the emergence of idiosyncratic meanings despite the satisfaction of conditions for cohesiveness is addressed in section 2.4. Differences between cohesive relations and semantically similar non-cohesive relations are discussed in section 2.5.

### 2.1 A model of base recognition

The idea behind the model of base recognition first introduced in Raffelsiefen (1993), (1998) is to account for cohesiveness by mimicking the conditions for meaning acquisition. The input consists accordingly of the phonological form of a novel word given in some context. The context includes both syntagmatic structure to allow for the computation of the relevant word class as well as extralinguistic information. Affixes – to the extent that they are recognized – may serve as additional word class markers. The immediate task of the learner is then to pick out the referent intended by the speaker when using the expression. The more general task is to assign a meaning to that expression. In (28) the input is

represented by specifying the phonological form and word class of the expression above the line and its meaning, represented by the question mark, below the line. The transcriptions used below represent a variant of General American (cf. Wells 2000).

- (28) Input:  
 $\frac{[skwa:l[əɹ]_{SUFF}]_{N/NP}}{?}$

If the context is such that the referent is easily accessible, in particular in the case of concrete nouns preceded by a determiner, interpretation may well proceed without recourse to other words in the mental lexicon. The proposal is that in other cases, especially for words with abstract meanings, learners regularly resort to their mental lexicon to solve the task of assigning meaning by way of checking for suitable base candidates. The fact that cohesive and non-cohesive word pairs differ in that the former exhibit certain similarities in their phonological form indicates that base candidates are selected on the basis of phonological similarity with the input word. Given the input *squalor*, relevant candidates would include words like *squaw*, *squall*, or *squalid*. In (29), the meanings of words are represented by their orthographic form.

- (29) Input:  $\frac{[skwa:l[əɹ]_{SUFF}]_{N/NP}}{?}$  → Base candidates:  
 $\frac{[skwa:l[ɪd]_{SUFF}]_{ADJ}}{squalid'}$   
 $\frac{[skwa:l]_N}{squall' \dots}$

The meanings of base candidates chosen on the basis of phonetic similarity will not automatically determine the meaning of a newly encountered word. Rather, candidates will succeed only if their meaning is compatible with the situational context in which the input word has been encountered. Assuming for now that the adjective *squalid* is the only candidate whose meaning satisfies the compatibility criterion, it is recognized as the base:

- (30) Input:  $\frac{[skwa:l[əɹ]_{SUFF}]_{N/NP}}{?}$  → Base candidates:  $\frac{[skwa:l[ɪd]_{SUFF}]_{ADJ}}{squalid'}$  → Accepted candidate:  $\frac{[skwa:l[ɪd]_{SUFF}]_{ADJ}}{squalid'}$   
 $\frac{[skwa:l]_N}{squall' \dots}$

If a base candidate is accepted and base recognition has thus succeeded, the input word is interpreted with reference to the word class and meaning of that base. For the example in (30), which involves a word which occurs either with or without a determiner and an adjectival base, the rule in (20a) applies. The meaning to be associated with the expression /skwa:ləɹ/ is accordingly as follows:

- (31)  $\frac{[skwa:l[əɹ]_{SUFF}]_{N/NP}}{\text{'condition / quality / state / property / instance of being squalid'}}$

The meaning in (31) is consistent with the definition given in the OED (“the state or condition of being physically squalid; the quality or state of being morally or mentally squalid”). Moreover, the particular account of word interpretation illustrated in (30) explains the cohesiveness of the relation between *squalor* and *squalid*, which is demonstrated by the OED entries in (32):

(32)

	<i>squalor</i>	<i>squalid</i>
†	aridity or roughness	dry, parched; marked by drought
☑	the state or condition of being physically squalid; a combination of misery and dirt	foul through neglect or want of cleanliness; repulsively mean and filthy
☑	the quality of being morally or mentally squalid	wretched, miserable, morally repulsive or degraded

Cohesiveness is explained because the meaning assigned to *squalor* in acquisition consistently involves the meaning of the word recognized as its base, *squalid*, as a crucial ingredient, however that meaning evolves. The explanatory power of this prediction may seem to be largely diminished by making successful base recognition contingent upon the satisfaction of the semantic compatibility criterion.<sup>17</sup> Potential circularity in the account of cohesiveness can be eliminated by exploring the observation that successful base candidates are typically etymologically related to the input word. That is, satisfaction of semantic compatibility itself can be predicted in terms of some notion of continuity as described in (33):

(33)    *If*            (i)     $P_1: A \rightarrow B$   
           *and*            (ii)    $P_2: A \rightarrow \{\dots, B, \dots\}$   
           *then*            $P_2: A \rightarrow B$             }    continuity

Assuming a speaker  $P_1$ , who interprets word A with reference to word B, and provides the input for a hearer/learner  $P_2$ , who selects word B as a base candidate, word B is likely to satisfy semantic compatibility with the context and hence succeed in being chosen as the base. This is because a speaker for whom (i) is true will typically use word A in a context with which word B is semantically compatible. Such an account leaves room for historical change of meaning as long as the change is gradual. In fact, seemingly drastic changes such as the change from ‘dry’ to ‘filthy’ in (32) usually involve series of minor meaning extensions (cf. a series of cause-for-effect metonymies as in ‘dry (skin)’ > ‘rough (appearance)’ > ‘unkempt’ > ‘neglected’ > ‘filthy’).

As a result of being recursive, the inference scheme in (33) predicts cohesiveness in the semantic relation among words for as long as both premises hold. Crucially, for etymologically related words there is at least one point in

<sup>17</sup> Reference to semantics is necessary to ensure the selection of *squalid*, rather than *squall* or *squaw*, as a base for interpreting *squalor*.

time when the first premise holds, that is, the moment of coinage. This is because newly coined words are virtually always based on some existing word.<sup>18</sup> The claim is then that for etymologically related words base recognition succeeds and cohesiveness persists for as long as the second premise holds. This implies that only phonological change can end cohesiveness, because only phonological change affects the selection of base candidates. The validity of this hypothesis is tested with a case study presented in the next section.

## 2.2 Phonological conditions on base selection: a case study

According to the OED, nouns ending in *-or* and etymologically related adjectives ending in *-id* or *-ent* have been borrowed separately into English. Significantly, we find that despite their similar historical origin the relevant pairs fall largely into two classes: in the pairs in (34a) phonological stem identity correlates with cohesiveness, indicated by “→”, whereas in the pairs in (34b) phonological non-identity correlates with non-cohesiveness indicated by “≠”. The transcriptions represent American English and are roughly phonemic (cf. Wells 2000). I assume here that word-final /ər/ is recognized as a noun marker and that final /-ənt/ and /-əd/ are recognized as adjective markers. Nothing hinges on this assumption.

(34) a.	/skwɑ:l-ər/ → /skwɑ:l-əd/ 'squalor' 'squalid'	b.	/ræŋk-ər/ ≠ /ræns-əd/ 'rancor' 'rancid'
	/kænd-ər/ → /kænd-əd/ 'candor' 'candid'		/rɪg-ər/ ≠ /rɪdʒ-əd/ 'rigor' 'rigid'
	/splend-ər/ → /splend-əd/ 'splendor' 'splendid'		/tɜ:rg-ər/ ≠ /tɜ:rdʒ-əd/ 'turgor' 'turgid'
	/ɑ:rd-ər/ → /ɑ:rd-ənt/ 'ardor' 'ardent'		/lɪk-ər/ ≠ /lɪkw-əd/ 'liquor' 'liquid'
	/fɜ:rv-ər/ → /fɜ:rv-ənt/ 'fervor' 'fervent'		/læŋg-ər/ ≠ /læŋgw-əd/ 'languor' 'languid'
	/tɔ:rp-ər/ → /tɔ:rp-əd/ 'torpor' 'torpid'		/vɛɪp-ər/ ≠ /væp-əd/ 'vapor' 'vapid'
	/pæl-ər/ → /pæl-əd/ 'pallor' 'pallid'		/fɪ:t-ər/ ≠ /fet-əd/ 'fetor' 'fetid'

Cohesiveness in (34a) is mainly reflected in parallel meaning extensions, in particular, metaphoric extensions from more concrete to more abstract meanings, mainly referring to personality traits or human emotions.

<sup>18</sup> There is of course nothing to prevent the occasional acceptance of a historically unrelated base candidate whose meaning is sufficiently similar to that of the input word, a phenomenon known as “folk-etymology”. Also there are cases where words have a fairly idiosyncratic meaning from the start (cf. 2.4).

(35)

	<i>candor</i>	<i>candid</i>
†	brilliant whiteness	white
†	purity, stainlessness of character, innocence	pure, stainless, innocent
☑	frankness, openness, ingenuousness, outspokenness	frank, open, ingenuous, straightforward

	<i>splendor</i>	<i>splendid</i>
†	great brightness; brilliant light or lustre	resplendent, brilliant, extremely bright, in respect of light or colour
☑	magnificence; great show of riches or costly things; pomp, parade	marked by much grandeur or display; sumptuous, grand, gorgeous

	<i>fervor</i>	<i>fervent</i>
†	of water: boiling, seething	boiling
(†)	glowing condition, intense heat	hot, burning, glowing
☑	warmth or glow of feeling, passion, vehemence, intense zeal	of persons: ardent, intensely earnest. From 17th c. almost exclusively with reference to love or hatred, zeal, devotion or aspiration

	<i>ardor</i>	<i>ardent</i>
(†)	fierce or burning heat; <i>concr.</i> fire, flame	burning, on fire, red-hot; fiery, hot, parching
☑	heat of passion or desire, vehemence, ardent desire; warmth of emotion, zeal, fervour, eagerness, enthusiasm	glowing with passion, animated by keen desire; intensely eager, zealous, fervent, fervid

	<i>torpor</i>	<i>torpid</i>
☑	absence or suspension of motive power, activity, or feeling	benumbed; deprived or devoid of the power of motion or feeling; in which activity, animation, or development is suspended; dormant
☑	intellectual or spiritual lethargy; apathy, listlessness; dullness; indifference	wanting in animation or vigour; inactive; slow, sluggish; dull; stupefied; apathetic

	<i>pallor</i> <sup>19</sup>	<i>pallid</i>
☑	paleness or pallidness, esp. of the face	faint or feeble in colour; <i>spec.</i> (of the face) wan, pale, esp. from illness, shock, etc.

The association between nouns and adjectives is also supported by the equivalence of adjectival and nominal constructions in (36):

(36)	squalid slums	the squalor of the slums
	candid interview	the candor of the interview
	splendid Renaissance gardens	the splendor of Renaissance gardens
	her ardent eyes	the ardor of her eyes
	fervent Spanish Catholicism	the fervor of Spanish Catholicism
	torpid bureaucracy	the torpor of bureaucracy
	pallid skin	the pallor of the skin

Evidence for non-cohesiveness of the pairs in (34b) is presented below. Since some of these pairs continue to exhibit fairly strong similarities in meaning and because the proof of non-cohesion is of crucial importance for testing the model I will present relevant entries from the OED one by one. For the pairs in (34b) it is no longer feasible to use a single column for marking the status of meanings as obsolete (†) or in synchronic use (☑). Therefore I mark that status individually for each meaning.

(37)

	<i>rancor</i>		<i>rancid</i>
†	foulness of smell	☑	of fat or oil, or foods containing these: having an unpleasant taste or smell as a result of decomposition; rank, stale, sour
☑	deep-rooted and bitter ill feeling; resentment or animosity, esp. of long standing	☑	as if sour with age or decomposition; disagreeable, odious, nasty

The literal use of *rancid* shows a narrowness (reference to fats and oils) which was never reflected in the noun. By now, only the metaphoric use of the noun is left, which however differs considerably from the metaphoric extensions observed in the adjective.

<sup>19</sup> The cohesiveness of the pair *pallor-pallid* is expressed more clearly in the respective definitions given in the Free Online Dictionary, both of which emphasize the notion of abnormality, suggestive of illness or death. Both the OED and the Free Online Dictionary list metaphoric use only for the adjective, not for the noun. Metaphoric use of *pallor* is however attested in internet data.

(38)

	<i>rigor</i>		<i>rigid</i>
†	of material objects: stiffness, hardness	☑	stiff, unyielding; not pliant or flexible; firm; hard
☑	strict accuracy, the strict terms, application, or enforcement of some law, rule, etc.	☑	harsh, severe, inflexible, strict admitting or allowing of no deviation from strict accuracy

Again, the original literal use has become obsolete in the noun, but persists in the adjective. The current metaphoric extensions differ considerably in that the resulting noun meaning has rather positive connotations, expressing a desirable quality when applied to scientific procedures etc. whereas the resulting adjective meaning is rather negative, expressing a lack of flexibility.

(39)

	<i>turgor</i>		<i>turgid</i>
☑	<i>Physiol.</i> and <i>Bot.</i> the normal swollen condition of the capillaries and smaller blood-vessels	☑	swollen, distended, puffed out
		☑	in reference to language: inflated, grandiloquent, pompous, bombastic
	<i>liquor</i>		<i>liquid</i>
☑	beverage, drink. Now almost exclusively <i>spec.</i> , a drink produced by fermentation or distillation	☑	of a material substance in that condition (familiar as the normal condition of water, oil, alcohol, etc.) in which its particles move freely over each other
		☑	not fixed or stable. Of movement: facile, unconstrained

Unlike the adjectives, the nouns are entirely restricted to literal use, the expression *turgor* being limited to scientific jargon. The meanings of the adjectives show metaphoric extension.

