



PRAGMATIC FACTORS IN CONDITIONAL REASONING WITH NARRATIVE TEXTS*

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INTRODUCTION

In this study the role of pragmatic knowledge in conditional reasoning was investigated (Cheng & Holyoak, 1985; Holyoak & Cheng, 1995). In previous studies, the importance of problem content and empirical knowledge were investigated using different deductive reasoning tasks: sillogistic reasoning tasks (see for example Valiña, 1988; Valiña & De Vega, 1998) or conditional reasoning tasks (Asensio, Martín Cordero, García-Madruga, & Recio, 1990; Martín, Valiña, Seoane, & Ferraces, 1997; Santamaría, García-Madruga, & Carretero, 1996; Seoane, & Valiña, 1988; Valiña, Seoane, Ferraces, & Martín, 1995, 1996a, b; Valiña, Seoane, Gehring, Ferraces & Fernández-Rey, 1992; Valiña, Seoane, Martín, Fernández-Rey, & Ferraces, 1992, among others).

We tried to precisely determine the importance of the variable which we refer to as "the probability of empirical frequency" (Valiña & cols. 1992a, b; Valiña & cols., 1996a, b). This refers to the frequency with which the expressed relation between the antecedent and the consequent in conditional sentences occurs in the real world.

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If, as is proposed by the Theory of Mental Models (Johnson-Laird, 1983; Johnson-Laird & Byrne, 1991), people elaborate representations of the real world, it would be expected that reasoning with conditional sentences in which "empirical possibilities" are expressed will be different from the reasoning involved with statements which imply "empirical necessities" (Byrne & Johnson-Laird, 1992).

METHOD

149 students participated in this experiment. They did not receive any instructions in logic.

A 3 x 2 x 2 x 4 design was used, with repeated measurements in the last two factors. **The probability of empirical occurrence** expressed between the antecedent and the consequent could occur always (**deterministic**), sometimes (**probabilistic**) or there could be no specific relation (**without specific relation**). In conditional arguments (**Modus Ponens, Modus Tollens, Affirmation of the Consequent and Denial of the Antecedent**) we used people with **available** professions (biologist, clown, etc.) and non-available (axiologist, tightrope walker, etc.). Finally, conditional reasoning problems were presented in the context of 16 narrative texts about scenarios of daily life, with the same procedure as that used in previous experiments about syllogistic reasoning (Valiña & De Vega, 1988). The texts had a congruent or registered an incongruent ending.

RESULTS

Significant differences were registered in the type of logical rule. Specifically, the percentage of correct answers for each type of rule were: Modus Ponens (77.56%), Modus Tollens (70.55%), Denial of the Antecedent (52.91%) and Affirmation of the Consequent (51.85%).

The frequencies of endorsement of conditional inferences for congruent and incongruent texts are presented in Figures 1 and 2.

