The Theta System

Argument Structure at the Interface

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Hidden Entries: a Psycholinguistic Study of Derivational Gaps

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8.1 Introduction

A well-known fact about verbs is that they appear in different diatheses (voices). For example, the notion of 'opening' can be realized as a transitive verb (*Mary opened the door*), as an unaccusative verb (*the door opened*), and as a verbal passive (*the door was opened by Mary*). Among scholars addressing this phenomenon, there is a consensus that different verbal alternant of the same thematic notion are derivationally related. In other words, it is widely agreed that there is a systematic, rule-governed connection between the various diatheses.

When attempting to form a specific generalization regarding any derivational alternation, one of the issues that must be addressed is derivational gaps: cases in which one alternant is idiosyncratically absent from the vocabulary of a certain language. Consider, for example, unaccusative verbs and their transitive alternates. A model which views these voices as derivationally related is not complete if it does not account for the fact that in English, for instance, the unaccusatives *roll* and *close* have a transitive alternative (*Mary rolled the ball/closed the window*) while the unaccusatives *collapse* and *vanish* do not (**Mary collapsed the sand castle/vanished the diamonds*). If unaccusative and transitive verbs are connected by a systematic rule, the fact that some transitive equivalents of existing unaccusatives are absent from the English vocabulary cannot be overlooked. An exhaustive analysis of this alternation would have to take a stand regarding this absence. A priori, two types of

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linguistic encoding, I use the term 'hidden lexical entries'. I adopt Horvath and Siloni's (2008a) terminology, which distinguishes between 'the mental lexicon'—a component of grammar consisting of lexical entries—and 'the actual vocabulary' of a particular language—the set of words speakers use. Accordingly, I define hidden lexical entries as forms that do not exist in the vocabulary of a language, but are assumed to have a representation in the mental lexicon.

The assumption of lexical entries that lack a corresponding vocabulary item is often perceived as an ad hoc, unfalsifiable theoretical tool, whose postulation should be avoided (Aronoff 1976; Anderson 1992). Lacking a corresponding vocabulary item, these forms are always hidden in the mental lexicon and are never used in an utterance. Consequently, there appears to be no way of providing theory-independent evidence for their existence.

In this chapter I demonstrate that a psycholinguistic research can be employed to decide between 'the nonexistence approach' and 'the hidden representation approach'. I argue that given the common assumption that the lexical component of a language interfaces with the conceptual system (e.g. Fodor 1975; Pinker 1994; Sperber and Wilson 1997), it is not unreasonable to assume that lexical encoding affects the perception of the matching concept, i.e. the mental notion corresponding to it. Therefore, keeping in mind that the language faculty interacts with other components of the human cognitive system, the existence of a lexical representation should be traceable even when there is no direct evidence for it, i.e. no corresponding vocabulary item. Based on this assumption, I conducted an experimental study that explores the psychological reality of hidden lexical entries. This research used the transitive–unaccusative verbal alternation as a case study, and its results support the psychological reality of the hidden lexical entries mechanism suggested by Reinhart (2002; forthcoming, a) and Horvath and Siloni (2008a). The chapter shows that, even though hidden lexical entries are missing from the list of actual words, they are not unfalsifiable theoretical constructs.

The chapter is structured as follows: Section 8.2 presents the transitive–unaccusative alternation and two alternative derivational gaps accounts (Arad 2005 v. Reinhart 2002; forthcoming, a; Horvath and Siloni 2008a) suggested in this context. Section 8.3 discusses a distinction made by Horvath and Siloni (2008a), which provides a natural ground to compare the validity of the accounts discussed in section 8.2. Section 8.4 suggests a general hypothesis regarding the relation between lexical encoding and the conceptual system and presents an experiment designed to test the predictions of this hypothesis. In section 8.5 I present a subsequent experiment conducted to provide further reinforcement to my analysis of the experimental results, and section 8.6 brings my conclusion.

8.2 Unaccusative verbs and gaps in the transitive–unaccusative alternation

Perlmutter's (1978) unaccusativity hypothesis splits the class of intransitive verbs into two distinct sub-types, unaccusative verbs (*break*, *vanish*, *roll*, sometimes referred to as inchoative verbs) and unergative verbs (*run*, *walk*, *sneeze*). Ever since its formulation, unaccusativity has been the target of many analyses within different frameworks and views of grammar. Within the principles and parameters framework (Chomsky 1981), it is argued that unaccusative verbs lack an external argument; their grammatical subject is an underlying object, i.e. an internal argument. Indeed, across languages, the subject of unaccusatives passes tests diagnosing internal arguments, unlike the subject of unergative verbs (e.g. Perlmutter 1978; Burzio 1986; Chomsky 1981; Reinhart 1991; Borer 1994; Levin and Rappaport Hovav 1995; Meltzer and Siloni forthcoming; Pesetsky 1995; Reinhart 2002; forthcoming, a; Alexiadou, Anagnostopoulou, and Everaert 2004; Reinhart and Siloni 2005). I adopt this view of unaccusativity.[2, 3]

A prominent cross-linguistic fact about unaccusative verbs is that they tend to have a transitive alternative, a phenomenon I will refer to as the transitive–unaccusative alternation (also known in the literature as the causative–anticausative alternation). Some examples of the alternation are given in (1)–(4):

English:

(1) a. The window broke
b. The girl/ stone/wind broke the window

(2) a. The ball rolled
b. The girl/wind rolled the ball

Hebrew:

(3) a. *ha-kadur* *hitgalgel*
The-ball rolled
'The ball rolled'

b. *Roza/ha-ru'ax* *gilgela* *'et* *ha-kadur*
Roza/the-wind rolled.TRANS ACC the-ball
'Roza rolled the ball'

[2] For psycholinguistic and neurolinguistic evidence in favour of the unaccusative hypothesis, see e.g. Costa and Friedmann (Ch. 13 below), Friedmann et al. (2008), Shetreet, Friedmann, and Hadar (2010).

[3] There are other views. For example, Van Valin (1990) claims that unaccusativity should be given a semantic analysis and need not be encoded in syntax. Sorace (1995; 2000) maintains a completely different concept of unaccusativity. According to her, there is no distinct unaccusative subset. Rather, there is an unaccusativity hierarchical scale based on aspectual and thematic properties, where unaccusatives and unergatives are at opposite ends, and in between there are verbs not unequivocally one or the other.

(4) a. *ha-'agartal* *nafal*
The-vase fell
'The vase fell'

b. *ha-tinok/kadur* *hipil* *'et* *ha-'agartal*
The-baby/ball fall.TRANS ACC the-vase
'The baby/the ball caused the vase to fall'

The transitive–unaccusative alternation inspired researchers to assume a derivational relation between the two alternants. Thus, it is a widely held assumption that unaccusative verbs and their transitive counterparts are derivationally related (e.g. Levin and Rappaport Hovav 1995; Harley 1995; Pesetsky 1995; Marantz 1997; 2006; Reinhart 2002; forthcoming, a; Doron 2003; Reinhart and Siloni 2003, 2005; Chierchia 1989/2004; Arad 2005; Alexiadou Anagnostopoulou, and Schäfer 2006; Ramchand 2006; Horvath and Siloni 2008a; 2008b; Koontz-Garboden 2009 among many others).

Similarly to other derivational alternations, the transitive–unaccusative alternation also exhibits derivational gaps. As illustrated and listed below, there are cases in which the transitive counterparts of certain unaccusative verbs are idiosyncratically missing from the vocabulary of a given language:

(5) a. The tower collapsed
b. *The wind/the emperor collapsed the tower

(6) a. The spot vanished
b. *The cleaners/the detergent vanished the spot

(7) a. *ha-cemax* *naval* (Hebrew)
the-plant wilted
'The plant wilted'

b. *ha-zman/ganan* *hinbil/nibel*[4] *'et* *ha-cemax*
the-time/gardener wilt.TRANS ACC the-plant
'Time/the gardener caused the plant to wilt'

(8) Further examples for non-alternating unaccusatives:
Hebrew: *hirkiv* 'got rotten', *kamaš* 'withered', *daha* 'faded', *hexmic*[5] 'turned sour', *hexlid* 'became rusty'.
English: (from Friedmann et al. 2008): *appear*, *arise*, *arrive*, *stand*, *emerge*, *depart*, *exist*, *disappear*, and *flower*.

[4] These nonexistent Hebrew verbs are given in the CiCeC (*pi'el*) and hiC.CiC (*hif'il*) verbal templates which are typical of Hebrew transitive verbs.

[5] *hexmic* is ambiguous between 'turned sour' (an unaccusative) and 'pickled' (a transitive). But the latter is not the transitive alternative to the former.

The examples above are of sporadic gaps. Because these gaps occur idiosyncratically in some languages and not in others, their absence from the vocabulary cannot be explained semantically. Thus, for example, *collapse* and *vanish* have a transitive alternant in Hebrew (*motet* and *he'elim* accordingly) and *wilt* has a transitive alternant in Hungarian (*elhervaszt*). It seems unreasonable to argue that the semantics of a transitive lexical entry would prevent it from having a corresponding vocabulary item in one language, while a semantically identical verb can be found in the vocabulary of another. There is also no morphophonological generalization that can provide an explanation for the absence of these transitive forms. First, in English the transitive and unaccusative forms are identical; so there could be no morphophonological reason ruling out the one but not the other. Second, in Hebrew the unaccusative *nafal* 'fall', for instance, has a transitive counterpart in the vocabulary (*hipil*) while the phonetically minimally different *naval* 'wilt' does not.[6] Finally, these gaps cannot be accounted for by a process of 'blocking': Aronoff (1976) suggests that a rule can be blocked when its output is semantically equivalent to an item already existing in the mental lexicon. Importantly, the transitive alternates in (6) and (7), for example, missing from Hebrew and English respectively, do not have a semantic equivalent, which could have blocked them from appearing in the vocabulary of these languages.

As demonstrated above, there is no characteristic that singles out the absent transitive forms from the existing ones. Some forms are idiosyncratically absent from specific vocabularies and their absence cannot be attributed to any independent constraint. Consequently, an analysis of the transitive–unaccusative alternation (like other analyses of derivational alternations), would not be complete without addressing this phenomenon.

As mentioned in section 8.1, a priori there are two possible approaches. (i) 'the nonexistence approach': the corresponding entries do not exist; (ii) 'the hidden representation approach': the corresponding entries exist, but are prevented from occurring as actual vocabulary items. According to the nonexistence approach, then, certain transitive alternates of unaccusatives are missing because the derivational operation which connects unaccusatives to their transitive counterparts is not always productive. According to the hidden representation approach, the missing transitives exist, but are prevented from being part of a particular language's actual vocabulary by some mechanism.

A discussion of possible accounts for derivational gaps in the transitive–unaccusative alternation can be found in Arad's (2005) study of the morphosyntax of Hebrew. Arad assumes that the primitives mapped to the syntax are category neutral

[6] Some of the Hebrew unaccusatives presented in (8) (e.g. *hirkiv*, *hexlid*) appear in the *hif'il* (hiC.CiC) template, which is typically a transitive template. Nonetheless, this cannot be the reason for the absence of their transitive counterparts from the vocabulary, as there are many instances where the same *hif'il* form is used for both unaccusatives and transitives. Some examples are *hexsix* (became dark/made dark), *hisri'ax* (smelled/ made smell), *he'mik* (deepen), and *hivsil* (ripen).

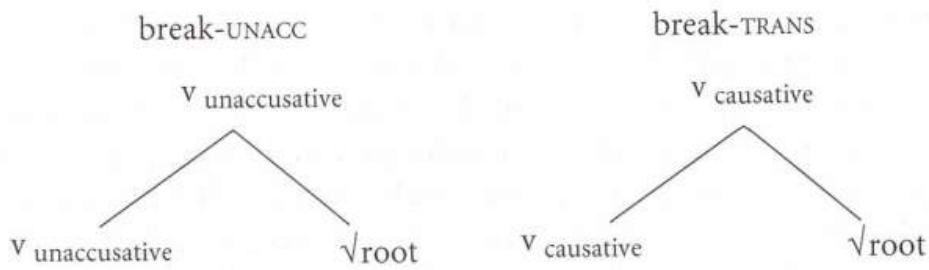

FIGURE. 8.1 The syntactic representation of unaccusatives and their transitive counterparts (Arad 2005)

'atomic roots' and functional heads/features merged together in the syntactic component, which is the only computational component of grammar. Accordingly, within Arad's analysis, roots turn into words only after they have merged with a category determining head in the syntax. In the case of verbalized roots, their unaccusative or transitive properties are determined by the type of verbalizing head that attaches to them. As schematized in Fig. 8.1, the relation between the transitive and the unaccusative alternants of the same verbal concept directly results from originating from the same root.

Arad mentions two alternative ways of accounting for derivational gaps, and considers them empirically equal: (a) The missing items are absent because they lack an interpretation. There is no suitable item to match their syntactic structure in the encyclopedia; therefore, they crash at LF. (b) Certain roots are marked as unable to be combined with certain verbalizing structures. These two alternatives are varieties of the nonexistence approach, as both view the missing alternant as nonexistent.

A hidden lexical representation approach to the missing alternants in the transitive–unaccusatives alternation is provided by Reinhart (2002; forthcoming, a) and Horvath and Siloni (2008a; 2008b). Let us first summarize their approach to unaccusative verbs. As will be discussed in more detail in section 8.3, following Pesetsky (1995), they distinguish between one-place unaccusatives and two-place unaccusatives. While the latter are underived entries, the former are always derived by a lexical operation applying to the theta grid of the transitive. The operation, which is labelled 'decausativization', reduces the transitive verb's Cause (external) role altogether. A cause role, contrary to the Agent, is unspecified with regard to the mental state of the (corresponding) argument, and can therefore be assigned to either an animate or an inanimate argument. Thus, for example, the verbs *open* and *break*, which assign a Cause role, undergo decausativization, and have unaccusative alternants (9)–(10), unlike *eat*, whose external role is an Agent (11) (for more on decausativization, see Reinhart forthcoming, a; for the semantics of the operation see Dimitriadis, Chapter 12 below).

(9) a. The boy/the wind opened the door
b. The door opened

(10) a. The boy/the stone broke the window
b. The window broke

(11) a. The boy/*the spoon/*hunger ate the soup
b. *The soup ate

The operation that creates unaccusatives from their transitive alternants is schematized in (12) (abstracting away from details):

(12) Decausativization: V (θ Cause θTheme) → V θTheme

If so, then how come certain transitive alternates of one-place unaccusatives are missing? Reinhart (2002; forthcoming, a) and Horvath and Siloni (2008a) observe that all one-place unaccusative verbs seem to have a transitive alternant in one language or another, or had one in an earlier stage of the language. They assume with Fodor (1975) (among others) that lexical information is largely universal, i.e. that apart from phonological matrixes, information coded in the lexicon is by and large common across natural languages. This means that transitives that are missing from the vocabulary of a particular language but exist in other vocabularies must be listed in the lexicon. Following Chierchia (1989/2004), Reinhart and Horvath and Siloni suggest that in such cases the representation in the mental lexicon is abstract or 'frozen'. Frozen lexical entries are entries that cannot be inserted into the syntax, and hence are not part of the language's actual vocabulary. However, being lexical entries, they can serve as inputs to lexical operations; specifically, they can feed decausativization (12b) on a par with non-frozen entries (12a) (the nonexistent form is marked by *):

(13) Decausativization: V_{ACC} (θ Cause θ Theme) → V θ Theme
a. open-TRANS → open-UNACC
And also:
b. *vanish-TRANS → vanish-UNACC

Thus, while Arad's account is a nonexistence approach, Reinhart and Horvath and Siloni believe that there are hidden lexical representations. At first blush, the former seems like the preferable option. It seems like the null hypothesis—a transitive form is missing in a certain language because it simply does not exist. Nevertheless, if there is independent evidence supporting the hidden representation approach, the nonexistence approach should be abandoned. But is there a way of distinguishing a hidden lexical representation from a nonexistent one? After all, what type of evidence can support the claim that a missing form is in fact listed in the mental lexicon?

8.3 Three classes of unaccusative verbs and three types of transitive concepts

Horvath and Siloni (2008a) classify unaccusative verbs with no transitive counterpart in the vocabulary into two types: the *arrive* class and the *appeal* class. The *arrive* class consists of unaccusative verbs for which the transitive alternates are idiosyncratically absent from the vocabulary of certain languages while existing in others. For example:

(14) a. Hungarian
Unaccusative: *összeesik* 'collapse'
No transitive alternative

Hebrew
Unaccusative: *hitmotet* 'collapse'
Transitive: *motet*

b. Hebrew:
Unaccusative: *naval* 'wilt'
No transitive alternative

Hungarian:
Unaccusative: *elhervad* 'wilt'
Transitive: *elhervaszt*

c. English:
Unaccusative: *vanish*
No transitive alternative

Hebrew:
Unaccusative: *ne'elam* 'vanish'
Transitive: *he'elim*

In languages that morphologically mark valence reduction, these unaccusatives often bear morphological forms typical of valence-reducing operations.

The *appeal* class consists of two-place unaccusative Experiencer verbs with a nominative Theme argument that is generated internally and an Experiencer, which (in most cases) bears an oblique case (Belletti and Rizzi 1981; Pesetsky 1995). Importantly, this class constitutes a cross-linguistic phenomenon. Unlike the *arrive* class, these verbs systematically do not have a transitive alternative across languages (as far as is known). There is thus no cross-linguistic evidence to assume the existence of frozen transitive alternants (Reinhart 2002; forthcoming, a). Moreover, these verbs do not appear in a morphological form typical of valence-reducing operations:

(15) *ha-ra'ayon* *xamak* *mimeni*
The-idea escaped from+me
'The idea escaped me.'

(16) *ze* *medaber* *elay*
It talks to+me
'It appeals to me.'

Another characteristic that distinguishes the *appeal* class from the *arrive* class is that the *arrive* class unaccusatives have adjectival passive counterparts, while the *appeal* class unaccusatives do not (Pesetsky 1995). For example:

(17) a. *Dan kana praxim nevulim* (Hebrew)
Dan bought flowers wilted
'Dan bought wilted flowers'

b. **ha-ra'ayon ha-ze xamuk (mimeni)*
the-idea the-this escaped (from+me)
*'this idea is escaped (from me)'

Based on these observations, Horvath and Siloni (2008a) conclude that unaccusatives of the *arrive* class have frozen (hidden) transitive alternants that serve as input for the lexical operation that creates unaccusative verbs (decausativization) and for the lexical operation of adjectival passive formation, while unaccusatives of the appeal class are cross-linguistically underived and have no corresponding transitive entry, not even a frozen one.[7]

This classification enables us to tease apart hidden representation from nonexistence, because it allows comparison of items with no transitive alternative whatsoever to those argued to have frozen/hidden alternants. If the behaviour of the two sets can be shown to be different in a relevant way, the hidden existence approach would receive significant support. The existence of a class of underived unaccusative verbs, then, turns out to be crucial for our purposes.

Given Horvath and Siloni's distinction, there are three possible types of unaccusative verbs:

(i) derived, with a transitive alternant in the vocabulary (e.g. *open*);
(ii) derived, with a frozen transitive alternant (e.g. *collapse*, *vanish*);
(iii) underived, with no transitive alternant at all (e.g. *appeal*, *escape*).

These three types of unaccusatives are related to the following three types of logically possible transitive concepts:

1. type I transitive concepts: with a corresponding vocabulary item (e.g. *making something open*);
2. type II transitive concepts: with a corresponding hidden lexical representation (e.g. *making something vanish*);
3. type III transitive concepts: with no lexical representation at all, not even a hidden one (e.g. *making something escape the mind of someone*).

I hold that the different nature attributed to each type of transitive concept is predicted to reflect on their accessibility. In the following section, I show how the

[7] Horvath and Siloni suggest that the operation forming adjectival passives applies in the mental lexicon and requires transitive entries as input. This accounts for the correlation between the lack of cross-linguistic evidence for transitive entries and the absence of adjectival passive alternants. For further details, see Horvath and Siloni (2008a).

connection between the lexical encoding and the accessibility of a concept can be used to explore the psychological reality of hidden lexical representations.

8.4 The GABLE hypothesis: predictions and experiment

The effect the existence of a vocabulary item has on the perception of the corresponding concept is a well-studied topic in the psycholinguistic research of colour terms. Kay and Kempton (1984), for example, found that even though colour concepts are universally defined, speakers of languages which use separate vocabulary items to refer to perceptually close colours such as blue and green utilize the linguistic classification when asked to categorize intermediate shades of these colours.

Kay and Kempton label this phenomenon 'the name strategy', and suggest that the existence of a parallel word affects the facilitation of a concept. I take this view one step further, and argue that in light of the fact that the mental lexicon is commonly assumed to have an interface with the conceptual system, any type of lexical representation, even a hidden one, is predicted to have an effect on the perception of the corresponding concept. I therefore formulate the following general hypothesis regarding the connection between lexical encoding and the accessibility of concepts:

(18) *GABLE (graded accessibility by lexical encoding)*
The relative accessibility level of a concept is affected by its lexical encoding:
(a) The existence of a word in the vocabulary of a language X is an accessibility enhancer for the concept it represents.
(b) The existence of a lexical entry (with or without a corresponding vocabulary item) is also an accessibility enhancer for the concept it represents.
(c) The enhancing effects of (a) and (b) are additive.

According to the GABLE hypothesis, a concept with a corresponding vocabulary item will be more accessible than a concept without a corresponding vocabulary item, and a concept with a corresponding lexical entry will be more accessible than a concept without a corresponding lexical entry. In other words, it predicts a difference between hidden and nonexistent lexical entries corresponding respectively to type II and type III concepts. Thus, provided with a method designed to measure the accessibility levels of concepts, the GABLE hypothesis can be used to detect the existence of hidden lexical entries.

With regard to gaps in the transitive-unaccusative alternation, the GABLE hypothesis makes two predictions. First, if frozen lexical entries are psychologically real, the GABLE hypothesis predicts that type I transitive concepts, with two accessibility

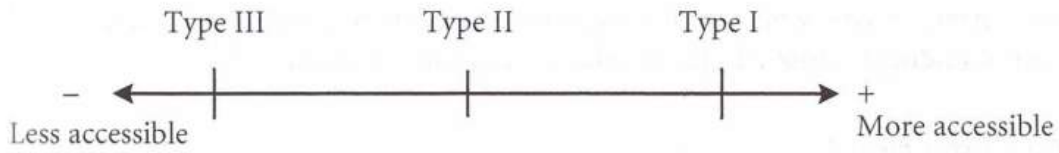

FIGURE 8.2 A three-way distinction

FIGURE 8.3 A two-way distinction

enhancers (vocabulary item and lexical entry), will be more accessible than type II transitive verbal concepts, with one accessibility enhancer (a hidden lexical entry), and that type II concepts will be more accessible than type III transitive concepts, which have no accessibility enhancers. This three-way distinction is schematized in Fig. 8.2.

A three-way distinction is consistent with Reinhart's (2002; forthcoming, a) and Horvath and Siloni's (2008a) hidden representation account, since it uses the notion of hidden lexical entries ('frozen lexical entries') to explain gaps in the transitive–unaccusative alternation. In contrast, a three-way distinction of this kind would be inconsistent with Arad's (2005) nonexistence account. This is because it only distinguish between concepts with a corresponding vocabulary item (hence, with a lexical representation) and concepts without a vocabulary item (hence, with no lexical representation).

The second prediction the GABLE hypothesis makes regarding gaps in the transitive–unaccusative alternation is that, if frozen lexical entries are not psychologically real, a two-way distinction should be observed. If type II unaccusatives do not have a hidden transitive alternate and are identical to type III unaccusatives with regard to lexical encoding, the prediction is that type I transitive concepts (two accessibility enhancers) will be more accessible than type II and III transitive concepts (no accessibility enhancers). In other words, as shown in Fig. 8.3, the accessibility levels of types II and III are not expected to be different.

