The Possibility of Perceptual Motivation
for *There*-Fronting*

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1. Introduction

It is generally agreed that there are two kinds of *there* in present-day English, 'deictic' (or 'locative') and 'existential' (or "Introductory"), hereafter referred to as *there1* and *there2*, respectively (e.g., Breivik 1977, Lakoff 1987, Mitchell 1985: 623). Both can be fronted as exemplified, below, taken from Lakoff (1987: 468):

(1) There's Harry with his red hat on. (deictic)
(2) There was a man shot last night. (existential)

In this paper, I propose a perceptual motivation for *there*-fronting. I hypothesize that the original motivation for *there*-fronting is the context of a speaker suddenly becoming aware of something sufficiently noteworthy[1]. In this context the speaker utters a demonstrative and emphatic *there* before the logical subject in the deictic *there*-construction, <*there* + BE + NP + (LOC)> and this sequence corresponds *iconically* to stages in the processes of vision. That is, basically, the space occupied by an entity[2] is perceived and analyzed by low-level vision before the entity can be identified as the NP by the process of object recognition in high-level vision. I also hypothesize that *there*, as well as the pointing that accompanies *there*, refers to a low-level visual (or other sensory) representation that will be named as the NP after the process of object recognition is complete. Moreover, I hypothesize that in

the aforementioned context the perceptual iconicity of the construction makes its use 'ecologically' (as regards survival) advantageous and that this then constitutes motivation for its initial use and subsequent regularization.

In Section 2, I look at historical data and data from child language acquisition to establish the likelihood that *there1*-fronting preceded *there2* constructions. Then, in Section 3, I examine the possibility that, given the right context, the processes of vision (as well as some other perceptual processes) could have served as a basis for deictic *there*-fronting. In Section 4, I examine the ecological (survival) factors that are likely to have supported deictic *there*-fronting. In section 5, I support my proposed perceptual motivation model via an analysis of the verbs that can participate in *there*-fronting today as well as some related directions for research.

1.1. Tentative assumptions and terms

Before we proceed, let us tentatively assume that *there1* is constrained by Lakoff's illocutionary force constraint, or at least something very much like it, and that this constraint entails that *there1* be used to indicate concrete/here-and-now entities, and that *there1* may take an accompanying pointing or head-turning gesture.

Illocutionary force constraint: deictic *there*-constructions direct the hearer's attention to something present.

In addition, let us assume that *there1* refers to an entity, that, like Purga below, must be in the visual field of both the speaker and the hearer. The context is that Gregoriy Kamarov points to the icebreaker that will escort them to sea (Lakoff 1987, case study 3).

(3) *'There's Purga,* Captain.'

Finally, let us assume that existential-*there* constructions have no such restrictions and may therefore direct the hearer's attention to more abstract entities outside the here-and-now.

2. Indirect evidence that *there2* derived from *there1*
2.1. Historical considerations[3]

Although most linguists assume that two kinds of *there* exist, not all linguists are convinced that *there2* is derived from *there1*. For example, while Traugott (1992) claims that existential *there is* derived from deictic *there*, Breivik (1977) argues that since evidence of *there2* exists in OE, OE can offer no direct evidence to support such an assumption, and that if *there2* did derive from *there1*, the separation must have taken place before OE.

However, Breivik (1977: 336) does indicate that *there2* is rare in OE and ME, that some instances of OE *there*-constructions are structurally ambiguous (i.e. readable as either *there1* or *there2*), and that OE *there2* sometimes behaves differently from PDE *there2*.

Moreover, Mitchell (1985:623-6) surveys several OE scholars' opinions of *there2*[4] and his conclusions match what Breivik indicates above. However, Mitchell also notes that the *there* in *there*-fronted sentences in OE are most commonly local in reference rather than existential and notes that after an initial clause type that would require *there2* in MnE, in OE often *there1* is used. In addition, Mitchell observes that the frequency of *there*-fronted sentences that can be interpreted as either *there1* or *there2* increases over time. Further, he interprets this increase as suggesting that the weakening of the local function of *there* in *there*-fronted sentences is the source of *there2*.

Finally, Traugott (1992) states that OE *there2* is derived from the locative adverb *there* and that the two are sometimes hard to distinguish. She also asserts that *there2* is very rare until later OE, that its frequency of use varied among

authors, and that its usage is associated with first-hand accounts, indicating it might be a feature of speech. All of these points, she concludes, would be consistent with a construction that was to become obligatory later when subject position had to be filled. The following is from Traugott's discussion on the development of 'empty' subjects,

