APPENDIX B

Measures of Association Used in One or More of the Studies

The studies covered used quite different statistics to demonstrate co-variance with happiness. These measures of association are based on different assumptions of the mathematical quality of the data and are hence not fully comparable.

Though different in many respects, the bulk of the measures of association is at least equal with respect to the range in which they express the degree of co-variance. Most are standardized on a variation between one and zero. As such they allow at least a rough comparison.

Comparison is more difficult where unstandardized measures are involved, such as differences in means (DM), F, or the wellknown Chi-square (X^2). Therefore it was of little use to mention such values in the excerpts. It sufficed to note whether there was any relationship at all and if so, whether this was positive or negative (0, + or -). Neither was there use in enumerating differences in percentages (D%), the size of such differences depending too much on the number of categories involved and whether rows or columns are compared.

The various measures of association that figured in one or more of the investigations are listed below in alphabetical order. Assumptions about the level of measurement being quite crucial, differences on that matter are summarized in connection. More detail about formulas and strong and weak points can be found with the authors mentioned in the right column.

MEASURES OF ASSOCIATION USED IN ONE OR MORE OF THE STUDIES, IN ALPHABETICAL ORDER.

symbol used here	name and other symbols used	range	assumptions about mathematical quality of the data	remarks	further information in
C	Pearson's contingency coëfficient	0 to 1	Assumes either ordinal level of measurement of both variables or one ordinally and the other dichotomous.		McNemar, 1969: 227-231
DM	Difference in means	0 to ∞	Assumes that both variables are measured at the interval level.	Differences not mentioned in the excerpts. It sufficed to note whether there was a difference and in what direction (0, + or -).	
$D\bar{R}$	Difference in average ridits	0 to 1	Assumes that both variables are measured at the nominal level.		Bross (1958)
D%	Difference in percentages. When both variables are dichotomized called Epsilon and symbolized with ε	0 to 100	All levels of measurements.	Differences not mentioned in the excerpts. It sufficed to note whether there was a difference and in what direction (0, + or -).	
F	variance ratio	0 to ∞	Assumes that either both variables measured at the interval level or one at the nominal level and one at the interval level. Assumes also symmetry of distributions.	Values not mentioned because they are not standardized. It sufficed to note whether there was any association and in what direction (o, + or -).	McNemar, 1969: 282-287
G	Goodman & Kruskal's Gamma γ	-1 to +1	Assumes ordinal level of measurement for both variables and symmetry of distribution. Works on the basis of grouped data.	The higher the number of knotted pairs (ties) the lower the significance of the association.	Mueller et al, 1970: 279-192
G'	Gamma as mentioned above, computed by us on the basis of a frequency distribution in the original report.				

symbol used here	name and other symbols used	range	assumptions about mathematical quality of the data	remarks	further information in
Gs	Standardized Gamma or partial Gamma (G_{pt}). Gamma as above from which the effect of one or more third variables is filtered away.				
h^2	correlation ratio, eta	0 to 1	Assumes nominal level of measurement for one variable and interval level for the other. Assumes a-symmetry.	Because of a-symmetry h^2_{xy} not always identical with h^2_{yx}.	Mueller et al., 1970:326
mc	Guttman's monotonicity coëfficient	0 to 1	Assumes interval level of measurement for both variables		Guttman, 1977
Q	Yule's Q	-1 to +1	Assumes that both variables are dichotomized and symmetry of distributions		Mueller et al., 1970: 290-292
r_{pc}	Partial correlation. The correlation in r_{pm} (see below) that remains when the effect of one or more third variables is filtered away.				
r_{pm}	Product moment correlation. Pearson's correlation coëfficient, mostly simply referred to as 'r'	-1 to +1	Assumes that both variables are measured at the interval level, that distributions are symmetric and the relationship linear.		Mueller et al., 1970: 315-318
r_s	Spearman's correlation Rho ρ	-1 to +1	Assumes that both variables are measured at the ordinal level		Mueller et al., 1970: 267-276
tau	Goodman & Kruskal's tau τ	-1 to +1	Assumes that variables are both measured at the nominal level or one nominally and the other dichotomous. Assumes symmetry of distributions.		Mueller et al., 1970: 279-292

symbol used here	name and other symbols used	range	assumptions about mathematical quality of the data	remarks	further information in
t_k	Kendall's tau	-1 to +1	Assumes that both variables are measured at the ordinal level.	Three variants: $-t_{ka}$ equal number of categories in both variables, not corrected for knots $-t_{kb}$ equal number of categories in both variables, corrected for knots $-t_{kc}$ unequal number of categories in both variables, not corrected for knots	Mueller et al., 1970: 257-263
T^2	Tschuprow's T	0 to 1	Assumes that either both variables are measured at the nominal level or one nominally and the other dichotomous.		Blalock, 1979: 304-315
V^2	Cramer's V	0 to 1	Assumes that either both variables are measured at the nominal level or one nominally and the other dichotomous.		Hays, 1973: 745
X^2	Chi-square χ^2	0 to ∞	Assumes that both variables are measured either both nominally or both dichotomous or one nominally and the other dichotomous.	Values not mentioned in the excerpts. It sufficed to note whether there was any association and in what direction (0, + or -)	Mueller et al., 1970: 432-434