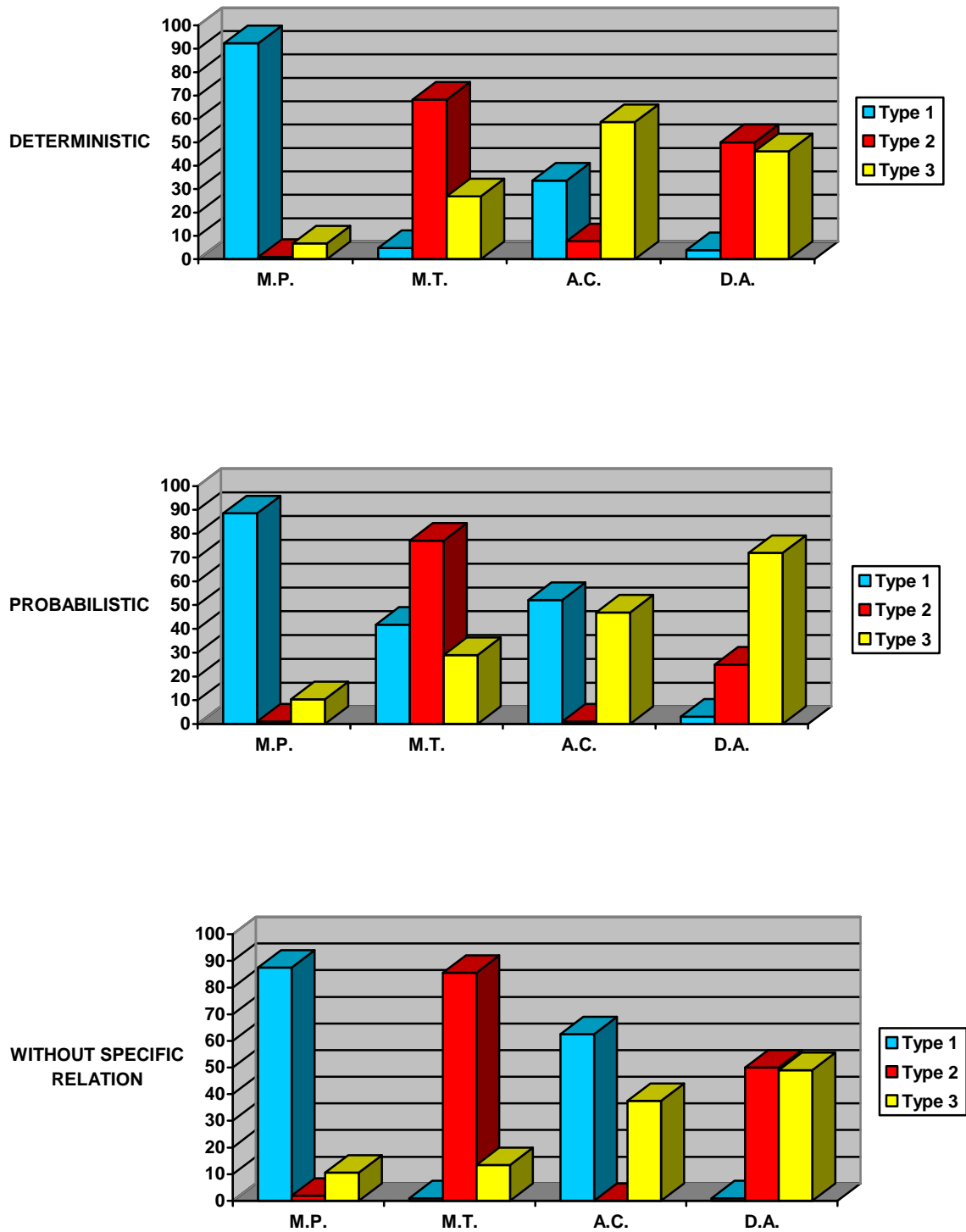


Figure 1. Frequency (%) of endorsement of conditional inferences for affirmative *If p then q* - Congruent texts.