> [...] the surface category subject is clearly not obligatory in OE. Nevertheless, there is some evidence that already in OE there was a tendency to fill the subject position and to associate it with definiteness. This tendency is manifest in two main ways: the occasional use of *hit* in impersonal constructions (and some others, [...]), and the use of *there* in certain copula constructions with an indefinite subject. [...]
>
> Unlike *hit* in impersonals, *there* occurs with a subject. Its function is not to fill a totally empty subject position, but rather to place a definite element in subject position, where otherwise an indefinite would occur, and thus correlate subject position with definiteness, at least in copula constructions. In PDE this correlation is obligatory in existential sentences with indefinite subjects, cf. *There is a problem with this analysis vs.* **A problem is with this analysis.* In OE it is optional [...]
>
> <div align="right">(Traugott 1992: 217-8)</div>

It appears that the earlier the text the more frequently *there*-fronted sentences are used in a clearly local sense, and the harder it is to find clear instances of *there2* Extrapolating these trends back in time, it would appear that at some point, *there*-fronted sentences with an optional locative might have been uniquely *there1* and that some writers then began to use *there2* in initial position, yielding ambiguous sentences. Meanwhile, before *there2* had been established, an indefinite subject in copula constructions could also constitute a legitimate existential sentence. Then, as English syntax came to require that the subject slot be filled and associated that slot with definiteness, *there2* became regularized in existential copula expressions, as a way of adding definiteness to the subject slot.

Although in Traugott's quote above, she mentions that *there* was used as a source of definiteness for existential copula constructions, she does not indicate

why *there* should be definite. Therefore, I suggest the following analysis. We assume that *there1* is required to be in the visual field of both the speaker and the hearer. Because both the speaker and hearer look at the place designated by *there1* at almost exactly the same time, that place is almost immediately known to both of them. Thus, it is reasonable to suggest that *there* in the *there1* copula construction entails some degree of definiteness. This in turn suggests the possibility that the source of the definiteness that came to be required by existential sentences with indefinite subjects is the definiteness inherent in the *there1* copula construction. If so, this indirectly supports a *there2* from *there1* analysis.

As a final type of indirect historical evidence for *there1* being the source of *there2*, I introduce some general principles of grammaticalization and syntacticization. Lexical material for grammaticalization goes from concrete to abstract. (see a discussion on 'abstraction' in Heine et al. 1991). Accordingly, *there1*, which is not abstract, could have grammaticalized into *there2*, which is abstract, but the reverse would not occur. Also, high frequency of use of a word or construction can result in its grammaticalization/syntacticization into a new word or construction (e.g. Bybee and Thompson to appear). As seen earlier, *there1* was much more frequent in OE than *there2*. If *there1* were also common before *there2* existed, then *there2* might have been derived from *there1* via frequency effects. Finally, the move from irregular to regular use of *there2* suggests syntacticization (Givon 1979) from adverbial there to *there2*.

2.2. Child language progresses from deictic to existential *there*

Inoue (1991) shows data from various studies and concludes the following sequence of acquisition of *there2* from *there1*.

1ˢᵗ Stage	Deictic adverb *there* alone
2ⁿᵈ Stage	There NP (deictic)
	NP/Preposition/Verb *there* (deictic)

3rd Stage	There's NP (location)	(deictic)
4th Stage	There's NP (location)	(existential)

Based on the data shown by Inoue, it appears that the 1st stage occurs at about 15 months and the 2nd at just under 24 months, the 3rd between approximately 22 and 25 months and the 4th at 26 to 27 months.

According to Bickerton (1990), children's linguistic development is likely to parallel the evolution of human language in general.

> [...] there are no substantive formal differences between the utterances of trained apes and the utterances of children under two. The evidence of children's speech could thus be treated as consistent with the hypothesis that the ontogenetic development of language partially replicates its phylogenetic development. The speech of under-twos would then resemble a stage in the development of the hominid line between remote, speechless ancestors and ancestors with languages much like those of today.
>
> Haeckel's claim that ontogeny repeats phylogeny [...] cannot stand as a general law of development. However [...] no one should be surprised if it applies to evolutionary developments that are quite recent and occur in a species whose brain growth is only 70 percent complete at birth and is not completed until two or more years afterwards (Bickerton, 1990: 115)

Applying the above to Inoue's stages of acquisition of *there2*, the language of the under-two-year olds in the 1st and 2nd stage is pre-syntactic and, indeed, signing apes can, like children at the 2nd stage, use deictic *there*[5]. (Bickerton 1990:110).

The above suggests that for both children's and humans' linguistic development, the basic form of progress over time can be characterized as the expansion of the ability to express the concrete/here-and-now domain into an ability to express more of the abstract/outside-of-here-and-now domain. According to our assumptions in section 1.1, *there1* is characteristically here-and-now and *there 2* is not, so it is most likely that *there1* came first and that *there2* is derived from it.

So far I have introduced indirect historical linguistic evidence and child

language acquisition evidence for *there1* originating before *there2* and *there2* deriving from *there1*. Then, I linked the child language acquisition evidence to the evolution of human language. In the following section I will show data from the 2nd stage of child language acquisition in which *there* is first fronted.