A two-way distinction would be inconsistent with Reinhart (2002; forthcoming, a) and Horvath and Siloni (2008a), who predict a three-way distinction, but compatible

with Arad (2005), who assumes only two types of unaccusatives—those with a corresponding transitive in the vocabulary and those without one.

8.4.1 *Experiment 1*

The following experiment was designed to measure the relative accessibility levels of type I, II, and III transitive concepts once a speaker is exposed to their unaccusative verbal variant, hence to compare the validity of the approaches described above.

8.4.1.1 *Participants* Participants included twenty adult native Hebrew speakers, ten male and ten female, with an education level of thirteen years or more. Participants' age ranged from 19 to 29 (mean age 24.1). None had any relevant prior linguistic education.

8.4.1.2 *Materials and design* The stimuli consisted of nine unaccusative verbs with a corresponding transitive in the vocabulary (type I); six unaccusative verbs with no transitive alternate in the vocabulary, but with a parallel adjectival passive alternate, which, following Horvath and Siloni (2008a), was taken to suggest that they have a frozen/hidden transitive alternate (type II); and six two-place unaccusative verbs with no transitive alternate, no adjectival passive alternates, and no known cases of transitive alternates in the vocabulary of languages other than Hebrew (type III). Unaccusatives were identified based on two Hebrew unaccusativity diagnostics: modification by a possessive dative and simple inversion (Borer and Grodzinsky 1986; Shlonsky 1997; Meltzer & Siloni forthcoming). For the full list of unaccusative verbs used in experiment 1, see appendix A.

For each of the twenty-one unaccusative verbs, a very short story was composed. The stories included scenarios that established the status of an entity as the causer of some event through relevant content. In each story, the event was only labelled towards the end of the vignette, using a sentence with one of the unaccusative verbs ('the unaccusative sentence'). The very last sentence of the story described an outcome of the event ('the outcome sentence').

Subjects were then asked to rate from 1 (least acceptable) to 8 (most acceptable) the extent to which they perceived the causer of the event to be 'the executor of a specific action' that resulted in whatever the outcome sentence described. Examples (19) and (20) are translations of stories, stimuli sentences, and tasks composed for the unaccusatives *nafal* 'fall', a Hebrew type I unaccusative, and *xamak me-* 'escape (the mind of)', a type III unaccusative.

(19) John and Mary are twins. They are a bit similar and a bit different. John, for example, is a clumsy boy who always drops stuff and Mary is not clumsy at all. In fact, teasing John about his clumsiness is Mary's very annoying habit. Last week they were on their way to Grandma's house for a holiday dinner. John

carried the cake and his sister Mary carried a glass dish that contained some fish. The dish was cold, slippery and heavy. Mary felt how it began to slip out of her grip.

The dish **fell** on the sidewalk. John gloated.

On a scale of 1–8, how acceptable/conceivable for you is it to consider Mary as the executor of **one specific action** that resulted in the gloating of John?

(20) Danny was very happy, he was elected chairman of the prom's decoration committee. He was excited about the chance to finally express his creative side. Unfortunately, as the date approached, Danny found it very difficult to come up with a good enough decorating idea. It was about two days before prom night when Danny made himself sit in his room and think really hard. After sitting there for nearly two hours, it seemed to him that this method might be working and that an idea should pop up very soon. But—alas! in the exact moment he felt an idea getting structured in his mind, his sister shouted from the other room: 'Danny, would you be a dear and make me a sandwich?'

The idea **escaped** Danny's mind. It was now completely empty.

On a scale of 1–8, how acceptable/conceivable for you is it to consider Danny's sister to be the executor of **one specific action** that resulted in the emptiness of his mind?

The rationale behind this task is that in order to grade the extent to which the causer (e.g. Mary, Danny's sister) is the executor of the event described by the unaccusative verb (e.g. the falling of the dish, and the escaping of the idea from Danny's mind), participants must facilitate the transitive concept corresponding to it. Recall that the GABLE hypothesis predicts that for each unaccusative, if the relevant transitive concept has a parallel vocabulary item in Hebrew, it should be more accessible than transitive concepts without a parallel vocabulary item, and that if the relevant transitive concept does not have a parallel vocabulary item, but does have a parallel lexical entry (a hidden lexical entry), it should be more accessible than a concept with no representation in the mental lexicon at all. The more accessible a transitive concept is for speakers, the more prominent the role of the causer as the event's executer should be. Therefore these different accessibility levels should positively correspond with the acceptability ratings participants give to causers.

Finally, as described and illustrated above, this experimental design used outcome sentences as mediators between the unaccusative sentence and the task. This was done for two reasons. First, a question that directly concerns the event described in the unaccusative sentence (e.g. how acceptable/conceivable for you is to consider Mary as causing the dish to fall?) would have to include the unaccusative counterpart of the transitive concept whose accessibility we wish to measure. This might blur the

picture, since it might induce the facilitation of all three types of transitive concepts, thus masking the differences between them. Second, the use of outcome sentences differentiates the task from a simple content question. This is important, since it ensures participants will not concentrate on memorizing the details of the stories, which could disrupt the process of providing an intuitive judgement.

8.4.1.3 *Procedure* Each subject participated in a short, one-on-one training session which included two items. Two subjects who did not show a full understanding of the task were excluded from the experiment.[8]

The experiment was conducted using a PowerPoint slide show and an answer form. The first slide included the first story. Only in the next slide, after pressing the ENTER key, did the subject encounter the unaccusative sentence, the outcome sentence, and the task. This separation was maintained in order to ensure that it was the unaccusative's verbal concept participants were considering while answering, and not any other verbal concepts mentioned in the story. Also for this purpose, participants were instructed that once they have moved on to the next slide they cannot go back. In addition, the unaccusative verbs appeared in boldface.

8.4.1.4 *Results* Since the data was measured on an ordinal scale, non-parametric statistics were used to analyse the results. A Friedman test revealed a significant effect of verb type on median ratings per subject (X^2 (2) = 25.73, $p < 0.0001$) (see Figs. 8.4 and 8.5). A post hoc Wilcoxon signed-rank test comparing median acceptability ratings per participant per verb type showed that the median ratings for type I unaccusatives (median = 8, inter-quartile range = 1) are significantly higher than the median ratings for type II (median = 6, inter-quartile range = 1.75) (one-tailed: W(18) = 171, $p < 0.0001$), and that the median ratings for type II unaccusatives are significantly higher than the median ratings for type III unaccusatives (median = 5, inter-quartile range = 5) (one tailed : W(19) = 119, $p = 0.0087$). When p is corrected for multiple comparisons, this pattern remains intact (i.e. Type I > Type II > Type III).

8.4.2 *Discussion*

As detailed above, a statistical analysis of the participants' performance found the ratings for type I concepts significantly higher than the ratings for type II concepts, and the latter significantly higher than the ratings for type III concepts. Hence, type I concept were found to be more accessible than type II concepts and type II were found to be more accessible than type III.

[8] These participants provided long and detailed philosophical explanations for their performance in the training session, thus demonstraing a clear misconception of the intuitive judgement they were asked to give.

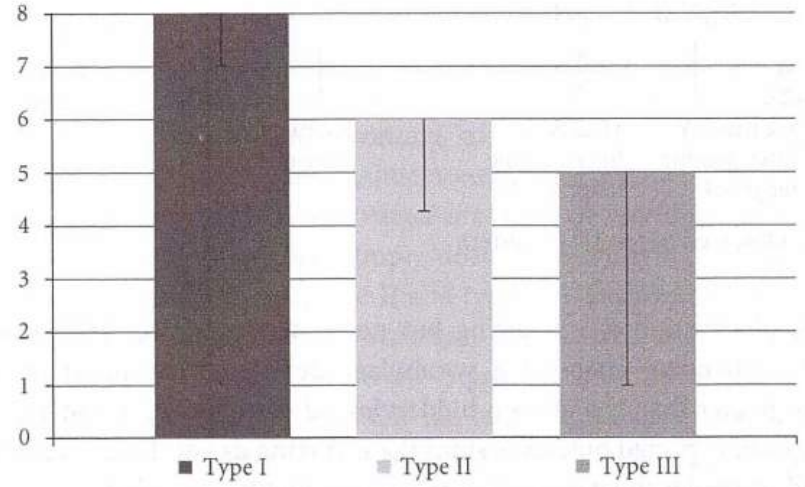

FIGURE 8.4 Median ratings per verb type (error bars represent inter-quartile range)

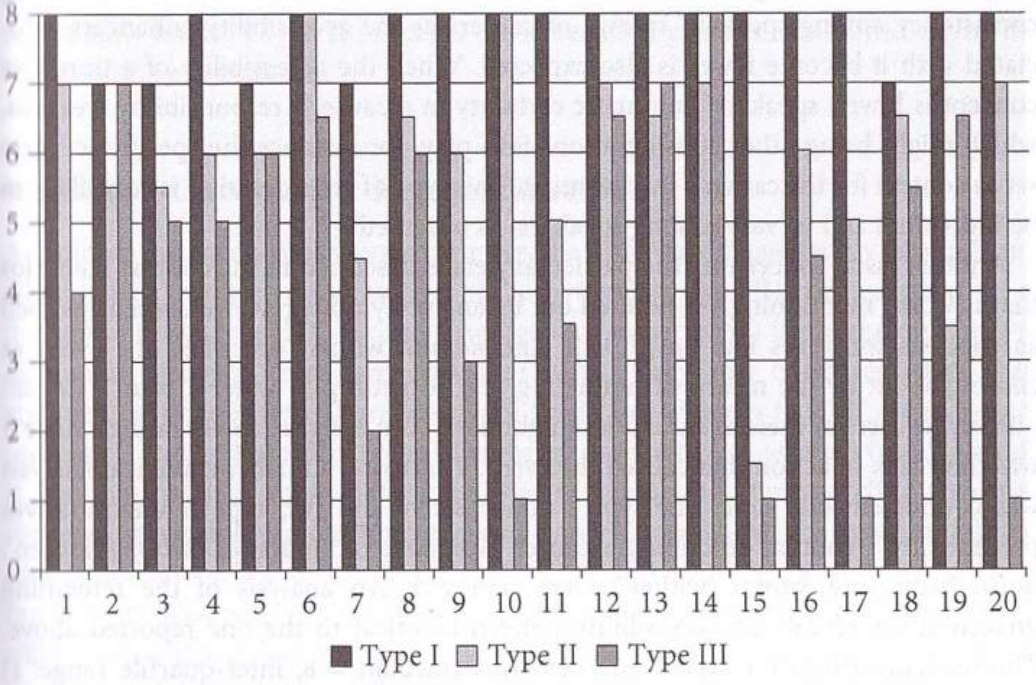

FIGURE 8.5 Median ratings per subject

Furthermore, as schematized in Fig. 8.6 below, the collected ratings are not distributed evenly across the accessibility scale. The difference in the ratings provided for type I concepts and type II concepts, is greater than the difference between type II and type III. This suggests that the enhancing effect a vocabulary item has on the accessibility of the corresponding concept is greater than that of a (hidden) lexical

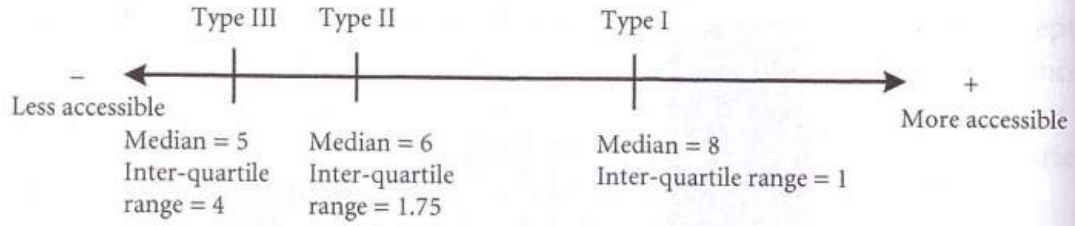

FIGURE 8.6 Observed accessibility pattern

entry. This observation is interesting but not at all surprising. It shows that the accessibility-enhancing effect of a vocabulary item used in spoken and written language is greater than the effect a hidden lexical entry has on a concept's accessibility. This is an expected outcome, since the recurring use of these vocabulary items is predicted to render the corresponding concept highly accessible.

In addition, the variance among speakers is rather small when rating the causer of a type I transitive concepts (inter-quartile range = 1), higher (inter-quartile range = 1.75) when rating the causer of a type II concept, and much higher (inter-quartile range = 4) when rating the causer of a type III concept. This pattern of a decreasing consistency among speakers' ratings of causers as the accessibility enhancers associated with it become fewer is also expected. When the accessibility of a transitive concept is lower, speakers' automatic certainty in a causer's responsibility weakens, which might bring other considerations into play, for instance the specific scenario set as context for the causer's involvement. This type of consideration is very likely to be individual and to vary among speakers, as observed.

Another issue concerning the particular details described in the context scenarios that is worth mentioning. As pointed out by an anonymous reviewer, scenarios used as contexts for verbs like *naval* 'wilt' and *kamaš* 'wither' described the event as coming about by the means of not acting (e.g. forgetting to water a plant). Consequently, causers of these eventualities might have been assigned lower ratings, since it was their lack of action that caused the event. Therefore, a further statistical analysis was conducted: this time, one type I unaccusative and two type II unaccusatives preceded by a context describing a causer avoidance of an action (*hitrofef* 'loosen', *naval* 'wilt', and *kamaš* 'wither') were removed. An analysis of the remaining unaccusatives reveals an accessibility pattern identical to the one reported above. The median ratings for type I unaccusatives (median = 8, inter-quartile range: 1) are significantly higher than the median ratings for type II (one tailed: $W(13) = 91$, $p = 0.0008$), and the median ratings for type II unaccusatives (median = 6, inter-quartile range: 2) are significantly higher than the median ratings for type III (median = 5, inter-quartile range = 4) (one tailed: $W(15) = 73$, $p = 0.02$). Therefore, speakers' judgements were not influenced by this variable.

The results of experiment 1 reveal a three-way distinction between type I, type II, and type III transitive verbal concepts. Considering the observed pattern of

accessibility, it is clear that some property, uniquely possessed by type II transitive concepts, renders them more accessible than type III transitive concepts, even though both types lack a corresponding word in the vocabulary of Hebrew. This is evidence in favour of Reinhart's (2002; forthcoming, a) and Horvath and Siloni's (2008a) hidden representation account, and against nonexistence accounts like Arad's (2005).

Recall that, according to the nonexistence accounts, derivational gaps occur when a part of a derivational alternation simply does not exist in a particular language. Consequently, for these accounts, type II and type III transitive concepts are identical. They both lack a corresponding vocabulary item as well as a lexical representation, and are therefore not expected to trigger different accessibility for their transitive alternates, contrary to fact. On the other hand, according to the hidden representation account assumed by Reinhart (2002; forthcoming, a), and Horvath and Siloni (2008a), while type II transitive verbal concepts are listed in the mental lexicon in a hidden manner (idiosyncratically marked as unable to be inserted into the syntax), type III verbal concepts are not listed at all. As a result (under the assumption that the lexical encoding of a concept affects its perception), this account predicts that the accessibility levels of type III concepts will be lower than the accessibility levels of type II concepts. As stated, this prediction is borne out by the results of the experiment.