(40)

	<i>languor</i>		<i>languid</i>
☑	heaviness or tenderness of mood or feeling; emotional weariness or lowness of spirits, caused by sorrow, lovesickness, etc.	☑	of a person, a person's character, actions, emotions, etc.: not easily inspired to emotion, exhibiting only faint interest or concern; spiritless, indifferent, apathetic

<input checked="" type="checkbox"/>	a natural or affected lack of energy and alertness, often as an indication of a nonchalant or dispassionate nature; habitual lassitude and inertia in a person's movements and behaviour, drowsiness or inactivity, esp. when pleasurable; relaxation	<input checked="" type="checkbox"/>	of a person, animal, bodily function, etc.: weak, faint, or inert, esp. from illness or fatigue; lacking vitality or vigour, listless
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The first meanings listed for the noun and adjective, respectively, appear almost opposite, expressing abundance of versus lack of emotion, respectively. The other meanings also differ sharply, expressing a certain control and desirability of the state associated with the noun<sup>20</sup>, as opposed to the weakness and illness connoted by the adjective.

(41)

	<i>vapor</i>		<i>vapid</i>
<input checked="" type="checkbox"/>	matter in the form of a steamy or imperceptible exhalation; <i>esp.</i> the form into which liquids are naturally converted by the action of a sufficient degree of heat	†	of a damp or steamy character; dank; vaporous
		<input checked="" type="checkbox"/>	of liquors, beverages, etc.: devoid of briskness; flat, insipid
<input checked="" type="checkbox"/>	used to denote something unsubstantial or worthless	<input checked="" type="checkbox"/>	<i>fig.</i> devoid of animation, zest, or interest; dull, flat, lifeless, insipid

The concept 'steam' has disappeared from the adjective, but remains essential to the noun. The development of the adjectival meaning as an attribute of beverages is not reflected in the noun. Overlaps in the metaphoric meaning extensions, which are rather unusual for the noun but represent the most common use of the adjective, are presumably accidental.

(42)

	<i>fetor</i>		<i>fetid</i>
<input checked="" type="checkbox"/>	an offensive smell; a stench	<input checked="" type="checkbox"/>	having an offensive smell; stinking
		<input checked="" type="checkbox"/>	<i>fig.</i> "foetid heroes", "the fetid atmosphere of a court"

<sup>20</sup> cf. the definition of *languor* in the Free Online Dictionary "a pleasant state of dreamy relaxation" illustrated with the quote *It was hot, yet with a sweet languor about it.*

The similarity of the definitions of noun and adjective can result from the extremely low frequency of these words, which may explain the lack of any change in either of them (cf. Latin *fetere* 'to stink'; see also the discussion of the meaning similarities in (26)). Metaphoric use is attested only for the adjective.<sup>21</sup>

The dissociation of the nouns and adjectives indicated in the OED definitions above is supported by the non-correspondence of the relevant adjectival and nominal constructions. The nouns derived by *-ness*-suffixation have been added to show that nominalization is not hindered by inherent properties of the adjectives (cf. the discussion of the data in (11a) and (12a)).

(43)	rancid butter	the *rancor/✓rancidness of the butter
	rigid card board	the *rigor/✓rigidness of the card board
	turgid prose	the *turgor/✓turgidness of the prose
	languid movements	the *languor/✓languidness of the movements
	liquid paint	the *liquor/✓liquidness of the paint
	vapid beer / conversation	the *vapor/✓vapidness of the beer / conversation
	fetid atmosphere	the *fetor/✓fetidness of the atmosphere

The data considered so far suggest a rather strict condition on the selection of base candidates: to be admitted, certain parts of the phonological form of a candidate must not deviate from the corresponding parts of the input word. The parts in question could be defined either as the stem, assuming that the endings are recognized as suffixes, or, alternatively, they could be defined as the word except for the final consonant. Such a restriction would have the effect that the adjectives in (34b) are never even considered as base candidates of the nouns. Rather, both nouns and etymologically related adjectives are interpreted independently, with the result that the meanings are free to dissociate.

An explanation of the semantic non-cohesiveness as a consequence of the phonological opacity observed in the word pairs in (34b) raises the question of what caused that opacity in the first place. The fact that all pairs in (34b), but none of the pairs in (34a), became phonologically opaque can be traced back entirely to the respective segmental structures. All pairs involving stem-final velar plosives developed alternations because such plosives palatalized before the high front vowel in the adjectival suffix, but not before the (originally back round) vowel in the noun suffix. This rule, known as "Velar Softening", explains the opacity in the pairs *rancor-rancid*, *rigor-rigid*, and *turgor-turgid*. Synchronically, Velar Softening concerns the relation between spelling and sound, in particular, it expresses a rule for how to pronounce the graphemes <c> or <g> before the graphemes <i>, <e> or <y> (cf. Raffelsiefen 1993:73ff).<sup>22</sup>

<sup>21</sup> The metaphoric use of *fetid* is only illustrated in the OED, not defined.

<sup>22</sup> Words like /hærərki/ 'hierarchy', /mɔ:nərki:st/ 'monarchist' or /gɪlt/ 'guilt' show that the rule does not concern the phonemes /k/ or /g/. Words like /kritəsəz/ 'criticize' or /rænsəd/ 'rancid' show that it neither concerns the phonemes /i/ or /ɪ/. Rather the rule relates graphemes to phonemes. Like

- (44)
- |                                      |   |                     |
|--------------------------------------|---|---------------------|
| $\langle c \rangle \rightarrow /s/$  | } | $\langle i \rangle$ |
| $\langle g \rangle \rightarrow /dʒ/$ |   | $\langle e \rangle$ |
|                                      |   | $\langle y \rangle$ |

The alternations in the pairs *liquor-liquid* and *languor-languid* arose because the labial glide deleted between a velar plosive and a following round vowel, but remained elsewhere. None of these sound changes affected the pairs in (34a), which mostly involve stem-final clusters ending in an alveolar or a labial obstruent. Vowel opacity in *vapor-vapid*, but not in *squalor-squalid*, can be traced back to historical contrasts in the length of the stem vowels in these words. In general, vowel alternations are possible whenever a single stem-final consonant is preceded by a vowel other than /ɑ:/, /ɔ:/ or /u:/. This is because front vowels are always short in adjectives ending in *-id* (cf. *fetid*, *rapid*, *vivid*, *rabid*, *placid*, *frigid*, *timid*, *tepid*, *intrepid*, *insipid*, *arid*, *livid*, etc.). Vowels never alternate before clusters; hence the phonological transparency in for instance *splendor-splendid*, as opposed to vowel alternations in *fetor-fetid*.

The observations that phonological opacity is strictly phonologically conditioned and that non-cohesiveness correlates with opacity strongly support the model in (30). They raise the question, however, of why the pairs in (45) are non-cohesive, despite their phonological transparency:

- (45) a.    /hɔ:r-ər/ ≠ /hɔ:r-əd/  
           'horror'    'horrid'
- (45) b.    /stu:p-ər/ ≠ /stu:p-əd/  
           'stupor'    'stupid'  
           /hju:m-ər/ ≠ /hju:m-əd/  
           'humor'    'humid'  
           /væl-ər/ ≠ /væl-əd/  
           'valor'    'valid'

The words *horror* and *horrid* have somewhat related meanings but the noun fails to reflect the lessening intensity of emotion connoted by *horrid*, which no longer implies fear or dread (*horrid weather*, *his horrid tie*). This pair differs from all other pairs investigated in this section in that there exists a very prominent alternative base candidate: the adjective *horrible* was borrowed into English already in the early 12th century with the meaning 'dreadful', 'hideous', 'shocking', 'frightful'. Certain meanings historically associated with the noun *horror*<sup>23</sup>, which was borrowed almost 200 years later, are barely attested in English: rather its meaning ('a painful emotion compounded of loathing and fear' OED) appears to have become based on the meaning of *horrible* almost from the start. The adjective *horrid*, first attested in the late 16th century, apparently

many lexical rules, it has exceptions (e.g. /deməgɑ:gi/ 'demagogy', to satisfy paradigm uniformity with /deməgɑ:g/ 'demagogue').

<sup>23</sup> The meanings in question are 'roughness' and 'ruggedness', which are also associated with the adjective *horrid* in the donor languages.

failed to have any impact on the by then firmly established base relation *horror-horrible*. Synchronically, the neglect of *horrid* as a base candidate is plausibly explained in terms of frequency alone: by the time *horrid* is acquired, the acquisition of the much more frequent words *horror* and its 'continual' base *horrible* has already progressed to a state, where additional base candidates no longer play a role. These observations are accommodated by considering frequency in addition to 'continuity' when assessing base candidates. Specifically, there appears to be a 'saturation effect', meaning that once base recognition has succeeded, newly acquired base candidates are no longer evaluated.

The notion of 'saturation' may also be relevant for explaining the pairs in (45b). Consider first the evidence presented in (46) which shows that the respective words used to be semantically compatible. Yet, in (46a) the noun has failed to reflect the subsequent changes in the adjective; in (46b) the noun subsequently changed while the meaning of the adjective has remained more or less constant; in (46c) both the noun and the adjective later changed, although in different directions (all definitions are cited from the OED, the markers '☒' and '†' refer to the synchronic status):

(46) a.

	<i>stupor</i>		<i>stupid</i>
☒	a state of mental stupefaction; apathy or torpor of mind	†	having one's faculties deadened or dulled; in a state of stupor, stunned
☒	a state of insensibility or lethargy	†	apathetic, indifferent

(46) b.

	<i>humor</i>		<i>humid</i>
†	moisture; damp exhalation; vapor	☒	slightly wet as with steam, suspended vapor, or mist; moist, damp

(46) c.

	<i>valor</i>		<i>valid</i>
†	worth or importance due to personal qualities or to rank; power, import, significance	†	of persons: sound or robust in body; possessed of health and strength of things: strong, powerful

What distinguishes the pairs in (46) from the data considered earlier is the borrowing of rival nouns, *stupidity*, *humidity* and *validity*, before the 16th century.<sup>24</sup>

<sup>24</sup> Cf. French *stupidité*, *humidité*, *validité*. In some cases, the respective *-ity*-derivations are systematically absent because of haplology (*\*candidity*, *\*splendidity*, *\*ardidity*). In other cases, they simply were never borrowed or became restricted to just one of several meanings associated with the adjective (*liquidity* as a banking term (cf. *liquid assets*)). Native coinages in *-ity*, mostly from the

It can be shown, that as soon as both these nouns and the related adjectives were part of English, they entered into cohesive relations, leaving the respective nouns in *-or* isolated (cf. the current meanings of *humor* ('the faculty of perceiving or expressing what is ludicrous or amusing') and *valor* ('courage or bravery, esp. as shown in warfare or conflict')). Cohesiveness in the relation between nouns ending in *-ity* and the corresponding adjectives is demonstrated in (47):

(47)

	<b><i>stupidity</i></b>		<b><i>stupid</i></b>
†	the condition of being deprived of the use of the faculties; a state of stupor	†	having one's faculties deadened or dulled; in a state of stupor, stunned
†	incapacity for emotion; lack of feeling or interest, apathy, indifference	†	apathetic, indifferent
☑	dullness or slowness of apprehension; gross want of intelligence	☑	wanting in or slow of mental perception; lacking ordinary activity of mind; slowwitted, dull
	<b><i>humidity</i></b>		<b><i>humid</i></b>
☑	the quality or condition of being humid; moistness, dampness	☑	slightly wet as with steam, suspended vapour, or mist; moist, damp
	<b><i>validity</i></b>		<b><i>valid</i></b>
†	the quality or state of being physically strong or sound; robustness, strength	†	of persons: sound or robust in body; possessed of health and strength of things: strong, powerful
☑	the quality of being valid in law; legal authority, force, or strength	☑	good or adequate in law; possessing legal authority or force
☑	the quality of being well-founded on fact, or established on sound principles, and thoroughly applicable to the case or circumstances; soundness and strength (of argument, proof, authority, etc.)	☑	of arguments, proofs, assertions, etc.: well founded and fully applicable to the particular matter or circumstances; sound and to the point; against which no objection can fairly be brought

18th or 19th century, apparently failed to gain ground, as they are rarely attested (cf. *?squalidity*, *?fervidity*, *?torpidity*, *?turgidity*, *?vapidity*, *?fetidity*).

In accordance with the definitions in (47) the correspondences are as follows:<sup>25</sup>

(48) stupid argument	the *stupor/✓stupidity of the argument
humid air	the *humor/✓humidity of the air
valid argument	the *valor/✓validity of the argument

Non-cohesiveness for the pairs in (45b) (e.g. [stupor]<sub>N/NP</sub> ⇏ [stupid]<sub>A</sub>) could accordingly be accounted for by omitting from consideration those base candidates which have already been chosen as a base for some other word with the same category (e.g. [stupidity]<sub>N/NP</sub> → [stupid]<sub>A</sub>). Assuming that meaning is a function of base recognition this restriction has the effect of avoiding synonymy. The data hence support the view that meaning in derivational morphology is determined strictly by paradigmatic relations, not by composing affix meanings with stem meanings. The only question that remains is why nouns ending in *-ity* were more successful in associating with the respective base adjectives than nouns ending in *-or*. There is additional evidence to be discussed in the next section which suggests that learners are more eager to relate longer than shorter words to a base, in particular, when the short words consist of a maximally unmarked single trochaic foot and exhibit no phonological signs of morphological complexity.

