Deriving Conditional Perfection in Russian: the role of negation, clause order and face

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Introduction. Quantity inferences derived on the basis of conditional sentences were coined as Conditional Perfection (CP) in Geis and Zwicky (1971), cf.: *If you mow the lawn, I'll give you five dollars*; *Inference: If you don't mow the lawn, I won't give you five dollars*. Unlike scalar inferences, which is another variety of quantity inferences, CP has not experimentally been well studied. To the best of our knowledge, there are only a few papers which explore the CP derivation: Lilje (1972), Fillenbaum (1975), Plogmann (2011), Van Tiel and Schaeken (2016) a.o. However, these studies do not involve a systematic experimental investigation of negation and order of an antecedent and a consequent. There arise 3 research questions. **The 1st question** is whether the CP derivation from a negated antecedent/consequent (single negation) or from both of them (double negation) would yield more *yes*-answers and would take time comparable to the processing of a conditional with zero negation. **Prediction A** is that conditionals with zero negation yield more CP and involve faster processing than conditionals with single negation, which give rise to more CP and to faster processing than conditionals with double negation. In other words, the prediction is as follows: If P, Q >> If not P, Q; If P, not Q >> If not P, not Q. **The 2nd question** is whether the processing of an order antecedent+consequent (direct order) would take time comparable to the processing of an order consequent+antecedent (inverse order). **Prediction B** is that the CP derivation from conditionals with the direct order would yield more *yes*-answers and takes a lesser timing than the CP derivation from conditionals with the inverse order. In other words, the prediction is as follows: If P, Q >> Q, if P. The reason for this is that, intuitively, the CP derivation starts from an antecedent (it has a form "If P, Q") and in case of "Q, if P" the hearer changes the order of the clauses and then derives CP, and this presumably takes additional time. **The 3rd question** is whether the CP derivation is different for face(-threatening) speech acts vs. non-face(-threatening) speech acts. **Prediction C** is that face speech acts facilitate the CP derivation since they concern damage to / respecting the hearer's interests.

Methods. Relying upon Fillenbaum (1975), we distinguished among 5 types of speech acts (SAs) that conditionals express: promises and threats (face SAs), causal and temporal sentences, contingent universals (non-face SAs). Moreover, according to the questions and predictions, each of the 5 groups come into the following schemas:

1) affirmations without negation, with single negation, with double negation presented in the direct order: If P, Q; If not P, Q; If P, not Q; If not P, not Q;
2) affirmations without negation, with single negation, with double negation presented in the inverse order: Q, if P; Q, if not P; Not Q, if P; Not Q, if not P.

All the sentences are unique. It means that their lexical contents are different. Each of the schemas is represented in 2 different versions distributed between 2 experimental lists. We did this in order to decrease a potential effect that some sentences might have. All in all, we generated 80 stimuli (5 types of SAs x 2 types of order x 4 types of (non-)negated sentences x 2 versions) distributed between 2 lists, with 40 stimuli per list. We used an inference task, cf. Geurts and Pouscoulous (2009), Van Tiel et al. (2016) a.o. Participants were presented with a conditional on a slide followed (on the next slide) with the question whether it is possible to make an inference and with *yes/no*-answers. The key "G" on the keyboard was reserved for *yes*-answers and the key "J" for the *no*-answers. There was a time interval of 10 seconds to read a conditional and an interval of 15 seconds to answer the question. The latter interval was maximum, that is, participants had to choose an answer within this interval and their reaction times were recorded.

The experiment was conducted in the Russian language. The next sentences illustrate stimuli.

(2) *Esli ty pol'yoš mne tsvety, ja nakormlju tebja pirogami*.

if you will.water me flowers I will.feed you with.pies

Možete li Vy sdelat' iz etogo vyvod, čto esli ty ne pol'yoš mne tsvety, ja ne nakormlju tebja pirogami?

can whether you make from this inference that if you not will.water flowers I not will.feed you with.pies

'If you water my flowers, I will give you the pies. Would you infer from that that if you don't water the flowers, I won't give you the pies?' (Promise; If P, Q)

(3) *Desertnoj vilkoj ne pol'zujutsja, esli v menju ne predusmotren desert*.

dessert fork not use if in menu not foreseen dessert

Možete li Vy sdelat' iz etogo vyvod, čto desertnoj vilkoj pol'zujutsja, esli v menju predusmotren desert?

can whether you make from this inference that dessert fork use if in menu foreseen dessert

'One does not use a dessert fork if the menu does not contain a dessert. Would you infer from this that one uses a dessert fork if the menu contains a dessert?' (Contingent Universal; Not Q, if not P)

The fillers are affirmations which denote sequences of events and were followed with a question that violates the order of the events. They were expected to receive a definite *yes*-response or a definite *no*-response. There were 46 fillers. 6 of them were presented at the beginning of the experiment in order to train participants for the further experimental materials. The same fillers were used in both lists. Due to a big number of stimuli and fillers, each 20 items were followed with a small break for 10 seconds in order to give some rest for participants. The experiment was conducted via IbexFarm, which is a free online platform for conducting experiments. 68 people were involved (49 female, age range = 19-39 y.o., mean age = 22).

Results (Logistic regression and GLM). The distribution of answers among the fillers was uniform, whereas the one among the targets was biased ($p < .001$); the fillers were answered significantly faster than the targets ($p < .001$). Both for answers and RTs, the interactions between SAs vs. Negation and between SAs vs. Order were significant ($p < .05$), but not between Negation vs. Order ($p > .05$). Pairwise comparisons among types of Negation for answers and RTs revealed that double negation significantly facilitates the CP derivation and is processed faster than the single/zero types of Negation ($p < .01$). Prediction A was not confirmed. A plausible reason for this is that in case of double negation, both clauses of a conditional are marked with negation and, in this sense, are parallel in processing. Another plausible reason is that double negation is tantamount to affirmation (cf. $\neg \neg p = p$). Pairwise comparisons among the types of clause order for answers revealed a significant difference between the direct vs. inverse types of Order ($p < .05$). Surprisingly, the inverse clause order facilitates the CP derivation to a bit greater extent than the direct clause order. Prediction B was not confirmed. A plausible reason for this is that the inverse order makes the consequent focused. Finally, pairwise comparisons among SAs for answers and RTs revealed that the face SAs facilitate the CP derivation. Prediction C was confirmed. This suggests that inferential reasoning is dependent upon face/politeness factor (cf. also Bonnefon et al. 2009).

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