2.3. X + *there* vs. *there* + X: the case of Eric in the 2nd stage of *there2* acquisition As noted earlier, Lakoff (1987) observes, that *there1* is used to draw the hearer's attention to something present. The following example from child language acquisition illustrates two early usages of deictic *there*.

  In the 2nd stage, children use *there* in two two-word patterns (Inoue 1991), *there* + X and X + *there*, as indicated by the subject called Eric IV (age 23, 2). Compare (a) and (b) below:

   (a) *there* + X

      (4) (Lois opens closet door; vacuum cleaner is inside)
          "there cleaner"

   (b) X + *there*

      (5) (looking at picture of birds) "e birdie there"
      (6) (Eric drinks juice) "any soda in there"
      (7) (Eric putting plane piece into puzzle; he called it a wrench instead
          of a plane) "wrench go there"

  Based on the context of his subjects' utterances, Braine (as cited in Inoue 1991) notes a semantic difference between X + *there* and *there* + X. Namely, X + *there* indicates the location of X, or the location required for X while *there* + X, is used to draw attention to things by indicating their *presence or existence* (italics mine). Thus, both in terms of structure and meaning, *there* + X closely resembles the

adult deictic *there* + BE +NP construction, for example, "There's a tiger!"

In terms of structure, obviously, the sequence of *there* preceding the NP is the same. In addition, like the adult, Eric is capable of longer utterances, as seen in example (5), (6) and (7), but he does not use them in this context.

As for meaning, it seems reasonable to assume that both the child's and the adult's utterance are used to indicate both the presence *and* the existence of an entity, although given the word "present" in Lakoff's illocutionary force constraint, some might think of the adult utterances as only indicating presence. However, upon closer examination, the expression "something present" in Lakoff's constraint would appear to entail that the 'something present' also *exist*. Thus, both are, in some sense, existential[6]. Therefore, let us refer hereafter to the *there*-fronted deictic copula structure as *there1+(2)*.

Consideration of the following argument should help to clarify this view. It is logical to say that physically indicating an object while saying *there* gives a deictic sense to that utterance of *there*. It is also logical to say that saying *there* without being able to point at a place designated by *there* makes that utterance of *there* non-deictic or existential. However, it is illogical to judge that an instance of *there* cannot be existential simply because it meets the criterion for being deictic.

Note that at 23 months Eric's word order has not yet been fixed to match the syntactic conventions of English (Bickerton:187), and his speech is, therefore, a good place to look for possible perceptual influences. Let us now examine Eric's *there* + X utterance from the perspective of vision science to see how visual processes are likely to be involved in Eric's looking at the closet in the first place and his saying *there* before saying 'cleaner'.

3. *There1+(2)* and perception of movement in the periphery of the visual field
3.1. Low-level vision processes: the colliculus and saccades

Why should Eric look in the direction of the closet in the first place? The most

likely answer to this is that his "colliculus" made him do it. But before reading the following description of the colliculus and its role in perception of movement in the periphery of the visual field[7], recall the initial part of the context for Eric's utterance in section 2. 3 above, "(Lois opens closet door: [...])."

The colliculus is a structure in the brain. When it receives stimulus from motion in the periphery of vision, the colliculus makes the eyes, and neck if necessary, turn to look at the source of that motion[8]. Interestingly, it is believed that the motion perceived by the colliculus constitutes a "figure" that is segregated from "ground" even before the eyes start to turn toward the motion[9]. It is therefore conceivable that, with a strong enough stimulus, this low-level visual process might in and of itself be able to motivate the utterance of the word *there* and the action of pointing. For example, if something unexpected whizzed through the periphery of the visual field, one might say, "There! What was that?". But it would not become a near-real-time *there*-fronted copula construction because the process of object-recognition would not be able to take place. Afterwards, however, one could say, "There was something that just whizzed by over there". According to Crick (1994), when stimulated, the signal the colliculus sends to the brain is, "Look out! There's something there". It seems likely that this signal raises the level of activation of the neurons required for saying a deictic *there*-fronted sentence. However, it seems unlikely that the signal should grow sufficiently large to create a deictic *there*-fronted sentence in and of itself because one always turns to look at the object as soon as humanly possible. By doing so, other low-level visual processes take over.

As a brief digression from our discussion of vision, it is interesting to note that in addition to being wired to respond to motion in peripheral vision, the colliculus is also wired to respond to stimuli detected by the senses of hearing and touch.[10] Therefore, the colliculus may play a part in other kinds of *there*-fronting involving unexpected and notable percepts arrived at via those senses, as exemplified below.

(a) Hearing:

    (8)   There's someone yelling in the next building.

    (9)   There's a strange sound out there. I wonder what it is.

(b) Touch:

    (10) There's something in my shoe!

Another very basic type of eye movement is a "saccade", an automatic jump that the eyes make from place to place, on average 3 or 4 times a second (Crick 1994: 122-3). For example, imagine that you come home and there is an unexpected person asleep on your couch, under some blankets and perfectly still. Saccades are probably what would lead you to discover the person. Thus, saccades could have led Eric's gaze to the open door and the vacuum cleaner even if his colliculus had never gotten involved.

In sum, both the collicular response and saccades may be involved with *there*-fronting. Moreover, since the colliculus involves something entering the visual field on its own, it may be associated with verbs of motion and/or appearance. On the other hand, since saccades involve moving the eyes to a new location where something may already exist, they may be associated with verbs of existence and/or spatial configuration.

However, in between saccades something can also appear. So the interstices between saccades might be associated with verbs of appearance that do not involve an entity's moving into the visual field. These verb categories will be examined in section 5.

3.2. An overview of other vision processes[11]

The most basic distinction made in the overall process of vision is between low-level[12] and high level vision. Low level vision operates over all or most of the

visual field in parallel and it involves many sub-processes. These sub-processes sort out the raw sensory data created by incoming light and turn it into sketchy-representations, the most salient of which will be further developed and sent on to high-level vision.

During low-level vision the spotlight of mental attention automatically helps to pick out the most salient representation. Then, by temporarily pooling the resources of the low-level visual processes to further develop and clarify that representation, attention makes that representation even more salient and ignores the surrounding representations.

A representation at this stage, and maybe before, is most likely a "figure" and the rest of the visual field "ground." Having reached this level, the representation can pass through the "bottleneck" that stands between low-level and high-level visual processes.

The bottleneck is a metaphor used to indicate that many representations may be present during low-level vision but that only one or a few at a time can proceed to high-level vision, since high-level vision operates in a "linear" manner. The processes of high-level vision are not entirely visual in nature, and among them is the process of "object recognition."

While mental attention is attending to a representation during low-level vision, that representation is generally considered to be treated by attention as a "location" in the visual field. However, if the salient and attended-to-location moves, there is evidence that mental attention follows it and treats it as an object. In either case, low-level vision gathers a lot of information about the visual field, especially the attended-to-representation, including detailed information about its spatial configuration and manner of motion, even before beginning the process of object recognition (see Appendix A for more detail about these processes). Therefore, I hypothesize that the attended-to-representation can be viewed as an "entity" that is location-like and/or object-like in nature, and that certain perceptual contexts

provide sufficient motivation to refer to this entity as "there."

It should be noted that how and why attention is attracted to certain representations over others is not completely understood. Nonetheless, there seems to be general agreement that a process called "pop out" is commonly involved. Although not everything is known about what causes one thing to pop out and others not to, it may have to do with a thing's being notably different from its surroundings as the vacuum may well have been in Eric's case.

A closet may contain, for example, numerous articles of clothing hanging from hangers and perhaps numerous shoes of somewhat similar form and dark color and/or towels of similar form. However, it usually contains only one vacuum cleaner, and its form, texture and even color, are likely to be noticeably different from other things in a closet. Therefore, it is likely that the vacuum cleaner just popped out at Eric and grabbed his attention. The following is a somewhat detailed estimate of the visual processes likely to be involved in Eric's *there* + X utterance in roughly chronological order.

Eric looks into the closet. His early-vision processes work in parallel over the visual field (essentially, the inside of the closet). The unique properties of the vacuum cleaner begin to attract Eric's attention, which begins to help the visual system better develop the representation of the vacuum cleaner by allowing the visual system to focus on it and temporarily filter out information from the unattended to surrounding objects. The representation of the vacuum cleaner is now a focal 'place' in Eric's visual field, thus providing him motivation to say "there", so he does. Meanwhile, under the spotlight of Eric's mental attention the representation of the vacuum cleaner has become salient enough to pass into the bottleneck and then enter the high-level process of visual object recognition. This involves matching the clearly perceived yet unidentified form of the vacuum cleaner with some "perceptual object" in memory that is associated with a name in his lexicon, "cleaner," which he utters.

4. Ecology and the context for *there* + X

Bickerton (1990: 146) notes that two of the most important motivations for the evolution of language in our ancestors is that it would allow them "to warn of danger or pass on information about food sources—actions that might help preserve the lives of individuals or even whole groups".

However, to use language voluntarily, some degree of cortical control is essential. Like humans, apes also warn of danger and announce the discovery of food. They do this through alarm calls and food barks, but their vocalizations are involuntary. Obviously, humans have a high degree of cortical control, but the difference between humans and apes now appears to be scalar rather than absolute (Bickerton 1990:142).

My hypothesis is that the original motivation to use a *there*-fronted deictic structure, or, rather, some ancient ancestral form of it, is essentially the same or very similar to those that drive apes' involuntary vocalizations and that modern deictic *there*-fronting is some sort of vestige of this ancient behavior. Support for this hypothesis is the fact that fronting or left movement is a regular means of emphasis (Bickerton 1990:170), and the fact that the *there* in *there*-fronted sentences receives stress (Lakoff 1987).

