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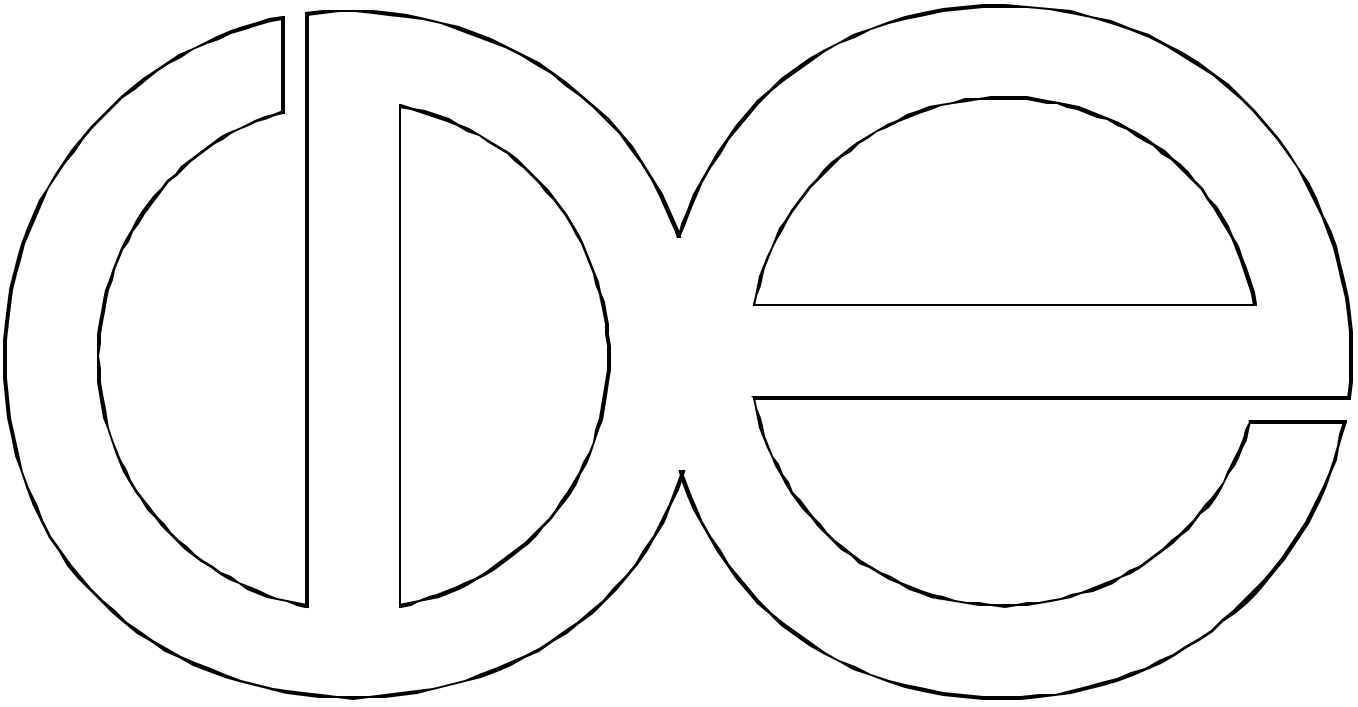

Socioeconomic Status and Depression among Adult Siblings[1]

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FIRST DRAFT

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In this paper, we estimate a series of models of the relationship between socioeconomic status and depression among middle-aged sister and brother pairs in the Wisconsin Longitudinal Study (WLS). The WLS is a long-term study of women and men who graduated from Wisconsin high schools in 1957 and of their randomly selected sisters or brothers. Our findings lend insight into the structure of depression by gender and the nature of sibling psychological resemblance. Our preferred model is based on responses to questions from the Centers for Epidemiologic Studies Depression Scale (CESD), a commonly used measure of current depressive symptoms.

The measurement portion of the model posits a general second order factor that affects four first order factors; the first order factors, in turn, affect twenty survey items. Sibling resemblance occurs only through correlation of the second order factors for brothers and sisters. Depression has different measurement properties for women and for men. In general, the structural properties of depression appear similar across gender. However, men and women express increases or decreases in depression levels in different ways, that is, with differential loadings of specific items on the first order factors.

There is only moderate sibling resemblance with regard to depression. The depression factors for siblings are correlated between $r = 0.09$ and $r = 0.16$; that is, between 9 and 16 percent of the variance in depression is common to sibling pairs. This weak correlation lends support to the hypothesis that depression, at least as measured by the CESD, is primarily situational, rather than a characteristic: a state, rather than a trait.

However, the causal model suggests that lower levels of depression are related to a relatively enduring measure of socioeconomic status. Of four measures of socioeconomic status—educational attainment, occupational standing, household income, and net worth—only

net worth is consistently related to depression. Regardless of gender, individuals with more accumulated wealth tend to have lower levels of depression. Among men alone, occupational status, as measured by occupational education, has a direct effect on depression. Income and education are not directly related to depression.

The Factorial Structure of Depression

The CESD was introduced in the 1970s to measure depression in the general population. Individuals respond to 20 questions, which ask, for example, how many days during the past week the respondent was "bothered by things that usually don't bother me" or had "crying spells" (see Appendix A, for list of questions and mnemonics used in the analysis). An early exploratory factor analysis showed that the questions loaded on four distinct sub-factors: depressed affect, positive affect, somatic and retarded activity, and interpersonal (Radloff, 1977:398-9). Subsequent research has supported this four-factor structure, pointing out, however, that use of the combined score (or the second-order factor) loses little information.

Psychological Resemblance of Siblings

Researchers have come to diverse conclusions regarding family psychological resemblance. One study found that siblings did not share depressive symptoms, but did share anxiety levels (Rende, Wickramaratne, Warner, and Weissman, 1995). Another study found correlations among depression scores for spouses and for siblings raised together (Tambs and Moum, 1993). Researchers have found greater resemblance among same-sex twin pairs in symptoms of depression, than among different-sex pairs (Tambs, Harris, and Magnus, 1995; Tambs and Moum, 1993). A comparison of two large samples of twins, their spouses, parents, siblings and offspring, led to the conclusion that depressive symptoms depend more on genetic

factors than on the shared environment. The correlation for full siblings for depression is low, 0.12-0.13 (Kendler, Walters, Truett, Heath, Neale, Martin, and Eaves, 1994). Further research on both positive and negative affect among twins and their families found that negative affect stems from heritability and common environment, whereas positive affect stems from shared environment and assortative mating (Baker, Cesa, Gatz, and Mellins, 1992).

This quantitative behavioral genetic research generally suggests that gender does not affect sibling resemblance in depression. The observed correlations for pairs of female twins are higher than for male twins. However, these differences are not statistically significant (McGue and Christensen, 1997). Kendler, et al. (1994) prefer a model that does not distinguish between women and men. That is, they suggest that the structure of depression probably does not differ by gender.

Quantitative behavior genetics has been criticized both on theoretical and methodological grounds. Most critics point out the difficulty of actually separating shared environmental and genetic influences. Economists and sociologists criticize the data quality and models used by the behavior geneticists (Goldberger and Kamin, 1998). Molecular geneticists point out that the behavior genetics population-based approach cannot identify particular genes. These scientists identify candidate genes that may be expressed in behavior or characteristics. They criticize the primary behavior genetic assumption that genes and environment are completely separate. This more biological approach rests on the assumption that development is multi-dimensional and non-linear (Gottlieb, Wahlsten, and Lickliter, 1998).

In response to these criticisms, traditional quantitative behavior geneticists have attempted to expand their research programs. Plomin and Rutter (1998) describe their efforts to collect DNA to add to their population-based research. However, little research has been done

combining these approaches. So far, molecular geneticists have failed to identify a candidate locus to account for observed differences in depression (Moldin, Reich, and Rice, 1991).

Socioeconomic Status and Depression

Depression, like other mental disorders, is inversely related to socioeconomic status. The relationship, however, is slight. It varies by gender, age, and employment status. Nevertheless, a significant body of research has tried to explain this relationship, primarily through measures of occupational and perceived control. Measures of socioeconomic status (SES), particularly education and income, appear to have direct effects on depression in most studies.

Socioeconomic status is inversely related to mental disorder (Holzer, et al., 1986:259; Link, Lennon, and Dohrenwend, 1993:1353). Distress, which includes depression and anxiety, displays this same pattern (Mirowsky and Ross, 1986:23; Ross and Mirowsky, 1989: 206, 215). Individuals with higher status, as measured by education and income, tend to have lower levels of distress (Ross and Mirowsky, 1989). The relationship between depression and SES is weaker than that for other disorders, such as schizophrenia (Holzer, et al., 1986:267). In part because of such differences, some researchers suggest that SES has a different relationship with each particular mental disorder. They suggest that these relationships be examined separately (Dohrenwend, et al., 1992:961; Miech, et al., 1999:1126).

SES explains a small portion of the variance of depression. For example, in the U.S. the combination of income, occupational status and education explains an average of three to six percent of the variance in distress across eight community and national epidemiologic studies

(Kessler, 1982:755). Of the three SES measures, education and income are more important than occupational status for predicting distress (Kessler, 1982:756-7).[2]

The relationship of SES and depression differs by gender and employment status. Women are two times as likely to report being depressed as men (Holzer, et al., 1986:267; Doehrenwend, et al., 1992: 947). For women, education is the strongest of the SES predictors of depression. For men, family income is more important (Kessler, 1982:752). Paradoxically, SES variables have the strongest predictive power for non-employed housewives. Among housewives, the combined SES variables (not including occupational status) explain six percent of the variance in depression. Among employed men and women, these variables explain three and four percent of the variance (Kessler, 1982:755).

Age also alters the relationship of SES and depression. Age may be related to depression in a curvilinear fashion. Individuals in the 30 to 44 year old group were more likely than older and younger individuals to experience depression (Holzer, et al., 1986:267-8). Miech, et al. speculate that the association between SES and depression "may be specific to adulthood, reflecting adult-specific processes" (1999:1123). They base this conclusion on the lack of association between depression and SES, as measured by family background and educational attainment measures, for the members of a New Zealand birth cohort examined at the ages of 15 and 21.