8.5 Hidden Cause subject-Experiencer verbs

As pointed out by an anonymous reviewer, the difference suggested by Horvath and Siloni (2008a) between unaccusatives of the *arrive* class (type II) and unaccusatives of the *appeal* class (type III) (derived v. underived, respectively) is not the only way to distinguish between these two classes of verbs. They also differ regarding their argument structure (type II are one-place predicates whereas type III are two-place predicates) and in the fact that type III verbs are psychological, whereas type II are not. It may be that it is these differences that influence the corresponding transitive concepts' imageability and concreteness, and are responsible for the significant difference between type II and type III concepts. Thus, if the conditions of the experiment can be controlled with regard to these factors, the conclusions drawn from its results will possess a higher degree of certainty. With these particular classes of verbs, such an experimental design is impossible, since the class of unaccusatives suspected as underived are two-place psychological verbs, while the other two classes are not.

Nevertheless, there is a class of two-place psychological verbs argued to be derived from a hidden transitive lexical representation that can be compared with type III unaccusatives.[9] Before introducing this set of verbs, we have to discuss the verbal

[9] The relevance of these verbs for the purposes of this study was pointed out to me by Tal Siloni (p.c.).

alternation relevant for them: the alternation between object-Experiencer verbs (as in *The doctor worried John*) and their one-place, subject-Experiencer counterparts (*John worried (about his health)*).

Normally, object-Experiencer verbs do not entail their subject-Experiencer counterparts. For example, 21(a) does not entail 21(b), since in a scenario where Dan caused Dina to be afraid of something other than himself, (a) is true while (b) is false:

(21) a. *Dan hifxid et Dina* Exp. (object-Experiencer) (Hebrew)
Dan frightened ACC Dina
'Dan frightened Dina.'

b. *Dina* Exp *paxada mi-Dan.* (subject-Experiencer)
Dina feared from-Dan
'Dina feared Dan.'

According to Pesetsky (1995), the theta grid of object-Experiencer verbs is < Cause, Experiencer, Subject-matter >. Pesetsky further argues that Cause and Subject-matter cannot co-occur, and hence one of them must be left out of the derivation.[10] In (21a), then, Dan can be interpreted as either the Subject-matter of Dina's fear or as the Cause. Therefore, it does not entail (21b), where Dan can only be interpreted as the Subject-matter.

Siloni (2009) notes that this non-entailment relationship does not always hold. Some Hebrew object-Experiencer verbs do entail their subject-Experiencer counterpart. For example *hiršim* 'impressed' in (22a) entails its subject-Experiencer counterpart in (22b):

(22) a. *Dan hiršim et Dina* Exp. (object-Experiencer)
Dan impressed ACC Dina
'Dan impressed Dina.'

b. *Dina* Exp *hitrašma mi-Dan.* (subject-Experiencer)
Dina got+impressed from-Dan

Siloni (2009) shows that verbs like *hiršim* (*hidhim* 'amazed', *sime'ax* 'made-happy', *ye'eš* 'discouraged') constitute a set of verbs that are singled out by a cluster of additional properties that they do not share with other object-Experiencer verbs: they fail to passivize, do not pass Agenthood tests, and do not have a corresponding nominal.

According to Reinhart (2002; forthcoming, a), similarly to unaccusatives, which are derived from their transitive alternatives, subject-Experiencer verbs are derived

[10] According to Pesetsky (1995), Cause and Subject-matter cannot be realized as arguments of the same verb as they are not 'sufficiently distinct'. For a discussion on distinctness, see Pesetsky (1995) and Reinhart (2002; forthcoming, a).

from their object-Experiencer counterparts via the lexical operation of decausativization, which removes the inputs' Cause theta role (as discussed in section 8.2). Siloni (2009) adopts this view and suggests the following account for the special behaviour of *hiršim* type object-Experiencers. According to her, object-Experiencer verbs like *hiršim* have a hidden Cause role, which cannot be realized in the syntax. Therefore, unlike other object-Experiencer verbs, their subject can only be interpreted as Subject-matter. Consequently, utterances like (22a) above are semantically equivalent to the ones with their subject-Experiencer counterpart. This means that just like the transitive alternates of unaccusatives of type II, the basic lexical entries from which subject-Experiencer verbs like *hitrašem* are derived are listed in the mental lexicon but never occur in the actual vocabulary. Henceforth I refer to this type of verbs as 'hidden Cause Experiencer verbs' (see Siloni 2009 for explanation of the additional properties these verbs show).

To summarize, hidden Cause subject-Experiencer verbs are two-place psychological verbs. In that respect, they are similar to type III unaccusatives. However, while the former are argued to have an alternant with a Cause argument hidden in the mental lexicon from which they are derived, the latter are argued to be underived and to lack a transitive alternant altogether. For this reason, a comparison between these two types of verbs can determine whether or not the accessibility differences found in experiment 1 between type II and type III concepts can follow form the fact that unaccusatives of type III were two-place psychological verbs, unlike unaccusatives of type II. Since hidden Cause subject-Experiencer verbs and type III unaccusatives are both two-place psychological verbs, any significant difference revealed by a comparison of speakers' performance in tasks involving them would suggest that the results of experiment 1 cannot be attributed to these two factors. In addition, this comparison can provide further support for Siloni's analysis, since the GABLE hypothesis predicts that if hidden Cause object-Experiencers are psychologically real, they should be more accessible than type III concepts.

8.5.1 *Experiment 2*

The following experiment compared the accessibility levels of hidden Cause object-Experiencer verbs with the accessibility levels of type III transitive concepts.

8.5.1.1 *Participants* Participants included twenty-nine adult native Hebrew speakers, eleven male and eighteen female, with an education level of thirteen years or more. Participants' age ranged from 21 to 35 (mean age 24.16). None had any relevant prior linguistic education.

8.5.1.2 *Materials and design* The stimuli consisted of six hidden Cause subject-Experiencer verbs, the six unaccusatives of type III used in experiment 1, and a group of control items consisting of five unaccusatives of type I. For a full list of verbs used in this experiment, see appendix B.

As described above, the characteristic that sets apart hidden Cause object-Experiencer verbs from other object-Experiencer verbs is that they never realize the Cause theta-role. Thus, in this class, the argument in subject position cannot be interpreted as Cause, but only as Subject-matter. As a diagnostic for this set, I used purpose clauses. The modification by a purpose clause has long been acknowledged as detecting Agenthood because such clauses can only modify verbs whose external argument is interpreted as an Agent (Manzini 1983; Jaeggli 1986). In our case, since the Cause role is unspecified for mental state, it can be assigned to animates and inanimates. An animate argument bearing it is usually interpreted as Agent. An argument bearing the Subject-matter role, however, is not. Therefore, modification of object-Experiencer verbs by a purpose clause can be utilized to distinguish between verbs that allow the realization of the Cause role and verbs that do not; while the former would pass the Agenthood diagnostic, the latter would fail.

Based on this, a separate group of fifteen adult Hebrew speakers were asked to rate from 1 (least acceptable) to 5 (most acceptable) the acceptability of twenty-three sentences with a purpose clause modification. Ten of the sentences included object-Experiencer verbs likely to be hidden Cause object-Experiencers, seven likely to be 'regular' object-Experiencer verbs, and six filler sentences with agentive verbs. The object-Experiencer verbs for which the median ratings were 2 or less were viewed as hidden Cause Experiencer verbs. Thus their subject-Experiencer counterparts were included in the experimental stimuli. For example (translated from Hebrew):

(23)	*Raxel*	*ye'aša*	*'et*	*rut*	*kedey*	*še-hi*
	Raxel	discouraged	Acc	Rut	so	that-she
	tafsik	*lihiyot*	*kazot*	*optimit*	*kol ha-zman*	
	will.stop	to.be	such	optimistic	all the-time	

'Rachel discouraged Ruth so she will stop being such an optimist all the time.' (Median acceptability rating: 2)

Experiment 2 was similar in design to experiment 1. A very short story that established the status of an entity as the causer of an event was composed for each of the verbs. The events were labelled towards the end of the vignette, using a sentence with one of the verbs ('the target sentence'[11]) and the very last sentence of the story described an outcome of the event ('the outcome sentence'). Subjects were then asked to rate from 1 (least acceptable) to 7 (most acceptable) the extent to which they perceive the causer of the event to be 'the executor of a specific action' that resulted in whatever the 'outcome sentence' described. Example (24) is a translated story,

[11] This label is less specific than its equivalent in the design of experiment 1 (i.e. 'the unaccusative sentence'), since in this experiment some of the stimuli verbs were unaccusatives and some were subject-Experiencer verbs.

stimulus sentence, and task structured to test the accessibility of the transitive concept parallel to the subject-Experiencer verb *hit'anyen* ('got-interested'):

(24) Joey never really cared about clothes. Most of his outfits consisted of jeans and T-shirts. Sometimes, when he was really not in the mood to think about which shirt to wear, he went to work with the same shirt he used as a pyjama. Therefore it was only natural that when his best friend Dave applied for fashion school, Joey thought it was a complete waste of time. However, as time went by, after Dave forced Joey to tag along to countless fashion shows and insisted on hearing his input regarding every design exercise he had to submit, Joey's attitude began to change.

