Julie Fadlon
Tel Aviv University

<u>The directionality of verbal diathesis: a psycholinguistic study</u> **1.Introduction:** Different diatheses of the same verbal concept (transitive *'John **opened** the window*, unaccusative *'the window **opened'***, verbal passive *'the window was **opened'***, etc.) are commonly considered to be connected by a derivational operation. Theoretical models which address this connection discuss the issue of directionality: is one alternate derived from the other or is the case that both originate from a mutual source? If the former is correct, which of the alternates is the input of the operation and which is its output? Different models anchored within diverse theoretical frameworks provide various arguments to favor one directionality route over the other. I show that a theory-independent psycholinguistic research can provide insight into what alternate, if any, speakers perceive as derivationally more basic. My empirical array for this purpose is the transitive-unaccusative alternation. I thus present and discuss two experiments involving 66 Hebrew speakers, designed to examine the derivational relationship between unaccusative verbs and their transitive alternates.

2. Theoretical background: Ever since the formulation of the unaccusative hypothesis (Perlmutter 1978), unaccusativity was the target of many analyses (Chomsky 1981; Burzio 1986; Levin & Rappaport 1995; Pesetsky 1995, among others). One prominent crosslinguistic fact about unaccusative verbs is that they tend to have a transitive alternate **(**e.g.: *'The ball **rolled** /'The wind **rolled** the ball'*). This inspired many to assume a derivational relationship between these two diatheses. The views regarding its nature vary. Some (Harley 1995; Marantz 1997; Alexiadou et al 2006, among others) consider both alternates to originate from an abstract linguistic entity, while others consider one of the alternates to be derived from the other. I label the former type of theories the *root-based theories* and the latter the *transitive-to-unaccusative theories* (Levin & Rappaport 1995; Chierchia 2004; Reinhart & Siloni; 2005 Horvath and Siloni 2008; Koontz-Garboden 2009) and the *unaccusative-to-transitive theories* (Pesetsky 1995; Ramchand 2006; Pylkkänen 2008), according to the suggested direction of derivation.

3. Hypothesis and predictions: I argue that speakers' perception of a derivational alternation reflects the derivational relationship between its members. Hence, I put forward and empirically and theoretically justify the following hypothesis, which I label ICE (**I**nput **C**ontextual **E**ffect): Given a derivational operation, a context consisting of the input would serve as a better facilitator for the lexical retrieval of the output than vice versa. The rationale behind this hypothesis is that if indeed one of the alternates is created through a linguistic procedure performed on the other, a manner of presentation reflecting the ordering in which these structures are 'naturally' created will have contextual effect observably greater than the contextual effect of mere semantic or phonological relatedness. For example, if the unaccusative *break* is the input for the derivational operation which creates the transitive *break*, a task requiring speakers to retrieve the transitive *break* (the output) after they were exposed to the unaccusative *break* (the input) should be easier than a task that calls for the retrieval of the unaccusative (input) after speakers encountered the transitive (output). Assuming ICE, the three different views of directionality reviewed in 2 above make three different predictions: *unaccusative-to-transitive* views predict that an unaccusative and then transitive order will be easier for speakers than a transitive and then unaccusative order, while *transitive-to-unaccusative* approaches predict the opposite performance pattern to emerge. Finally, *root-based* theories predict the two orders to pose an equal degree of difficulty.

4. Experiments: to test these predictions, two cross-modal lexical priming experiments were conducted. In this type of design speakers are presented with an auditory prime word and afterwards with a target word or non-word, which appears on a computer screen. They are then required to complete a lexical decision task: press a certain key if the second word exists and another one if it does not. Their reaction time (RT) is recorded and analyzed. Accordingly, this study compared speakers' RT to transitive-unaccusative prime-target combinations (TU) with their RT to unaccusative-transitive prime-target combinations (UT). The basic structure of the experimental design was inspired by the work of Frost et al (2000). <u>Experiment 1</u> **Participants**: 36 adult Hebrew speakers. **Stimuli**: 34 morphologically distinct pairs of unaccusative verbs and their transitive alternates (e.g. *gilgel* 'roll-trans', *hitgalgel* 'roll-unacc'; *hikpi* 'freeze-trans', *kafa* 'freeze-

