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# EXPERT CHOICE'S "STRUCTURAL ADJUST" NEEDS TO BE ADJUSTED

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**Abstract:** In this presentation I shall address the issue of how to adjust the set of priorities (i.e. weights) in the Analytic Hierarchy Process in order to prevent a node from being penalized for belonging to a larger family of nodes than another node in the hierarchy. The usual situation of a linear hierarchy without feed-back or other non-standard dependence is assumed.

Node families of different sizes at the same hierarchy level will occur if the hierarchy is incomplete: not every element of level $n$ relates to an element of level $n+1$ ($n \geq 1$; the goal is at level 0). Further, the sheer process of grouping nodes can disturb original priorities if not all groups have equal size. As the weights of the nodes of each family are normalized so as to add up to unity, nodes belonging to the larger family of two families will get smaller weights than the nodes belonging to the smaller family. The adjustment implemented in Expert Choice's version 8, which boils down to weighing the priority of a node with respect to its parent by the respective proportions of the children of that node and its equally leveled siblings, is called "structural adjust" and may be turned off and on with respect to individual nodes at the user's discretion when using the software package.

This procedure, although in itself correct for the purpose of adjusting local priorities in a limited part of the hierarchy, is of little use from a broader perspective. Assuming that the ultimate aim of the adjustment is to produce final alternative priorities/scores at the goal level which are not affected by the mere size of node families, then the above adjustment procedure is not sufficiently comprehensive and, in fact, incorrect as will be shown.
This incorrectness is due to the limited scope of the adjustment and, when actually computing adjusted priorities, to not discriminating between alternative- and criterion-nodes.

An adjusted "structural adjustment" procedure will be proposed. The principle of this adjusted procedure is as follows. Taking the aggregation node as a reference, one has to go down all along the hierarchy from each of the reference's children until the relevant criterion-leaves (i.e. the leaves which can be reached from that child-node, not being alternatives). For the reference node, compute the total number of relevant leaves. Further, compute for each of its children the total number of relevant leaves (N.B. a child may be a leave itself, which then counts for 1 relevant leave). Then for each child, divide the latter number by the former and use this ratio to correct the original weight of the child with respect to its reference parent. Each node of the hierarchy below the goal plays the role of aggregation reference in turn while synthesizing.