What are Logical Relations?

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Logical consequence and the converse relation of implication, contradiction and the complementary relation of compatibility, independence and the opposite relation of logical equivalence are all logical relations between propositions. Discussion stemming from Tarski's definition of "logical notions" makes it evident that the parallel question of the definition of "logical relation" has not been addressed. This paper locates the concept of logical relation in the literature of twentieth-century logic by colleagues of American Postulate Theorists often in connection with relations between members of postulate sets and between members of "squares of opposition". Relations considered to be logical are all found to share two properties: "formality" and "contentuality". A formal relation is one that relates every pair that is in the same logical form as a pair that it relates. Formal relations "hold in virtue of form". A contentual relation is one that relates any pair whose members are respectively logically equivalent to the corresponding members of a pair that it relates. Contentual relations "hold in virtue of content". Relations considered non-logical in the relevant sense are found to lack one or the other of these properties. The relation that relates a disjunction to either of its disjuncts is non- logical; it is formal but not contentual. Material implication is non-logical; it is not formal but it is contentual. Some non-logical relations relevant to logical considerations are neither formal nor contentual; e.g. the relation of an axiom to a theorem of a particular axiomatic theory. The paper concludes with the proposal that in order for a relation to be logical (in the relevant sense) it is necessary and sufficient that it be both formal and contentual.

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