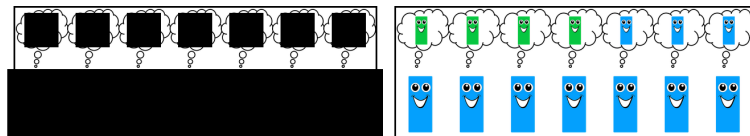


# Interpreting Presuppositions in the Scope of Quantifiers: *every* vs. *at least one*

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This paper looks at presupposition (PS) projection from the scope of the quantifiers *every* and *at least one*, as triggered by *be aware* (Exp. 1) and *again* (Exp. 2). We are interested in: (1) whether PSs project universally or existentially in quantified sentences. Theoretical accounts differ here (e.g., Heim 1983; Geurts 1999; Beaver 2001; Schlenker 2008, 2009; Fox 2012), but recent experimental work (Chemla 2009; Tiemann 2014) suggests that the force of the projected PS varies by quantifier. (2) Whether the descriptively observed readings result directly from the projection mechanism, or via independent mechanisms such as domain restriction (e.g., Geurts and Tiel 2016). If domain restriction plays a role, it yields non-universal inferences, even if projection itself is universal (a universal projection may thus yield a response descriptively equivalent to existential projection relative to the unrestricted domain—see the picture for  $\exists$ PS2 in Figure 2). (3) Whether the presupposed content also forms part of the entailed content (e.g., Sudo 2012; Zehr and Schwarz to appear). Our results show that *every* and *at least one* pattern differently, with *every* giving rise to universal PSs, that to limited extent can be weakened by domain restriction; and *at least one* giving rise to non-universal PSs. Our results also indicate the availability of PS-less readings for both triggers, apparently more prevalent than domain restriction. Thereby, we present novel evidence that helps to pin-point more directly which of the theoretical options can actually be substantiated experimentally.

**Experimental Design** We use a picture-matching task with a (partially) covered box (Huang et al. 2013). The covered box allows for a choice that better fits with subjects’ expectations without making it salient. Both experiments varied the quantifiers *every* and *at least one* as a between-subjects factor, with 80 subjects per experiment. Exp. 1 made use of the factive trigger *be aware* in sentences of the form *Q alien is aware that he is COLOUR*. Participants were told that the aliens can only find out what colour they have through the use of a potentially malfunctioning machine. Written sentences were presented along with two pictures of seven aliens (Figure 1). The aliens’ actual color represented the presuppositional dimension and thought bubble-renderings of the aliens’ beliefs the assertive dimension. In the ‘covered box’ picture, the aliens and thought bubbles were hidden by black squares. In Exp. 2, *again* was used in sentences like *Q alien turned COLOUR again*, paired with pictures showing aliens travelling from a home planet on which they had a certain colour (the presuppositional dimension), to another planet on which they turned gray, and finally to a third planet on which they turned a colour other than gray again (the assertive dimension). In both experiments, 6 conditions were included (3 control conditions), with 5 repetitions per condition and per quantifier (with a total of 60 items per participant).

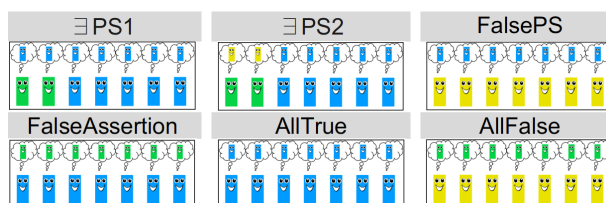


**Figure 1:** Illustration of the presentation of the two pictures in Exp. 1.

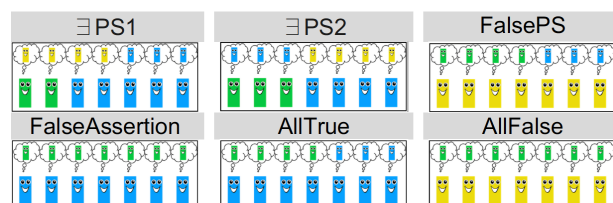
**Conditions and Predictions** The different conditions consist of picture-variations using different colour distributions, yielding varying compatibility with candidate interpretations (Figures 2-5).

The colour distributions are identical in Exp. 1 and Exp. 2. The critical items are:  $\exists$ PS1, which is compatible with an existential PS (not all aliens are blue), and the assertion is true (all think they are blue);  $\exists$ PS2, which is also compatible with an existential PS, but here the truth of the asserted content depends on the posited reading; and FALSEPS for which the assertion is true, but the PS is false (none of the aliens are blue). Crucially, the overt picture for  $\exists$ PS1 can only be accepted under a non-universal reading.  $\exists$ PS2 provides different diagnoses depending on the trigger it is paired with: when paired with *every* the overt picture can only be accepted under a domain restriction reading; when paired with *at least one* it can only be accepted if the presupposition is not entailed (and there is no independent requirement for the presupposition and entailed content to hold of the same individual(s); cf. the ‘Binding problem’ for presuppositions). In FALSEPS the overt picture can only be accepted under a PS-less reading (note that it also requires the presupposition to not be entailed). Control items are: FALSEASSERTION (the assertion is false, PS is universally met), ALLTRUE (PS is universally satisfied, assertion is true), and ALLFALSE (both assertion and PS are false).

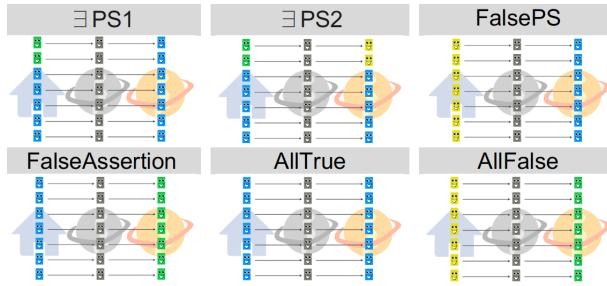
**Results & Discussion** Logistic regression mixed effect models were used to analyze the data. As expected, target acceptance rates for the ALLFALSE, FALSEPS, and ALLTRUE conditions are at floor and ceiling, respectively, in both experiments (Figure 6 and 7). Results on critical items are as follows. First, the significant difference for  $\exists$ PS1 between *every* and *at least one* indicates a difference in projection behavior between the quantifiers, with *every* projecting universally, and *at least one* not. The comparable results for  $\exists$ PS1 for *aware* and *again* suggest that this is not due to an effect of a contrast in whether or not the PS is entailed (though the present results do not elicit such a contrast; see the last conclusion point). Secondly, the 20% acceptance rate for  $\exists$ PS2 for *every* in Exp. 1 (significantly different from baseline controls) clearly indicates the existence of domain restriction to satisfy a universal PS. However, the extent to which domain restriction is available here is much more limited than suggested by related results from Geurts and Tiel (2016). Finally, the data for  $\exists$ PS2 for *at least one* suggests that our participants accessed non-entailing interpretations for *again* as well as for *aware*, and the data on the FALSEPS items indicates that there were readings of both the *aware*- and *again*-sentences for which no PS seemed to be involved at all, though further work is needed to assess how these may be derived.



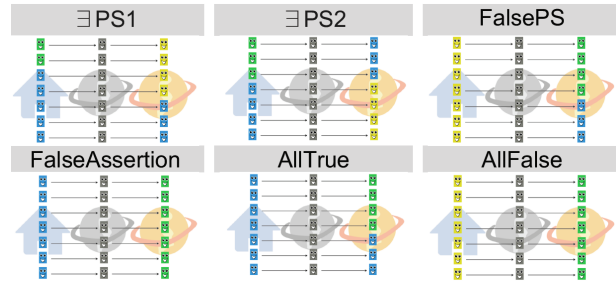
**Figure 2:** Exp. 1 (*be aware + every*):  
*Every alien is aware that he is blue.*



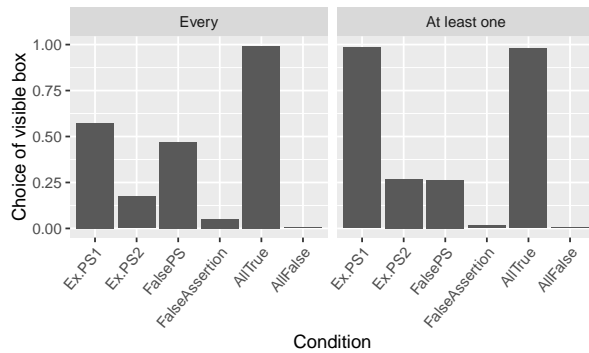
**Figure 3:** Exp. 1 (*be aware + at least one*):  
*At least one alien is aware that he is blue.*



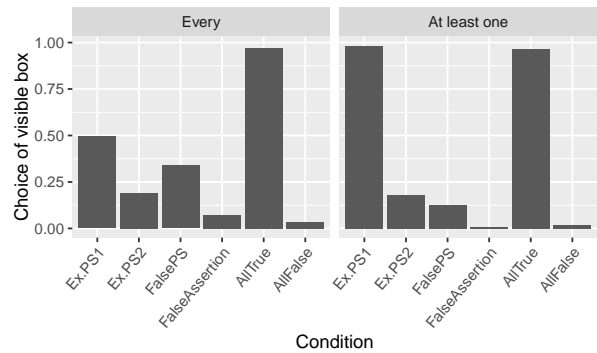
**Figure 4:** Exp. 2 (*again + every*):  
*Every alien turned blue again.*



**Figure 5:** Exp. 2 (*again + at least one*):  
*At least one alien turned blue again.*



**Figure 6:** Results Exp. 1 (*be aware*)



**Figure 7:** Results Exp. 2 (*again*)

## Selected References

**Chemla**, Emmanuel (2009). “Presuppositions of quantified sentences: Experimental data”. In: *Natural Language Semantics* 17.4, pp. 299–340. **Geurts & van Tiel** (2016). “When “all the five circles” are four: New exercises in domain restriction”. In: *Topoi* 35.1, pp. 109–122. **Sudo**, Yasutada (2012). “On the semantics of phi features on pronouns”. PhD thesis. Massachusetts Institute of Technology, Cambridge, MA. **Tiemann**, Sonja (2014). “The Processing of ‘wieder’(‘again’) and Other Presupposition Triggers”. PhD thesis. Universität Tübingen. **Zehr & Schwarz** (to appear). “Entailed vs. Non-Entailed Presuppositions-An Experimental Assessment”. In: *Proceedings of NELS* 46.