Data and Methods

The data consist of responses provided by sibling pairs in the 1992-94 wave of the Wisconsin Longitudinal Study (WLS). The WLS is based on a random sample of 10,317 women and men who graduated from Wisconsin high schools in 1957. Survey data were collected from

[2] However, Kessler (1982) used occupational prestige to measure occupational standing. In general, occupational

the 1957 graduates or their parents in 1957, 1964, and 1975. Those data provide a full record of social background, youthful aspirations, schooling, military service, family formation, labor market experiences, and social participation. The 1975 survey included a roster of the ages and educational attainments of all living brothers and sisters, and more detailed information was obtained for a randomly selected sibling of each graduate. In 1977 the WLS interviewed a highly stratified, random subsample of 2000 siblings of the graduates, using an instrument that closely paralleled the 1975 survey. In 1992-94, we carried out four major surveys: Telephone and mail surveys of WLS graduates and parallel telephone and mail surveys of a larger sample of brothers and sisters of the graduates. The sample design has become increasingly complex over time. Briefly, we now have active samples of 8500 WLS graduates out of 9750 survivors and of 5300 of their siblings, and sample retention is high in both components of the design.

We present structural equation models estimated in *Mplus* (Muthén and Muthén, 1998), assuming either categorical or continuous indicators of depression. We examine sibling pairs who provided complete responses to the CESD, which is part of the mail questionnaire. There is substantial missing data on these questions. The WLS contains mail responses from 4045 siblings. Of these, 2,825 pairs provided complete answers to the CESD questions. Because of further problems with several of the variables, described below, we arrive at a final sample of 2364 sibling pairs for the structural equation models.[3]

We use four measures of socioeconomic status: Educational attainment, household income, occupational status (occupational education), and net worth. Education is the number of years of education based on the highest degree the respondent had earned as of the 1992-94 wave of the survey. Income is the household income, which is calculated by adding the respondent's

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socioeconomic status has higher criterion validity than prestige (Hauser and Warren, 1997).

and spouse's total incomes, with the addition of the salary, wage and self-employment income of other household members. Total income can also include interest, social security, pension, child support, inheritance, and public assistance. The household income measure is transformed using a started log [*ln*(income+$1,000)]. Some of the observations have missing data or zero or negative dollar amounts, which, when included in regression analyses, introduce downward bias in regression estimates. To correct for this, we use unconditional mean substitution, adding dummy variables for each type of substitution. In the multiple group analyses, that is, where we pool data across sibling pairs of differing gender composition, some of the dummy variables are problematic because they are not present in all of the groups. We have adopted different procedures, depending on the configuration of the data in each group. Among graduates, we use a dummy variable for missing data and drop all observations that have negative or zero dollar values. Among siblings, we use dummy variables for missing data and zero dollar values, and we drop all observations with negative income. This leads to a loss of 102 sibling pairs.

Occupational education is based on the current or most recent occupation. It is the percentage of persons who completed at least one year of college in the 1990 Census in the combination of occupation, industry, and class of worker (see Hauser and Warren, 1997). This measure is transformed using the following equation:

$$ln\ (\text{occupational education} + 1)/(100 - \text{occupational education} + 1)$$

This transformation brings the resulting measure into an appropriate relative scale and ensures a more linear relationship with the dependent variable. There is some missing data on this variable as well. Unfortunately, including a dummy for missing occupational education introduces substantial upward bias into the regression of depression on the socioeconomic status variables,

[3] We report some findings from OLS regression analyses that use all 2825 sibling pairs.

so we drop the 244 cases that have missing data on this item for both graduates and siblings from the structural equation models.

Net worth is the sum of the respondent's equity in home, motor vehicles, real estate and business or farm, plus savings and investments, and minus other debts. Net worth has not been used in previous analyses of the relationship between socioeconomic factors and depression. We transform this variable in a manner similar to that used for income. The negative and zero dummy variables lead to some bias in the regression estimates and are not found in all of the groups. Therefore we drop the 216 cases that have negative and zero net worth from analyses using *Mplus.*

In the final models, we also control for the age of the siblings. We do this because age is thought to have a relationship with depression. Our graduates have very little variance in age; almost all were born in 1939. By contrast, the siblings are much more heterogeneous with regard to age. In this sub-sample, the mean for sibling age is 53 years old, with a standard deviation of 7.3 years. The age range at the time of interview was 30 to 77 years old.

Few of the respondents reported symptoms of depression during the week prior to their survey responses. The possible answers range from zero to seven days in which the respondent experienced each depressive symptom. Because of problems with skew, the models that rely on categorical indicators require that these responses be reclassified into four categories: zero, one, two and three or more days in which the respondent experienced the symptoms. Positively worded questions were reverse coded. The means are very low, most below 1.0. Moreover, after reversal of the positive items, all questions have positively skewed distributions. (See Appendix B for means, standard deviations and measures of skew.)

In addition to being skewed, the dependent variables are also ordinal. The usual estimation procedures for measurement and structural models assume continuous, normally distributed, interval data. In analyses based on ordinal data, these assumptions may bias the estimates and increase the standard errors. There are a number of possible strategies to correct for either or both the ordinal and the skewed nature of the data. In an earlier paper we presented analyses of various strategies for estimating these models (MacLean and Hauser, 1999).

The ideal is to present models that recognize that the dependent variables are ordered categories. Unfortunately, these models cannot be compared using the traditional chi-square based statistics. These models can only be estimated using a mean- and variance-adjustment. In this procedure, chi-square statistics are calculated directly from sample statistics for each model. This means that nested models cannot be compared in the traditional way (Muthén and Muthén, 1998). An alternative might be to use WLS (without mean- and variance-adjustment) for the purposes of model selection. This type of analysis calculates chi-square statistics in the traditional way, allowing comparison of nested models. This alternative did not work in this particular case because the data are too skewed, and the sample size is too small for these models to converge.[4] Therefore, we report fit statistics for models estimated assuming continuous indicators of depression. In these analyses, we used the started log transformation, $ln\,(1 + y_i)$ for each depression indicator. Then, we report parameter estimates from the preferred measurement model, estimated with categorical indicators. Because of further problems with estimation, we report parameter estimates for the full model of socioeconomic status and depression using continuous indicators.

[4] Linda Muthén, personal communication, July 1999.

Models

Our measurement model is based on the analysis in MacLean and Hauser (1999). The equations of the model for each pair of siblings are displayed in Figure 1. The model says that each of the 20 CESD questions indicates 1 of 4 sub-factors: Negative affect, positive affect, somatic, and interpersonal. The metric of each factor is normalized by fixing the slope of its first indicator. The sub-factors, in turn, load on a general depression factor (see Figure 2). The metric of the second order factor is normalized by fixing the slope from the factor to the first sub-factor, negative affect. When the model is extended to sibling pairs, the second order factors correlate across siblings (see Figure 3). This model is then estimated in a multiple group context, where each of the groups is determined by the ordered combination of the gender of graduate and sibling, producing four pairs: Male-male, male-female, female-male and female-female. Various parameters are equated to test the equivalence of measurement and structure separately for men and for women and, finally, for all respondents. We report parameter estimates from the version of the measurement model that uses categorical indicators.

To look at the relationship of SES and depression for siblings, we estimate the models first for single sex pairs. The structural model, shown in Figure 4, includes education, occupational education, net worth, and income as independent variables. While the socioeconomic characteristics or graduates and siblings are freely correlated, we specify that each sister or brother's socioeconomic status can affect only her or his own level of depression.[5] In different versions of the model we test hypotheses that one or another variable determines depression in single-sex sibling pairs. The preferred model is then used as the basis for the multiple group model, which includes both homogeneous and heterogeneous pairs. In this

[5] The absence of such cross-sibling effects in these reduced form models opens the possibility of estimating models of reciprocal interaction between siblings' depressive states.

context, we test hypotheses about the equivalence of the effects of the independent variables within and across gender. We report parameter estimates from the version of the model that uses continuous indicators of depression.

Results

Measurement of Depression

The multiple group version of the measurement model suggests that depression has different measurement properties for men and for women.[6] The base model in Table 1 equates all parameters of the measurement model across same sex sibling pairs but does not equate parameters for coed pairs, that is combinations of brother and sister. Subsequent models equate parameters by sex. For instance, in model B, we equate the λ^y for the male graduates who have female siblings and the male siblings of female graduates with those of the male-male sibling pairs. Model E equates all parameters to be the same by sex. It has a chi-square of 6,022 with 3,188 degrees of freedom, yielding a BIC statistic of –18,742 (Raftery, 1995). When we equate the λ^y for all types of respondents, regardless of sex, in model F, the fit deteriorates. This constraint says that the indicators load equally onto their sub-factors regardless of sex. The chi-square for this model is 6,387, with 3,204 degrees of freedom, for a BIC of –18,501. We reject the hypothesis that the measures load equally on the sub-factors for all respondents. In model G, as in model E, the parameters are equated within sex, with the addition of an equality constraint on the covariance between the second order factors for coed pairs. This improves the fit and is the preferred model in the multiple group context.

Within this preferred model it is possible to look at parameter estimates by gender. Here, we turn to parameter estimates of the preferred model, re-estimated with categorical indicators of

depression. In general, as shown in Table 2, the factors explain more than half the variance of more than half the indicators, both among women and men.

For both women and men, the somatic factor explains relatively little of the variance in its indicators. This factor explains less than half the variance in four of the indicators among women, and six of the indicators among men. The factor explains only a fifth to a quarter of the variance in the "sleep" indicator. The other three factors explain relatively more of the variance in their indicators. For both women and men, the negative affect factor accounts for more than half the variance in six of its seven indicators.

