# Barkan etal (2012) effect size calculations & power analysis

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## Effect Size calculation

```
# Study 1
## likelihood of hiring
eta.F(dfm = 3, # Model degree of freedom
      dfe = 137, # Error/residual degree of freedom
      Fvalue = 12.13,
      a = .10) # Alpha level, set to .10 to obtain 90% CI
```

```
## $eta
## [1] 0.20987
##
## $etalow
## [1] 0.10391
##
## $etahigh
## [1] 0.30281
##
## $dfm
## [1] 3
##
## $dfe
## [1] 137
##
## $F
## [1] 12.13
##
## $p
## [1] 0.00000043369
##
## $estimate
## [1] "$\\eta^2$ = 0.21, 90\\% CI [0.10, 0.30]"
##
## $statistic
## [1] "$F$(3, 137) = 12.13, $p$ < .001"
```

```
## loyalty to company
eta.F(dfm = 3, dfe = 137, Fvalue = 3.54, a = .10)
```

```
## $eta
## [1] 0.071941
##
## $etalow
## [1] 0.0075503
##
## $etahigh
## [1] 0.13842
##
## $dfm
## [1] 3
##
## $dfe
## [1] 137
##
## $F
## [1] 3.54
##
## $p
## [1] 0.016439
##
## $estimate
## [1] "$\\eta^2$ = 0.07, 90\\% CI [0.01, 0.14]"
##
## $statistic
## [1] "$F$(3, 137) = 3.54, $p$ = .016"
```

```
# honesty on the job
eta.F(dfm = 3, dfe = 137, Fvalue = 3.75, a = .10)
```

```
## $eta
## [1] 0.075885
##
## $etalow
## [1] 0.0095377
##
## $etahigh
## [1] 0.1438
##
## $dfm
## [1] 3
##
## $dfe
## [1] 137
##
## $F
## [1] 3.75
##
## $p
## [1] 0.012559
##
## $estimate
## [1] "$\\eta^2$ = 0.08, 90\\% CI [0.01, 0.14]"
##
```

```
## $statistic
## [1] "$F$(3, 137) = 3.75, $p$ = .013"
```

```
# Study 2
## perceived unethicality
eta.F(dfm = 2, # Model degree of freedom
      dfe = 146, # Error/residual degree of freedom
      Fvalue = 5.82,
      a = .10) # Alpha level, set to .10 to obtain 90% CI
```

```
## $eta
## [1] 0.073839
##
## $etalow
## [1] 0.014985
##
## $etahigh
## [1] 0.14633
##
## $dfm
## [1] 2
##
## $dfe
## [1] 146
##
## $F
## [1] 5.82
##
## $p
## [1] 0.0036992
##
## $estimate
## [1] "$\\eta^2$ = 0.07, 90\\% CI [0.01, 0.15]"
##
## $statistic
## [1] "$F$(2, 146) = 5.82, $p$ = .004"
```

```
## self to behave unethically
eta.F(dfm = 2, dfe = 146, Fvalue = 6.82, a = .10)
```

```
## $eta
## [1] 0.085442
##
## $etalow
## [1] 0.021462
##
## $etahigh
## [1] 0.16155
##
## $dfm
## [1] 2
##
## $dfe
```

```
## [1] 146
##
## $F
## [1] 6.82
##
## $p
## [1] 0.0014737
##
## $estimate
## [1] "$\\eta^2$ = 0.09, 90\\% CI [0.02, 0.16]"
##
## $statistic
## [1] "$F$(2, 146) = 6.82, $p$ = .001"
```

```
## encourage friend to behave unethically
eta.F(dfm = 2, dfe = 146, Fvalue = 9.74, a = .10)
```

```
## $eta
## [1] 0.11772
##
## $etalow
## [1] 0.041879
##
## $etahigh
## [1] 0.20169
##
## $dfm
## [1] 2
##
## $dfe
## [1] 146
##
## $F
## [1] 9.74
##
## $p
## [1] 0.00010699
##
## $estimate
## [1] "$\\eta^2$ = 0.12, 90\\% CI [0.04, 0.20]"
##
## $statistic
## [1] "$F$(2, 146) = 9.74, $p$ < .001"
```

```
# study 3
## calculate Cohen's d from means, standard deviations, and group sample sizes.
## MASC - set 1
d.ind.t(m1 = 5.15, m2 = 4.64, sd1 = 0.80, sd2 = 0.79, n1 = 34, n2 = 34, a = 0.05)
```

```
## $d
## [1] 0.6415
##
## $dlow
```

```
## [1] 0.15144
##
## $dhigh
## [1] 1.1269
##
## $M1
## [1] 5.15
##
## $sd1
## [1] 0.8
##
## $se1
## [1] 0.1372
##
## $M1low
## [1] 4.8709
##
## $M1high
## [1] 5.4291
##
## $M2
## [1] 4.64
##
## $sd2
## [1] 0.79
##
## $se2
## [1] 0.13548
##
## $M2low
## [1] 4.3644
##
## $M2high
## [1] 4.9156
##
## $spooled
## [1] 0.79502
##
## $sepooled
## [1] 0.19282
##
## $n1
## [1] 34
##
## $n2
## [1] 34
##
## $df
## [1] 66
##
## $t
## [1] 2.645
##
## $p
```

```
## [1] 0.0102
##
## $estimate
## [1] "$d_s$ = 0.64, 95\\% CI [0.15, 1.13]"
##
## $statistic
## [1] "$t$(66) = 2.64, $p$ = .010"
```

```
## MASC - set 2
d.ind.t(m1 = 4.52, m2 = 3.96, sd1 = 0.91, sd2 = 1.16, n1 = 34, n2 = 34, a = 0.05)
```

```
## $d
## [1] 0.53716
##
## $dlow
## [1] 0.051118
##
## $dhigh
## [1] 1.0193
##
## $M1
## [1] 4.52
##
## $sd1
## [1] 0.91
##
## $se1
## [1] 0.15606
##
## $M1low
## [1] 4.2025
##
## $M1high
## [1] 4.8375
##
## $M2
## [1] 3.96
##
## $sd2
## [1] 1.16
##
## $se2
## [1] 0.19894
##
## $M2low
## [1] 3.5553
##
## $M2high
## [1] 4.3647
##
## $spooled
## [1] 1.0425
##
## $sepooled
```

```
## [1] 0.25285
##
## $n1
## [1] 34
##
## $n2
## [1] 34
##
## $df
## [1] 66
##
## $t
## [1] 2.2148
##
## $p
## [1] 0.030233
##
## $estimate
## [1] "$d_s$ = 0.54, 95\\% CI [0.05, 1.02]"
##
## $statistic
## [1] "$t$(66) = 2.21, $p$ = .030"
```

```
## MASC - set 3 (repoted ANOVA F-statistics)
eta.F(dfm = 1, dfe = 66,Fvalue = 5.15, a = .05)
```

```
## $eta
## [1] 0.072382
##
## $etalow
## [1] 0
##
## $etahigh
## [1] 0.2247
##
## $dfm
## [1] 1
##
## $dfe
## [1] 66
##
## $F
## [1] 5.15
##
## $p
## [1] 0.02652
##
## $estimate
## [1] "$\\eta^2$ = 0.07, 95\\% CI [0.00, 0.22]"
##
## $statistic
## [1] "$F$(1, 66) = 5.15, $p$ = .027"
```

```r
## BIDR - self-deceptive positivity
d.ind.t(m1 = 4.19, m2 = 4.20, sd1 = 0.66, sd2 = 0.43, n1 = 34, n2 = 34, a = 0.05)
```

```
## $d
## [1] -0.017953
##
## $dlow
## [1] -0.49326
##
## $dhigh
## [1] 0.45749
##
## $M1
## [1] 4.19
##
## $sd1
## [1] 0.66
##
## $se1
## [1] 0.11319
##
## $M1low
## [1] 3.9597
##
## $M1high
## [1] 4.4203
##
## $M2
## [1] 4.2
##
## $sd2
## [1] 0.43
##
## $se2
## [1] 0.073744
##
## $M2low
## [1] 4.05
##
## $M2high
## [1] 4.35
##
## $spooled
## [1] 0.557
##
## $sepooled
## [1] 0.13509
##
## $n1
## [1] 34
##
## $n2
## [1] 34
```

```
##
## $df
## [1] 66
##
## $t
## [1] -0.074023
##
## $p
## [1] 0.94122
##
## $estimate
## [1] "$d_s$ = -0.02, 95\\% CI [-0.49, 0.46]"
##
## $statistic
## [1] "$t$(66) = -0.07, $p$ = .941"
```

```
## BIDR - impression management
d.ind.t(m1 = 3.62, m2 = 3.13, sd1 = 0.89, sd2 = 0.76, n1 = 34, n2 = 34, a = 0.05)
```

```
## $d
## [1] 0.5921
##
## $dlow
## [1] 0.10402
##
## $dhigh
## [1] 1.0759
##
## $M1
## [1] 3.62
##
## $sd1
## [1] 0.89
##
## $se1
## [1] 0.15263
##
## $M1low
## [1] 3.3095
##
## $M1high
## [1] 3.9305
##
## $M2
## [1] 3.13
##
## $sd2
## [1] 0.76
##
## $se2
## [1] 0.13034
##
## $M2low
## [1] 2.8648
```

```
##
## $M2high
## [1] 3.3952
##
## $spooled
## [1] 0.82756
##
## $sepooled
## [1] 0.20071
##
## $n1
## [1] 34
##
## $n2
## [1] 34
##
## $df
## [1] 66
##
## $t
## [1] 2.4413
##
## $p
## [1] 0.017323
##
## $estimate
## [1] "$d_s$ = 0.59, 95\\% CI [0.10, 1.08]"
##
## $statistic
## [1] "$t$(66) = 2.44, $p$ = .017"
```