Of course, the human cognitive apparatus is different from that of apes in that it utilizes true human language, with thousands of times the number of categories that tutored apes can posses, and far more abstract categories as well. Thus, while a limited number of stimuli are salient enough to cause apes to make vocalizations, humans, even two-year-olds like Eric, have an enormous variety of stimuli that may motivate *there1+(2)*-fronting.

It seems likely that it is still ecologically advantageous to notify others as quickly as possible when one becomes aware of a sufficiently salient stimulus, such as a burglar. However, the range of what now constitutes a sufficiently salient stimulus would be difficult to judge accurately without systematically cataloguing

people's spontaneous *there1+(2)*-fronted utterances. However, based on Eric's utterance and memory of passed utterances, it appears that becoming aware of just about anything new, unusual, unexpected or interesting might be stimulus enough, and given human cortical control we can make *there1+(2)*-fronted utterances with anything from a stressed whisper to a yell.

5. Verbs that participate in *there*-fronting

As the following quote suggests the only verbs that can participate in *there*-fronting are verbs of appearance or existence or other verbs used in such a way as to take on the sense of appearance or existence.

> The prototypical intransitive verbs found in the *there*-insertion construction have been described as verbs of existence and appearance. Not all the verbs that allow this construction appear to meet this characterization readily in their basic sense, but it has been suggested that they all show an appearance or existence sense when found in this construction. (Levin 1993:91)

Given the above, one will recall that the *there1+(2)* utterance is intended to draw attention to the presence/existence of a noteworthy visual representation. One will also recall that verbs of appearance may be related to the collicular response and verbs of existence may be related to saccades.

As noted earlier, if there is motivation to make a near-real-time deictic *there*-fronted utterance, that utterance will use the copula in the present tense, and often in reduced form. Therefore, all of Levin's verb categories except BE entail the use of *there2* and not *there1+(2)*.

However, what explanation can be offered for the fact that such a wide variety of verbs can indicate existence or presence/appearance? The answer lies with timing and mental imagery.

Since the *there1+(2)* construction is an attempt to draw people's attention to something automatically assumed to be noteworthy[13] in as close to real-time as

possible, it is important to indicate the location of that entity by uttering a stressed *there* or *there's* and pointing. Then hearers can look at the location specified by *there* in an alert state, which would vary with the amount of stress and volume given to *there*, and decide for themselves what to do about the thing that will be entering their awareness as their visual processes do their jobs. At such times it is not pragmatically reasonable or ecologically advantageous to specify a lot of additional information in the verb.

Nonetheless, as noted earlier, a lot of information is collected during low-level visual processes that can be specified in a verb. Consequently, after the *there1+(2)* event is finished, one can report the event from memory using a *there*-fronted structure and a verb that includes more detail about spatial configuration or manner of motion. Or, one can imagine a *there1+(2)* event and report it with other verbs. But in either case the actual utterance will necessarily be an example of *there2*-fronting, since no real object can be pointed to.

In addition, Levin (1993: 255-8) observes that verbs of appearance "describe the appearance of an entity on the scene" and that verbs of existence "relate to the existence of an entity at some location". As for Levin's mention of "on the scene" for appearance verbs and "at some location" for existence verbs, both equate to the optional locative expression of the *there1+(2)* and *there2* constructions. However, as Levin points out, many of the verbs require the locative to be placed other than at the end of the sentence.

Once again an explanation for this is that *there*-fronting is initially motivated by becoming aware of the presence/existence of something noteworthy in the external world that warrants speaking as soon as possible. In this context, it is the low-level visual representation referred to by *there* that takes precedence. Then, since the representation has automatically already been sent on for object recognition, the NP comes next. Until object recognition is complete, however, all attention is focused on just that one representation. Then, after object recognition, the speaker

can visually zoom out of the NP object space and start to find other objects to put into the optional locative.

According to a perceptually iconic and ecologically motivated view of the *there1+(2)* construction, the locative will only be used if the speaker believes it is necessary to give the hearer additional orienting information with which to find the location specified by *there*, where the post copular NP exists. The orienting information in the optional locative would then naturally consist of objects near the NP that are easy to see and prepositions that orient the hearer's gaze with respect to the easily seen, nearby objects. Thus, if a locative occurs, it occurs last with the near-real-time utterance of *there1+(2)*.

However, this restriction would not apply for mental representations, because they are inherently non-here-and-now descriptions. For example, if someone is narrating in the past tense, it makes sense to front the orienting objects (locative) for the hearer before starting the *there*-construction, as in (13).

(13)   In the mountains there raged a fire. (*there2*)

Also if the speaker is giving known information in the present tense (like a television newscaster) he could say,

(14)   In the mountains there rages a fire. (*there2*)

However, viewing an event that merits an approximation of real-time, the speaker can only say, for example,

(15)   There's a fire in the mountains! *there1+(2)*

The particular restrictions on locative positions associated with the various verbs

in Levin's list are a good topic for further study.

