

## Gradable assertion speech acts

Yael Greenberg, Bar Ilan University, [yaelgree@gmail.com](mailto:yaelgree@gmail.com) &  
Lavi Wolf, Ben Gurion University of the Negev, [wolf.lavi@gmail.com](mailto:wolf.lavi@gmail.com)

**Introduction:** This paper builds on two main ideas in the literature. First, that some epistemic modal expressions are gradable, i.e. are not quantifiers over possible worlds (Kratzer 1981, 1991, 2012), but denote relations between propositions and degrees of subjective probability / belief, *aka* credence, (similarly to the way gradable adjectives denote a relation between individuals and degrees, as in e.g. Kennedy & McNally 2005 (K&M)). This has been claimed, e.g., for (some) modal adjectives (Yalcin 2005, 2007, Lassiter 2010, 2015, to appear) for particles like the German *eh-* (Herburger & Rubinstein 2014, 2017, Goncharov & Irimia 2017), and motivated by the ability of such expressions to be compared (*more likely/ eher*), and / or to be modified by e.g. degree modifiers / questions (*very likely/ How likely?*). Second, that speech acts (SA) can participate in the compositional interpretation and be embedded (cf. Krifka 2014, Cohen & Krifka 2014, Crnič & Trinh 2009, Thomas 2014, Beck 2016). We focus on the speech act operator *ASSERT*, which, following Thomas' 2014 and Beck's 2016 implementation of Krifka 2014, we take to be type  $\langle\langle s, t \rangle, \langle c, c \rangle\rangle$  as in (1), where  $c$  is the type of contexts, including a speaker, hearer, time of utterance and Common Ground ( $c_{sp}, c_h, c_b, C_w$ ):  
(1)  $[[ASSERT]] = \lambda p. \lambda c. \lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: assert(p)(c)\} \rangle$  Where *assert(p)(c)* is true iff in  $w$   $c_{sp}$  is committed to behave as though she believes that  $p$  at  $c_b$ , and  $c_h$  is a witness to this commitment.

**Our proposal** is to examine a way to integrate these two ideas, and move them one step forward so that **(bare) assertion speech acts are modeled as gradable, and are compositionally modifiable by (overt and covert) degree modifiers**. We outline two main motivations for our proposal:

**First motivation: Modal adverbs as modifiers over ASSERT:** Piñón 2006, Wolf & Cohen 2009, Wolf 2015 observe that, unlike modal adjectives (MADJs), modal adverbs (MADVs) act as modifiers of assertion speech acts. E.g. (A) MADVs, but not MADJs can only be embedded in the consequent but not the antecedent of conditionals (cf. Bellert 1977, Nilsen 2004, Piñón 2006, Ernst 2009):  
(2) a. #If John possibly/probably/certainly arrived at the office early, I will call the office.  
b. If it's possible/probable/certain that John arrived at the office early, I will call the office.  
(3) a. If John is in the office, it is possible / probable / certain that he arrived there early  
b. If John is in the office, he possibly / probably / certainly arrived there early.

We support such contrasts by data from COCA (Davies, 2008), as seen in e.g. (4):

(4) a. If it is/it's possible (243) vs. If it is/it's/he is/he's/she is/she's possibly (0)  
b. If possible (1725) vs. If possibly (14; 12 out of these are non-conditional *ifs* e.g. as *whether*)  
(B) Only MADVs are speaker-oriented, (Jackendoff 1977, Nuyts, 2001, Ernst 2009, Nilsen 2004):  
(5) A: It is probable that they have run out of fuel. B: Whose opinion is this?  
(6) A: They have probably run out of fuel. B: #Whose opinion is this?

Following Piñón 2006, Wolf & Cohen 2009 and Wolf 2015 conclude that MADVs combine with *ASSERT* and lower/raise the speaker's credence degree regarding the propositional content she asserts.

**Analysis:** We adopt Wolf's 2015 conclusion, and suggest that if MADVs indeed lower / raise the degree of credence in assertions, then assertions, crucially, even those containing no modal expression, should involve credence degrees to start with. To compositionally capture this idea we make two moves. First, we take bare assertions to denote degree relations, by adding a credence degree argument to the denotation of *ASSERT* in (1) so it is now type  $\langle\langle s, t \rangle, \langle d, \langle c, c \rangle \rangle\rangle$ , as in (7):  
(7)  $[[ASSERT]]: \lambda p. \lambda d. \lambda c. \lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: Assert(p)(d)(c)\} \rangle$ , Where *assert(p)(d)(c)* is true iff in  $w$  the speaker of  $c$ ,  $c_{sp}$ , is committed to behave as though she believes that  $p$  to a degree  $d$ , at the time  $c_b$ , and the hearer  $c_h$  is a witness to this commitment.

Second, we propose that similarly to degree modifiers over adjectives (e.g. *completely*), **MADVs are degree modifiers over gradable speech acts**,  $G$ , as seen in (8) and illustrated in (9)-(10):

(8)  $[[Probably]]: \lambda G. \lambda p. \lambda d. \lambda c. \lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: \exists d > 0.5 \wedge G(p)(d)(c)\} \rangle$

$[[Possibly]]: \lambda G. \lambda p. \lambda d. \lambda c. \lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: \exists d > 0 \wedge G(p)(d)(c)\} \rangle$

$[[certainly]]: \lambda G. \lambda p. \lambda d. \lambda c. \lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: \exists d = 1 \wedge G(p)(d)(c)\} \rangle$

(9) (a) John is probably a thief      b. [Probably(Assert)] (John is a thief) (c)

(10)  $\lambda c': c' = \langle c_{sp}, c_h, c_b, C_w \cap \{w: \exists d > 0.5 \wedge Assert(John\ is\ a\ thief)(d)(c)\} \rangle$

In words, (9b) combines with a context  $c$  and yields a new context  $c'$  which is just like  $c$  except that the common ground is updated with the information that the speaker,  $c_s$ , in  $c$  is committed at the time  $c_t$ , to behave as though her credence in “John is a thief” is greater than 0.5 (and  $c_b$  is a witness).