unacc') controlled for morpho-phonological form and frequency; 68 phonological controls, which share the same amount of phonemes with each of these transitives and unaccusatives but are not derivationally related to them (e.g. *gigel* 'googled', *hitgolel* 'wallowed'); and 68 randomly chosen Hebrew verbs paired with 68 non-words composed in the form of Hebrew verbs. ***Design and procedure****:* participants were randomly divided into two groups of 18 members. The stimuli for each group included 17 transitive-unaccusative pairs in TU prime-target order; 17 of these pairs in UT prime-target order; 17 unaccusative-phonological control prime-target pairs; 17 transitive-phonological control prime-target pairs and 68 verb-nonword filler pairs. The 17 TU pairs presented to the first group were presented to the second group in UT order, and vice-versa. Thus participants never encountered the same alternation twice, yet, for each alternation, speakers' performance was tested for both TU and UT prime-target order. In addition, control pairs were presented to participants who did not see their matched transitive-unaccusative pairs. The software used for constructing and running the experiment was E-prime 2.0 by PST Inc. Participants were instructed to listen to the prime and then press 1 if the word which appears on the screen exists and 0 if it is a non-word. They were then presented with a trial session consisting of 11 prime-target pairs followed by 136 transitive-unaccusative, control and filler pairs, quasi-randomly ordered to prevent adjacency of derivationally related items. ***Results***: statistical analyses by items and by subjects both revealed that speakers' reaction time to transitive-unaccusative pairs was significantly faster than their reaction time to unaccusative-transitive pairs (682ms Vs. 722ms, by items: t(33)=2.6, p=0.014; by subjects: t(35)=2.46, p=0.019). Also, the reaction time to transitive-unaccusative pairs was significantly faster than the RT in the case of their phonological control pairs (703ms Vs. 886ms, t(134)=9.2, p<0.0001). Experiment 2: Since unaccusative verbs are semantically entailed by their transitive counterparts, a follow-up experiment, which isolates the variable of semantic entailment, was needed. Hence, experiment 2 was constructed and run to examine an alternative hypothesis, according to which the reaction pattern revealed in experiment 1 does not necessarily indicate that unaccusatives are derivationally more complex, but is due to the semantic entailment relation between transitives and their unaccusative alternates. ***Participants***: 30 adult Hebrew speakers (average age 27). ***Stimuli***: 34 pairs of transitive verbs and their semantically entailed but not derivationally related intransitives, controlled for frequency and morpho-phonological form (e.g. *cinen* 'chilled-trans', *hitkarer* 'cooled-intrans'); 34 control pairs of semantically and derivationally non-related transitives and intransitives; and 68 pairs of randomly chosen Hebrew verbs and non-words. ***Design and procedure***: participants were again divided into two groups. Each group was presented with 17 semantically related pairs in which the entailing verb is the prime and the entailed verb is the target and 17 pairs in the opposite order. In addition, the pairs presented to one group in entailing-entailed order were presented to the second group in the opposite order and vice versa. The experimental procedure was identical to that of experiment 1. ***Results***: the variable of semantic entailment was not found to be relevant for this task. Statistical analyses by items and by subjects both revealed that speakers' reaction time to entailing-entailed pairs is not significantly different from their RT to entailed-entailing pairs (723.7ms Vs. 723.9ms by items: t(33)=0.08, p=0.99; by subjects: t(29)=0.013, p=0.98). **5. Conclusion and discussion**: assuming ICE, the results of experiments 1 and 2 suggest that speakers perceive the transitive verb as the basic alternate and its unaccusative counterpart as the derived one. This is consistent with *transitive-to-unaccusative* analyses and inconsistent with *unaccusative-to-transitive* and *root-based* analyses. In addition, the significant difference found between the overall performance with unaccusatives-transitive pairs (TU and UT) and pairs of verbs for whom the relation is purely phonological, provides new empirical evidence to reinforce the view that the relation between unaccusatives and their transitive alternates is more than a phonological one. My paper will bring a thorough discussion of these theoretical consequences. **Selected references:** Alexiadou et al 2006; Burzio 1986; Chierchia 2004; Chomsky 1981; Frost et al 2000; Horvath and Siloni 2008; Harley 1995; Koontz-Garboden 2009; Levin & Rappaport 1995; Marantz 1997; Perlmutter 1978; Pesetsky 1995; Pylkkänen 2008; Ramchand 2006; Reinhart & Siloni 2005.