The following are the subcategories of verbs that Levin (1993:88-90) includes as participating in *there*-insertion, all of which can have a sense of appearance or existence. When used in a *three*-fronted construction, all of the verbs in Levin's categories below are used to describe an event that involves a person becoming aware of an entity for one of three resons:

1. A noteworthy entity enters the filed of view and/or 1. b, produces motion in the periphery of view and the eyes and neck move to meet it.

2. A random saccade causes a person's view to fall on a noteworthy entity.

3. A noteworthy entity materializes at a location already in the filed of view. Levin's Verbs of Manner of Motion would generally correspond to 1. (consider for example the verbs in this group within the structure, "There VERBED into view an NP.") Her Verbs of Spatial Configuration (except swing and dangle) correspond to 2. Levin's Verbs of Appearance largely correspond to 3 (those underlined correspond to 1. and/or 1. b). Her Verbs of Existence largely correspond to 2 (except those that are underlined, which would typically correspond to 1and 1. b). The Meander Verbs correspond to different reasons depending on how they are used. This is also true to some degree of all the verbs in all other classes. For example if the verb 'twist' describs movement that is literal, as in "There twisted on the ground, a badly injured worm" it corresponds to reason 1. b, but if it describes movement that is figurative as in, "There twisted throughout the thicket, tangles of ancient barbed vines" 'twist' corresponds to reason 2.

Verbs of Manner of Motion (Run and Roll Verbs): amble, climb, crawl, creep, dance, dart, flee, float, fly, gallop, head, hobble, hop, hurtle, jump, leap, march, plod, prance, ride, roam, roll, run, rush, sail, shuffle, skip, speed, stagger, step, stray, stride, stroll, strut, swim, trot, trudge, walk.

Verbs of Spatial Configuration: crouch, dangle, hang, kneel, lean, lie, perch, rest, sit, slouch, sprawl, squat, stand, straddle, stretch, swing

Verbs of Appearance: accumulate, appear, arise, assemble, awake, awaken, begin, break, burst, dawn, derive, develop, emanate, emerge, ensue, evolve, exude, flow, follow, gush, happen, issue, materialize, occur, open, plop, spill, steal, stem, supervene, surge.

Verbs of Existence (drawn from various subclasses): blaze, bubble, cling, coexist, correspond, decay, depend, drift, dwell, elapse, emanate, exist, fester, float, flow, fly, grow, hide, hover, live, loom, lurk, overspread, persist, predominate, prevail, project, protrude, remain, revolve, reside, rise, settle, shelter, smolder, spread, stream, survive, sweep, swing, tower, wind, writhe

Meander Verbs: cascade, climb, crawl, cut, drop, go, meander, plunge, run, straggle, stretch, sweep, tumble, turn, twist, wander, weave, wind.

Spatial configuration and manner of motion are likely to be perceivable during low-level vision. Processes of low-level vision calculate spatial configuration. Thus the spatial configuration of an entity could be determined during the early-vision representation of the entity and before the process of object recognition (See Appendix B).

Also, in early-vision, mental attention focuses on a place, which is consistent with the conventional use of *there* in fronting. However, if the focused-on representation moves, mental attention appears to follow the representation and treat it as an object (Crick 1994: 62). Because motion is tracked before a representation is sent on for object recognition, manner of motion may be detected before an object is identified.

Thus, the defining features of both verbs of Spatial Configuration (hereafter S.C.) and Manner of Motion type appearance verbs (hereafter M.M.A.) are likely to be perceivable in the low-level environment that I claim motivates *there*-fronting.

Additionally, the *there*-fronting of verbs of appearance without motion such as "materialize", and "appear" (hereafter A.) might also be perceptually motivated since such verbs would seem good candidates for pop-out. This is because an entity's "coming into existence" or appearing unexpectedly before one's gaze would entail its creating differences in the data detected by low-level vision. In fact, illusionists or magicians make a living off the perceptual stimulation that perceived appearance creates, but we don't make *there1+(2)* utterances at magic shows since we expect things to appear there.

However, despite the fact that the features of verbs belonging to the above types are detectable in the context that motivates *there1+(2)* they are not used in making close-to-real-time utterances, probably because they are too long (recall examples (13)-(15), the discussion of locative movement, and the basic motivation for *there1+(2)*). Rather, they are used to describe memories or imaginings of real-time events. For near-real-time utterances, only the copula is used, and in contracted form, -'*s*. Compare the following examples that are intended to represent the same event. (Existence is represented hereafter as E)

(a) Near-real-time utterance: *there1+(2)* (Deictic)
(16)   There's a wild boar on the table! (A./E.)
(17)   *There bounds onto the table a wild boar! (insufficient time for verb)
(18)   *A wild boar is on the table! (insufficient excitement for context)

(b) Past narrative from memory or imagination: *there2* (Non-deictic)
(19)   Suddenly, onto the table, there bounded a wild boar!