This model also allows us to look more closely at the characteristics of the indicators, particularly the thresholds of the categorical variables. As mentioned above, the original eight category indicators were collapsed into variables with four categories (0, 1, 2, and 3 or more days of the symptom in the last week). This requires estimation of three thresholds for each of the twenty variables. There are therefore sixty possible thresholds to compare across gender. When differences between these thresholds are compared, more than half, 37, are statistically different from zero (see appendix D for point estimates and standard errors of the thresholds). Despite these statistical differences, the male and female thresholds reveal the same general patterns, as shown in Figure 5.

In general, increases in the sub-factors lead to corresponding greater increases in the indicators for men than for women. For example, as shown in Table 3, for men, increases in negative affect lead to relatively greater increases in feeling fearful than for women. In the same vein, increases in the somatic factor lead to relatively greater increases in difficulty sleeping for men than for women. However, the biggest gender difference in this model is for the dislike indicator, which loads more highly on the interpersonal sub-factor for women (1.314) than for

[6] The following discussion of fit statistics is based on models with continuous indicators.

men (1.167). In other words, increases in the interpersonal sub-factor lead to relatively greater increases in feeling disliked by others for women than for men. Similarly, increases in the negative affect factor produce larger increases in crying for women than for men. Other gender differences in the primary factor loadings are relatively small.

In order to compare the second order parameters across men and women it is necessary to constrain parameters (the first-order loadings) to be the same regardless of the deterioration of fit. Otherwise, the values of the higher order parameters would depend on the indicator chosen to normalize the primary factors. For instance, the choice of cry or fearful as the reference variable could lead to different interpretations of the loading of the negative affect factor on the second-order depression factor. Therefore, for the comparisons of paths from the second-order factor to the first-order factors, as well as for comparisons of the disturbance variances of the first-order factors, we equate the primary factor loadings (λ^y) for all respondents regardless of gender.

When these constraints are imposed, the gender differences in loadings of first order factors on the second order factor are modest (see Table 4). The positive affect and somatic factors load more highly on depression for women than for men. That is, increases in depression lead to greater increases in the somatic factor and greater decreases in positive affect for women than for men. However, the differences in these loadings are not statistically significant. Depression explains a larger share of the variance in each of the first order factors for men than for women. Depression explains 84 percent of the variance in negative affect among women and 92 percent among men; it accounts for at least half of the variance in the somatic factor for all respondents. Depression explains less than half the variance in positive affect and even less than that in the interpersonal factor.

The sex differences in the loadings of the second-order factors on the first-order factor affect estimates of other second order parameters. Therefore, in addition to continuing to equate the primary factor loadings across gender, we also equate the secondary factor loadings (βs). This allows direct comparisons of the variances and correlations of depression for women and men. As shown in Table 4, the depression factor has slightly more variance among men than among women, .755 compared to .729.[7] However, this difference is not statistically significant. The lack of statistical significance for the gender differences in these second order parameters suggests that the biggest gender difference is not in the underlying structure of depression, but in how it is expressed.

Finally, the model suggests that siblings resemble each other in current depressive state to a limited extent. Table 5 shows the correlation of depression ranges from r = 0.09 to r = 0.16, depending on the type of sibling pair. That is, only 9 to 16 percent of the variance in depression is common to members of the same sibship.

Depression and Socioeconomic Status

We turn now to an examination of the relationship of socioeconomic status and depression. The results from this examination suggest that net worth dominates this relationship. That is, increases in net worth decrease depression. For men, but not for women, it appears that status, as measured by occupational education, also plays a role in reducing depression. In contrast to previous research, which has not included measures of net worth, education and income are not independently related to depression.

We begin with a series of models estimated independently for single-sex sibling pairs. These models are based on continuous indicators of depression and are slightly modified from

[7] These variance estimates are based on the model with equal second order loadings for women and men, and not on the model whose loadings are reported in the upper panels of Table 4.

the preferred measurement model of the previous section. Here, the slopes of the first order factors on the general depression factor and of the indicators on the first order factors are equated within gender. This implies that the measurement properties of depression may differ by gender. In these models, however, the error variances of all indicators and factors are not equated within gender. That is, the variances can differ by type of respondent, graduate or sibling.

Table 6 presents fit statistics from the model selection process. The general pattern is roughly the same for both men and women. Model A says that only education has an effect on depression. This model explains relatively little of the variance for both graduates and siblings. According to this model, education explains none of the variance in depression for male graduates, but slightly more than 2 percent for male siblings. It explains approximately one percent of the variance for both female graduates and their siblings. Model B says that only occupational education has an effect on depression. This model fits slightly worse than the previous model for sisters. The model has the same number of degrees of freedom, but chi-square rises from 1,728 to 1,737, so BIC also rises from –3,879.42 to –3,869.65. The model fits better than the previous model for brothers, suggesting that, for men, occupational education explains relatively more of the variance in depression than does education. Model C, which says that finances, in the form of income and net worth, determine depression, fits much better than the previous models for both women and men. In model D, we therefore add occupational education to this model, and again, the fit improves. In model E, we add education to this combined model. This model, which says that each of the separate measures of socioeconomic status effect depression, fits better than the previous ones. In our final model, we equate the regression parameters across siblings (of the same gender). This says that the effect of the

socioeconomic variables on depression is the same, regardless of whether the respondent is a graduate or a sibling.

In the multiple group model, we import the constraints across same-sex sibling pairs from the previous discussion, and allow the structural parameters, though not the measurement parameters, to vary freely across the coed sibling pairs (see Table 7). As above, the measurement parameters are equated separately for all women and for all men. In Model B, we equate the regression slopes to be the same within gender, regardless of respondent type (graduate or sibling). This constraint improves model fit, chi-square rises from 8,127.17 to 8,279.63, with 98 degrees of freedom, and BIC falls from –31,907.67 to –32,471.87. We would like to know if these relationships are the same regardless of gender. In order to test this, we must first equate the measurement parameters. When we do this, in model C, the fit deteriorates, suggesting that we cannot compare the structural relationships across gender.

We present parameter estimates from model B, the preferred model, in Table 8. These results show that net worth is the only independent variable that has a significant effect on depression for both men and women. That is, increases in net worth lead to decreases in depression. This effect is significantly greater for women than for men. Occupational education is also negatively related to depression, but is only significant for men. However, these effects are trivially different for women and men. Surprisingly, increases in education appear to increase depression among men, but this effect is not statistically significant. These models include controls for missing and zero data for income and net worth. These are not statistically significant. The sibling estimates also include a control for age. Age has a significant and negative effect on depression for males, but not for females.

We wanted to learn whether the negligible effects of educational attainment and income are a peculiarity of the Wisconsin data or a consequence of including net worth among the socioeconomic measures. Thus, as shown in Table 9, we re-estimated the models of Table 8 for women and men, excluding net worth. In this reduced model, the effects of educational attainment remain insignificant, but those of income increase substantially and become statistically significant. Current household income appears to affect depression only because it is a proxy for net worth.

At this point, we became more concerned about our exclusion of cases with negative or zero net worth. We could not include these in the structural model, so we estimated a series of OLS models for the larger sets of graduates and siblings, using a composite measure of depression. These findings are reported in Table 10. In general, these findings are consistent with those in Table 8, that is, net worth affects depression (except among male siblings), while income is not significant in any group. Educational attainment also has negligible effects in all four groups, but occupational education is significant among female graduates and male siblings. The only significant effects of missing data and zero or negative dollar amounts occur among male graduates. In that group, missing occupational education and negative net worth are associated with large increases in depression. Otherwise, our deletion of such cases has had minimal effects on the findings.

Returning to the structural model in our subsample of sibling pairs, we compared depression variances by gender. For this purpose, despite poor fit, we equated the measurement parameters across gender. The resulting variance estimates are reported in the bottom line of Table 8. This leads to the observation that depression has greater residual variance among

women than among men, in contrast to the finding above, but this difference is also not statistically significant.

Because the residual variances in depression differ across types of respondents, we find that the model explains different portions of variance for the different types of respondents. As shown in Table 11, the model explains the smallest portion of the variance for male graduates, and the largest portion of the variance for male siblings. In general, the model explains relatively more of the variance in depression for respondents who are in coed pairs than for respondents who are in single-sex pairs.

Finally, in Table 12, we look at the portion of the sibling covariance in depression that is explained by the model. Recall that the correlation between siblings ranged from r = 0.09 to r = 0.16 for depression. We find that the various measures of socioeconomic status explain relatively little of this already small covariance. The model explains the smallest portion of the covariance, less than two percent, among pairs of brothers, and relatively more, slightly more than five percent, for pairs in which there is a female sibling.

Conclusion

The preceding analysis shows that the underlying structure of depression is similar for men and women. But the way that depression is expressed in specific indicators of depression appears to differ by gender. Sibling depression levels are only moderately correlated.

As in previous research, we found that a combination of SES variables explains relatively little of the variance in depression, ranging from two to six percent. In a departure from previous findings, we find no direct effects of income and education on depression. The lack of income effects apparently follows from our inclusion of a measure of net worth. Contrary to previous research, we find little evidence of gender differences in socioeconomic effects on depression.

For example, while we find that occupational status has a significant effect for men, but not for women, those two effects scarcely differ.

We have shown that, in this sample of high school graduates and their siblings, net worth is the most powerful explanatory socioeconomic variable with regard to depression. We think this finding is worth testing in larger national samples, e.g., the Health and Retirement Survey and the National Survey of Families and Households.

This model so far explains relatively little of the sibling covariance in depression. To extend this research we will attempt to explain more of the covariance in depression. We will pursue three strategies to investigate the relationship between siblings' levels of depression. First, we will add social comparison measures, in which the respondents judge their socioeconomic standing relative to their siblings. Second, we will explore the impact of job conditions on depression. Third, using socioeconomic variables, social comparisons, and job conditions as instrumental variables, we will test a model of reciprocal effects between siblings. We will also continue to try to estimate full structural models with categorical indicators of depression.