### 2.3 The broader picture

The evidence from cohesiveness in *-or*-suffixations strongly supports the two-step approach to base recognition: first, candidates are chosen based on phonological sameness; in a second step those candidates are evaluated with respect to semantic compatibility. The explanation hinges on a rather strict phonological screening process: alternations in a single consonant (*ri[g]or* - *ri[dʒ]id*), a single vowel (*v[ei]per* - *v[æ]pid*), or the presence or absence of a single glide (*lang[Ø]or* - *lang[w]id*) suffice to discard a candidate, thereby ruling out the formation of a base relation. The question arises then of how cohesiveness can be explained for the pairs considered earlier, some of which involve considerable phonological opacity.

The conclusion that the criterion of phonological sameness is crucial to explaining the data in (34) suggests that special conditions obtain whenever alternations are found in cohesive relations. In fact, the input words in (49) differ from

<sup>25</sup> Base recognition also affects further word formation. The data in (i) a., all of which are listed in the rather concise Oxford American Dictionary, indicate a fairly productive rule for deriving adjectives from abstract nouns by *-ous*-suffixation (*turgorous* is not listed, but neither is *turgor*).

- (i) a. rancorous, rigorous, languorous, vaporous, stuporous, humorous, valorous  
 b. ?squalorous, ?candorous, ?ardorous, ?fervorous, ?torporous, ?pallorous

The fact that none of the adjectives in (i) b. are listed can be explained in terms of blocking: no adjectives are derived from nouns which are themselves based on an adjective. The only exception is *splendorous* and its variant *splendrous*; ?*horrorous* is ruled out independently because of haplogy.

those in (34) in that they involve more than two syllables. Assuming that sameness in the sequence of consonants (cf. (49a)) or sameness of the initial string, including both the first nucleus and all postnuclear consonants (cf. (49b)), suffices for admitting base candidates for polysyllabic input words, cohesiveness in (49) compared to non-cohesiveness in (34b) would be explained.<sup>26</sup> The sameness of structure crucial to base selection is marked in boldface in (49).

- (49) a. /vəlɪdəti/ 'validity' → /væɪɪd/ 'valid'  
 /klɛərəti/ 'clarity' → /klɪr/ 'clear'  
 /səprɛməsi/ 'supremacy' → /səprɪm/ 'supreme'  
 /kəmpærəsən/ 'comparison' → /kəmpɛr/ 'compare'  
 /səbrɪəti/ 'sobriety' → /səubər/ 'sober'  
 /prəprɪəti/ 'propriety' → /prɑ:pər/ 'proper'
- b. /kəntrɪʃən/ 'contrition' → /kəntrɪt/ 'contrite'  
 /ɑ:dʒəsəti/ 'audacity' → /ɑ:dʒɪfəs/ 'audacious'  
 /prɪkəsəti/ 'precocity' → /prɪkəʊfəs/ 'precocious'  
 /ɔ:θentɪsəti/ 'authenticity' → /ɔ:θɛntɪk/ 'authentic'

Non-cohesiveness of the pair /æŋzɪəti/ 'anxiety' ⇏ /æŋkʃəs/ 'anxious' is accordingly a consequence of the lacking correspondence in the relevant phonological structure.

Apart from length, there are other properties which appear to trigger a special base search, such that also partially opaque candidates are admitted. The input words in (50a) differ from those in (50b) or (34b) in that they involve rare consonant clusters, underlined in (50), which do not occur in English simplexes.<sup>27</sup> By contrast, word-final clusters consisting of liquids and obstruents or fricative + /t/ are common in simplexes (e.g. *earth*, *gulf*, *soft*, *swift*) and therefore fail to trigger a special base search. As a result, the etymologically related words in (50b), but not those in (50a), were free to dissociate.<sup>28</sup> The sameness of (consonantal) structure crucial to base selection is again boldfaced.

<sup>26</sup> Base recognition can lead to more phonological sameness in base relations. Specifically, alternations are sporadically eliminated to satisfy a preference for uniform stems in derivational relation (cf. *ob[ɛ]sɪty* → *ob[i]sɪty*, based on *ob[i]se*, General American *comp[æ]rɪsɪən* → *comp[ɛ]rɪsɪən*, based on *comp[ɛ]rɪe*). Base recognition is a crucial prerequisite for paradigm uniformity, which accordingly will not affect pairs such as *v[ɛ]pɔr* - *v[æ]pɪd*.

<sup>27</sup> The clusters include non-homorganic nasal+obstruent sequences (e.g. /ŋθ/), voiced obstruents (e.g. /zd/), and sequences consisting of plosive+fricative other than /s/ (e.g. /dθ/).

<sup>28</sup> In some cases, vowel opacity is due to umlaut caused by the former suffix vowel (e.g. *length* - *long*). In most cases, opacity results from the fact that two consonants follow the vowel in one word and one consonant in the other (e.g. *wisdom* - *wise*, *depth* - *deep*).

- (50) a. /leŋθ/ 'length' → /lɔ:ŋ/ 'long'  
 /streŋθ/ 'strength' → /strɔ:ŋ/ 'strong'  
 /bredθ/ 'breadth' → /brɔ:d/ 'broad'  
 /wɪdθ/ 'width' → /waɪd/ 'wide'  
 /depθ/ 'depth' → /di:p/ 'deep'  
 /wɪzdəm/ 'wisdom' → /waɪz/ 'wise'
- b. /helθ/ 'health' ≠ /hi:l/ 'heal'<sup>29</sup>  
 /stelθ/ 'stealth' ≠ /sti:l/ 'steal'  
 /bɜ:rθ/ 'birth' ≠ /ber/ 'bear'  
 /drɪft/ 'drift' ≠ /draɪv/ 'drive'  
 /θrɪft/ 'thrift' ≠ /θraɪv/ 'thrive'  
 /wɪzəd/ 'wizard' ≠ /waɪz/ 'wise'

The input words in (51a) differ from those in (51b) or (34b) in that they have final stress, a marked property for nouns. As a result, sameness of the initial string and sameness of stress suffices for admitting base candidates. The consequence is semantic dissociation of the historically related words in (51b), but not of those in (51a). The sameness of structure crucial to base selection is again boldfaced.

- (51) a. /sæksés/ 'success'  
 → /sæksɪd/ 'succeed'  
 /æplɔ:z/ 'applause'  
 → /æplɔ:d/ 'applaud'  
 /dɪsɪ:t/ 'deceit'  
 → /dɪsɪ:v/ 'deceive'  
 /əféns/ 'offence'  
 → /əfénd/ 'offend'
- b. /æksès/ 'access'  
 ≠ /æksɪd/ 'accede'  
 /rɪsès/ 'recess'  
 ≠ /rɪsɪd/ 'recede'  
 /prɔ:sès/ 'process'  
 ≠ /præsɪd/ 'proceed'  
 /prɪtəns/ 'pretense'  
 ≠ /prɪténd/ 'pretend'

The pair in (52a) differs from noncohesive relations involving monosyllabic words, including those in (52b), in that all consonants as well as the nuclei are the same. The postnuclear glides also have the same height: they differ only with respect to backness or roundness. The pair *proud* - *pride* differs from the non-cohesive pair *drought* - *dry* in that it includes identical postnuclear consonants, which serve as an additional perceptual 'anchor' for base recognition:

- (52) a. /praɪd/ 'pride'  
 → /praʊd/ 'proud'
- b. /roud/ 'road'<sup>30</sup> ≠ /raɪd/ 'ride'  
 /plart/ 'plight' ≠ /pleɪ/ 'play'  
 /fɪlθ/ 'filth' ≠ /faʊl/ 'foul'  
 /sla:θ/ 'sloth'<sup>31</sup> ≠ /sləʊ/ 'slow'  
 /draʊt/ 'drought' ≠ /draɪ/ 'dry'

The fact that the relations in (53) are cohesive despite exhibiting the sort of phonological opacity up to now associated with failed base recognition indicates

<sup>29</sup> The OED posits the adjectives *hale* and *whole* as bases for *health*. The former meaning 'healing, cure' indicates that the etymologically related verb *heal* has also been recognized as a base, a claim confirmed by the current spelling and also the Old English spelling variant <heelthe>, which reflects the verbal spelling variant <heel(e)>. (Neither *hale* nor *whole* are ever spelled <heel(e)>). Non-cohesiveness of the relation *health* - *heal* is indicated by the fact that the verb, but not the noun, implies a change of state (from ill to well).

<sup>30</sup> The original meaning of *road* is 'act of riding (a horse)', reflecting the former restriction of the verb *ride* to horseback riding.

<sup>31</sup> All mid round vowels shortened before final /θ/ (e.g. *cloth*, *moth*, *broth*), causing the vowel alternation in *sloth* - *slow*.

a fundamental difference between derivational and inflectional relations. Cohesiveness in the latter is due to the fact that inflected forms are necessarily interpreted with reference to a base:<sup>32</sup>

- (53) [/*meɪd*/]PAST 'made' → [/*merk*/]INF 'make'  
 [/*left*/]PAST 'left' → [/*li:v*/]INF 'leave'  
 [/*lɔ:st*/]PAST 'lost' → [/*lu:z*/]INF 'loose'  
 [/*θɑ:t*/]PAST 'thought' → [/*θɪŋk*/]INF 'think'

The limited relevance of phonological conditions on base recognition in inflectional relations could explain some cases of unexpected cohesiveness in derivational relations: assuming that base relations are transitive, inflected forms could serve as a 'bridge', allowing base relations to be recognized despite a lack of phonological transparency. In (54), the respective first relations satisfy the rather strict phonological conditions on base recognition in derivational relations whereas the second relations have few phonological constraints as a result of being inflectional. Because of transitivity they account for base recognition in the pairs [loss]<sub>N/NP</sub> → [lose]<sub>v</sub> and [thought]<sub>N/NP</sub> → [think]<sub>v</sub>.<sup>33</sup>

- (54) [/*lɔ:s*/]N/NP 'loss' → [/*lɔ:st*/]PAST 'lost' → [/*lu:z*/]INF 'lose'  
 [/*θɑ:t*/]N/NP 'thought' → [/*θɑ:t*/]PAST 'thought' → [/*θɪŋk*/]INF 'think'

The generalizations proposed here are somewhat speculative, requiring more extensive research on possible correlations between phonological form and cohesiveness. The main preliminary conclusion is that base recognition and concomitant cohesiveness among (etymologically) related words is subject to conditions concerning the sameness of certain aspects of phonological form. This conclusion is very much at odds with the main tenet of Generative Phonology, which is based on linking lexical relatedness to recurrent rules (cf. Chomsky & Halle (1968), Kiparsky (1982), Mohanan (1986)). In particular, lexical relatedness between two words is expressed by positing a single lexical entry with a unique meaning, from which both words are derived by applying morphological and phonological rules. To circumvent the problem of overgeneration, which haunts all models of this sort because of unproductive word formation rules, Giegerich (1999) proposes to lexically mark all roots for the affixes with which

<sup>32</sup> In English, all etymologically related past tense forms and infinitives have identical initial consonants. An alternation in this position in the one relevant case correlates with non-cohesion (cf. /*rɑ:t*/ 'wrought' - /*wɜ:rk*/ 'work'). This may indicate that sameness of initial consonants is a prerequisite for base selection in such cases. Additional evidence for limited phonological conditions on base candidates in inflectional morphology is discussed in Raffelsiefen (1998: 258–261).

<sup>33</sup> Transitivity also explains the original meaning of *road*, O.E. *rād*, 'act of riding', with *rād*, the past tense of the verb *rīdan*, forming the bridge to the verb. Subsequent non-cohesion may result from sound changes affecting the relevant words differently: spelling records indicate that *road* and *rode* were typically not homophonous, implying that the bridge was in fact not (consistently) available. Strong evidence for transitivity in German base relations is presented in Raffelsiefen (1998: 263–266).

they can combine.<sup>34</sup> Relations such as *warmth* → *warm*, *decency* → *decent* or *adequacy* → *adequate* are accordingly expressed in terms of lexical entries as in (55) (the first entry specifies /wɔ:rm/ as a root, which can both combine with the suffix *-th* and be converted into an adjective):

(55) /wɔ:rm/<sup>-θ, ->A</sup>, /di:s/<sup>-ənt, -ənsi</sup>, /ædəkʷ/<sup>-ət, -əsi</sup>

Alternations are represented by specifying rules in the lexicon, which affect roots in some contexts (usually the derived word), but not others. Relations such as *depth* → *deep*, *serenity* → *serene*, *supremacy* → *supreme*, *divinity* → *divine*, *sanity* → *sane*, *volcanic* → *volcano*, etc. are accordingly described by complementing lexical entries as in (56a) with the phonological rules in (56b).<sup>35</sup>

(56) a. /di:p/<sup>-θ, ->A</sup>, /səri:n/<sup>-əti, ->A</sup>, /səpri:m/<sup>-əsi, ->A</sup>, /dəvəɪn/<sup>-əsi, ->A</sup>, /sern/<sup>-əti, ->A</sup>,  
/vɔ:lkeɪn/<sup>-əv, -k</sup>

b.	/i:/ → /e/	}	-CC	(e.g. d/e/pth, w/ɪ/dth, f/ɪ/fth)
	/aɪ/ → /ɪ/		-CVCV	(e.g. ser/e/nity, div/ɪ/nity, s/æ/nity)
	/eɪ/ → /æ/		-C-ic, -C-id <sup>36</sup>	(e.g. volc/æ/nic, Sem/ɪ/tic)

Rules as in (56b) would be posited on the basis of recurrence. Mohanan clarifies the matter as follows:

“Supposing we had a p/b alternation in exactly one word (e.g. *gip* (PRES), *gib* (PAST)), would we be willing to write a rule for this alternation? The answer would be no. On the other hand, if we found the same alternation in five hundred forms, we would be more than willing to build the rule into the grammar even if it turned out that it does not apply to novel forms. Surely, it couldn't be statistical frequency that lies behind this decision. What lies behind the phonologist's choice is the intuition that an alternation that is exhibited in a single form is most unlikely to be learned as a rule by a speaker, while one that is exhibited in five hundred forms is quite likely to be learned as a rule. In other words it is not the occurrence of the alternations in a corpus, but the intuitions about what might have been internalized by the language user, that conditions the phonologist's choice. These intuitions are based on a general principle of language acquisition, namely, that in order to internalize a pattern, the learner must be exposed to a reasonably large number of instantiations of the pattern.” Mohanan (1986: 58)

The proposal to link lexical relatedness to rule recurrence is not consistent with the facts: there are numerous cohesive relations which exhibit extremely rare or non-recurrent alternations (e.g. *comparison* - *compare*, *pride* - *proud*, *length* - *long*, *clarity* - *clear*, *loss* - *lose*, *applause* - *applaud*). Because the only way to

<sup>34</sup> In fact, Giegerich proposes to limit this approach to so-called stratum-1 affixes, which include all vowel-initial suffixes of Latinate origin (e.g. *-ity*, *-ent*, *-acy*) and a few Germanic suffixes consisting of single consonants (e.g. *-th*, *-r*). It is unclear how unproductive consonant-initial suffixes such as *-dom*, *-some*, *-hood*, etc. are prevented from overgenerating.