(20)   Suddenly, there was a wild boar on the table.

(21)   Suddenly, there bounded onto the table, a wild boar!

(22)   Suddenly, a wild boar was on the table

(c) Imagined future event: *there2* (Non-deictic)

(23)   Someday when we are eating at your uncle's ranch, there will bound onto the table, a wild boar!

(24)   Someday when we are eating at your uncle's ranch, a wild boar will bound onto the table.

(25)   Someday when we are eating at your uncle's ranch, there will be a wild boar on the table. (E.—probably interpreted as food)

(26)   Someday when we are eating at your uncle's ranch, suddenly there will be a wild boar on the table. (A,E)

Example (16) represents a near-real-time description of an event and uses the copula. In (17) the verb is unacceptable as a near-real-time utterance (but would be all right for a movie director describing what should happen in a film, or a someone reporting the past in the present tense). In (18) the simple declarative sentence instead of the emphatic *there*-fronted sentence indicates a lack of surprise and does not seem to coincide with real-time. In (19) the verb is grammatical because there is plenty of time to recall the motion and manner-of-motion features associated with the entity/event and use them to select a more descriptive verb than the copula. In (20) the copula in the past is acceptable but not very descriptive. The grammaticality of (22) and (24) show that the motivation for *there*-fronting is weakened outside of real-time. (21) and (23) recreate some of the dramatic effect of the remembered or imagined real-time scene and might be accompanied by hand gestures.

However, with (25) only an existential sense is possible, which is also the case if

the word 'suddenly' is removed from (20) and (22). Adding "suddenly" to (25) produces (26) and makes the future *be* verb a verb of appearance. This indicates that the *there1+(2)* construction already entails the notion of 'suddenness' and that in order for a *there*-fronted copula construction to be *there1+(2)* it must occur in near-real-time and be in the present terse which supports the claim that deictic *there*-fronting is perceptually motivated. Furthermore, only the copula of near-real-time *there1+(2)* can stand for the features of all the verbs that Levin lists as participating in *there*-insertion. This suggests not only that *there1+(2)* is the source of *there2* but also that it is the source of all *there*-fronting.

6. Conclusion

This paper has dealt only with perceptually motivated there'fronting' in deictic and existential constructions in English. However, similar structures exist in other languages, such as French $<il + y + a + (NP)>$ and Spanish $<hay + (NP)>$. However, since my hypothesis suggests a Linguistic Universal, it should be tested through a cross-linguistic study, that includes non-Indo-European languages.

Finally, in this paper I have examined one instance in which perceptual processes appear to influence fronting. However, other instances of fronting may result from similar processes, such as fronting of *here,* as in the following example,

(20)　Here comes the bus

Like, there-fronting, *here*-fronting may also be motivated by visual processes. As a bus comes toward one, it seems to get bigger. Crick (1994) points out that the effect of this is very vivid and that it is due to the expansion of the image on the retina, a phenomenon called, "dilation." Moreover, he notes that there is a special part of the brain that responds to "dilation" of a visual image. By substituting the word 'predator' for the word 'bus', the potential ecological (survival) importance

of the part of the brain used to detect dilation as well as the language for expressing it efficiently, such as through *here*-fronting, becomes evident.

7.1. Appendix A

The colliculus plays a significant role in directing attention to motion in the periphery of the visual field.

> Anyone who lectures is likely to have had the following experience. If there is a sudden change, such as a door opening, to the left or the right of the speaker, the eyes of the entire audience swivel simultaneously in that direction. The response appears to be almost immediate and largely involuntary. I would certainly expect that their colliculi are a major factor in producing such eye movements (Crick:127).

The main function of the colliculus in mammals appears to be the control of eye movements. The colliculus is layered, with three main regions that Crick calls the upper, middle, and deep regions. The upper region receives not only input from the retinal but also the auditory and somatosensory systems. The "deep regions connect to the brain stem onto neurons that lead to the control of the muscles of the eyes or the neck" (Crick 127)[14].

> As for the neurons, in the upper region many of them are selective for movement. They are very responsive to small stimuli, but less to the details of a stimulus, and their response to a change of light is often very transient—all factors that are likely to command involuntary attention. "They signal 'look out, there's something there!'" (Crick 127).

The middle and deep regions of the colliculus embody a "motor map". When the neurons of these regions fire, they encode the direction and amplitude of the change in eye position needed for the eyes to make a saccade (one large eye movement) to the target (Crick 127).

7.2. Appendix B

Low-level vision is the term used to describe the first processing stages in the analysis of incoming visual information. Such processes include recovering physical properties of the visual environment, such as

> depth to different points in the visual field, surface orientation of objects, boundaries of objects and material properties, motion in space and the like. In contrast, the high-level processes of visual perception use the representations produced by the early processes for tasks that are no longer purely visual in nature, such as object recognition"

(Yuille and Ullman 1994: 6).