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TABLE 1.
Goodness of Fit Statistics: Multiple Groups Measurement Models for Depression
(Continuous Indicators)

	χ^2	df	BIC
A. Base model	5,691.91	3,012	-17,705.64
B. λ_y same by gender	5,813.34	3,076	-18,081.37
C. B + Θ same by gender	5,975.40	3,156	-18,540.76
D. C + β same by gender	5,994.07	3,168	-18,615.30
E. D + ψ same by gender	6,022.17	3,188	-18,742.56
F. E + λ_y same for all	6,387.35	3,204	-18,501.68
G. E + $Y_{3,5,10} = Y_{4,5,10}$	**6,022.51**	**3,189**	**-18,749.99**

TABLE 2.
Squared Multiple Correlations: Preferred Multiple Groups
Measurement Model for Depression
(Categorical Indicators)

	Women	Men
Negative Affect		
Blues	0.799	0.784
Failure	0.683	0.673
Lonely	0.510	0.547
Cry	0.518	0.479
Sad	0.678	0.671
Depressed	0.819	0.790
Fearful	0.432	0.508
Positive Affect		
N_happy	0.735	0.717
N_enjoy	0.858	0.844
N_asgood	0.428	0.403
N_hopeful	0.576	0.573
Somatic		
Bother	0.551	0.496
Attention	0.379	0.407
Appetite	0.418	0.398
Effort	0.525	0.489
Sleep	0.202	0.274
Talk	0.455	0.491
Getgo	0.520	0.511
Interpersonal		
Unfriendly	0.490	0.548
Dislike	0.847	0.746

TABLE 3.
Parameter Estimates: Preferred Multiple Groups
Measurement Model for Depression
(Categorical Indicators)

	Women		Men	
Loadings on negative affect sub-factor of				
Blues	1.000	--	1.000	--
Failure	0.924	(0.021)	0.927	(0.021)
Lonely	0.799	(0.019)	0.836	(0.019)
Cry	0.805	(0.023)	0.782	(0.050)
Sad	0.921	(0.015)	0.926	(0.016)
Depresse	1.012	(0.015)	1.004	(0.015)
Fearful	0.736	(0.021)	0.805	(0.022)
Loadings on positive affect sub-factor of				
N_happy	1.000	--	1.000	--
N_enjoy	1.081	(0.021)	1.085	(0.021)
N_asgood	0.763	(0.025)	0.750	(0.026)
N_hopefu	0.885	(0.020)	0.894	(0.022)
Loadings on somatic sub-factor of				
Bother	1.000	--	1.000	--
Attentio	0.830	(0.029)	0.906	(0.033)
Appetite	0.871	(0.039)	0.896	(0.044)
Effort	0.976	(0.031)	0.994	(0.033)
Sleep	0.605	(0.031)	0.744	(0.033)
Talk	0.909	(0.029)	0.995	(0.033)
Getgo	0.972	(0.029)	1.015	(0.032)
Loadings on interpersonal sub-factor of				
Unfriend	1.000	--	1.000	--
Dislike	1.314	(0.067)	1.167	(0.053)

TABLE 4.
Parameter Estimates: Multiple Groups Measurement Model for Depression
(Categorical Indicators)

	Women		Men	
Loadings on depression of				
Negative-affect	1.000	--	1.000	--
Positive-affect	0.723	(0.021)	0.701	(0.020)
Somatic	0.708	(0.022)	0.740	(0.022)
Interpersonal	0.508	(0.025)	0.524	(0.024)
Squared Multiple Correlations				
Negative-affect	0.918		0.959	
Positive-affect	0.518		0.520	
Somatic	0.699		0.792	
Interpersonal	0.360		0.402	
Variance of Depression Factor	0.729	(0.021)	0.755	(0.022)

TABLE 5.
Correlations of Depression Factors by Sibling Pairs
(Categorical Indicators)

Female	0.158	(0.051)
Male	0.128	(0.057)
Male-Female	0.087	(0.037)

TABLE 6.
Goodness of Fit Statistics: Models for Relationship between SES and Depression
(Continuous Indicators)

Independent Variables	χ^2	df	BIC	R^2 grads	R^2 sibs
Sisters					
A. Education	1,728.08	867	-3,879.42	0.011	0.010
B. Occupational Education	1,737.85	867	-3,869.65	0.015	0.014
C. Net worth & income	2,005.17	1,140	-5,368.00	0.035	0.048
D. Model B & C	2,140.25	1,218	-5,737.41	0.042	0.052
E. Model D & A	2,230.04	1,296	-6,152.10	0.043	0.052
F. Model E, slopes equated	**2,230.57**	**1,300**	**-6,177.44**		
Brothers					
A. Education	1,597.14	867	-3,932.96	0.000	0.026
B. Occupational Education	1,570.33	867	-3,959.77	0.001	0.046
C. Net worth & income	1,940.91	1,257	-6,076.78	0.015	0.049
D. Model B & C	2,053.48	1,335	-6,461.72	0.015	0.064
E. Model D & A	2,177.63	1,413	-6,835.09	0.017	0.066
F. Model E, slopes equated	**2,182.38**	**1,417**	**-6,855.85**		

TABLE 7.
Goodness of Fit Statistics: Multiple Groups Models for
Relationship between SES and Depression
(Continuous Indicators)

	χ^2	df	BIC
A. Base model	8,127.17	5,154	-31,907.67
B. A & regression slopes (β) same by gender	8,279.63	5,246	-32,471.87
C. B & indicator slopes (λ^y) the same across gender	8,675.02	5,262	-32,218.78

TABLE 8.
Parameter Estimates: Preferred Multiple Groups Model for
Relationship between SES and Depression
(Continuous Indicators)

	Women		Men	
Regression of Depression on				
Education	-0.004	(0.004)	0.005	(0.003)
Net worth	-0.042	(0.007)	-0.021	(0.007)
Income	-0.010	(0.011)	-0.009	(0.011)
Occupational Education	-0.012	(0.007)	-0.013	(0.006)
Depression Variance*	0.098	(0.004)	0.085	(0.004)

* These estimates are from a different model than the estimates in the preceding lines. In this model, the measurement parameters are equated across gender.

Note: Models include controls for missing and zero data for income and net worth. The controls are not statistically significant. Sibling estimates also include a control for age. Age has a significant, and negative, effect on depression for males, but not for females.

TABLE 9.
Parameter Estimates: Multiple Group Model for
Relationship between SES and Depression,
Excluding Net Worth
(Continuous Indicators)

	Women		Men	
Regression of Depression on				
Education	-0.005	(0.004)	0.005	(0.003)
Income	-0.037	(0.010)	-0.023	(0.010)
Occupational Education	-0.014	(0.007)	-0.015	(0.006)

TABLE 10.
Parameter Estimates: OLS Regression of Depression on
Socioeconomic Status with All Dummy Variables, Complete Sub-sample (n=2825)

	Graduates		Siblings	
	Male	Female	Male	Female
Education	0.253 (0.217)	-0.315 (0.232)	-0.103 (0.201)	-0.434 (0.226)
Occupational Education	-0.345 (0.373)	-1.126 (0.380)	-1.285 (0.398)	-0.479 (0.397)
Missing	16.348 (6.405)	-0.749 (1.568)	1.671 (1.971)	1.112 (1.947)
Net worth	-1.068 (0.414)	-2.108 (0.374)	-0.838 (0.481)	-1.634 (0.440)
Missing	-3.639 (2.100)	-3.193 (2.508)	-3.799 (2.279)	-0.451 (3.870)
Negative	18.857 (7.152)	4.734 (5.735)	7.434 (7.006)	1.134 (4.119)
Zero	-0.406 (3.362)	3.421 (2.220)	3.581 (2.927)	3.332 (2.108)
Income	-0.922 (0.648)	-0.420 (0.600)	-0.694 (0.745)	-0.611 (0.637)
Missing	-6.811 (8.348)	2.609 (5.093)	5.429 (2.421)	4.338 (3.907)
Negative	-3.859 (4.254)	(dropped)	0.346 (5.635)	(dropped)
Zero	0.202 (2.027)	-2.582 (1.622)	1.618 (1.893)	-2.445 (1.691)

Note: There are 4 male graduates with negative net worth. There are 53 male graduates with missing occupational education.

TABLE 11.
Squared Multiple Correlations: Preferred Multiple Groups Model of
The Relationship between SES and Depression

		Same sex pair	Coed pair
Grads	Male	0.015	0.017
	Female	0.036	0.042
Siblings	Female	0.040	0.047
	Male	0.040	0.062

TABLE 12.
Explained Covariance: Preferred Multiple Groups Model of
The Relationship between SES and Depression

Male grad-Male sibling	0.015
Female grad-male sibling	0.039
Male grad-female sibling	0.053
Female grad-female sibling	0.052

Figure 1. Equations for Socioeconomic Model of Sibling Depression

$y_1 = \eta_1 + \varepsilon_1$ (blues)
$y_2 = \lambda_{2,1}\eta_1 + \varepsilon_2$ (failure)
$y_3 = \lambda_{3,1}\eta_1 + \varepsilon_3$ (lonely)
$y_4 = \lambda_{4,1}\eta_1 + \varepsilon_4$ (cry)
$y_5 = \lambda_{5,1}\eta_1 + \varepsilon_5$ (sad)
$y_6 = \lambda_{6,1}\eta_1 + \varepsilon_6$ (depressed)
$y_7 = \lambda_{7,1}\eta_1 + \varepsilon_7$ (fearful)

$y_8 = \eta_2 + \varepsilon_8$ (n_happy)
$y_9 = \lambda_{9,2}\eta_2 + \varepsilon_9$ (n_enjoy)
$y_{10} = \lambda_{10,2}\eta_2 + \varepsilon_{10}$ (n_asgood)
$y_{11} = \lambda_{11,2}\eta_2 + \varepsilon_{11}$ (n_hopeful)