<sup>35</sup> I will not delve into the question here of how exactly to specify both the stems and the rules to ensure correct outputs (the answers given are usually inspired by historical sound change). The entries or rules in (55), (56) would have to be modified to prevent Trisyllabic Laxing from applying to words like *decency* or *privacy*.

<sup>36</sup> The suffix *-id* is typically included here to account for the above-mentioned constraint on vowel length in the relevant adjectives (cf. *fetid*, *rapid*, *vivid*).



The only sensible explanation of dissociation in (58c) and comparable pairs in English would be to not assume Velar Softening as a synchronic rule in English. This solution, however, is hardly an option in Generative Grammar since it would destroy the basis for expressing relations among scores of other words.<sup>38</sup> In sum, the Generative idea of expressing relatedness between two words by deriving both from a single root is deeply flawed because it is based on an erroneous view of the significance of recurrence of alternations (as well as the recurrence of affixes). What truly matters is recognizability of relations between words based on sameness of (certain aspects of) phonological form.

So far, reference to affixes has been omitted completely, to account for the irrelevance of affix recurrence for base recognition and cohesiveness. Two modifications are called for here. First, it is necessary to account for the effect of productivity. Recall that nouns derived by *-ness*-suffixation in English are always assigned a deadjectival rather than a deverbal meaning when both bases are available (e.g. *corruptness* is interpreted as ‘condition of being corrupt’, rather than ‘act of corrupting’). This preference can be expressed in the model by submitting base candidates to an additional screening, activated by the presence of highly productive affixes. Linking such screening to high productivity is supported by the availability of both meanings for the noun *corruption*, which despite of the high frequency of the ending *-ion* in English and its overwhelming association with verbal bases differs from *-ness* in being unproductive. Even for affixes with high productivity the screening in question results only in a preference among candidates, not in the exclusion of candidates: the noun *forgiveness* shows that the presence of *-ness* does not hinder a deverbal interpretation if there is no suitable adjectival rival.

The second modification concerns the observation that in certain cases the direction of base relations can be affected by morphology. Consider first the general motivation for assuming asymmetry in base relations. As has been illustrated with numerous examples above, deadjectival meanings are assigned to nouns for which an adjective is recognized as a base (i.e. “state/property/quality/condition of being Y” (cf. (20a)). If, on the other hand, a noun is recognized as the base of an adjective, this will result in a denominal interpretation of the adjective. The relevant meaning could be roughly paraphrased as “characterized by Y”, where Y’ represents the meaning of the noun. Any elaborations on this paraphrase in the OED definitions in (59) reflect meaning differences in the respective base nouns.<sup>39</sup>

<sup>38</sup> The pairs include *cyni/k/al - cyni/s/ism*, *empiri/k/al - empiri/s/ism*, *fanati/k/al - fanati/s/ism*, *scepti/k/al - scepti/s/ism*, *critic/al - criti/s/ize*, *publi/k/ - publi/s/ize*, *politi/k/al - politi/s/ize*, *romanti/k/ - romanti/s/ist*, *analog/ous - analo/dʒ/y*, *apolo/glue - apolo/dʒ/y*, *pedago/glue - pedago/dʒ/y*. The alternations themselves concern regular relations between graphemes and phonemes as described in (44). As long as there is sufficient sameness in the relations, they do not impede recognition.

<sup>39</sup> e.g. *hunger* and *thirst* qualify as sensations, *health* is desirable, hence the choice of the expression *conducive to*.

(59)	greedy] <sub>A</sub> → greed] <sub>N/NP</sub>	full of greed
	hungry] <sub>A</sub> → hunger] <sub>N/NP</sub>	having the sensation of hunger
	thirsty] <sub>A</sub> → thirst] <sub>N/NP</sub>	having the sensation of thirst
	wealthy] <sub>A</sub> → wealth] <sub>N/NP</sub>	having wealth
	angry] <sub>A</sub> → anger] <sub>N/NP</sub>	moved by anger
	healthy] <sub>A</sub> → health] <sub>N/NP</sub>	conducive to health, characteristic of health
	filthy] <sub>A</sub> → filth] <sub>N/NP</sub>	full of filth
	risky] <sub>A</sub> → risk] <sub>N/NP</sub>	fraught with risk

Given a noun and a related adjective, the question of which functions as the base is usually determined by complexity or frequency, with no need to refer to morphological structure. That is, longer words are typically interpreted in terms of shorter words (*jealousy* → *jealous*, *envious* → *envy*) and, given equal length, less frequent words are interpreted in terms of more frequent words (*pride* → *proud*, *loss* → *lose*). Base relations in words of equal length which include recognizable suffixes, however, appear to be morphologically determined. Hence we find that the OED definitions of nouns ending in /ən/ listed in (60a) do not include expressions such as ‘condition’, ‘quality’, ‘state’ and never refer to the corresponding adjectives ending in /əs/. Instead, the definitions of such adjectives always refer to the respective nouns, usually phrased as “characterized by”. By contrast, the OED definitions of nouns ending in /əns/ illustrated in (60b) consistently include expressions such as ‘condition’, ‘quality’, ‘state’ if there is a corresponding adjective ending in /ənt/.

- (60) a. suspicious]<sub>A</sub> → suspicion]<sub>N/NP</sub>  
infectious]<sub>A</sub> → infection]<sub>N/NP</sub>  
contentious]<sub>A</sub> → contention]<sub>N/NP</sub>  
religious]<sub>A</sub> → religion]<sub>N/NP</sub>  
ostentatious]<sub>A</sub> → ostentation]<sub>N/NP</sub>  
superstitious]<sub>A</sub> → superstition]<sub>N/NP</sub>  
repetitious]<sub>A</sub> → repetition]<sub>N/NP</sub>  
flirtatious]<sub>A</sub> → flirtation]<sub>N/NP</sub>  
cautious]<sub>A</sub> → caution]<sub>N/NP</sub>  
nutritious]<sub>A</sub> → nutrition]<sub>N/NP</sub>  
ambitious]<sub>A</sub> → ambition]<sub>N/NP</sub>  
contagious]<sub>A</sub> → contagion]<sub>N/NP</sub>
- (60) b. redundance]<sub>N/NP</sub> → redundant]<sub>A</sub>  
extravagance]<sub>N/NP</sub> → extravagant]<sub>A</sub>  
elegance]<sub>N/NP</sub> → elegant]<sub>A</sub>  
nonchalance]<sub>N/NP</sub> → nonchalant]<sub>A</sub>  
dominance]<sub>N/NP</sub> → dominant]<sub>A</sub>  
exuberance]<sub>N/NP</sub> → exuberant]<sub>A</sub>  
ignorance]<sub>N/NP</sub> → ignorant]<sub>A</sub>  
competence]<sub>N/NP</sub> → competent]<sub>A</sub>

prevalence]<sub>N/NP</sub> → prevalent]<sub>A</sub>  
 relevance]<sub>N/NP</sub> → relevant]<sub>A</sub>  
 excellence]<sub>N/NP</sub> → excellent]<sub>A</sub>  
 confidence]<sub>N/NP</sub> → confident]<sub>A</sub>

The generalization expressed by the direction of the base relations in (60) could be expressed by referring to morphological structure as in (61).

- (61) If: X[əɪ]<sub>SUFF</sub>]<sub>N/NP</sub> & X[əs]<sub>SUFF</sub>]<sub>A</sub>  
 Then: X[əs]<sub>SUFF</sub>]<sub>A</sub> → X[əɪ]<sub>SUFF</sub>]<sub>N/NP</sub>
- If: X[əns]<sub>SUFF</sub>]<sub>N/NP</sub> & X[ənt]<sub>SUFF</sub>]<sub>A</sub>  
 Then: X[əns]<sub>SUFF</sub>]<sub>N/NP</sub> → X[ənt]<sub>SUFF</sub>]<sub>A</sub>

A possible reason behind these generalizations concerns the fact that the endings /əs/ and /əns/ are fairly reliable word class markers (/əs/ for adjectives and /əns/ for nouns) while the endings /əɪ/ and /ənt/ are by comparison uninformative. If these endings were not segmented at all for this reason the generalization would be that given two relatable words of equal length but unequal morphological complexity, the morphologically complex word is interpreted in terms of the simplex.

The tentative conclusion is then that it is not so much individual affixes, which are referred to in the default mechanism for base recognition described here, but rather their presence versus absence, that is, morphological complexity versus simplicity. The only exception concerns productive affixes, which may influence the selection of base candidates based on their inherent selectional properties. The irrelevance of other affixes and their selectional properties, in contrast to the relevance of phonological transparency, is confirmed by the data in (60b). Recall that the interpretation of nouns as actions versus qualities depends on the word class of the recognized base: *severance* denotes a process because the base *sever* is a verb whereas *prudence* denotes a quality because the base *prudent* is an adjective. Nouns such as *persistence*, *insistence*, *indulgence*, etc., which have both a verbal and an adjectival base, are associated with both interpretations ('act of persisting', 'quality of being persistent', etc.). Significantly, the availability of both meanings depends on the availability of both words as base candidates: for the nouns *ignorance*, *competence*, *prévalence*, *rélevance*, *éxcéllence* and *confidance* the historical iambic bases *ignóre*, *compéte*, *preváil*, *relieve*, *excél*, and *confide* are no longer accessible due to non-matching stress patterns. Again, stress opacity itself is conditioned by segmental structure: word pairs in which the last vowel in the stem is followed by a cluster or preceded by /h/ have matching stress (*indúlgence* - *indúlge*, *abhórrent* - *abhór*).<sup>40</sup> Other word pairs have non-matching stress and are consequently non-cohesive (*cómpetent* - *compéte*, *éxcéllent* - *excél*).

<sup>40</sup> This is because of a restriction on /h/ to foot-initial position in English and because clusters entail closed syllables, which attract stress.

## 2.4 Sources of idiosyncratic meaning

In the preceding sections I have presented evidence for linking non-cohesiveness in etymological base relations to failed base recognition, where failure is a consequence of insufficient congruence in surface phonological structures. A fleeting glimpse of dictionary entries will show that there must be additional causes of non-cohesion. In particular, the interpretation of nouns as “instance of Y’ing”, where Y’ is the meaning of a base verb or “instance of being Y’”, where Y’ is the meaning of a base adjective, appear to be prone to develop idiosyncratic nuances as is illustrated in (62):

(62)

recital	that which is recited	> a performance of music or poetry, usually by one performer
falsehood	that which is false	> a false statement, which has been circulated (?widely)
hardship	that which is hard	> that which is hard to endure, extreme privation
remainder	that which remains	> copies of books remaining with a publisher after sales have fallen off
moisture	that which is moist	> water or other liquid diffused through a substance
government	that which governs	> the group governing a country
development	that which is developed	> a group of dwellings built by the same contractor

A likely source of such developments lies in the fact that speakers are in principle free to choose any expression at their disposal in order to refer, restricted only by their assessment of the likelihood that the hearer will succeed in identifying the intended referent in a given context of utterance. For instance, the comedian Stephen Colbert consistently uses the expression *sweetness* to refer to his gun. Members of his audience, watching him whisper to and caress his gun as he uses this expression, will have no problem picking out the gun as the intended referent.<sup>41</sup> Given the significance of the context for interpretation, such idiosyncratic meanings are typically temporary. In fact, the OED contains countless entries showing idiosyncratic uses which have vanished without a trace. A few examples are given in (63):

<sup>41</sup> The question of whether this meaning ends up being listed in dictionaries appears to depend on extralinguistic factors (e.g. the fame of the speaker).