**Second motivation: The contextual variability of apparently unmodified assertions.** Following Lewis 1976 Potts 2006 and Davis et al. 2007 propose that pragmatically, Grice’s maxim of quality should be relaxed, as speakers do not always assert propositions with complete certainty, i.e. with subjective probability of 1. To quote: “...In practice [...], we can be lax on quality, as when we brainstorm new ideas or participate in bull sessions (Frankfurt, 1986). Conversely, we can be quite strict on quality, as when we maneuver to land rockets on the moon or instruct our students (perhaps). Therefore, I propose that each context comes with a quality threshold  $C\tau$ ”. (Potts 2006, p. 208). In the paper we discuss other examples of such contextual variability (and note that it does not always correlate with evidential strength, but can result from other contextual factors, e.g. what is at stake).

**Analysis:** We propose to ‘semanticize’ this contextual variability of the ‘quality threshold’ and implement it into the compositional view of gradable assertions. Specifically, we suggest that **the variability of  $C\tau$  with assertions is strikingly similar to the well-known variability found with gradable adjectives in their ‘positive form’**. The latter is often captured by taking apparently unmodified adjectives to be modified by a covert *POS*, setting the standard of comparison, as in (11):

(11)  $[[POS]] = \lambda G. \lambda x. \exists d d \geq \text{standard}(G, C) \wedge G(x, d)$  (e.g. von Stechow 1984, K&M 2005)

**We thus propose that apparently unmodified assertions are in fact modified by a covert *POS***, identical in type to MADVs, with the denotation in (12), as illustrated in (13)-(14):

(12)  $[[POS]]: \lambda G. \lambda p. \lambda c. \lambda c': c' = \langle c_{sp}, c_b, c_b, C_w \cap \{w: \exists d d \geq \text{standard}(G, C) \wedge G(p)(d)(c)\} \rangle$

(13) a. *John is a thief* b.  $[[POS(\text{Assert})]](\text{John is a thief})(c)$

(14)  $\lambda c': c' = \langle c_{sp}, c_b, c_b, C_w \cap \{w: \exists d d \geq \text{standard}(\text{ASSERT}, C) \wedge \text{Assert}(\text{John is a thief})(d)(c)\} \rangle$

In words, (13b) combines with a context  $c$  and yields a new context  $c'$  which is just like  $c$  except that the common ground is updated with the information that the speaker,  $c_s$ , in  $c$  is committed at the time  $c_t$ , to behave as though her credence in “John is a thief” is at least as high as the standard of credence (= the quality threshold) for assertions in the context.

Notice that K&M claim that the standard with Upper-closed adjectives (e.g. *clean / dry*) is not contextually supplied but equals the scale maximal point. If credence / subjective probability scales are upper closed, as claimed by Lassiter (to appear) (but cf. Klecha (2014)), then this should hold for apparently unmodified assertions as well. However, K&M themselves discuss apparent variability with such adjectives and derive it from imprecision (Lasersohn 1995, cf. Brunett 2014 for a detailed discussion and proposal). Other theories suggest that the standard for such adjectives is actually not necessarily maximal (e.g. McNally 2011, Sassoon & Toledo 2011) and can vary with contexts. We do not take a stand in this debate, but suggest that whatever mechanism used for variability with the positive form of U-closed adjective can be applied to the ‘positive form’ of assertions as well.

Finally, at this stage we do not attempt to use our proposal for MADVs to take a stand regarding debates about the semantics of MADJs. (E.g. while we take *possibly* to be a SA degree modifier, some theories (e.g. Klecha 2014) claim that the MADJ *possible* is non-gradable at all).

**Time permitting we point out several directions for further research.** For example: (a) **We observe that MADVs can appear with questions** (at least for some speakers), but not with directives (*Is John possibly married?* / *#Possibly close the door*), and suggest that this may be due to presence of an assertive components in the former but not the latter, see Krifka 2015. (Cf. Sauerland & Yatsushiro 2015 decomposition of questions into an imperative and CG component) (b) **How do MADVs interact with attitude verbs etc. (cf. Yalcin 2007)? And, if they are indeed modifiers of ASSERT, how can they be embedded in ‘not at issue’ positions** (e.g. *Even Mary, who is probably the best student in class, did not pass the exam*)? We discuss the possibility that the *ASSERT* operation should not be identified with at issue content (i.e. with what is ‘asserted’ vs. what is ‘presupposed’). (c) **Are there other degree modifications of assertions besides MADVs and *POS*?** We examine the possibility that some cases of ‘epistemic comparatives’ discussed in von Stechow & Kratzer 2014, Herburger & Rubinstein 2014, 2017, and Goncharov & Irimia 2017 are not propositional but can be modeled as SA comparatives over gradable *ASSERT*. (d) **Can the ‘gradable assertions’ view be used to advance our understanding of intensified affirmations** (e.g. *RIGHT! / Sure! / No*

*question!*) **and intensified denials**, (e.g. *No way! / Hell no! / You are far from truth*)? (e) Should gradability with assertions be used to measure **degrees of the speaker's credence of  $p$** , as suggested above, or perhaps **degrees of commitment for a complete credence of  $p$**  (to what degree the speaker is committed to fully believing  $p$ )? If so, how can such commitment degrees be modeled?