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When Four Distinct Ways to Measure Utility are the Same

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Assuming that binary rank- and sign-dependent utility holds for gambles and that riskless choice utility can be constructed using the binary operation of joint receipt of consequences, there are four distinct measures of utility over gains: the two, one from gambles and the other from joint receipt, that arise by working just with gains and the two that arise by working with the trade-off of gains with losses. The problem is to discover testable behavioral properties that make the various pairs of measure identical. This is worked out completely leading to six distinct properties. Three have been studies earlier both theoretically and empirically: event commutativity (Def. 6), segregation (Def. 8), and duplex decomposition (Def. 11). Three are new and have not been studied empirically: joint receipt decomposition (Def. 10 for gains and Def. 12 for the mixed case) and joint receipt consistency (Def. 13). Similar issues and results hold for losses, where the mathematics is identical except for parameter values. The paper concludes with a discussion of how the results extend to general finite gambles and of some possible difficulties.