(63)

justice	† a place or instrument of execution; a gallows.
freedom	† a piece of common land allotted by certain communities to freemen
subtlety	† a highly ornamental device, wholly or chiefly made of sugar, sometimes eaten, sometimes used as a table decoration
likeness	† a sculptured image; a statue
foulness	† a purulent affection (of the skin)
height	† the heavens
length	† a penis

Synchronically, there are also cases where concrete and thus more readily available meanings appear to block the computation of more abstract meanings based on the recognition of paradigmatic relatedness. Examples are given in (64):

(64)

casualty	one who is injured or killed in an accident (as in <i>There were two casualties in the train accident.</i> )
livelihood	a means of support (as in <i>To the trifolau, white truffles are a livelihood not a luxury.</i> )

Cases where regular meanings should be inferable, yet are not attested in dictionaries, often involve a lack of continuity. For instance, unlike *likelihood*, *livelihood* is not an historical *-hood*-derivation based on an adjective. Rather the formation involves reanalysis of the Old English compound *līflād* ‘life course’, which became obscure due to the fact that the word corresponding to its second member became obsolete. If there is no continuity, the condition for semantic compatibility are rarely satisfied, resulting in failed base recognition and idiosyncratic meanings. Still, the assumption that the evaluation for semantic compatibility is based on an extralinguistic context entails that regular meanings should be available in principle for any word with a recognizable base candidate. This is because all it takes is an extremely sparse context, such as *casualty* used as a book title, to ensure that base candidates will not be discarded for lack of semantic compatibility. Indeed, although shunned by dictionaries, the relevant “ignorant” meanings indicative of successful base recognition are amply attested in internet data (cf. “*Their livelihood and cheerfulness give us energy and motivation*”, which indicates *livelihood* in the sense of ‘property of being lively’; “*Apparently that is not the first time, judging her casualty, that she has done something like that*”, which indicates *casualty* in the sense of ‘property of being casual’). Such observations contradict the commonly held view of semantic drift as a one-way street indicated in the quote below:<sup>42</sup>

<sup>42</sup> Aronoff’s view here echoes Paul’s generalization referring to compounds: “the whole tends to become isolated with respect to the elements, out of which it is composed” (Paul 1880: 278). While probably mostly true for compounds, this generalization does not hold for derivational morphology.

“But words are peculiar, not only in that not all of those that should exist actually do, but also in that those which do exist do not always mean what they are supposed to mean, or even look like, what they are supposed to look like. Words, once formed, persist and change; they take on idiosyncrasies, with the result that they are soon no longer generable by a simple algorithm of any generality. The word gravitates toward the sign.” Aronoff (1976:18).

It is true of course that many existing words contain unproductive affixes and exhibit irregular alternations with respect to their etymological bases. These facts alone, however, do not entail irregular semantics: words which involve unproductive morphology and rare alternations often mean exactly what they are supposed to mean. Indeed, both small and drastic deviations from regular meanings are likely to disappear again (cf. *length*, formerly also meaning ‘lengthiness’ (e.g. “Excuse my length”) is now entirely regular; similarly, *laughter*, formerly also ‘a cause of laughter’ or ‘an instance of laughing’ (e.g. “They exchanged some quick laughters”) is now entirely regular (cf. (17)). A more accurate generalization is that – notwithstanding the sporadic emergence and disappearance of idiosyncratic uses – base relations are cohesive for as long as there is continuity as described in (33).

Apart from questioning the view of semantic idiosyncrasy as an incremental process one can also question Aronoff’s premise that words, when first formed, have a regular meaning. Consider a recent coinage in American English, *birther*, based on *birth* by applying highly productive *-er*-suffixation. The meaning of this word has been from the start “advocate of the claim that Barack Obama was born outside of the United States”. Such affixations, which are briefly discussed in section 4, also cast doubt on another claim by Aronoff, namely, that the presence of productive affixes renders words immune to developing idiosyncrasies. The claim is based on a comparison of *-ness*- and *-ity*-derivations based on adjectives ending in *-ous*. In particular, the relevant *-ness*-derivations are claimed to be strictly limited to ‘fact/quality/state/extent of Y’ meanings, where Y’ is the meaning of the adjective, whereas *-ity*-derivations are free to develop other meanings, possibly also evolving into count nouns. While possibly true of the very restricted and small set of words investigated by Aronoff, this generalization does not hold for productive word formation in general. A few examples of *-ness*-derivations with idiosyncratic meanings are given in (65) (cf. also the plural forms *weaknesses*, *illnesses*):

(65)

weakness	‘a particular fondness’ (e.g. ‘weakness for horn-rimmed glasses’)
illness	‘a particular form of ill health’
(her) highness	title of a princess
(his) holiness	title of the pope

Productivity appears to be relevant to idiosyncrasy only in that idiosyncratic meanings possibly never block additional regular meanings in words derived by productive rules (e.g. *weakness* can also mean ‘property of being weak’, in addi-

tion to the meaning listed in (65)). The issue of blocking and productivity is discussed in detail in section 3.

## 2.5 More on noncohesive relations

So far, a causal link has been established between the satisfaction of certain conditions on phonological sameness and cohesiveness. Yet, one could argue that there is no semantic difference between the pairs in the lefthand column in (66), which satisfy the conditions in question, and those in the righthand column, which fail to satisfy them. The pairs in (66a) are relations between ordinal and the corresponding cardinal numbers. The pairs in (66b) are adjective-noun pairs, relating nominal and attributive uses of the same concepts.

(66) a.	fourth] <sub>ORD</sub> - four] <sub>CARD</sub>	first] <sub>ORD</sub> - one] <sub>CARD</sub>
	fifth] <sub>ORD</sub> - five] <sub>CARD</sub>	second] <sub>ORD</sub> - two] <sub>CARD</sub>
	sixth] <sub>ORD</sub> - six] <sub>CARD</sub>	third] <sub>ORD</sub> - three] <sub>CARD</sub>
b.	herbal] <sub>A</sub> - herb] <sub>N</sub>	rural] <sub>A</sub> - country] <sub>N</sub>
	bridal] <sub>A</sub> - bride] <sub>N</sub>	solar] <sub>A</sub> - sun] <sub>N</sub>
	tribal] <sub>A</sub> - tribe] <sub>N</sub>	manual] <sub>A</sub> - hand] <sub>N</sub>
	coastal] <sub>A</sub> - coast] <sub>N</sub>	lunar] <sub>A</sub> - moon] <sub>N</sub>
	phrasal] <sub>A</sub> - phrase] <sub>N</sub>	hirsute] <sub>A</sub> - hair] <sub>N</sub>

Although semantically similar, the relations in the two columns in (66) differ in the way they originate. The association of the words in the lefthand column can be explained through regular base recognition and its effect on interpretation whereas the association of the words in the righthand column is analogically conditioned. The question of whether the analogies are based on concrete examples as in (67) or on more abstract schemas is not important: what matters is the association of words based on their prior and independently established meanings. Specifically, the relations in question necessarily involve given 'slots' in established paradigmatically organized networks, which merely need to be filled with a suitable word. Such relations include not only base relations but also antonyms (cf. (67b)), converses (cf. (67c)), and other lexical meaning relations (cf. Cruse (2000: 143ff)):

(67) a.	fifth] <sub>ORD</sub> : five] <sub>CARD</sub> = second] <sub>ORD</sub> : X X : two] <sub>CARD</sub>
	herbal] <sub>A</sub> : herb] <sub>N</sub> = rural] <sub>A</sub> : X X = country] <sub>N</sub>
b.	old] <sub>A</sub> : young] <sub>A</sub> = rural] <sub>A</sub> : X X = urban] <sub>A</sub>
c.	buy] <sub>V</sub> : sell] <sub>V</sub> = lend] <sub>V</sub> : X X = borrow] <sub>V</sub>

What distinguishes relations based on semantic analogies from relations based on regular base recognition as described in 2.1 is cohesiveness: the sort of pairs illustrated in the righthand column in (66) never exhibit parallel semantic change. For instance, the relation *rural-country* replaced the earlier relation *rural-land* after *country*, a Romance loanword, replaced the earlier Germanic expression *land* as an antonym of *city*. Significantly, the meaning of *rural* doesn't reflect the semantic change of *land* but rather switched association from *land* to its successor as an antonym of *city*, the noun *country*. Similarly, according to the OED the adjective *manual* has become an antonym of both *mental* (cf. *manual labor*) and of *automatic* (cf. *manual typewriter*). There is nothing to prevent the complete dissociation of the meaning of *manual* from the meaning of *hand*. Such dissociation is prevented only by regular base recognition, subject to strictly phonological conditions on the selection of base candidates. This is because in such relations the meaning assigned to one word in language acquisition involves the meaning of the other as a crucial ingredient. This condition on interpretation results not only in close semantic similarity but also in cohesiveness.

Despite the different origins between base relations based on phonologically determined base recognition and relations based on semantically founded analogies there are also shared properties. First, both types of relations appear to have a similar effect on blocking more regular word formation. For instance, nouns referring to celestial bodies are fairly regularly suffixed by *-ian* to be used in attributive constructions such as *Martian eclipse* (e.g. *Martian (Mars)*, *Saturnian (Saturn)*, *Neptunian (Neptune)*, *Plutonian (Pluto)*). Analogous formations such as *?Moonian* and *?Sunian* (also *?moonal*, *?sunal*, *?moonic*, *?sunic*, etc.) appear to be blocked by *solar* and *lunar*.

Second, although the sort of "slot-filling" involved in non-cohesive relations is primarily based on word meanings, there is also a tendency for the resulting pairs to exhibit phonological similarities. Examples for such similarities in etymologically unrelated words are given in (68) (the examples in (68a) are base relations, those in (68b) are antonyms<sup>43</sup>):

- |         |                                      |    |                                 |
|---------|--------------------------------------|----|---------------------------------|
| (68) a. | /mæskjəln/ 'masculine' - /mæn/ 'man' | b. | /θɪk/ 'thick' - /θɪn/ 'thin'    |
|         | /mænjuəl/ 'manual' - /hænd/ 'hand'   |    | /swi:t/ 'sweet' - /saʊr/ 'sour' |
|         | /lú:nər/ 'lunar' - /mu:n/ 'moon'     |    | /ɪl/ 'ill' - /wel/ 'well'       |
|         | /hɜ:rsù:t/ 'hirsute' - /hɛr/ 'hair'  |    | /í:vən/ 'even' - /ɑ:d/ 'odd'    |
|         | /li:gəl/ 'legal' - /lɑ:/ 'law'       |    | /gud/ 'good' - /bæd/ 'bad'      |

The similarities in question can concern single segments (e.g. identical onsets in *legal - law*, identical codas in *ill - well*) or sequences of segments (e.g. *thick - thin*, *lunar - moon*). They can be total or partial: the words *even* and *odd* are similar in that both start with a vowel<sup>44</sup>, the initial consonants in *good* and *bad* are similar in that both have the features [+grave] and [-tense]. It may well be

<sup>43</sup> Cf. also other kinds of opposites such as *king - /klu:en*, *aunt - uncle*, *boy - girl* as well as the data in (26).

<sup>44</sup> They thereby satisfy the condition on alliteration observed in Germanic poetry.

because of this similarity that *bad* replaced the earlier antonyms of *good*, *ill* and *evil*. In general we find that while words with a very high frequency may shun complete regularity in inflectional relations, they nonetheless tend to switch relations on the basis of (partial) phonological similarity. For instance, *went* (rather than \**goed*) replaced *eode* as the past tense of *go*, resulting in a pair whose initial segments are both [+grave] and [-tense] (cf. also the other pairs in (69c)). There appears to be a preference for associating words with initial grave consonants in English suppletive morphology (cf. the labials in (69a)).<sup>45</sup>

(69) a.	more - many	b.	was - be	c.	better - good
	more - much		were - be		went - go
	peuple - péron		worse - bad		well - good

The data in (68) and (69) indicate that paradigmatic slots are filled mainly, but not exclusively, on the basis of their matching morphosyntactic and semantic properties. For instance, the main properties qualifying *went* to be chosen as a past tense for *go* were presumably morphological (the final alveolar plosive) and semantic (the prior use as a past tense of the verb *wend* meaning then ‘to go off, to depart’, also ‘to go one’s way, to proceed’). Given the option, there appears to be a tendency to associate words with matching sounds. Unless the similarity suffices to satisfy the phonological conditions for selecting base candidates, the relations in question are bound to remain non-cohesive.

### 3 Alleged meaning differences between *-ness* and *-ity*

Riddle (1985) is credited with having demonstrated subtle meaning differences between the suffixes *-ness* and *-ity*, fueling speculation that total synonymy between affixes may be nothing but a fiction resulting from superficial analysis (Plag 1999: 240). In this section I will argue that on yet closer inspection the alleged meaning differences attributed to these affixes are pragmatic effects not linked to individual affixes.

The meaning contrast Riddle aims to establish is that *-ness* “tends to denote an embodied attribute or trait” while *-ity* “tends to denote an abstract or concrete entity”. She illustrates this contrast with the use of *hyperactiveness* compared to the use of *hyperactivity* in the following quotes: (a) “... don’t call this third-grader a picky eater. She’s a selective one ... whose hyperactiveness has decreased...” (b) “But to date there is no evidence that this type of dietary regime will have any effect on hyperactivity in children.” She comments as follows “*Hyperactiveness* in (a) denotes an embodied attribute of a particular child,

<sup>45</sup> Other examples include the alliteration in the relation *least*, *less*, *little* and perhaps the replacement of the ordinal number *other* by *second*, which resulted in a relation, where both words start with a tense alveolar obstruent (*second* - *two*). These findings argue against Nübling’s (2004) claim that there is a preference for complete phonological opacity in relations involving high frequency words.

while *hyperactivity* in (b) names the condition. That is, it denotes an abstract entity.”