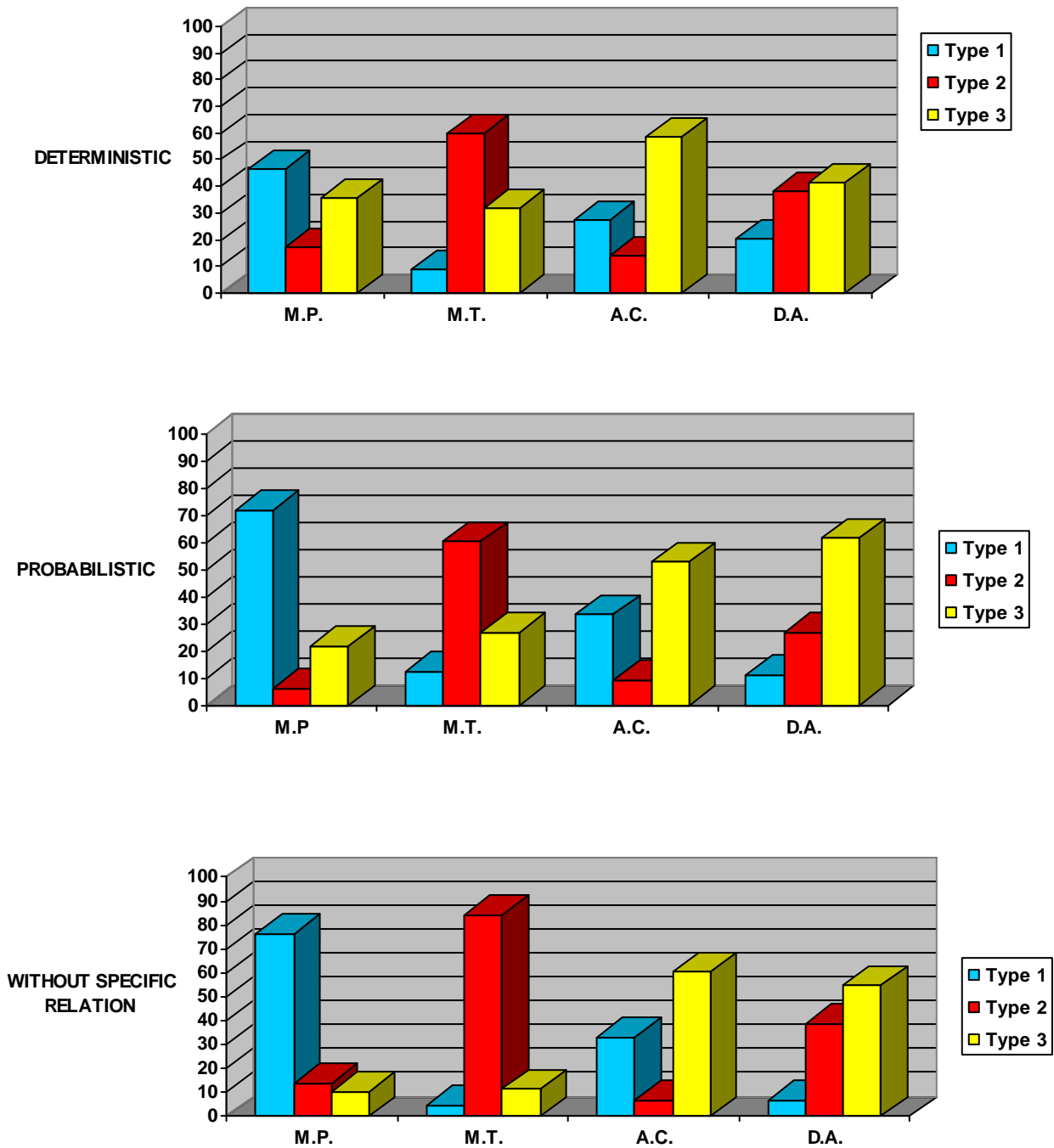


Figure 2. Frequency (%) of endorsement of conditional inferences for affirmative *If p then q - Non Congruent* texts.

Similarly a significant interactive effect was registered between the **probability of empirical occurrence** and the **type of logical rule** (Fig. 3) and the **congruence of the text** and the **type of logical rule** (Fig. 4)

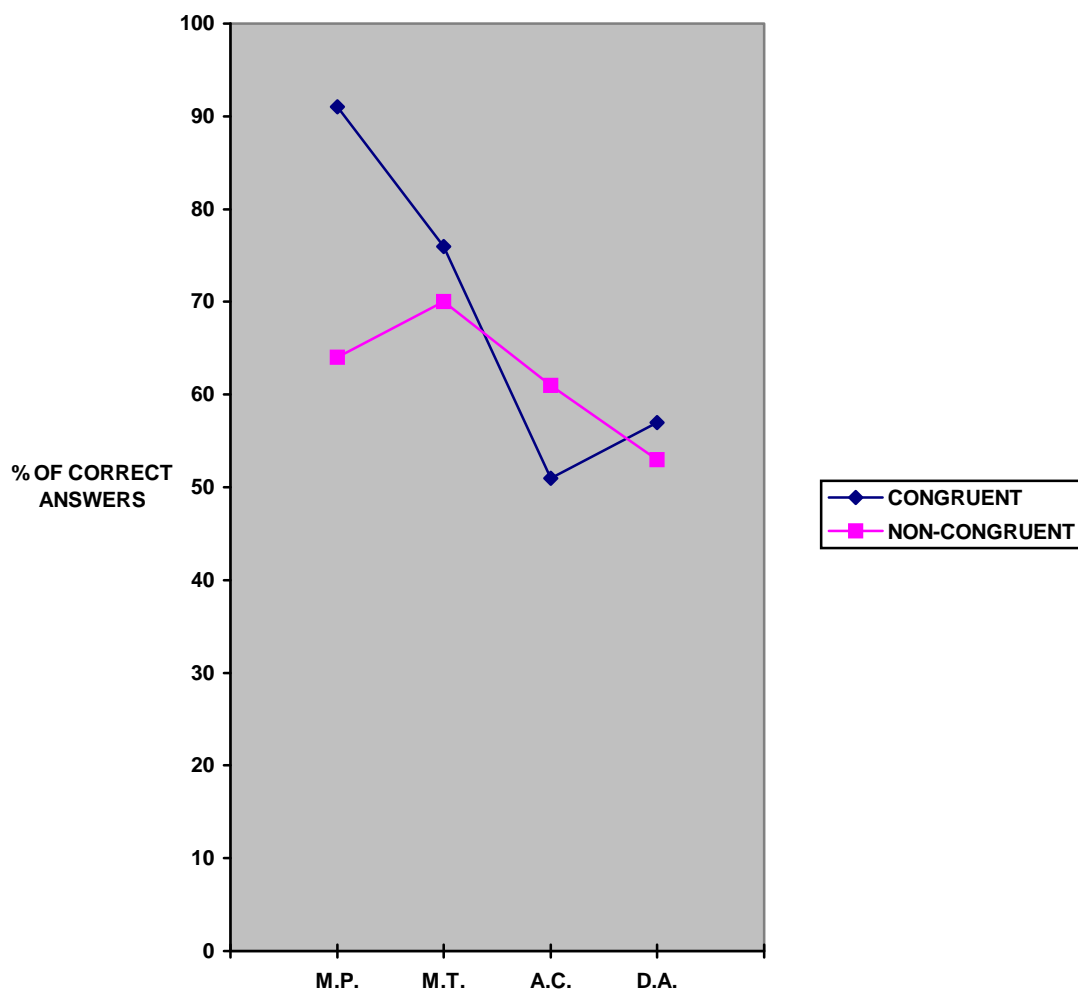


Figure 3. Interactive effects between the congruence and the type of rule in the percentage of correct answers.