$y_{12} = \eta_3 + \varepsilon_{12}$ (bother)
$y_{13} = \lambda_{13,3}\eta_3 + \varepsilon_{13}$ (attention)
$y_{14} = \lambda_{14,3}\eta_3 + \varepsilon_{14}$ (appetite)
$y_{15} = \lambda_{15,3}\eta_3 + \varepsilon_{15}$ (effort)
$y_{16} = \lambda_{16,3}\eta_3 + \varepsilon_{16}$ (sleep)
$y_{17} = \lambda_{17,3}\eta_3 + \varepsilon_{17}$ (talk)
$y_{18} = \lambda_{18,1}\eta_3 + \varepsilon_{18}$ (getgo)

$y_{19} = \eta_4 + \varepsilon_{19}$ (unfriendly)
$y_{20} = \lambda_{20,4}\eta_4 + \varepsilon_{20}$ (dislike)

$y_{21} = \eta_6 + \varepsilon_{21}$ (sblues)
$y_{22} = \lambda_{22,6}\eta_6 + \varepsilon_{22}$ (sfailure)
$y_{23} = \lambda_{23,6}\eta_6 + \varepsilon_{23}$ (slonely)
$y_{24} = \lambda_{24,6}\eta_6 + \varepsilon_{24}$ (scry)
$y_{25} = \lambda_{25,6}\eta_6 + \varepsilon_{25}$ (ssad)
$y_{26} = \lambda_{26,6}\eta_6 + \varepsilon_{26}$ (sdepressed)
$y_{27} = \lambda_{27,6}\eta_6 + \varepsilon_{27}$ (sfearful)

$y_{28} = \eta_7 + \varepsilon_{28}$ (sn_happy)
$y_{29} = \lambda_{29,7}\eta_7 + \varepsilon_{29}$ (sn_enjoy)
$y_{30} = \lambda_{30,7}\eta_7 + \varepsilon_{30}$ (sn_asgood)
$y_{31} = \lambda_{31,7}\eta_7 + \varepsilon_{31}$ (sn_hopeful)

$y_{32} = \eta_8 + \varepsilon_{32}$ (sbother)
$y_{33} = \lambda_{33,8}\eta_8 + \varepsilon_{33}$ (sattention)
$y_{34} = \lambda_{34,8}\eta_8 + \varepsilon_{34}$ (sappetite)
$y_{35} = \lambda_{35,8}\eta_8 + \varepsilon_{35}$ (seffort)
$y_{36} = \lambda_{36,8}\eta_8 + \varepsilon_{36}$ (ssleep)
$y_{37} = \lambda_{37,8}\eta_8 + \varepsilon_{37}$ (stalk)
$y_{38} = \lambda_{38,8}\eta_8 + \varepsilon_{38}$ (sgetgo)

$y_{39} = \eta_9 + \varepsilon_{39}$ (sunfriendly)
$y_{40} = \lambda_{40,9}\eta_9 + \varepsilon_{40}$ (sdislike)

$\eta_1 = \beta_{1,5}\,\eta_5 + \zeta_1$ (neg_affect)
$\eta_2 = \beta_{2,5}\,\eta_5 + \zeta_2$ (pos_affect)
$\eta_3 = \beta_{3,5}\,\eta_5 + \zeta_3$ (somatic)
$\eta_4 = \beta_{4,5}\,\eta_5 + \zeta_4$ (interpersonal)

$\eta_6 = \beta_{6,10}\,\eta_{10} + \zeta_6$ (sneg_affect)
$\eta_7 = \beta_{7,10}\,\eta_{10} + \zeta_7$ (spos_affect)
$\eta_8 = \beta_{8,10}\,\eta_{10} + \zeta_8$ (ssomatic)
$\eta_9 = \beta_{9,10}\,\eta_{10} + \zeta_9$ (sinterpersonal)

$\eta_5 = \gamma_{5,1}\xi_1 + \gamma_{5,2}\xi_2 + \gamma_{5,3}\xi_3 + \gamma_{5,4}\xi_4 + \zeta_5$
(graduate's depression)

$\eta_{10} = \gamma_{10,1}\xi_1 + \gamma_{10,2}\xi_2 + \gamma_{10,3}\xi_3 + \gamma_{10,4}\xi_4 + \zeta_5$
(sibling's depression)

$x_1 = \xi_1$ (education)
$x_2 = \xi_2$ (household income)
$x_3 = \xi_3$ (net worth)
$x_4 = \xi_4$ (occupational education)

$x_5 = \xi_5$ (seducation)
$x_6 = \xi_6$ (shousehold income)
$x_7 = \xi_7$ (snet worth)
$x_8 = \xi_8$ (soccupational education)

Figure 2. Second Order Factor Model of Depression with Four Sub-factors: Wisconsin High School Graduates