Riddle seems to suggest that *-ness*-suffixation differs from *-ity*-suffixation in that it requires external arguments, which is not true. I would claim that a meaning difference between the words in question, to the extent that there is one, is essentially a blocking effect linked to the sharp differences in their frequency. The current counts in COCA (*Corpus of Contemporary American*) are as follows:<sup>46</sup>

(70)	<i>hyperactivity</i> : 583	<i>hyperactiveness</i> : 0
	<i>hyper-activity</i> : 3	<i>hyper-activeness</i> : 0

The relative rareness of *hyperactiveness* is due to blocking by a noun with fossilized morphology, *hyperactivity*; its relative acceptability is due to the productivity of *-ness*-suffixation in English. This particular type of incomplete blocking yields pronounced meaning differences for rivals involving so-called function nouns, which, when applied to their argument, return a value which is an element of a linear ordering: a number, an amount, or a grade (cf. de Bruin & Scha (1988: 25ff)). Examples for function nouns are *density*, *width*, *frequency*, *weight*, or *speed*. Such nouns denote scales whose upper and lower ends are associated with antonyms consisting of gradable adjectives, one of which is marked, the other being unmarked. The unmarked antonym occurs in regular *how*-questions concerning values on the scale (e.g. *width*: *how wide is X?*), in regular *as*-constructions (e.g. *as wide as*), and, for some function nouns, can also follow the value (*three inches wide*). There is evidence that function nouns and the relevant unmarked adjectives form lexical relations which can be cohesive, as in (71a), or non-cohesive, as in (71b).

(71) a.	<i>density</i> ]N/NP → <i>dense</i> ]A	b.	<i>speed</i> ]N/NP - <i>fast</i> ]A
	<i>width</i> ]N/NP → <i>wide</i> ]A		<i>age</i> ]N/NP - <i>old</i> ]A
	<i>length</i> ]N/NP → <i>long</i> ]A		<i>size</i> ]N/NP - <i>big</i> ]A
	<i>depth</i> ]N/NP → <i>deep</i> ]A		<i>weight</i> ]N/NP - <i>heavy</i> ]A
	<i>breadth</i> ]N/NP → <i>broad</i> ]A		
	<i>frequency</i> ]N/NP → <i>frequent</i> ]A		

The evidence for the relations in (71), which I will refer to as ‘scale - unmarked antonym’-relation, comes from blocking as reflected in the frequency data adopted from COCA in (72). I have also added the frequencies of the relevant

<sup>46</sup> COCA contains more than 400 million words of text and is equally divided among spoken language, fiction, popular magazines, newspapers, and academic texts. The on-going compilation started in 1990. The rather extreme difference seen in (70) agrees with the respective frequencies in the BNC (British National Corpus) given below:

(i) *hyperactivity*: 46, *hyper-activity*: 1, *hyperactiveness*: 0, *hyper-activeness*: 0

Since the BNC contains only 100 million words and compilation ended in 1994 I will only refer to COCA in the remainder of this section.

base adjectives in parentheses<sup>47</sup>, to show that relatively low frequencies of *-ness*-formations cannot be explained in terms of low frequencies of the respective bases.

(72)

a. length: 17575	b. longness: 0 (242094)	c. shortness: 396 (63724)
density: 5043	denseness: 14 (5066)	thinness: 380 (22064)
width: 2771	wideness: 13 (37071)	tightness: 458 (18421)
depth: 9507	deepness: 19 (50658)	shallowness: 127 (6147)
breadth: 1694	broadness: 23 (18795)	narrowness: 139 (16994)
frequency: 8996	frequentness: 0 (9754)	rarity: 912 / rareness: 6 (18244)
size: 44883	bigness: 138 (178138)	smallness: 202 (158334)
speed: 28119	fastness: 33 (36753)	slowness: 365 (27627)
weight: 38761	heaviness: 315 (35053)	lightness: 571
age: 91734	oldness: 21 (183 898)	newness: 401 (618735)
		youth: 23488 / youngness: 10 (139659)

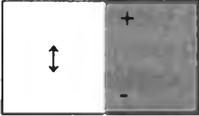
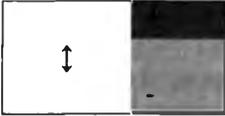
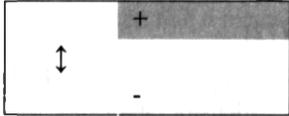
The significantly lower frequencies of the *-ness*-formations based on the unmarked antonyms in (72b) compared to the frequencies of the *-ness*-formations based on the marked antonyms in (72c)<sup>48</sup> indicates that only the former are affected by blocking. For instance, the noun *speed*, despite referring to the entire 'fast-slow'-scale, blocks only *fastness*, not *slowness*. The true extent of blocking in (72b) is obscured by the fact that some of the *-ness*-formations are based on the relevant adjectives in other senses, which are not related to the scale in question. For instance, six out of the fourteen occurrences of *denseness*, illustrated in (73), are based on a recent metaphoric extension of *dense* meaning 'stupid', which is not an antonym of *thin*.

(73) It is a testament to my denseness that I took this remark as a compliment.

The important observation is now that the meanings of the blocked *-ness*-formations in (72b) differ systematically from the meanings of the respective nouns with fossilized morphology which block them. The contrast in question is roughly sketched in (74).

<sup>47</sup> I have omitted the count for the adjective *light*, since the relevant number in COCA also includes the occurrences of the very frequent noun *light*.

<sup>48</sup> The low frequencies of *rareness* and *youngness* are presumably due to blocking by *rarity* and *youth*, respectively.

(74)	a. established noun (e.g. <i>age</i> )	b. established noun (e.g. <i>length</i> )	c. “blocked” noun (e.g. <i>oldness</i> , <i>longness</i> )
			

The sense of words like *age*, which relate to their base non-cohesively, comprises the entire scale ranging from *old* to its antonyms, *new* or *young* (cf. (74a)). This is also true for words like *length*, which relate to their base cohesively. They differ from the first group only in exhibiting a special kind of polysemy, which results from also being assigned a ‘plus-end-reading’ due to successful base recognition (i.e. ‘condition, quality, fact of being long’ (cf. (20a)).<sup>49</sup> This polysemy manifests itself in a stronger bias<sup>50</sup> towards a ‘plus-end-reading’. Finally, the senses of the last group illustrated by *longness* or *oldness* is characterized by lacking a ‘full-scale-reading’ due to blocking. These words are exclusively interpreted as condition, quality, fact of being Y’ where Y’ is the meaning of the adjective, resulting in a restriction to a ‘plus-end-reading’. Significantly, it is the meaning differences between the second and the third group, which could be mistaken for inherent properties of the affixes in question, such as the proposed link between the suffix *-ness* and the sense ‘embodied trait’.

For illustration of the blocking effect characterized in (74b) versus (74c) compare the uses of *density* and *denseness* in (75). The restriction to the ‘plus-end-reading’ explains why *denseness* could not easily replace *density* in (75a): the respective contexts all require ‘full-scale-readings’ or even ‘minus-end-readings’. By contrast, *density* can always replace *denseness*, albeit at a cost: the special effect pertaining to the restricted ‘plus-end-reading’ is lost.<sup>51</sup>

- (75) a. It is a dynamic field, meaning its density could change over time  
 ... it helps improve bone density ...  
 ... with the density of a soap bubble ...  
 There are cities that are basically spread out, with low density, like Los Angeles.
- (75) b. The biggest problem now was the denseness of the forest.  
 There was a delightful denseness to the air ...  
 The shade and the very denseness made the place wilder, secret.  
 ... the Stone Master exuded a serenity and self-possession, a gathered solidity and denseness that were seductive and of which I felt badly in need ...

<sup>49</sup> The polysemy in question is reflected in the term ‘measurement’ in the American Heritage Dictionary and in the terms ‘dimension’, ‘extent’ in the OED, which in both dictionaries are added to the standard descriptions for deadjectival nouns (‘quality, fact, condition’).

<sup>50</sup> The qualification ‘stronger bias’ is motivated by the fact that *all* function nouns exhibit some bias towards the ‘plus-end’ when taken out of context (cf. *I love age. I love weight*).

<sup>51</sup> These and the following examples are adopted from COCA.

One caveat is in order here: claims about exchangeability of nominalizations presuppose that both nouns are based on the same sense of the adjective. Metaphoric extensions of adjectives, especially when they are novel, often allow only *-ness*-suffixation. For instance, the noun *denseness* in (73), which is based on *dense* in the sense of 'stupid', cannot be replaced by *density*.

Compare next the use of *weight* in (76a) with the use of *heaviness* in (76b). The relevant meaning differences sketched in (74a) versus (74c) are supported by the observation that replacing *weight* by the corresponding *-ness*-formations can yield odd readings (cf. *?unhealthily low heaviness*) or change the proposition (cf. *a person's size and heaviness also make a difference*). By contrast, replacing *heaviness* by *weight* never gives rise to oddity nor does it affect the proposition: only the presupposition that the relevant property is there to a high degree is lost.

- (76) a. A person's size and weight also make a difference. One size does not fit all.  
Most of my life, I hovered around a healthy weight.  
... the media has sold them a bill of goods (e.g., an unhealthily low weight equals sexual desirability)
- b. Jane likes the feel of his heaviness; likes to know she can handle the weight of his body.  
Wrought iron's heaviness makes it best for windy climates.  
On these occasions a profusion of beads was worn, the heaviness of the glass probably impressing upon the wearer the weight of symbolism ...

The claim that function nouns such as *weight*, which relate to their base in a non-cohesive manner, and nouns like *height*, which have a cohesive relation to their base, differ only in that the latter exhibit a bias towards a 'plus-end-reading' is supported by the examples in (77).

- (77) a. We worry about its weight.  
b. We worry about its height.

In (77a) it is open whether the referent is feared to be too heavy or too light. By contrast, in (77b) there's probably some bias towards assuming that the referent is too high. As has been mentioned earlier, this bias could be explained by the polysemy affecting all function nouns in (71a), which relate to their base cohesively and consequently are subject to regular meaning assignment (cf. (20a)).

Additional examples for established nouns with fossilized morphology are given in (78). For the sentences in (78a, a') each of the paraphrases in the respective (c)-rows are conceivable, although there is a bias towards the first paraphrase. The respective second paraphrases in for instance (78c) is licensed by the meaning of *length* derived from the "scale - unmarked member of scale" relation in (71). The *-ness*-formations in (78b, b'), by contrast, are not part of that relation due to blocking by the established forms and therefore are interpreted only as 'condition, quality, fact of being Y', where Y' is the meaning of

the adjective (cf. rule (20a))'. As a result, the sentences in (78b, b') allow only for the first paraphrase in the respective (c)-row: there is no context where the expression *longness* could mean 'shortness':<sup>52</sup>

- (78) a. Don't worry about the length of your article  
 b. Don't worry about the longness of your article  
 c. Don't worry that your article might be too long.  
     Don't worry that your article might be too short.
- a'. Don't worry about the frequency of the busses.  
 b'. Don't worry about the frequentness of the busses.  
 c'. Don't worry that the busses might run too frequently. (concern about noise disturbance)  
     Don't worry that the busses might run too infrequently. (concern about lacking mobility)

Again, nouns such as *age*, which relate to their adjectival base in a non-cohesive manner, differ from the established nouns in (78) only in that they lack the polysemy associated with rule (20a) and therefore have no lexical bias towards the 'plus-end-reading':

- (79) a. Don't worry about the age of the applicant  
 b. Don't worry about the oldness of the applicant  
 c. Don't worry that the applicant might be too old.  
     Don't worry that the applicant might be too young.

Returning to the examples *hyperactivity* versus *hyperactiveness*, the semantic contrast in (74b,c) should be barely noticeable since *hyperactivity* is not a function noun and certainly does not denote a scale which also includes the sense of the antonym of its base *hyperactive*. In fact, intuitions appear to be vague here. Possibly, the use of *hyperactiveness* in (80a) suggests a high degree of the relevant condition. Perhaps *hyperactivity* in (80b) could not be replaced by *hyperactiveness*, as there is a reference to the low end of the relevant scale.<sup>53</sup>

- (80) a. "Things like hyperactiveness, lack of sleep, being hungry all the time, and depression"  
 b. "The remaining boys exhibited either very low levels of hyperactivity or moderate to high levels that decreased over time."

The meaning contrast posited by Riddle is at any rate not supported by these data, as *hyperactiveness* in (80a) denotes an abstract condition whereas *hyperactivity* in (80b) is attributed to particular referents.

<sup>52</sup> The claim that blocked nouns such as *longness* prompt a plus-end reading is also supported by internet data:

- (i) "Sorry about the longness of this post."  
 "The longness of the car makes the back seats very noisy."  
 "The longness of the arms and the shortness of the legs ..."

<sup>53</sup> These examples have been found in the internet (*hyperactiveness* never occurs in COCA).

To summarize, all nouns which relate to an unmarked antonym in a cohesive manner can be assigned a ‘plus-end-reading’ (cf. (20a)). The source of ‘full-scale-readings’ lies in semantically based relations referred to as ‘scale - unmarked antonym’ relations. Any noun, for which the unmarked antonym can be recognized as a base, can also be assigned a ‘full-scale reading’ unless the place in the relevant relation is occupied already by an established noun (i.e. a noun with fossilized or no morphology). In that case, only the ‘plus-end-reading’ is left (cf. (74c)). Significantly, none of the meanings in question are linked to individual affixes, but instead are determined entirely by the relevant paradigmatic relations.

The claim that the restricted readings illustrated above should not be lexically linked to the suffix *-ness* is supported by the fact that *-ness*-suffixations do allow for ‘full-scale-readings’ whenever they are not subject to blocking. Consider the function noun *thickness*, which, due to its cohesive relation to the adjective *thick*, favors a ‘plus-end-reading’, but is not restricted to it. That is, while the expression *thickness* is more easily associated with the concept “quality of being thick”, one could conceive of contexts where that expression is used to mean “thinness”. Examples from the internet are given in (81):

- (81) a. Context: concern that veneer on the outside of the plywood is too thin.  
 “I like the thought that I can machine and finish my solid panels without having to worry about the thickness of the veneer.”
- b. Context: concern that sea ice cover is becoming too thin.  
 “Since the previous topic- ‘no ice’ has failed to have the ice cooperate, the alarmist industry is now going to worry about the thickness of the ice and use ignorance about that to keep the fear alive.”

