

Membership vs Typicality in Sentence Verification Tasks: Implications for the Fuzzy Set Theory of Concepts

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The last years have seen the revival of the fuzzy set theory as a useful tool for dealing with some notorious problems unresolved by psychological theories of concepts [1]. A cornerstone of such theory is that "often it happens that the concepts encountered in the real world do not have precisely defined criteria of membership, i.e., they are vague ..." [2]. In addition to handling vagueness, the fuzzy set theory allows to take into account the typicality of instances, an issue prototypical theories of concepts have focused upon since Rosch's [3] seminal work. While vagueness and typicality are considered by the fuzzy theory as different manifestations of the same phenomenon, according to several authors it is unclear whether typicality and fuzzy membership are determined by different mechanisms (e.g., [4]).

In the paper, three experiments were carried out to investigate the role played by membership and typicality in a categorization task in which participants expressed their agreement with sentences like: “*Bats are/are not birds*”, “*Penguins are/are not birds*”, “*Canaries are/are not birds*”, and “*Toads are/are not birds*”, in which the membership and typicality dimensions were orthogonally manipulated.

In these experiments we also manipulated the presentation of the affirmative and negative sentences (Exp1, simultaneous vs random), the role played by hedge expressions (Exp2), and the channelling of an evaluation criterion (Exp3).

Overall, the results showed a significant main effect of both membership and typicality and a strong interaction between them as a proof of their role as factors in categorization judgment. Moreover, it was found that membership plays a stronger influence than typicality when they were directly contrasted. The relevance of these findings for the fuzzy set theory, especially in the context of concept representation in information systems, is discussed.

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