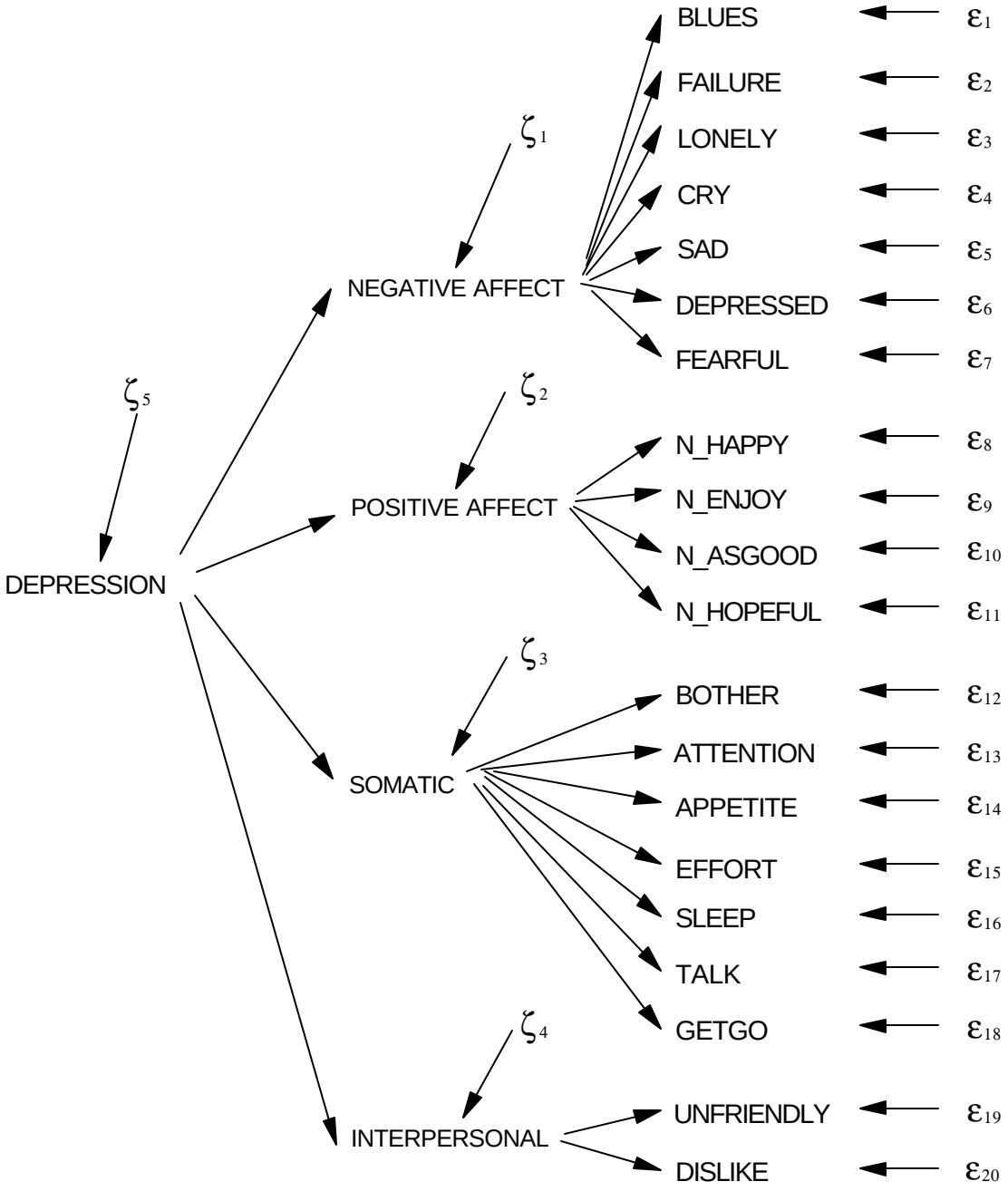


Figure 3. Second-Order Factor Model of Sibling Resemblance in Depression

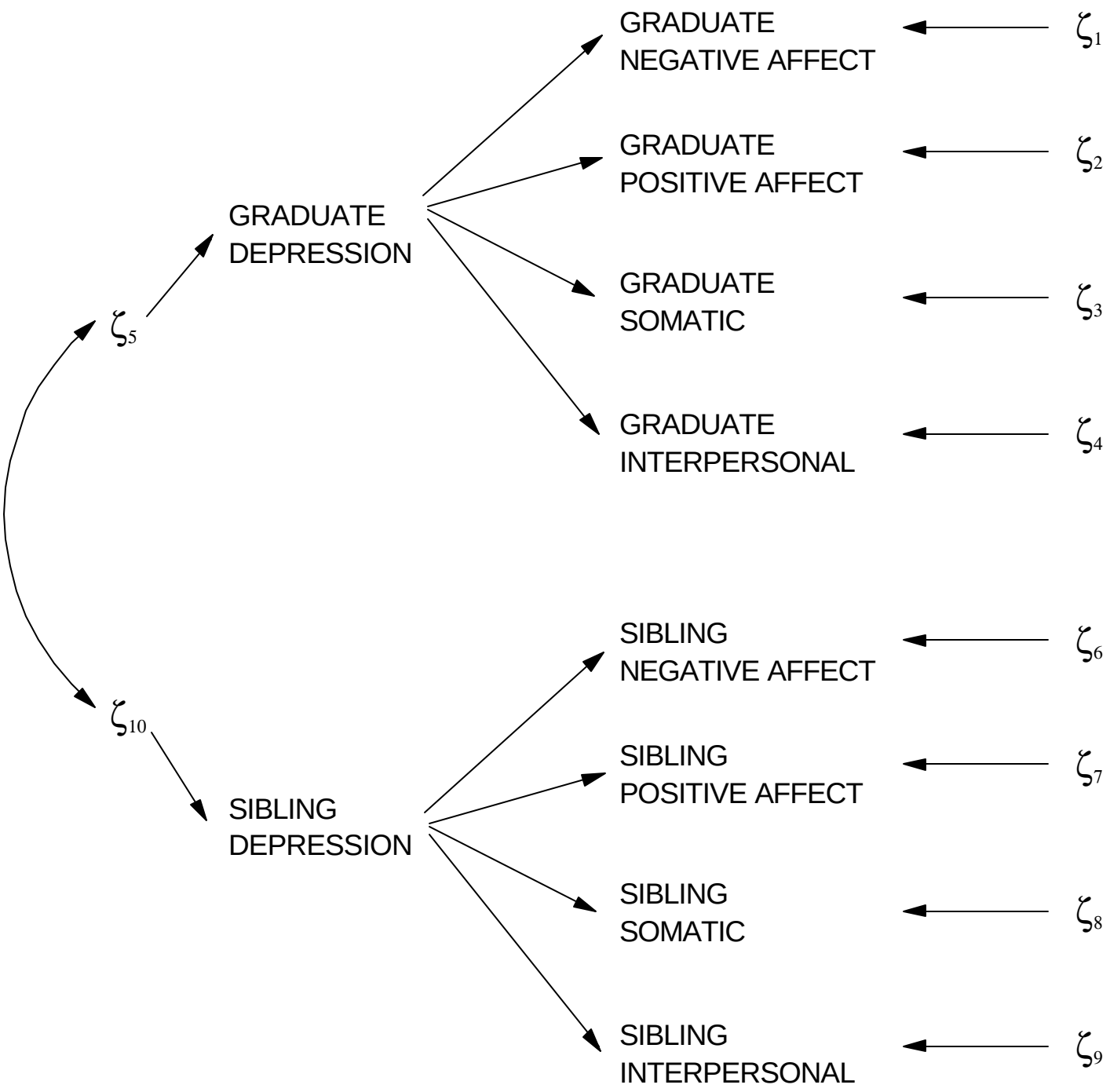


Figure 4. Socioeconomic Status and Depression in Sibling Pairs

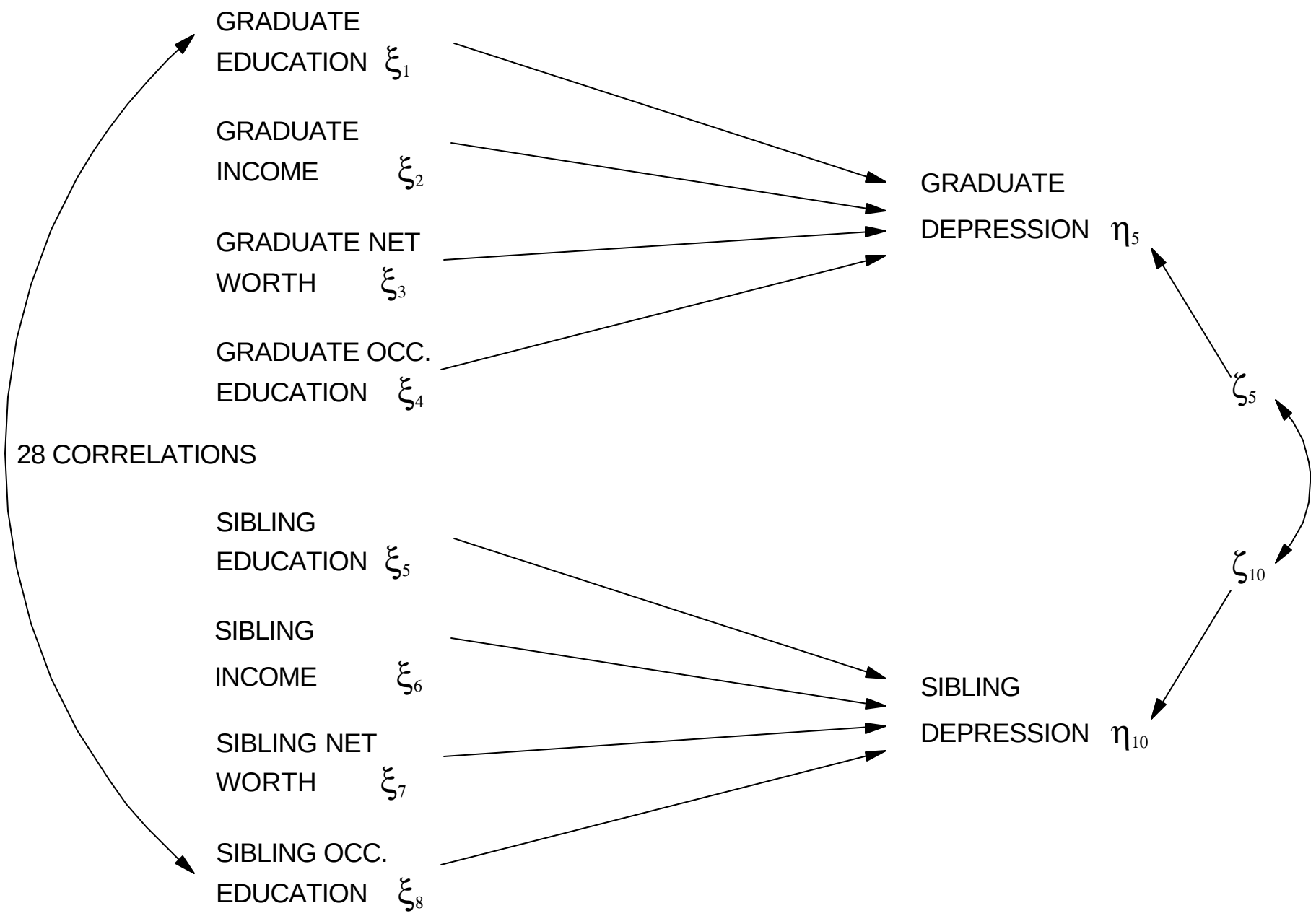
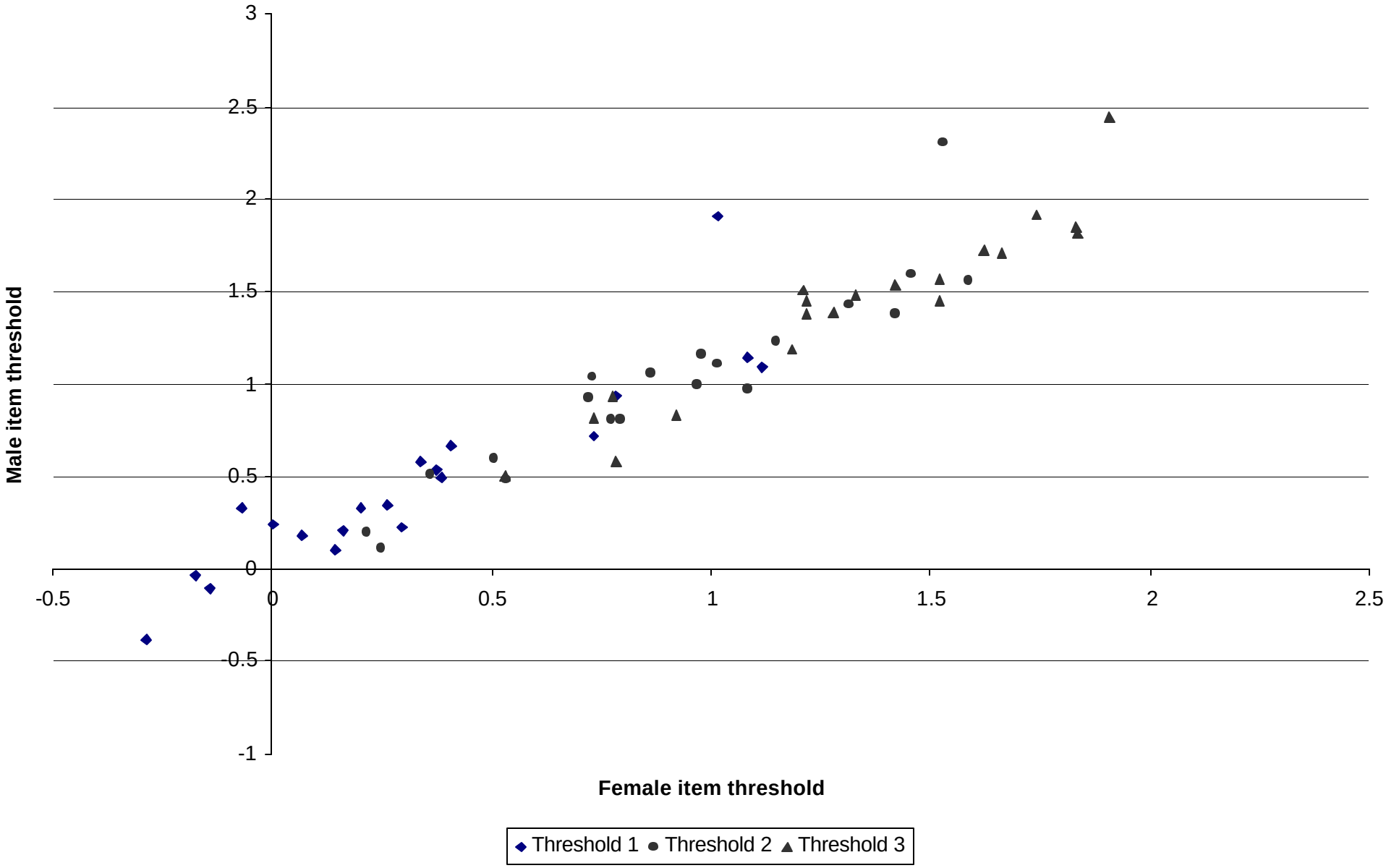


Figure 5. Comparison of Male and Female Item Thresholds



Appendix A: CESD questions

To each question, respondents marked a response from zero to seven (days). The questions are listed in the order they are asked in the mail interview. They have been reordered in the models based on their role in the four factor structure. Following each question, in parentheses is the mnemonic used in the analyses. Mnemonics preceded by "n_" have been reverse coded for purposes of computing means, standard deviations, skewness measures and correlations. When an item refers to a sibling, the prefix "s_" is added to its mnemonic. Thus "s_blues" refers to sibling responses to "blues."