# Power analysis

eta^2 = f^2 / ( 1 + f^2 ), namely f = sqr( eta^2 / ( 1 - eta^2 ) )

## Study 1

```
## same analysis (one-way ANOVA) for three DVs, those the smallest effect to do power analysis
## one-way anova of loyalty to company

etasquared <- 0.21
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )

etasquared <- 0.07
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )
pwr.anova.test(k = 5,
               f = f1,
               sig.level = 0.05,
               power = 0.95)
```

```
##
```

```
##      Balanced one-way analysis of variance power calculation
##
##               k = 5
##               n = 50.307
##               f = 0.27435
##       sig.level = 0.05
##           power = 0.95
##
## NOTE: n is number in each group
```

```
n1 <- 50.307*5
n1
```

```
## [1] 251.54
```

```
etasquared <- 0.08
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )
```

## Study 2

```
# same analysis (repeated-measure ANOVA) for three DVs, those the smallest effect to do power analysis
# one-way anova of perceived unethicality of behaviors

# perceived unethicality
etasquared <- 0.07
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )

# self to behave unethically
etasquared <- 0.09
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )

# encouraging the friend to behave unethically
etasquared <- 0.12
f1 <- sqrt( etasquared  / ( 1 - etasquared  ) )
```

Power analysis performed using G power for repeated ANOVA, screenshot of the result is attached in the supplementary "power analysis" section.