Veya and *Ya Da*: Marking the distinction between the inclusive and exclusive disjunctive "or" in Turkish language

There are two separate words for the logical expression of the disjunctive conjunctive "or" in Turkish language. We claim that the word *"veya"* denotes the "inclusive or," while the word *"ya da"* denotes the "exclusive or." Inclusive disjunction and exclusive disjunction differ only in the case where both constituent statements are true (Goldfarb, 2003). That is, the former corresponds to "A or B or both," while the latter should be interpreted as "A or B but not both". These two interpretations of the disjunctive are symbolised by a single word in most languages. Although Turkish has two etymologically different words for "or", these are used interchangeably in daily language. The fact that the disjunctive "veya" is formed by merging "ve" (Arabic for "and") and "ya" (Persion for "or"), while the disjunctive "ya da" appears as "ya … ya da …" (either … or …) in its grammatically more correct form should indicate that the former should correspond to inclusive or while the latter should be interpreted as exclusive. This preliminary study aimed to investigate whether Turkish speakers (n=20 Koç University undergraduate students) were aware of this distinction by making use of some reasoning tasks involving propositions formed with these two separate disjunctives. The tasks presented propositions connected with "ve" (and), "veya" (inclusive or) or "ya da" (exclusive or). The participants were asked to select the box(es) (see *Figure 1*) or the figure(s) (see *Figure 2*) that confirm the given proposition in each question.

We found that propositions created with disjunctives are harder to reason with, compared to "and", confirming the previous studies (King, 1966; Noveck et al., 2002) and extended this finding to Turkish language. Reasoning with "and" was the easiest and took the least time, compared to both disjunctives in both Box questions ($p<0.01$) and Figure questions ($p<0.05$). Results also indicated that Turkish speakers use the inclusive interpretation of "or"

more readily in their reasoning; regardless of which word, *"veya"* and *"ya da"*, is used (p<0.05). This means speakers, on average, did not significantly used the exclusive interpretation of "or" even when the proposition included "ya da" instead of "veya". However, our crucial finding was that the participants who explicitly had been *previously* made aware of the logical distinction between the two interpretations in another language like formal logic, computer programming or mathematics, showed to be able to map this information onto two words, *"veya"* and *"ya da"*, *congruently* (p<.05), i.e. they used the exclusive interpretation solely for "ya da" and the inclusive interpretation for "veya" at all trials.

These results suggest that although today's modern Turkish language does not readily make a conceptual difference between the two interpretations of the disjunctive, it still provides sufficient linguistic cues with the two separate words, *"veya"* and *"ya da"* for these concepts.

Key terms: disjunctive reasoning, inclusive or, exclusive or, veya, ya da

Word count: 452

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Figure 1

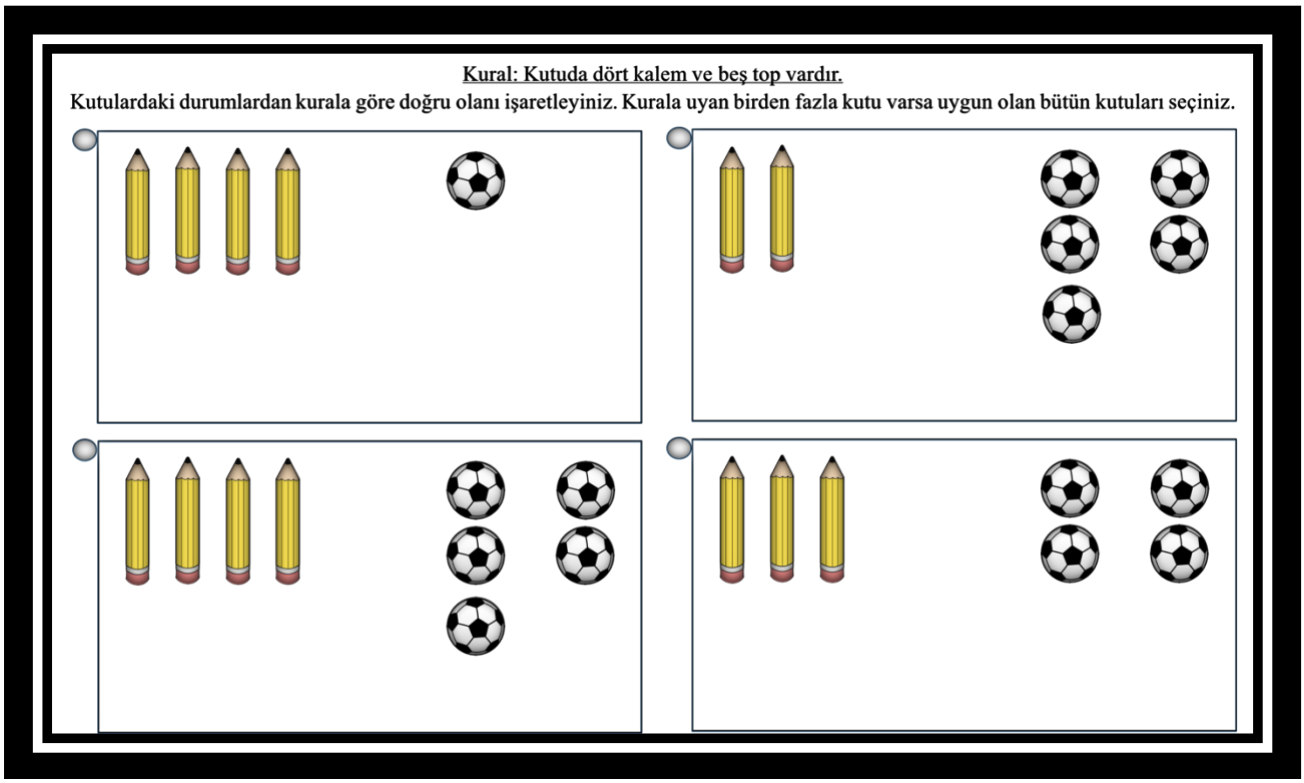

Figure 1 - Box Question with a proposition that is connected with "ve" (and). The question reads: "Rule: There are four pencils and five balls in the box. Select all the boxes that confirm the given rule."

The options represent all of the four possible truth values of the given proposition; that is the top left option confirms the first part of the proposition while rejecting the second part, the top right option rejects the first part of the proposition while confirming the second, the bottom left option confirms both parts of the proposition and the bottom right options rejects both parts of the propositions. The order of the options is randomised in each question. In this question that is connected with the conjunction "and" there is only one box option that confirms the whole proposition, which is the bottom left Box. In questions with propositions that are connected with "veya" (inclusive or), there are three correct responses while there is only one that rejects the whole proposition, which is the Box option that rejects both parts of the proposition. For "ya da" (exclusive or) questions, there are two correct and two incorrect options.

Figure 2

Figure 2 - Figure Question with a proposition that is connected with "veya" (inclusive or) The question asks: "From the figures given below select the one that is green or circle."

Among the six options, there always are the options that represent the four possible truth values of the given propositions and there are also two additional options that are random in their confirmation or rejection of any part of the proportion. The first figure from the left represents the option that rejects both parts of the proposition; the second confirms the first part of the proposition while rejecting the other; the third and the fourth figure also reject both parts of the proposition; the fifth figure confirms the first part of the proposition while rejecting the second; and the sixth figure rejects the first part of the proposition while confirming the second. In this case, the second, fifth and the sixth figures from the left are correct answers given the inclusive interpretation of "or". The order of the options is randomised in each question. Moreover, since the additional two options were randomised in their confirmation or rejection of the proposition, the number of correct responses in each question differed. However, there always is at least one correct answer and no more than three correct answers.