# Dingy Output

 *Tests of Distinguishability and Nonindependence*

# 1. Text

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please make sure that you acknowledge that you have used this program. Also
should you decide to use the exact text included here, you will need to put
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Kenny.

 Tests of Distinguishability

 The focus of this analysis is to determine whether role makes a
statistical difference in the data, and if it does, what is that difference.
That is, are there differences between the Father and the Mother for the
mixed variables Quality relationship? There are 82 dyads in the sample and
no missing data. The analyses employ the method of structural equation
modeling using the computer program lavaan. The means and standard
deviations of each variable for both the Father and the Mother are presented
in Table 1. Note that the estimates are maximum likelihood estimates and so
the standard deviations are a bit larger than conventional estimates.

 There are two ways in which role can make a difference. They are
differences between the variables in their means and their variances. That
is, are there mean or variance differences between the Father and the Mother
for the mixed variable Quality relationship? For instance, the means and
variances of Quality relationship might differ for the Father and the Mother.
 Because there is just one mixed variable and no between- or within-dyads
variables, there are no correlations that can differ for the Father and the
Mother .

 Dingy estimates several models and compares their fit to determine the
best fitting model. To compare models, Dingy uses the chi square test, the
chi square difference test, the Root Mean Square Error of Approximation or
RMSEA, and the Sample Size Adjusted Bayesian Information Criterion or SABIC.
With large sample sizes, the chi square tests have so much power that they
are almost always statistically significant. Because the sample size for
this analysis would not be considered large, the chi square tests may be
informative. Here the RMSEA must be less than 0.08 to be considered a
good-fitting model. The SABIC is a "badness of fit" index with smaller
values indicating better fit. Its absolute value is not interpretable, but
values for different models can be compared. One advantage of the SABIC is
that a value can be computed for the model of full distinguishability even
though it is a saturated model with zero degrees of freedom. To learn more
about these measures of fit, go to davidakenny.net/cm/fit.htm (reverse the
slashes).

 Table 2 provides the measures of fit for three models which allow for
different types of distinguishability and Table 3 presents the tests of
hypotheses of equal means and variances. To begin, the test that the means
for each variable are equal (Model I versus Model II) is statistically
significant (chi-square(1) = 7.22, p = .007). Thus, there is evidence that
the means are unequal. The test that the variances (Model II versus Model
III) are equal is not statistically significant (chi-square(1) = 0.77, p =
.379). Thus, the data are consistent with the hypothesis that the variances
are equal.

 Test of Nonindependence

 Additionally, there is the question of whether the scores of the Father
and the Mother are correlated, i.e., nonindependent. There is one
correlation between the scores of the Father and the Mother, and the null
hypothesis is that this correlation is zero. Table 4 contains the results
from these tests. (Note that SABIC(Sat) refers to the SABIC for the
saturated model.) Treating dyad members as distinguishable, there is good
evidence that there is nonindependence or correlation between the scores of
the Father and the Mother. Alternatively, if we treat dyad members as
indistinguishable, there is good evidence that there is nonindependence or
correlation between the scores of the Father and the Mother.

# 2. Tables

Table 1: Descriptive Statistics for the Father and the Mother

 Member Father Mother
 Mean SD Mean SD
Quality relationship 5.061 0.902 4.768 0.824

Table 2: Tests of Different Types of Distinguishability

Model Equal Means Equal Variances chi square df p RMSEA SABIC
 I Yes Yes 7.994 2 .018 0.191 11.752
 II No Yes 0.773 1 .379 0.000 5.784
 III No No 0 6.264

Table 3: Tests of Hypotheses of Different Types of Distinguishability

 Test chi square df p value
 Means I versus II 7.221 1 .007
Variances II versus III 0.773 1 .379

Table 4: Tests of Nonindependence across the Father and the Mother

 chi square df p value RMSEA SABIC SABIC(Sat)
 Distinguishable 12.651 1 <.001 0.377 17.662 6.264
Indistinguishable 9.959 1 .002 0.331 12.465 3.758

# 3. lavaan Output

Test of Distinguishability or the I-SAT Model

lavaan (0.5-23.1097) converged normally after 13 iterations

 Number of observations 82

 Number of missing patterns 1

 Estimator ML
 Minimum Function Test Statistic 7.994
 Degrees of freedom 2
 P-value (Chi-square) 0.018

 lhs op rhs label est se z pvalue ci.lower ci.upper
1 EWB\_A\_2 ~1 m1 4.915 0.079 62.092 0.000 4.760 5.070
2 EWB\_A\_1 ~1 m1 4.915 0.079 62.092 0.000 4.760 5.070
3 EWB\_A\_2 ~~ EWB\_A\_2 v1 0.768 0.090 8.578 0.000 0.592 0.943
4 EWB\_A\_1 ~~ EWB\_A\_1 v1 0.768 0.090 8.578 0.000 0.592 0.943
5 EWB\_A\_2 ~~ EWB\_A\_1 0.260 0.090 2.901 0.004 0.084 0.435
 std.lv std.all
1 4.915 5.609
2 4.915 5.609
3 0.768 1.000
4 0.768 1.000
5 0.260 0.338