Joey suddenly got **interested** in fashion. He now spends most of his pay cheque on clothes.

On a scale of 1–7, how acceptable/conceivable for you is it to consider Dave to be the executor of **one specific action** that resulted in Joey spending most of his pay cheque on clothes?

8.5.1.3 *Procedure* Similarly to the previous experiment, following a short training session, stories and tasks were presented to participants using a PowerPoint slide show. The first slide included the first story, and after pressing the ENTER key, participants encountered a separate slide containing the target sentence, the outcome sentence, and the task. Participants then marked their judgments in an answer form. Once again, to further ensure that it is the transitive concept related to the relevant verb that was being rated, target verbs appeared in boldface and participants were instructed not to go back to the previous slide.

8.5.1.4 *Results* A Wilcoxon signed rank test found the median ratings provided for causers of eventualities described by hidden Cause subject-Experiencer verbs to differ significantly from the median ratings provided for causers of eventualities described by type III unaccusatives (two-tailed: $W(25) = -162$, $p = 0.03$) (see Figs. 8.7 and 8.8). The direction of this difference is unexpected: the ratings provided for type III unaccusatives (median = 5, inter-quartile range = 1.5) were significantly higher than the ratings provided for hidden-Cause subject-Experiencer verbs (median = 4, inter-quartile range = 2.5).

Not surprisingly, median ratings provided for control items (median = 6.5, inter-quartile range = 1.5) were significantly higher from those provided for both types of target verbs ($p < 0.0001$).

8.5.2 *Discussion*

Assuming the GABLE hypothesis, the accessibility pattern revealed in experiment 2 is rather puzzling. Causers of eventualities described by type III unaccusatives, assumed not to have a transitive alternative in the mental lexicon at all, were rated significantly

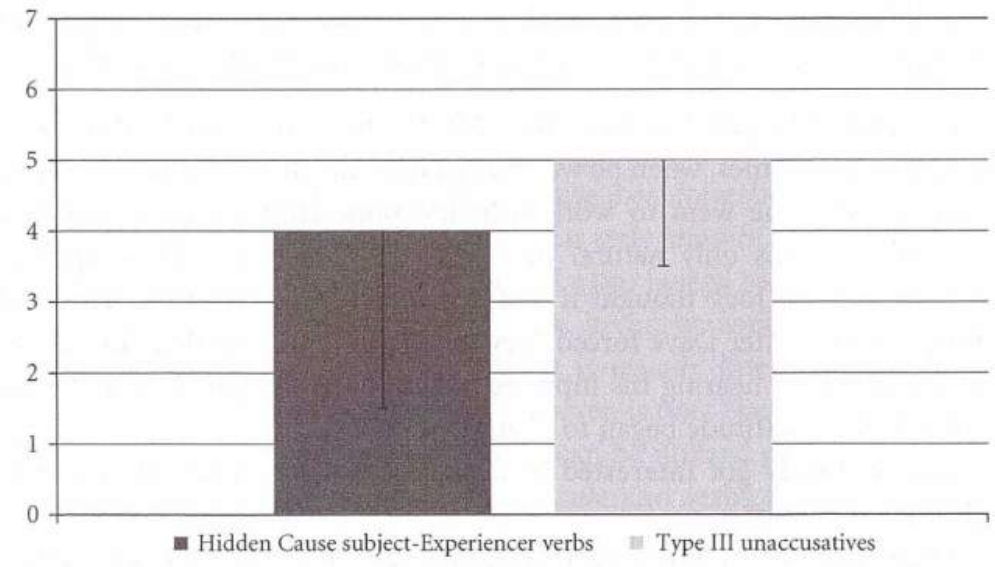

FIGURE 8.7 Median ratings per verb type, experiment 2 (error bars represent inter-quartile range)

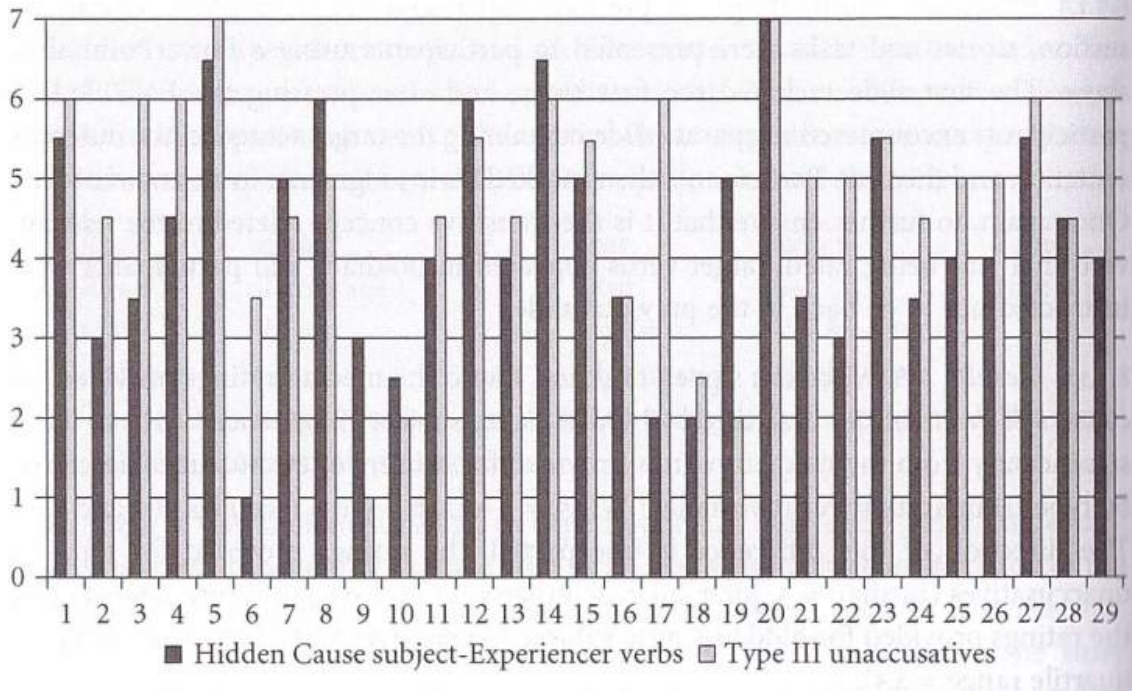

FIGURE 8.8 Median ratings per subject, experiment 2

higher than causers of eventualities described by hidden Cause subject-Experiencer verbs, assumed to have a hidden transitive alternative (a 'frozen' Cause). However, a close inspection of these verbs and the task participants were asked to perform clarifies matters.

Type III unaccusatives and hidden Cause subject-Experiencer verbs differ with regard to the type of argument in their subject position, Theme v. Experiencer,

respectively. This is crucial when these verbs are set in the context of the current experimental design. Compare, for example, the contents of the final slides presented to participants in the task involving the type III unaccusative *xamak* 'escaped (the mind of)'), repeated in (25a), and the task involving the hidden Cause subject-Experiencer verb *hit'anyen* 'got interested', repeated in (25b):

(25) a. The idea **escaped** Danny's mind. It was now completely empty.

How acceptable/conceivable for you is it to consider Danny's sister to be the executor of **one specific action** that resulted in the emptiness of his mind?

b. Joey suddenly **got interested** in fashion. He now spends most of his pay cheque on clothes.

How acceptable/conceivable for you is it to consider Dave to be the executor of **one specific action** that resulted in Joey spending most of his pay cheque on clothes?

Notice that in (a) participants are asked to rate the extent to which Danny's sister is the causer of an idea escaping Danny's mind, while in (b) participants are asked to rate the extent to which Dave is the causer of Joey being interested in fashion. In (a), as in all other sentences involving type III unaccusatives, the entity presented as affected by the causer is inanimate (e.g. 'the idea'), while in (b), as in all other sentences involving hidden Cause subject-Experiencer verbs, the entity presented as affected is human (e.g. 'Joey'). Considering this along with the fact that participants were asked to rate the extent to which the causer is the executor of the target event, the surprising pattern revealed in experiment 2 can be explained. Causers established in the context as affecting inanimate objects were rated higher, while causers established as affecting humans were rated lower. The reason for this is that when the affected entity is human, it is more likely to share or to be viewed as sharing responsibility for the event taking place. As a result, the causer's part in the execution of the event is rendered less perceptible. Therefore, when comparing hidden Cause subject-Experiencer verbs and type III unaccusatives, this task cannot be used to detect the existence of a hidden lexical representation, since the difference in the nature of the affected entity slants the results.

Nevertheless, although no conclusion regarding the psychological reality of a frozen Cause role in the lexical representation of hidden Cause object-Experiencer verbs can be drawn from this experiment, its results support this experimental design's validity, thus reinforcing the conclusions drawn from experiment 1. First, the fact that the introduction of a human affected entity in the target sentence significantly influenced participants' performance demonstrates that it was the target verbal concept which participants considered while completing the task, and not one of the other verbal concepts they were exposed to during the experiment. Therefore,

it confirms that the precautions taken to ensure that participants provide the required judgements (i.e. the separation of the context slide and the visual emphasis of the target verb) are indeed effective.

Second, the accessibility pattern revealed in experiment 2 shows a clear correspondence between participants' performance and aspects of causation relevant for the lexical encoding of causative verbs. Recall that this experimental design was employed to test the predictions of the GABLE hypothesis under the assumption that the more accessible a transitive concept is for speakers, the more prominent the role of the causer as realizer of the event should be. Consequently, in the case of a transitive concept with a corresponding lexical entry, the causer is predicted to be rated higher since, according to GABLE, this concept is more accessible than a concept with no lexical encoding. The results of experiment 2 suggest that the connection between this design and the lexical encoding of transitive verbs is more direct. This is so since the contrast between causers affecting humans and causers affecting inanimate objects reveals that speakers' decisions are guided by the information these lexical entries encode. Neeleman and van de Koot (Chapter 2 above) view the lexical semantics of causative verbs as encoding the existence of a crucial contributing factor (CCF) that is held accountable for the event.[12] The results of experiment 2 show that the notion of CCF played a central role in determining speakers' performance, since when the affected entity was human, and thus likely to share accountability with the causer, the latter received a lower rating even though it was contextually established as the cause of the event. In other words, participants rated the likelihood of the causer being the event's CCF. The results of experiment 2 thus support the validity of this experimental design as a mean of detecting the hidden existence of transitive (causative) lexical entries.

Finally, even though both target conditions in experiment 2 were two-place psychological verbs, the accessibility of their corresponding transitive concepts were found to be significantly different. This suggests that these characteristics are not the ones that influence participants' performance in this experimental design.[13]

[12] The notion of CCF in comparable with Reinhart's *+c* (cause change/event) feature. For further details, see Reinhart (2002; forthcoming, a), Neeleman and Van de Koot (Ch. 2 above).

[13] Nonetheless, to rule out the option that the relevance of these characteristics was masked by the introduction of a human Experiencer as the affected entity in the hidden Cause Experiencers condition, an additional third experiment has recently been completed. In the new experiment, the involvement of a human Experiencer in the eventualities described by hidden Cause Experiencer verbs was made less salient. The analysis of its results shows a pattern opposite to the one observed in experiment 2: causers of eventualities described by hidden Cause Experiencer verbs were rated significantly higher than causers of eventualities descried by type III unaccusatives. In other words, the accessibility levels of the transitive concepts corresponding to these two types of verbs were yet again found to be significantly different even though both are two-place and psychological. Thus, apart from providing additional evidence for the existence of a Cause role in the lexical representation of hidden Cause Experiencer verbs, this observation further confirms that participants' performance in experiment 1 and 2 was not influenced by these characteristics.

8.6 Conclusion

This chapter discussed the phenomenon of derivational gaps, and compared two possible types of explanations for their emergence: the 'nonexistence approach' and the 'hidden representation approach'. It was shown that the assumption of hidden lexical entries is falsifiable: that even though hidden lexical entries are not used in utterances, it is possible to tap into their psychological reality. According to the GABLE hypothesis, the lexical encoding of a concept has an effect on its accessibility level. As a result, the existence of a hidden lexical entry can be revealed through the estimation of the accessibility level of the corresponding concept.

With regard to the case study at hand—gaps in the transitive–unaccusative alternation—GABLE predicts that if unaccusatives that idiosyncratically lack a transitive alternative in the vocabulary have a corresponding hidden (frozen) lexical entry, we get a three-way distinction: transitive concepts related to unaccusatives with a transitive counterpart in a speaker's vocabulary will be more accessible than transitive concepts related to unaccusatives derived from frozen lexical entries, and the latter will be more accessible than transitive concepts related to underived unaccusatives. In contrast, if the missing transitive alternatives neither exist in the vocabulary nor are hidden in the lexicon, then GABLE predicts a two-way distinction: between those that have an alternative and those that do not. The results of experiment 1 show a three-way distinction, thereby providing evidence in favour of the existence of frozen lexical entries, as suggested by Reinhart (2002; forthcoming, a) and Horvath and Siloni (2008a). The results of experiment 2 provide support for the validity of this experimental design, thus reinforcing the conclusions drawn from experiment 1.

The GABLE hypothesis carries consequences also beyond the issue of gaps in the transitive–unaccusative alternation. It constitutes a step toward a better grasp of the linguistic encoding of concepts and the relation between abstract lexical representations and vocabulary items, a topic that can undoubtedly benefit from further cross-linguistic research involving other derivational alternations.

Appendix A. Verbs used in experiment 1

Type I unaccusatives	Transitive (cause-external theta-role)
hitkavec 'shrank'	*kivec*
nafal 'fell'	*hipil*
hitkamet 'got wrinkled'	*kimet*
hitlaxlex 'got dirty'	*lixlex*
nigmar 'was finished'	*gamar*
nišbar 'broke'	*šavar*
nisraf 'got burnt'	*saraf*

nirtav 'got wet'	*hirtiv*
hitrofef 'loosen'	*rofef*

Type II unaccusatives	Adjectival passive
hirkiv 'got rotten'	*rakuv*
kamaš 'withered'	*kamuš*
naval 'wilted'	*navul*
daha 'faded'	*dahuy*
hexmic 'turned sour'	*xamuc*
hexlid 'became rusty'	*xalud*

Type III unaccusatives	
medaber ('el)	'appeals (to)'
mešane (le)	'matters (to)'
xamak (me)	'escapes from'
xaser (le)	'misses (to)'
xore (le)	'unpleasing (to)'
maca xen (be-einey)	'appeals (to the eyes of)'

Appendix B. Verbs used in experiment 2

Hidden cause subject-Experiencer verbs

hit'anyen	'got interested'
tama	'was amazed'/'wondered'
hicta'er	'was sorry'
nidlak	'got turned on'
hitrageš	'got excited'
hitya'eš	'got discouraged'

Type III unaccusatives

medaber ('el)	'appeals (to)'
mešane (le)	'matters (to)'
xamak (me)	'escapes from'
xaser (le)	'misses (to)'
xore (le)	'unpleasing (to)'
maca xen (be-einey)	'appeals (to the eyes of)'

Control items

nafal	'fell'
hitkamet	'got wrinkled'
nigmar	'was finished'
nišbar	'broke'
nisraf	'got burnt'