Ben Ambridge, University of Liverpool

The formation and restriction of linguistic generalizations: A competition-based account

In this paper we present and test a new theory of the formation and restriction of linguistic generalizations based on the competition-model framework. The goal of the account is to explain (1) how children form generalizations that allow for the production of novel utterances, (2) how children retreat from overgeneralization errors (e.g., **She giggled me*), (3) why certain generalizations are deemed ungrammatical by adult speakers, whilst other equally creative novel utterances (e.g., **She sneezed the napkin off the table*) are not and (4) why overgeneralization errors are observed at different rates for different constructions.

A basic assumption of the account is that speakers form grammatical constructions - at whatever level - (e.g., AGENT ACTION PATIENT; VERB+*ed*) by abstracting across utterances in the input (e.g., *I rolled the ball, John broke the cup*; *walked, talked, smiled*). Each slot (e.g., ACTION) is associated with particular semantic (and/or phonological and/or pragmatic) properties: those shared by the items that appeared in this position in the input utterances that gave rise to the construction. For example, the ACTION slot in the AGENT ACTION PATIENT transitive causative construction is associated with the semantic property of expressing direct, prototypically-physical causation (e.g., one cannot say *John crashed the car* if John simply distracted the driver).

When producing an utterance, *every* construction in the speaker's inventory competes for selection to convey the intended **message** (though most will have an activation level close to zero). The winner is the most highly activated construction, as determined by **construction frequency** (more frequent constructions will be more easily activated than less frequent constructions), **item-in-construction frequency (**items in the message will activate constructions in which they have frequently appeared), **fit** and **relevance**. The notion of **fit** reflects the assumption that grammaticality is determined by the compatibility between the properties of individual **items** and the construction **slots** into which they are inserted: An utterance is grammatical to the extent that the semantic properties of each slot and its filler overlap (e.g., *giggle* is a poor filer for the ACTION slot in the transitive causative construction [**She giggled me*] as the properties of the verb [internal causation] and slot [direct external causation] are not well matched). A highly **relevant** construction matches the message perfectly, in that it contains an appropriate slot for each entity in the message, and is associated with the required meaning (see Table 1 for examples).

Overgeneralization errors (e.g., **She giggled me*) reflect the use of an item in a construction slot with which it is less than optimally compatible. Hence, such errors reflect **competing motivations** on the part of the speaker: the motivation to use (a) a particular verb to express the semantics associated with that action (e.g., the nature of the laughter) and (b) a particular construction to express the event-level semantics (e.g., causation). These errors are due to the child's failure to have acquired (a) an adultlike understanding of the properties of a particular construction slot or item or (b) an alternative construction which contains a slot that is a better fit for that item. Errors cease gradually as this knowledge is acquired.

The predictions of this account were tested on data from the English locative constructions. The VERB slot in the **container-locative** construction is associated with the semantics of causing the container/location to change state (e.g., from full to empty; *Lisa **filled** <u>the box</u> with paper*). Hence the account predicts (via *fit*) that the lower the degree to which a verb is judged (by independent semantic-raters) as AFFECTING THE CONTAINER, the greater the degree to which overgeneralization errors of this verb into the container-locative construction (e.g., **Lisa poured/spilled <u>the floor</u> with water*) will be deemed ungrammatical. Conversely, since the VERB slot in the **contents-locative** construction is associated with the semantics of AFFECTING THE CONTENTS (e.g., *Lisa **poured** <u>water</u> onto the floor*), the less a verb is judged to exhibit this semantic feature, the greater the predicted ungrammaticality of overgeneralization errors into the contents-locative construction (e.g., **Lisa filled/lined paper into the box*). The account also predicts (via *item-in-construction frequency*) that the higher the frequency of a particular verb in the container-locative construction, the greater the extent to which overgeneralizations into the contents-locative construction will be deemed ungrammatical (and vice versa), as the verb will activate the former construction at the expense of the latter (due to construction competition).

These predictions were tested by obtaining grammaticality judgment data for 60 verbs (20 contents-locative-only, 20-container-locative only and 20 alternating) from 20 participants aged 5-6, 9-10 and adults, and semantic feature ratings from 10 adults. In support of the account, regression analyses revealed that both item-in-construction frequency (as determined using the *British National Corpus*) and semantic-feature ratings were significant predictors of the relative ungrammaticality of overgeneralization errors.

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Table 1. Competition between constructions: Example of a sentence derivation for the message JOKE $CAUSE_{INDIRECT}$ [MAN LAUGH] showing some of the most highly-activated competing constructions.

Construction	**Freq**	**Relevance**	**Fit**
Transitive causative [SUBJ] [VERB] [OBJ] **The joke laughed the man*	High	High. There is a suitable slot for *the joke* [SUBJ], the man [OBJ] and *laughed* [VERB].	Relatively high. *The joke* and *the man* are suitable items for the [SUBJ] and [OBJ] slots respectively. However, *laughed* is not a good candidate for the VERB slot, which requires a VERB that denotes direct causation (e.g., *amuse*).
Intransitive [SUBJ] [VERB] *The man laughed*	High	Low. *The man* and *laughed* are suitable items for the [SUBJ] and [VERB] slot, but one item in the message (*the joke*) is left unexpressed.	Perfect. *The man* and *laughed* are suitable items for the [SUBJ] and [VERB] slots respectively.
Periphrastic causative [SUBJECT] make [OBJECT] [VERB] *The joke made the man laugh*	Low	High. There is a suitable slot for *the joke* [SUBJ], the man [OBJ] and *laughed* [VERB].	Perfect. *The joke* and *the man* are suitable items for the [SUBJ] and [OBJ] slots respectively. Since the VERB slot is associated with the meaning of an action that is less than fully causal, *laugh* is a suitable item.