The second argument for not linking the ‘plus-end-reading’ to the suffix *-ness*, but rather analyse it as a general blocking effect, concerns its cross-linguistic validity: the effect in question can be observed whenever there is a highly productive rule for deriving nouns from adjectives in conjunction with lexicalized nouns. Some examples from Bulgarian are given in (82), where the relevant productive nominalization rule is *-ost*-suffixation. In all cases, speaker intuitions are very clear that the “blocked” nouns strictly imply a ‘plus-end-reading’, in contrast to the corresponding established nouns, which allow for a ‘full-scale-reading’:<sup>54</sup>

established noun	“blocked” noun
<i>bǎrzina</i> - <i>bǎrz</i> ‘fast’	<i>bǎrzost</i> <i>Bǎrzostta na tozi begač me iznenadva.</i> “The fastness of this runner surprises me.”
<i>dǎlbočina</i> - <i>dǎlbok</i> ‘deep’	<i>dǎlbokost</i> <i>Dǎlbokostta na tova ezero me vpečatli mnogo.</i> “The deepness of this lake impressed me very much.”

<sup>54</sup> I thank Hristo Velkov for supplying these examples.

<i>čestota - čest</i> 'often'	<i>čestost</i> <i>Po čestost tova javlenie prevážhožda ostanalite.</i> "This phenomenon exceeds all others in oftenness."
<i>silna - silen</i> 'strong'	<i>silnost</i> <i>Po silnost tozi sportist mi haresva poveče ot drugija.</i> "I prefer this athlete to all others because of his strongness."
<i>dälžina - däläg</i> 'long'	<i>dälghost</i> <i>Dälghostta na tozi razkaz e zabeležitelna.</i> "The longness of this narrative is remarkable."

In (83) I list relevant examples from Russian (cf. (83a))<sup>55</sup>, Swedish (cf. (83b)) and German (cf. (83c)). The suffixes appearing in the blocked nouns are all highly productive:

(83)	established noun	"blocked" noun
a.	<i>voзраст - staryj</i> 'old'	<i>starost'</i> <i>Starost' prihodit vnezapno, kak sneg. Utrom vy vstajete i vidite, čto vsje belo. (J. Renar)</i> "Oldness comes suddenly, like snow. You get up in the morning and see that everything is white."
b.	<i>längd - lång</i> 'long'	<i>långhet</i> <i>Även den onödiga längheten är något som till slut gynnar boken.</i> "Even the unnecessary longness is something which in the end serves the book well."
c.	<i>Alter - alt</i> 'old'	<i>Altheit</i> <i>Deine Altheit widert mich an. (R. Götz)</i> "Your oldness repels me."

In the last example, it is clear that the addressee is considered to be old. If the noun *Alter* were used instead, the addressee could just as easily be a teenager.

Both the dependence on blocking observed in (78) versus (81) and the (possible) universality of the effect argue against linking the 'plus-end-reading' lexically to the productive affixes in question. In fact, the effect should not even be linked to productivity as a property of rules but rather to the avoidance of the established.<sup>56</sup> From the perspective of the hearer the sensitivity to blocking serves to avoid synonymy.

<sup>55</sup> I thank Olga Ivanova for this example.

<sup>56</sup> Avoidance makes it necessary to apply whatever productive nominalization rule there is, since there is no other option for supplying the relevant expressions.

Apart from claiming meaning differences for *-ness-* and *-ity-* suffixations based on the same adjective<sup>57</sup> Riddle further cites occurrences of complete blocking as evidence for inherent suffix meaning. I have argued above that it is precisely the ‘unblockability’ of productive rules such as *-ness-* suffixation that is vital to the meaning effects in question. In fact, all cases of alleged blocking due to inherent affix meaning cited by Riddle concern *-ity-* suffixation (e.g. *\*maroonity*, *\*laven-derity*, *\*Slavicity*, *\*juvenility*), even though the unacceptability of these formations is explained independently by the nonproductivity of the suffix *-ity* (cf. (4b)).

To conclude, there is no evidence for lexically associating any of the affixes in question with meaning. The data support the claim that meaning is determined by recognition of paradigmatic relations among words, subject to blocking effects in connection with pre-established relations. For nouns with fossilized morphology such blocking can lead to a loss of cohesiveness in base relations (cf. the historical meaning developments of the pairs *stupor-stupid*, *humor-humid*, *valor-valid* due to blocking by *stupidity*, *humidity*, *validity*). For nouns with productive morphology blocking does not affect cohesion but gives rise to certain restrictions in meaning (e.g. ‘plus-end readings’ for blocked *-ness-* suffixations in English).

#### 4 Meaningful affixes

The claim that affixes are meaningless by default raises the question of what accounts for the clear associations of certain affixes with meaning. The conditions in question arguably concern a general prerequisite for meaning: the availability of choice (cf. Lyons 1968:413).

##### 4.1 Meaningful prefixes

The clearest cases of meaningful affixes are modifying prefixes. Some examples are given in (84).

(84) a.	[[æb] <sub>MOD</sub> [nɔ:rməl] <sub>HEAD</sub> ] <sub>A</sub>	b.	abnormal behavior ~ normal behavior
	[[ænt] <sub>MOD</sub> [ɑ:rktrɪk] <sub>HEAD</sub> ] <sub>A</sub>		the antarctic region ~ the arctic region
	[[mæɪ] <sub>MOD</sub> [kəntent] <sub>HEAD</sub> ] <sub>A</sub>		his malcontent demeanor ~ his content demeanor
	[[ɑ:rk] <sub>MOD</sub> [eɪndʒəl] <sub>HEAD</sub> ] <sub>N</sub>		the archangel Gabriel ~ the angel Gabriel

<sup>57</sup> Riddle observes an interesting meaning contrast in cases like “*she was hired because of her ethnicity*” as opposed to “*she was hired because of her ethnicness*”. *Ethnicity* is like a function noun in that, when applied to its argument, it returns a unique value (e.g. Greek, Indian, African-American). The special meaning of *ethnicness* “exhibiting ethnic characteristics to a high degree” is once again a blocking effect: the frequency of *ethnicity* in COCA is 4596; the count for *ethnicness* is: 0.

As is illustrated in (84b), modifying prefixes can be omitted without affecting the grammaticality or the meaningfulness of the constructions in which they occur. It is this optionality which forces the assignment of meaning to these affixes even if they do not recur. In case of non-recurrence, meanings are presumably assigned in a top-down fashion such that the meaning of the modifier is computed on the basis of the meaning of the whole and the meaning of the base. Historically related prefixes which are not optional are not assigned any meaning (cf. *ab-* in *abstract, abrupt*; *mal-* in *malaise, malapert*)

Whether they are isolated or are highly productive, modifying prefixes always form separate phonological words, which are necessarily stressed, thereby contrasting with other word-initial phoneme sequences, including other prefixes as shown in (85).

- (85) a. [[di:]<sub>MOD</sub>[væljʊ]<sub>HEAD</sub>]<sub>V</sub> (di:)<sub>ω</sub>(væljʊ)<sub>ω</sub> 'devalue'  
 b. [[dɪ]<sub>PREF</sub>[vɛləp]<sub>ROOT</sub>]<sub>V</sub> dɪ(vɛləp)<sub>ω</sub> 'develop'

Recognition of a prefix in (85b) is indicated by prosody: Latinate prefixes such as *de-*, *re-* and *pre-* exhibit specific phonetic variants which do not occur in simplexes (cf. the entries in Wells 2000) and which indicate non-integration of the prefix into the prosodic word of the root (e.g. *defeat, defer, desire*). Such non-modifying prefixes in English are clearly meaningless, having no other function than to signal word class (i.e. verbs). Prosodic structure correlates accordingly systematically with meaningfulness, such that both are ultimately conditioned by choice: the modifying prefix *de-* in (85a) is optional, hence meaningful, while the head prefix in (85b) is not optional, hence meaningless.

The correlation between prosody and meaning even extends to the cases in (86), all of which involve bound roots.<sup>58</sup>

- (86) a. **deflate** ↔ **inflate** [[di]<sub>MOD</sub>[flɛɪt]<sub>ROOT</sub>]<sub>V</sub> (di:)<sub>ω</sub>(flɛɪt)<sub>ω</sub>  
**decrease** ↔ **increase** [[di]<sub>MOD</sub>[kri:s]<sub>ROOT</sub>]<sub>V</sub> (di:)<sub>ω</sub>(kri:s)<sub>ω</sub>  
**exhale** ↔ **inhale** [[eks]<sub>MOD</sub>[heɪl]<sub>ROOT</sub>]<sub>V</sub> (ɛks)<sub>ω</sub>(heɪl)<sub>ω</sub>  
**export** ↔ **import** [[eks]<sub>MOD</sub>[pɔ:rt]<sub>ROOT</sub>]<sub>V</sub> (ɛks)<sub>ω</sub>(pɔ:rt)<sub>ω</sub>  
 b. **develop** ↔ **envelop** [[dɪ]<sub>PREF</sub>[vɛləp]<sub>ROOT</sub>]<sub>V</sub> dɪ(vɛləp)<sub>ω</sub>  
**deduce** ↔ **induce** [[di]<sub>PREF</sub>[dú:s]<sub>ROOT</sub>]<sub>V</sub> di(dú:s)<sub>ω</sub>  
**exhibit** ↔ **inhibit** [ɪgzɪbɪt]<sub>V</sub> (ɪgzɪbɪt)<sub>ω</sub>  
**explore** ↔ **implore** [ɪksplɔ:ɹ]<sub>V</sub> (ɪksplɔ:ɹ)<sub>ω</sub>

What motivates the classification of the prefixes in (86a) as modifiers is the fact that the relevant complex words are part of oppositions (directional opposites) involving identical roots as is shown in the first column. As a result, the prefixes could be exchanged while preserving the meaningfulness of the constructions, thereby satisfying the condition of choice. The meaning assigned to these pre-

<sup>58</sup> The special phonetics of these prefixes compared to regular Latinate prefixes followed by bound roots is also observed in Eckert & Barry (2002: 115)

fixes conforms to their interpretation in other modifying uses based on independent words (cf. the reversative meaning of *de-* in the verbs *decompose*, *decompress*, *deradicalize*) or, if no such uses exist, they are computed in a top-down fashion (cf. the outward direction associated with *ex-* in *exhale*, *export*). An analysis of the (historical) prefixes as modifiers is ruled out for the words in (86b), which differ from the words in (86a) in not being part of oppositions. The presence of the prefixes in (86b) never involves choice: they consequently do not form separate phonological words and are always meaningless. The modifying prefixes in (86a) differ from the regular modifying prefixes in (84), which can be omitted, in that they also exhibit the variants characteristic of non-modifying prefixes or of simplexes (cf. not only [di:flért], but also [diflért] ~ [diflért] ~ [dɔflért]). This reflects the more iffy status of morpheme recognition in such cases, compared to word-based cases like *decompose*.

#### 4.2 Meaningful suffixes

The suffix *-ish* is associated with the meaning 'somewhat or rather' (American Heritage Dictionary) or 'approaching the quality of somewhat' (OED) as is illustrated in (87a). The suffix *-let* has a diminutive meaning. Like modifying prefixes, suffixes are assigned meanings only when they can be omitted without affecting the grammaticality or meaningfulness of the constructions in which they occur. Otherwise these suffixes have no meaning as is shown by the examples in (87b):

(87) a.	greenish] <sub>A</sub> (→ green] <sub>A</sub> ) 'somewhat or rather green'	b.	garish] <sub>A</sub>
	tallish] <sub>A</sub> (→ tall] <sub>A</sub> ) 'somewhat or rather tall'		lavish] <sub>A</sub>
	roundish] <sub>A</sub> (→ round] <sub>A</sub> ) 'somewhat or rather round'		raffish] <sub>A</sub>
	piglet] <sub>N</sub> (→ pig] <sub>N</sub> ) 'small/young pig'		tablet] <sub>N</sub>
	owlet] <sub>N</sub> (→ owl] <sub>N</sub> ) 'small/young owl'		toilet] <sub>N</sub>
	eaglet] <sub>N</sub> (→ eagle] <sub>N</sub> ) 'small/young eagle'		chaplet] <sub>N</sub>
	booklet] <sub>N</sub> (→ book] <sub>N</sub> ) 'small book'		fillet] <sub>N</sub>

In expressions like *a lavish buffet* or *garish makeup*, the suffix *-ish* fails to connote the restraint associated with *-ish* in (87a)). Similarly, the historical *-let*-suffixations in (87b) no longer carry any diminutive meaning in English. While these words are presumably simplexes in modern English, diminutive meaning appears to be generally lost in words with no recognizable base, even when the suffixes themselves are still recognized. This is shown by the connection between diminutive meaning and base relations in German *-chen*-suffixations illustrated in (88):

(88) a.	Rosin[chen]] <sub>N-NEUT</sub> (→ Rosine] <sub>N-FEM</sub> ) 'small raisin'	b.	Kanin[chen]] <sub>N-NEUT</sub> 'rabbit'
	Markis[chen]] <sub>N-NEUT</sub> (→ Markise] <sub>N-EM</sub> ) 'small awning'		Radies[chen]] <sub>N-NEUT</sub> 'radish'
	Räd[chen]] <sub>N-NEUT</sub> (→ Rad] <sub>N-NEUT</sub> ) 'small wheel'		Mäd[chen]] <sub>N-NEUT</sub> 'girl'

Unlike the suffix *-let* in English, the diminutive suffix *-chen* in German is highly productive. The claim that this suffix is recognized also in (88b), where the historical base has become obsolete, is supported by both morphological evidence (association with neuter gender) and especially by phonological evidence (prosodic boundary effects). Yet, there is no diminutive meaning (cf. *Riesenkä-ninchen* 'giant rabbit' versus *?Riesenrosinchen* 'giant small raisin').