On how many days during the past week did you:

1. feel you could not shake off the blues even with help from your family and friends? (blues)
2. feel bothered by things that usually don't bother you? (bother)
3. think your life had been a failure? (failure)
4. feel happy? (n_happy)
5. feel that people were unfriendly? (unfriendly)
6. feel lonely? (lonely)
7. enjoy life? (n_enjoy)
8. have crying spells? (cry)
9. feel that people disliked you? (dislike)
10. feel sad? (sad)
11. feel depressed? (depressed)
12. have trouble keeping your mind on what you were doing? (attention)
13. not feel like eating, your appetite was poor? (appetite)
14. feel you were just as good as other people? (n_as_good)
15. feel everything you did was an effort? (effort)
16. feel hopeful about the future? (n_hopeful)
17. feel fearful? (fearful)
18. sleep restlessly? (sleep)
19. talk less than usual? (talk)
20. feel you could not "get going" (getgo)

Appendix B. Means, Standard Deviations and Skew
for all variables

Variable	Mean	Std. Dev.	M	Skew
blues	0.395		1.036	3.668
bother	0.585		1.061	2.839
failure	0.234		0.809	4.792
n_happy	1.480		1.660	1.214
unfriend	0.649		1.195	2.887
lonely	0.880		1.559	2.285
n_enjoy	1.203		1.725	1.573
cry	0.284		0.928	4.525
dislike	0.380		0.920	3.703
sad	0.965		1.346	2.216
depresse	0.668		1.236	2.754
attentio	0.861		1.320	2.250
appetite	0.282		0.957	4.427
n_asgood	1.564		2.405	1.379
effort	0.867		1.442	2.254
n_hope	1.757		2.195	1.137
fear	0.635		1.292	2.847
sleep	1.515		1.867	1.417
talk	0.628		1.073	2.462
getgo	0.907		1.328	2.185
s_blues	0.419		1.022	3.352
s_bother	0.531		0.983	2.780
s_failur	0.261		0.896	4.901
s_n_happ	1.504		1.713	1.296
s_unfrie	0.665		1.136	2.657
s_lonely	0.798		1.467	2.369
s_n_enjo	1.108		1.714	1.807
s_cry	0.291		0.833	4.164
s_dislik	0.388		0.932	3.901
s_sad	0.997		1.478	2.176
s_depres	0.708		1.364	2.742
s_attent	0.914		1.327	2.042
s_appeti	0.336		0.998	4.017
s_n_asgo	1.642		2.451	1.332
s_effort	0.954		1.554	2.114
s_n_hope	1.883		2.314	1.095
s_fear	0.731		1.332	2.399
s_sleep	1.393		1.894	1.591
s_talk	0.645		1.017	2.111
s_getgo	0.946		1.348	2.047

Appendix B. Means, Standard Deviations and Skew
for all variables

Variable	Mean	Std. Dev.	M	Skew
Graduate				
Education	13.81	2.34		0.95
Net worth	232,151.30	263,717.60		2.70
Income	65,482.01	51,284.18		1.97
Occ Ed	61.32	25.05		-0.15
Sibling				
Education	13.86	2.55		0.52
Net worth	213,465.10	252,537.90		2.90
Income	57,762.95	46,090.43		1.52
Occ Ed	60.55	25.06		-0.18

Appendix C. Correlation Matrix for Transformed Data for Sisters

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1.000						
lnlonely	0.173	1.000					
lncry	0.254	0.418	1.000				
lnfelsad	0.360	0.469	0.491	1.000			
lndepres	0.399	0.463	0.583	0.582	1.000		
lnhappy	0.213	0.242	0.155	0.233	0.342	1.000	
lnenjoy	0.250	0.280	0.360	0.366	0.458	0.563	1.000
lnhope	0.351	0.119	0.121	0.260	0.205	0.438	0.483
lnbadapp	0.284	0.093	0.119	0.102	0.178	0.147	0.113
lnsleep	0.099	0.165	0.240	0.243	0.246	0.037	0.133
lntalkls	0.387	0.183	0.274	0.340	0.342	0.125	0.283
lnflefrt	0.174	0.241	0.414	0.225	0.369	0.074	0.236
lngetgo	0.198	0.418	0.474	0.388	0.464	0.257	0.362
lnfail	0.384	0.307	0.337	0.326	0.440	0.408	0.480
lnasgood	0.257	0.155	0.203	0.219	0.206	0.367	0.341
lnbother	0.422	0.136	0.234	0.304	0.386	0.282	0.318
lnkepmin	0.235	0.078	0.192	0.227	0.221	0.076	0.207
lnfear	0.229	0.117	0.196	0.262	0.295	-0.036	0.208
lnunfrin	0.296	0.186	0.002	0.123	0.004	-0.049	0.008
lndislik	0.288	0.218	0.378	0.352	0.333	-0.034	0.241
lnsblues	-0.011	0.011	0.252	0.071	0.198	-0.014	0.186
lnslonel	0.140	-0.090	-0.036	0.044	-0.071	0.077	0.084
lnscry	-0.035	0.101	0.249	0.100	0.150	-0.130	0.104
lnssad	0.101	-0.023	0.134	0.174	0.076	-0.098	0.132
lnsdeprs	0.043	0.015	0.077	0.137	0.029	-0.175	0.031
lnshappy	0.147	-0.044	0.063	0.144	-0.034	-0.003	0.177
lnsenjoy	0.238	-0.003	0.127	0.173	0.051	0.061	0.235
lnshope	0.076	-0.052	-0.072	-0.034	0.006	0.183	0.027
lnsprapp	-0.019	-0.035	-0.037	-0.014	0.030	0.067	-0.006
lnssleep	-0.010	0.071	0.122	0.149	0.038	-0.103	-0.009
lnstlkls	-0.058	0.105	0.232	0.140	0.165	0.062	0.243
lnsefrt	-0.027	0.082	0.105	0.024	-0.015	-0.038	0.089
lnsgetgo	-0.020	0.096	0.104	0.058	0.055	-0.050	0.066
lnsfail	0.030	-0.061	-0.081	-0.074	0.042	0.044	0.009
lnsasgd	0.037	0.046	-0.002	0.029	-0.007	0.134	0.095
lnsbothe	0.026	-0.016	0.043	0.037	0.008	0.121	0.072
lnskpmnd	0.022	0.029	0.180	0.168	0.077	0.009	0.255
lnsfear	-0.097	-0.082	-0.033	-0.086	-0.009	-0.006	-0.019
lnsunfri	-0.048	-0.129	-0.120	-0.164	-0.099	-0.013	-0.054
lnsdislk	-0.040	-0.033	0.069	0.016	0.012	0.076	0.138

Appendix C+A114. Correlation Matrix for Transformed Data for Sisters

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1.000						
lnbadapp	0.070	1.000					
lnsleep	0.052	0.079	1.000				
lntalkls	0.209	0.238	0.223	1.000			
lnflefrt	0.038	0.214	0.342	0.243	1.000		
lngetgo	0.193	0.234	0.195	0.391	0.520	1.000	
lnfail	0.277	0.155	0.122	0.232	0.137	0.275	1.000
lnasgood	0.487	0.133	0.096	0.142	0.051	0.157	0.310
lnbother	0.203	0.203	0.138	0.341	0.145	0.229	0.397
lnkepmin	0.208	0.169	0.440	0.315	0.372	0.298	0.227
lnfear	0.078	0.112	0.404	0.245	0.484	0.217	0.188
lnunfrin	0.112	0.122	0.126	0.237	0.102	0.008	0.140
lndislik	0.151	0.130	0.162	0.338	0.172	0.228	0.218
lnsblues	-0.088	-0.059	0.081	0.086	0.197	0.219	0.009
lnslonel	0.224	-0.024	-0.059	0.129	-0.065	-0.007	0.099
lnscry	-0.160	-0.013	0.125	0.179	0.219	0.221	-0.034
lnssad	0.029	-0.020	0.207	0.274	0.040	0.146	0.043
lnsdeprs	-0.082	-0.061	0.168	0.199	0.030	0.144	-0.061
lnshappy	0.142	-0.004	0.012	0.192	-0.020	0.084	0.063
lnsenjoy	0.255	-0.037	-0.048	0.154	0.029	0.079	0.096
lnshope	0.148	0.053	-0.127	-0.042	-0.076	-0.013	0.069
lnsprapp	0.033	0.038	0.030	0.027	-0.008	0.042	0.012
lnssleep	0.021	-0.037	0.289	0.066	0.252	0.056	-0.024
lnstlkls	0.011	0.000	0.089	0.129	0.147	0.276	0.130
lnsefrt	-0.086	0.035	0.020	0.160	0.090	0.180	0.039
lnsgetgo	-0.078	-0.043	0.000	0.149	0.030	0.179	0.019
lnsfail	0.053	-0.043	-0.008	0.001	-0.064	-0.005	0.002
lnsasgd	0.153	-0.017	0.005	0.077	-0.112	0.039	0.182
lnsbothe	-0.010	0.033	0.053	0.082	-0.045	0.090	0.143
lnskpmnd	0.116	-0.039	0.171	0.270	0.025	0.183	0.121
lnsfear	-0.065	0.001	0.124	-0.038	0.184	-0.075	0.061
lnsunfri	-0.044	0.076	0.163	-0.050	0.179	-0.088	0.015
lnsdislk	0.141	0.082	0.006	0.153	-0.010	0.021	0.082