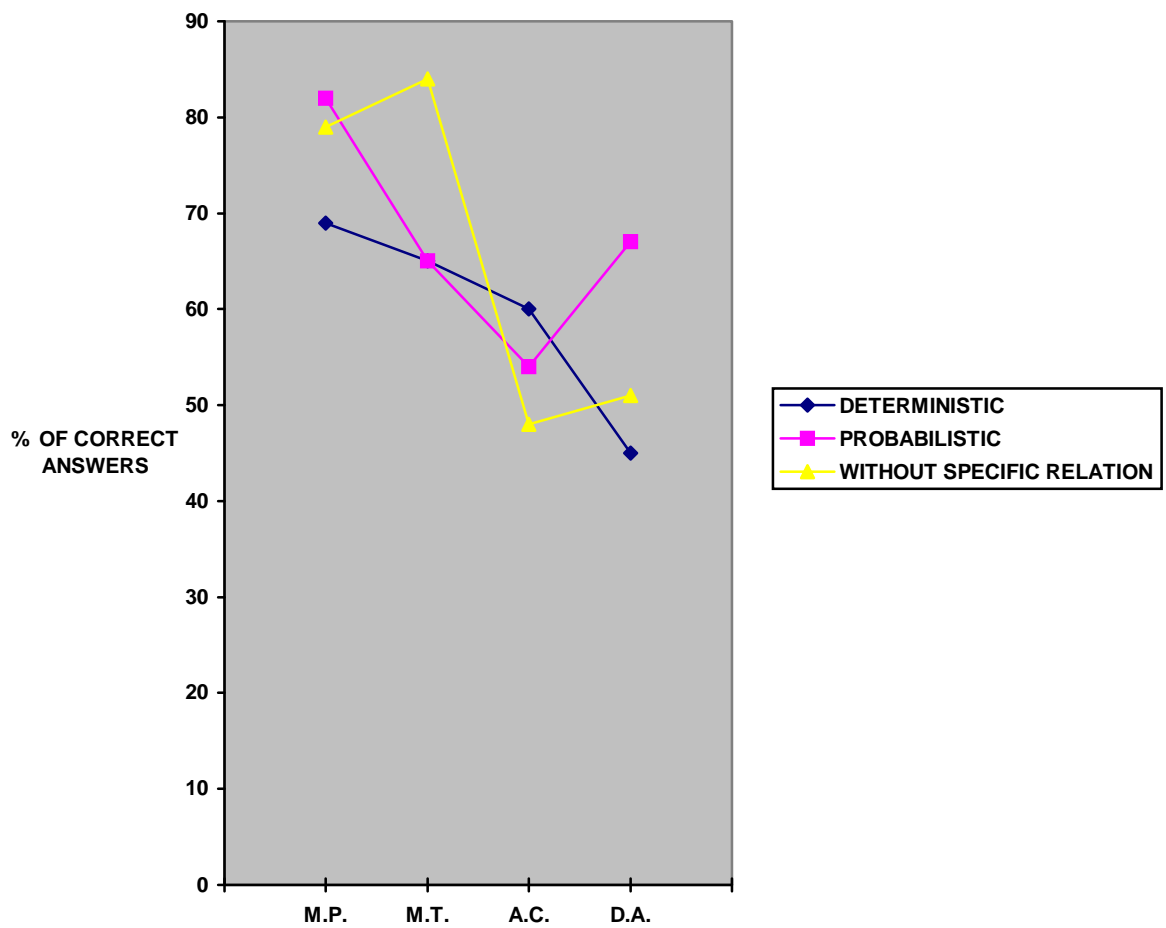


Figure 4. Interactive effects between the probability of empirical occurrence and the type of rule in the percentage of correct answers.

DISCUSSION

In the experiment reported here different conditionals were used in narrative texts, with a congruent or incongruent ending. The results showed the importance of the probability of empirical frequency between the antecedent and the consequent of the rule and the congruence of the texts on the conditional inferences.

The results are not consistent with theories based on formal rules of inference. The mental models approach (Johnson-Laird, 1983; 1986, 1995; Johnson-Laird & Byrne, 1991; 1992, 1993, 1995; Johnson-Laird, Byrne & Schaeken, 1992, 1994; Byrne & Johnson-Laird, 1992) and his revised version (Evans, 1993) may prove more successful.

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