The dependence of affix meaning on base recognition observed in (85) to (88) raises the question of why adjectives ending in the suffix *-able* are regularly associated with a deontic meaning ("can be X'ed"), even when involving bound roots as in (89):

- (89) feasible, edible, malleable, credible, visible, audible, palpable,  
tangible, pliable, flexible

Possibly the regular  $[X[\underline{əbəl}]]_A - [X[\underline{əbɪləti}]]_N$  correspondences (e.g. *feasible* - *feasibility*), the existence of the near-homophonous pair of independent words *able* - *ability*, and the productivity of the suffix *-able* applied to transitive verbs (*understandable*, *washable*) are all relevant for inherently linking *-able* with a deontic meaning.<sup>59</sup> Certainly, productivity alone is not sufficient to ensure a consistent link between affixes and meaning as is shown by the nominalizing suffixes in (90), all of which are highly productive (the deadjectival suffixes in (90a) are repeated from (2); the suffix *-ness* is blocked only by the *-ity* rule given underneath):<sup>60</sup>

(90) a.	$[X]_A \rightarrow [X[\underline{nəs}]]_{N/NP}$	kaput → kaputness
	$[X[\underline{əbəl}]]_A \rightarrow [X[\underline{əbɪləti}]]_{N/NP}$	pursuable → pursuability
b.	$[X[\underline{ɛrt}]]_V \rightarrow [X[\underline{ɛrʃən}]]_{N/NP}$	dónate → donátion
	$[X[\underline{áiz}]]_V \rightarrow [X[\underline{əzɛrʃən}]]_{N/NP}$	stándardize → standardizátion
	$[X[\underline{əfáɪ}]]_V \rightarrow [X[\underline{əfəkɛrʃən}]]_{N/NP}$	glórfify → glorificátion
	$[[\underline{ən}][X]]_V \rightarrow [[\underline{ən}][X][\underline{mənt}]]_{N/NP}$	enlarge → enlargement
	$[[\underline{bi}][X]]_V \rightarrow [[\underline{bi}][X][\underline{mənt}]]_{N/NP}$	bereave → bereavement

The distribution of the underlined suffixes in (90) involves no choice because their domains are distinct, determined by the presence of specific affixes. *-ness-*

<sup>59</sup> The relevance of independent words is shown by the fact that semi-suffixes (cf. Marchand 1969:356ff), which are in the process of grammaticalization, retain meaning as long as they are homophonous with their source word (e.g. *bucketful*, source: *full*, *childlike*, source: *like*). The link would accordingly be *feasibility*, source: *ability*; the deontic meaning in *feasible* then via the relation *ability* - *able*.

<sup>60</sup> Like  $[X[\underline{əbəl}]]_A \rightarrow [X[\underline{əbɪləti}]]_N$ , most of the productive rules involve fusions of adjacent vowel-initial suffixes, where the relations between the respective 'X' strings are transparent, but the relations between the noun and the base are not transparent. The special affinity of *-ment* to words with the prefixes *en-* or *be-* is possibly caused by phonological similarities (the initial labials in *-ment* and *be-*, the identical VC-strings in /mənt/ and /ənt/). In contrast to *-ness-*suffixation, the affix-sensitive rules in (90) can be blocked entirely by fossilized forms (e.g. *\*believement* (cf. *belief*), *\*insurement* (cf. *insurance*), *\*ostracization* (cf. *ostracism*)). The rule  $[X[\underline{əbəl}]]_A \rightarrow [X[\underline{əbɪləti}]]_N$  is blocked when X is a noun (*\*personability*, *\*objectionability*).

suffixation also involves no choice since *-ness* is the only productive nominalizing suffix based on adjectives in English. Consequently, none of the underlined suffixes in (90) has meaning. The claim that there are no choices is not contradicted by productive *-er*-suffixation, which differs from the rules in (90) in that it yields count nouns which need to combine with a determiner to form a noun phrase. From the perspective of the hearer, such nouns differ from those in (90) in that the contexts of utterance in which they occur typically include a concrete referent. If this referent is inanimate and a verb is recognized as the base, the default interpretation of the nouns in question is “sth. (suited) for Y’ing”, where Y’ is the meaning of the verb (e.g. *mixer*, *walker*, *keeper*, *sleeper*, *diner*). If a person is identified as the referent (indicated by the downward arrow in (91)), the default interpretation is to associate the relevant concept with control or volition. If a verb, especially an action verb, is recognized as a base the interpretation is straightforward:

(91) If  $X]_N \rightarrow Y]_V$  then  $M(X) = \text{“one who Ys”}$   
 ↓  
 person

- a. mixer, speaker, hearer, beggar, pleaser, investor,
- b. participant ( $\rightarrow$  participate), rapist, cook, starveling, braggart

The examples in (91a,b) show that the default interpretation in question is by no means associated with a particular affix (the arrow “ $\rightarrow$ ” points to the relevant base).

If a noun is recognized as a base, the interpretation is more vague (cf. (92a)), unless the base denotes an academic field (“one who practices Y”, (cf. (92b)), a country (“one who comes from Y”) or a city (“one who lives in Y”) as in (92c). Again, none of the interpretations are linked to specific affixes:

(92) If  $X]_N \rightarrow Y]_{N/(NP)}$  then  $M(X) = \text{“one connected with Y”}$   
 ↓  
 person

- a. villager, teenager, widower, probationer, left-hander, honeymooner, no-brainer enthusiast ( $\rightarrow$  enthusiasm), Marxist ( $\rightarrow$  Marxism), fraud, gangster, mountaineer
- b. philosopher ( $\rightarrow$  philosophy), biologist, grammarian, lawyer
- c. Londoner, Seattleite, Peruvian, Mexican, Greek ( $\rightarrow$  Greece)

As soon as a choice is involved, that is, as soon as there are productive rules with identical domains and identical ranges, affixes are associated with meaning. The *-ee*-formations in (93b) are associated with a lack of control or voli-

tion.<sup>61</sup> Significantly, default semantics in (93a) (cf. (91) and (92)) correlates with phonologically unmarked prosodic structure of the noun (word-final trochees or dactyls) whereas special semantics ('lack of control') correlates with a highly marked prosodic structure (main stress on the word-final syllable).

(93) a.	advisor] <sub>N</sub>	b.	conseillère] <sub>N</sub>
	biographe] <sub>N</sub>		biographee] <sub>N</sub>
	entraîneur] <sub>N</sub>		entraînée] <sub>N</sub>
	employeur] <sub>N</sub>		employée] <sub>N</sub>

From the point of view of the speaker or creator of new formations, the productive rule of *-er*-suffixation differs from the nominalization rules in (90) in that its domain is not restricted to certain word classes and in that its output may have idiosyncratic meaning from the start (e.g. *birther*, *looker* (a good-looking woman), *loaner* (something lent for temporary use), *keeper* (an object that one should keep), *no-brainer* (something that requires little mental effort to understand)). These peculiarities may indicate a fundamental difference in the origin of the formations: nominalizations as in (90) are based on rules which have the function of providing (stylistic) variants (e.g. *they radicalized the students* - *the radicalization of the students*) whereas the *-er*- and *-ee*-formations represent an essentially onomasiological type of morphology based on concepts.<sup>62</sup> That is, these formations typically start with real world phenomena (e.g. a vocal group of people and their sensational claim that Barack Obama was not born in the United States), which give rise to concepts requiring expressions. Such expressions are based on whatever words the speaker deems suitable for encoding the concept and end in *-er*,<sup>63</sup> unless the speaker wishes to associate the concept with a lack of control, in which case the ending *-ee* is chosen<sup>64</sup> (cf. *amputee*, *attendee*, *retiree*, *escapee*).<sup>65</sup> The suffix *-er* carries no meaning other than serving as the default marker for concrete concepts in English. Other meaning components such as agenthood or dynamism originate in non-affix-specific mechanisms of base recognition (cf. (91)).

<sup>61</sup> An association of non-modifying affixes with meaning presupposes productivity: the occurrence of doublets like *departure*, *department* or *committal*, *commitment* will lead to semantic differentiation on the word level to avoid synonymy, without any effect on the affixes.

<sup>62</sup> Štekauer is a proponent of the view that all word-formation is onomasiological (for an historical overview, see Štekauer (2005)).

<sup>63</sup> The suffix *-er* is strictly blocked in words containing certain suffixes (e.g. *Marxism* - *Marxist* (\**Marxismmer*), *enthusiasm* - *enthusiast* (\**enthusiasmmer*) and to partial blocking by simplex established words (e.g. *fraud* (?*frauder*), *thief* (?*stealer*)).

<sup>64</sup> The lack-of-control specification entails a restriction to humans since the concept of control is irrelevant to other objects.

<sup>65</sup> Barker's (1998) proposal to associate lack of volition with an argument of the base runs into problems with nouns such as *biographee*, *escapee*, *retiree*, etc. which are based on words lacking the relevant argument structure.

## 5 Summary

Semantic regularity in English nominalizations supports a hearer-based model of analysis based on the recognition of paradigmatic relatedness among whole words. Such a model allows for a succinct description of the conditions under which one word is interpreted in terms of another synchronically (e.g. *contrition* ‘quality of being contrite’) as well as the conditions under which relations are cohesive diachronically. The conditions in question include judgments of sameness in phonological structure and knowledge of previously established relations to account for blocking. Affixes, unless they are productive, play no role in this analysis. Affixes are assigned meaning only if their presence involves choice, where choice presupposes preserving the meaningfulness of the relevant constructions.<sup>66</sup> As a consequence, all affixes which can be omitted have meaning (e.g. *her ab-normal behavior, this pig-let*). Also productive affixes which compete with each other have meaning (e.g. *employee* vs. *employer*). None of the nominalizing suffixes in English involve choice as they can neither be omitted nor do they compete with each other: the productive rules listed in (90) involve mutually exclusive domains. The complete synonymy among the affixes in (90a) and (90b), respectively, which also encompasses the relevant fossilized suffixes described in section 1, is simply a reflection of the lack of choice among these affixes and their resulting meaninglessness. The irrelevance of these affixes for the semantic interpretation is also reflected in the irrelevance of rule recurrence: fossilized morphology does not hinder base recognition.

It goes without saying that the findings presented in this paper are not compatible with the basic assumptions of Generative models that all morphemes are signs and that the source of regularity in complex words are (productive) rules for combining morphemes. Consider the model of lexical semantics developed by Lieber (2004). To account for the narrow range of meanings found in derivational affixes and the frequent occurrence of synonymy Lieber proposes a small system of abstract semantic features which defines the lexical semantic space. Compositions of these features build the so-called skeleton of each lexical item, which is meant to represent all and only those aspects of meaning which are relevant to syntax. Skeletons are illustrated with the simplexes in (94a) and the affixes in (94b) (cf. Lieber 2004: 25, 39):

(94) a.	[+material] ([ ])	table, leg, pickle
	[-dynamic] ([ ])	happy, old, kind
	[+dynamic] ([ ])	snore, dance, stumble
	[+material] ([ ], ([ ]))	leg (of table), foot (of mountain)
	[-dynamic] ([ ], ([ ]))	fond (of pickles), keen (on mountains)

<sup>66</sup> The relevance of choice for meaning is by no means unique to morphology. The word /tu:/ has meaning in *Jane is too young* because it can be left out or replaced (*Jane is young; Jane is very young*); the word /tu:/ has no meaning in the construction *Jane is to stay*, where it can be neither left out nor replaced by some other word.

- b. [-material ([ ], <base>)] -ness, -ity, -hood, -ship, -ism  
 [-material, dynamic ([ ], <base>)] -ation, -al, -ment, -ance, -ure

The feature [ $\pm$ material] signals the conceptual category of substances/things/ essences, where [+material] defines concrete nouns and [-material] defines abstract nouns. The feature [ $\pm$ dynamic] signals a situational meaning, such that [+dynamic] corresponds to an event or a process and [-dynamic] corresponds to a state. Meanings of complex words are computed by adding affixal skeletons as an outer layer to the skeleton of the base, thereby subordinating that skeleton. In Lieber's description the term "base" does not refer to independent words but rather to the stems, that is, to word-internal constituents.

Meaning differences between nouns associated with the skeleton specified as '[+material] ([ ])' such as *table*, *leg*, *pickle*, etc are expressed in terms of differences in the 'body'. The body differs from the skeleton in being encyclopedic, holistic, and nondecompositional. The absence of meaning differences between the affixes in each row in (94b) results from the fact that "derivational affixes will often have little or nothing in the way of semantic bodies." (2004: 10). In view of the findings presented in this paper Lieber's account raises many questions such as:

- What determines whether or not affixes have a body?
- Assuming that affixes are signs, what prevents some from having bodies?
- Assuming that specific affixes are associated with specific skeletons as in (94b), what accounts for the dependence of the affix meaning on the category of the base? (e.g. *forgiveness*, *ignorance*, *moisture*)

I contend that while English speakers might learn to associate the content words in (94a) with the corresponding skeletons they never associate the affixes in (94b) with any meaning. These affixes, to the extent that they are productive, are associated with selectional properties as in (90) or are recognized as pure syntactic category markers. Nothing else needs to be learned about them.

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