The processes of low-level vision are believed to apply in virtually all visual domains and tasks. Also, many of the processes of low-level vision, such as detection of edges and their orientations, and short-range detection of speed and motion, appear to occur simultaneously across the visual field, or at least large parts of it. This is in sharp contrast to object recognition, which appears to operate sequentially on one object at a time.

One of the main purposes of early vision is to organize the raw data (incoming light) into a representation that describes the significant "events", such as edges. This is done in a variety of ways. "Intensity edge detection" locates sharp discontinuities in image intensity, such as are typically found at object boundaries. "Texture boundary detection" identifies sharp changes in texture found, for example, at the boundary between a lake and the sand of its beach. And "motion segmentation" uses differences in speed between objects to detect boundaries that may be undetectable in static images[15].

Another aim of low-level vision is to estimate depth or surface orientation. One process used to do this is "binocular stereo vision", which involves matching the image from each eye and then perhaps using some kind of triangulation to obtain the depth of object(s)[16]. Another process is "structure from motion", which can

estimate both the depth and three-dimensional structure of objects. Other processes include "shape from texture", "shape from shading", and "shape from contour".

A third general goal of low-level vision is to compute material properties of objects. For example, color can help to distinguish between different objects, and texture can also help generate clues about the properties of objects.

Although low-level vision includes many sub-processes that extract specific kinds of features from the raw image data, it also uses more global processes to group the features. As features are grouped a specific area of visual space may emerge as being especially salient.

Lastly, largely because the retina does not receive enough information to recover unambiguously the full three-dimensional world, low-level vision uses some constraints or assumptions about the world that are generally true (illusions are examples of when they are not true) and largely innate. For example, there is evidence that even a five-month-old infant uses a kind of "rigidity" assumption in motion perception (Yuille and Ullman 1990).

To illustrate such a "rigidity" assumption, imagine that you are under water and see some spots rotating with a uniform relation to each other, as though they could be glued onto a transparent sphere. You assume, therefore, that they *are* on a 'rigid' sphere, and you are probably right. Later, it would be more likely for you to learn that someone had filled with water and then submerged a transparent beach ball covered with spots than it would be to learn that someone had manipulated the unattached spots by telekinesis.

In addition, according to V.S. Ramachandran's Utilitarian Theory of Perception, such assumptions about the world probably evolved through natural selection (cited in Crick). Given assumptions such as the rigidity from motion assumption, discussed above, it seems reasonable that humans could assume that a focused on low-level visual representation will in fact become a physical entity in the world. Moreover, given V.S. Ramachandran's Utilitarian Theory of Perception, it seems

reasonable that such a perceptual assumption could motivate the fronting of *there* in a *there1+(2)* utterance in order to draw the hearers' attention to a salient representation as soon as possible, that is, before it completes the process of object recognition.

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Notes

'(I thank Masaji Tajiri for helping me with OE and ME references and data. I also thank Tomoko Smith and Cindy Daugherty for their helpful suggestions.)

1. I hypothesize that the evaluation of its being noteworthy or worth reporting may often occur before the object is recognized.

2. In fact, many important properties of the yet-to-be-recognized-object are observed during low-level vision. For more detail see Appendix A.

3. I apologize for my inability to produce the OE script.

4. Mitchell uses Nagashima's term "introductory" *there*.

5. However, the examples in Bickerton do not include the context that I claim should motivate *there*-fronting

6. This fact could have been an additional motivation for using *there1*+(LOC) as a new template for existential sentences in OE. (The authors, however, consider *there* in both stage two patterns to be a deictic adverb).

7. For a more detailed description of the colliculus and its functions see Appendix A.

8. Although it does this essentially automatically it can be overridden by conscious effort.

9. This hypothesis could be tested by first creating a peripheral motion stimulus for subjects and then monitoring their eyes as they attempt to point at it and say "there."

10. Similar kinds of neural processes, could also be responsible for there-fronting based on

unexpected and notable smells and tastes

(11)   There's a funny smell in here.

(12)   There's a strange taste in this chowder. Are you using some new kind of spice?

11. Not all vision scientists agree about all the details of vision, but I believe most would not object to this simplified overview.

12. For a little more detail on the process of low-level vision and attention, see Appendix B.

13. See Appendix A.

14. This suggests that an unexpected noise or touch could create a response similar to that created by peripheral motion.

15. In addition to motion detection in peripheral vision, *motion segmentation* may play an especially important role in hunting, avoiding predators, and being the first one to a limited food source as discussed in the section on ecology.

16. Recall that object recognition does not occur in low-level vision. "Object(s)" is/(are) used, for lack of a better word, to refer to perceptual data in the process of becoming representations that might become candidates for the high-level process of object recognition.