**Power computation for moderation effect**

Assume the following model:

with y the dependent variable, x the predictor and z the moderator, xz the interaction term. Variables x and z are distributed as *N*(0,1) and  as *N*(0,()). The correlation between x and z is r. There is no correlation between  with x and z.

*Effect sizes*

The effects sizes of the three effects are the standardized coefficients (beta), defined as:

If x, z and xz are uncorrelated, the variance of y is:

Because the variance of xz is:

We choose the squares of b1, b2 and b3 such that they sum to 1. For example:

b1 = *sqrt*(.5), b2 = *sqrt*(.3) and b3 = *sqrt*(.2). If the variance of  is also 1, it follows that the var(y) = 1 + var() = 2. The effects sizes then become:

By adding more error to y the sqrt(2) becomes larger and the effect sizes decrease.

When x and z are correlated the variance of xz becomes: