**http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize**

**Rules of thumb on magnitudes of effect sizes**

The scales of magnitude are taken from Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates (see also [here](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize?action=AttachFile&do=view&target=esize.doc)). The scales of magnitude for partial ω2 are taken from Table 2.2 of Murphy and Myors (2004).

There is also a table of effect size magnitudes at the back of Kotrlik JW and Williams HA (2003) [here.](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize?action=AttachFile&do=view&target=powmags.pdf) An overview of commonly used effect sizes in psychology is given by Vacha-Haase and Thompson (2004).

Kraemer and Thiemann (1987, p.54 and 55) use the same effect size values (which they call delta) for both intra-class correlations and Pearson correlations. This implies the below rules of thumb from Cohen (1988) for magnitudes of effect sizes for Pearson correlations could also be used for intra-class correlations. It should be noted, however, that the intra-class correlation is computed from a repeated measures ANOVA whose usual effect size (given below) is partial eta-squared. In addition, Shrout and Fleiss (1979) discuss different types of intra-class correlation coefficient and how their magnitudes can differ.

The general rules of thumb given by Cohen are for eta-squared, which uses the total sum of squares in the denominator, but these would arguably apply more to partial eta-squared than to eta-squared. This is because partial eta-squared in factorial ANOVA arguably more closely approximates what eta-squared would have been for the factor had it been a one-way ANOVA and it is presumably a one-way ANOVA which gave rise to Cohen's rules of thumb.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Effect Size** | **Use** | **Small** | **Medium** | **Large** |
| Correlation |  | 0.1 | 0.3 | 0.5 |
| η2 | one-way anova (regression) | 0.01 | 0.06 | 0.14 |
| η2 | Anova | 0.02 | 0.13 | 0.26 |
| [omega-squared](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/os2) | Anova; Field (2013) in brackets | 0.01 | 0.06 | 0.14 |
| [Multivariate eta-squared](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize?action=AttachFile&do=view&target=mvwl.doc) | one-way MANOVA | 0.01 | 0.06 | 0.14 |
| Cohen's f | one-way an(c)ova (regression) | 0.10 | 0.25 | 0.40 |
| η2 | Multiple regression | 0.02 | 0.13 | 0.26 |
| κ2 | Mediation analysis | 0.01 | 0.09 | 0.25 |
| Cohen's f | Multiple Regression | 0.14 | 0.39 | 0.59 |
| Cohen's d | t-tests | 0.2 | 0.5 | 0.8 |
| Cohen's ω | chi-square | 0.1 | 0.3 | 0.5 |
| Odds Ratios | 2 by 2 tables | 1.5 | 3.5 | 9.0 |
| [Average Spearman rho](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/avsp) | Friedman test | 0.1 | 0.3 | 0.5 |

Also:Haddock et al (1998) state that 3π multiplied by the log of the odds ratio is a standardised difference equivalent to Cohen's d.

* [Using partial eta-squared in an ANCOVA in SPSS](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/anceta)
* [Effect size for multilevel models](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/reffs)
* [Further details on the derivation of the Odds Ratio effect sizes](http://www.sportsci.org/resource/stats/effectmag.html)
* [Cohen's d adjusted for base rates](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/baserat)
* [A quick guide to choice of sample sizes for Cohen's effect sizes](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/dunlap)
* [A nonparametric analogue of Cohen's d and applicability to three or more groups](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/nonpz)

**Definitions**

For two-sample t-tests Cohen's d = (difference between a pair of group means) / (averaged group standard deviation) = 2|t| / Sqrt [df(error)] (Howell, 2013, p. 649)

For a one-sample t-test Cohen's d = difference between the mean and its expected value / standard deviation = t / Sqrt(N)

η2 =SS(effect) / [ Sum of SS(effects having the same error term as effect of interest) + SS(the error associated with these effects) ]

Cohen's f = Square Root of eta-squared / (1-eta-squared)

There is also a Partial η2 = SS(effect) / [ SS(effect) + SS(error for that effect) ]

Multivariate η2 = 1 - Λ1/swhere Λ is Wilk's lambda and s is equal to the number of levels of the factor minus 1 or the number of dependent variables, whichever is the smaller (See Green et al (1997)). It may be interpreted as a partial eta-squared.

κ2=ab / (Maximum value of ab) where a and b are the regression coefficients representing the independent variable to mediator effect and the mediator to outcome respectively to estimate the indirect effect of IV on outcome. See Preacher and Kelley (2011) for further details including MBESS procedure software for fitting this in R. For further details on mediation analysis see also [here.](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/SobelTest) Field (2013) also refers to this measure.

Suggestion : Use the square of a Pearson correlation for effect sizes for partial η2 giving 0.01 (small), 0.09 (medium) and 0.25 (large) giving intuitively larger values than eta-squared.

Cohen's ω2= Sum over all the groups ((observed proportion - expected proportion)2) / (expected proportion)

\* [Odds Ratio definition](http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/oddsr)

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