Turkish "unless" is not biconditional unless the pragmatic context allows it

Hearing the utterance *Unless you press the button, the alarm will not stop*, one would infer that (i) the alarm should stop upon a button-press, and that (ii) somebody must have pressed the button upon hearing the alarm stopping. This pattern of reasoning demonstrates that the connective *unless* receives a biconditional interpretation in this example. It has long been suspected that biconditionality of *unless* is not a lexically given semantic absolute, but a function of the broader syntactic/semantic organization of the hosting sentence. Particularly, while *unless* gets a biconditional interpretation in positive quantificational contexts (PQC) (e.g., *every*), it gets a uniconditional reading in negative quantificational contexts (NQC) (e.g., *no*).[1, 2] Yet, exceptive accounts take *unless* to be biconditional in all contexts.[3] To our knowledge, there exists no consensus on either the descriptive facts about *unless* or how to model its meaning.[4] We aim to contribute to this research with two experiments on the semantics of Turkish *unless*. Exp-1 explores the effect of pragmatic context on the interpretation of *unless* and Exp-2 investigates its interaction with quantifiers.

Previous studies on English show that *if*, a uniconditional connective, can be interpreted biconditionally in inducement contexts (promises/threats).[5] We tested whether a similar contextual effect exists for *unless*, a connective logically modeled as biconditional. Exp-1 employs an acceptability rating task based on a previous study[5] to test how Turkish *unless* is interpreted in rule vs. advice contexts (see A). 73 participants saw an utterance with *unless* followed by an inference either requiring or not-requiring a biconditional reading, and rated the likelihood of each inference on a 7-point scale. Mann-Whitney U test showed that *unless* was significantly more biconditional in rule contexts (Mdn=49) than in advice contexts (Mdn=34) (U=193.5, p<.0001). Thus, the interpretation of *unless* (like *if* [5]) changes with the pragmatic setting, which is a novel finding supporting the claim that the meaning/interpretation of these connectives are shaped and enriched through pragmatic processes.

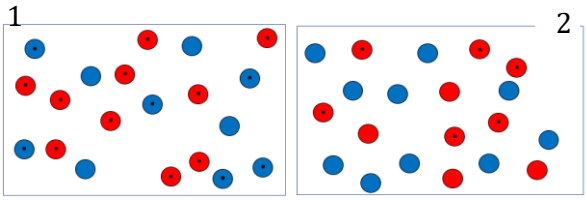
In line with this, a recent study showed that *unless* was semantically biconditional in neither PQC nor NQC even in rule settings.[4] English speakers were presented with pictures of 20 marbles (either in red or blue; with or without dots) along with statements using *unless* and *if not* in PQC and NQC to decide whether the statements correctly described each picture. Exp-2 used a similar paradigm to see whether Turkish correlates of *unless* and *if not* (i.e., *-mediği sürece* and *değilse*) would behave similarly. We varied the connector (*unless* vs. *if not*) and quantifier-context (PQC/*every* vs. NQC/*no*) between subjects (see B), and varied within-subjects the ratio of marbles (10 marbles in red and 10 marbles in blue) under quantifier (either *every* or *no*) with dots among 0, 0.2, 0.4, 0.6, 0.8 and 1 to see whether the degree of acceptability vary in line with this ratio. There were 12 test and 8 filler items and 73 participants in total. We used participants' responses (True/False) as our dependent variable. Mixed-effects logistic regressions including connector, quantifier-context, and ratio as the fixed effects, and participant and item as random intercepts showed a three-way interaction between connector, quantifier-context, and ratio [$X^2(4)=31,75;\ p<.0001$], and a separate analysis for each connector produced a quantifier-ratio interaction [*unless:* $X^2(1)=14,02;\ p=.00018$; *if-not:* $X^2(1)=10,92;\ p=.0009$] Pairwise comparisons between *unless* and *if not* for each quantifier and for each ratio showed: (i) for the PQC, *unless* was more biconditional than *if not* in all ratios except for ratio-0 (where only the non-target marbles have dots), and for the NQC, *unless* did not differ from *if not* in any ratios except for ratio-1 (where no marbles had dots) (*Table & Figure).* This pattern is similar to the pattern for English, except that Turkish speakers were more likely to accept the cases where no marbles have dots in NQC condition, which is a puzzle we try to solve. Overall our findings clearly contradict with the logic-based exceptive accounts of *unless* while concurring with recent studies showing that biconditionality arises as a result of pragmatic requirements.[4, 5]

References: [1] Higginbotham (1986). [2] Leslie (2008). [3] von Fintel (1991). [4] Nadathur & Lassiter (2014). [5] Evans, Neilens, Handly & Over (2008).

A. Sample Test Items (Experiment 1)

	Rule context	**Advice context**
	Düğmeye basmadığın sürece alarm susmaz. *Unless you press the button, the alarm will not stop. (~p → ~s)*	Kahve içmediğin sürece uyanık kalamazsın. *Unless you drink coffee, you will not stay awake. (~c → ~a)*
Biconditionality required	Düğmeye bastım; o halde alarm sustu. *I have pressed the button; therefore, the alarm has stopped. (p → s)*	Kahve içtim; o halde uyanık kalabildim. *I have drunk some coffee, therefore, I am awake. (c → a)*
Biconditionality not required	Alarmım sustu; o halde düğmeye bastım. *The alarm has stopped, that means I have pressed the button. (s → p) ≡ (~p → ~s)*	Uyanık kalabildim; o halde kahve içtim. *I am awake, that means I have drunk some coffee. (a → c) ≡ (~c → ~a)*

B. Sample Test Items (Experiment 2)



(1) Mavi/Kırmızı (*olmadığı sürece/değilse)* her bilyede nokta var.
"Every marble has a dot (unless/if) it is (not) blue/red"

(2) Kırmızı/Mavi (*olmadığı sürece/değilse)* hiçbir bilyede nokta yok.
"No marble has a dot (unless/if) it is (not) red/blue"

Table: *Pairwise comparisons between "unless" and "if not" using Wilcoxon-signed rank test*

Ratio	**PQC Condition (Every)**	**NQC Condition (No)**
1	*W*= 1082.00, z=-3.97, *p<0.001*, r= -0.46	*W*=1353.00, z=-1.35, *p=0.18*, r=-0.16
0.8	*W*=1231.00, z=-2.15, *p=0.03*, r=-0.25	*W*=1299.00, z=-1.28, *p=0.20*, r=-0.15
0.6	*W*=1208.00, z=-2.65, *p=0.008*, r=-0.31	*W*=1276.00, z=-1.78, *p=0.07*, r=-0.21
0.4	*W*=1210.00, z=-2.54, *p=0.01*, r=-0.29	*W*=1312.00, z=-1.20, *p=0.23*, r=-0.14
0.2	*W*=1212.00, z=-2.44, *p=0.01*, r=-0.28	*W*=1265.00, z=-1.73, *p=0.08*, r=-0.20
0	*W*=1370.00, z=-0.947, *p=0.34*, r=-0.11	*W*=1165.00, z=-2.93, *p=0.03*, r=-0.34

Figure: *Proportion of responses agreeing with the statement in both connectives in both quantifiers*