Appendix C. Correlation Matrix for Transformed Data for Sisters

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1.000						
lnbother	0.231	1.000					
lnkepmin	0.163	0.266	1.000				
lnfear	0.002	0.085	0.408	1.000			
lnunfrin	0.021	0.139	0.231	0.265	1.000		
lndislik	0.158	0.189	0.283	0.316	0.368	1.000	
lnsblues	0.002	0.069	0.083	0.107	-0.099	0.171	1.000
lnslonel	0.153	0.046	0.051	-0.124	0.025	0.025	0.228
lnscry	-0.086	-0.005	0.115	0.133	-0.031	0.223	0.545
lnssad	0.015	0.067	0.246	0.137	0.076	0.243	0.399
lnsdeprs	-0.059	-0.007	0.185	0.165	0.094	0.226	0.509
lnshappy	0.069	0.047	0.098	0.047	0.055	0.236	0.282
lnsenjoy	0.126	0.093	0.109	0.077	0.051	0.268	0.318
lnshope	0.141	0.164	-0.055	-0.152	-0.027	-0.060	0.132
lnsprapp	0.057	0.073	0.011	-0.065	-0.059	0.010	0.282
lnssleep	0.042	-0.089	0.220	0.263	0.151	0.045	0.107
lnstlkls	0.073	0.107	0.184	0.052	-0.058	0.203	0.434
lnsefrt	-0.014	0.007	0.050	-0.001	-0.028	0.021	0.335
lnsgetgo	0.015	0.009	0.013	0.012	-0.015	0.039	0.370
lnsfail	0.077	0.030	0.033	-0.101	-0.052	-0.033	0.280
lnsasgd	0.177	0.146	0.011	-0.131	-0.014	-0.072	0.035
lnsbothe	0.069	0.149	0.093	-0.088	-0.009	-0.047	0.386
lnskpmnd	0.099	0.088	0.235	0.082	0.047	0.207	0.260
lnsfear	-0.009	0.070	0.127	0.184	0.096	-0.081	0.093
lnsunfri	0.019	0.042	0.154	0.167	0.054	-0.094	0.116
lnsdislk	0.170	0.163	0.070	-0.098	0.007	-0.029	0.116

Appendix C. Correlation Matrix for Transformed Data for Sisters

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1.000						
lnscry	0.126	1.000					
lnssad	0.393	0.539	1.000				
lnsdeprs	0.294	0.520	0.803	1.000			
lnshappy	0.343	0.255	0.480	0.494	1.000		
lnsenjoy	0.406	0.203	0.311	0.326	0.719	1.000	
lnshope	0.270	-0.004	0.010	0.068	0.297	0.365	1.000
lnsprapp	0.226	0.224	0.267	0.273	0.103	0.148	0.182
lnssleep	0.146	0.131	0.223	0.242	0.167	0.202	0.015
lnstlkls	0.178	0.380	0.419	0.392	0.257	0.227	0.082
lnsefrt	0.133	0.366	0.481	0.541	0.311	0.185	0.067
lnsgetgo	0.169	0.374	0.417	0.480	0.287	0.233	0.247
lnsfail	0.205	0.191	0.216	0.219	0.183	0.205	0.284
lnsasgd	0.162	0.071	0.146	0.148	0.303	0.246	0.514
lnsbothe	0.201	0.157	0.356	0.350	0.220	0.119	0.196
lnskpmnd	0.285	0.299	0.563	0.515	0.410	0.306	0.052
lnsfear	0.151	0.065	0.095	0.107	-0.002	0.024	0.176
lnsunfri	0.169	0.063	0.058	0.044	-0.074	-0.009	0.067
lnsdislk	0.181	0.108	0.143	0.028	0.067	0.151	0.217

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1.000						
lnssleep	0.075	1.000					
lnstlkls	0.222	0.124	1.000				
lnsefrt	0.206	0.153	0.393	1.000			
lnsgetgo	0.256	0.209	0.476	0.582	1.000		
lnsfail	0.308	0.049	0.169	0.096	0.214	1.000	
lnsasgd	0.098	0.034	0.158	0.177	0.223	0.200	1.000
lnsbothe	0.276	0.069	0.383	0.369	0.334	0.207	0.270
lnskpmnd	0.157	0.235	0.420	0.467	0.441	0.115	0.176
lnsfear	0.212	0.325	0.085	0.083	0.144	0.152	0.067
lnsunfri	0.251	0.124	0.105	0.078	0.089	0.159	0.021
lnsdislk	0.136	0.032	0.248	0.117	0.174	0.201	0.168

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1.000				
lnskpmnd	0.354	1.000			
lnsfear	0.129	0.097	1.000		
lnsunfri	0.188	0.010	0.357	1.000	
lnsdislk	0.229	0.162	0.227	0.333	1.000

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1.000						
lnlonely	0.601	1.000					
lncry	0.191	0.137	1.000				
lnfelsad	0.626	0.565	0.210	1.000			
lndepres	0.603	0.538	0.150	0.664	1.000		
lnhappy	0.434	0.317	0.051	0.365	0.413	1.000	
lnenjoy	0.460	0.407	0.033	0.382	0.416	0.720	1.000
lnhope	0.363	0.283	0.065	0.327	0.353	0.617	0.600
lnbadapp	0.248	0.222	0.182	0.209	0.206	0.100	0.153
lnsleep	0.223	0.223	0.089	0.249	0.286	0.128	0.119
lntalkls	0.395	0.326	0.174	0.370	0.364	0.386	0.338
lnflefrt	0.417	0.406	0.147	0.345	0.340	0.352	0.383
lngetgo	0.403	0.464	0.096	0.394	0.467	0.321	0.300
lnfail	0.615	0.535	0.338	0.516	0.612	0.369	0.378
lnasgood	0.073	0.068	0.068	0.140	0.237	0.291	0.302
lnbother	0.634	0.478	0.186	0.491	0.428	0.306	0.312
lnkepmin	0.241	0.247	0.091	0.300	0.236	0.165	0.134
lnfear	0.441	0.434	0.232	0.541	0.456	0.297	0.254
lnunfrin	0.330	0.319	0.133	0.270	0.172	0.259	0.241
lndislik	0.418	0.285	0.146	0.410	0.248	0.300	0.279
lnsblues	0.298	0.155	-0.054	0.176	0.066	0.140	0.158
lnslonel	-0.037	-0.044	-0.005	0.049	0.058	-0.049	0.001
lnscry	-0.032	-0.047	0.061	-0.053	-0.039	-0.062	-0.083
lnssad	-0.073	-0.115	-0.042	-0.012	0.011	-0.128	-0.086
lnsdeprs	-0.044	-0.095	0.016	0.037	0.028	-0.055	-0.018
lnshappy	0.196	0.137	-0.064	0.142	0.146	0.210	0.236
lnsenjoy	0.214	0.137	-0.033	0.161	0.134	0.202	0.250
lnshope	0.164	0.168	0.000	0.198	0.158	0.140	0.170
lnsprapp	-0.047	-0.064	0.030	0.046	-0.001	-0.069	-0.015
lnssleep	-0.138	-0.153	-0.001	-0.032	-0.005	0.013	0.068
lnstlkls	0.008	-0.051	0.015	-0.014	0.067	0.132	0.075
lnsefrt	-0.072	-0.090	0.000	-0.011	0.024	0.068	0.038
lnsgetgo	-0.082	-0.169	0.011	-0.025	0.016	-0.048	-0.015
lnsfail	-0.057	-0.099	-0.049	-0.048	-0.060	-0.088	-0.050
lnsasgd	0.201	0.143	0.035	0.146	0.086	0.109	0.094
lnsbothe	-0.094	-0.101	-0.012	0.032	0.001	0.010	0.024
lnskpmnd	-0.101	-0.119	0.054	0.027	0.030	-0.025	-0.079
lnsfear	-0.035	-0.073	-0.011	-0.026	0.001	-0.055	-0.020
lnsunfri	-0.097	-0.105	0.001	-0.046	-0.030	-0.028	-0.035
lnsdislk	-0.118	-0.117	-0.006	-0.145	-0.152	-0.068	-0.100

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1.000						
lnbadapp	0.077	1.000					
lnsleep	0.193	0.159	1.000				
lntalkls	0.287	0.224	0.133	1.000			
lnflefrt	0.253	0.298	0.218	0.330	1.000		
lngetgo	0.248	0.251	0.321	0.291	0.413	1.000	
lnfail	0.345	0.155	0.123	0.276	0.393	0.361	1.000
lnasgood	0.462	0.159	0.089	0.138	0.032	0.101	0.146
lnbother	0.267	0.211	0.189	0.363	0.392	0.359	0.494
lnkepmin	0.084	0.129	0.210	0.178	0.307	0.316	0.092
lnfear	0.336	0.211	0.297	0.318	0.345	0.345	0.406
lnunfrin	0.165	0.079	0.098	0.278	0.370	0.262	0.296
lndislik	0.264	0.144	0.174	0.398	0.288	0.261	0.209
lnsblues	0.134	-0.062	0.075	0.117	0.086	0.006	0.119
lnslonel	0.005	0.115	0.020	0.028	-0.033	0.012	0.000
lnscry	-0.074	0.002	-0.075	-0.042	-0.078	-0.061	-0.023
lnssad	0.001	0.111	0.078	-0.012	-0.113	-0.062	-0.058
lnsdeprs	0.003	0.044	0.101	-0.023	-0.097	-0.083	-0.105
lnshappy	0.203	0.052	0.101	0.182	0.156	0.064	0.139
lnsenjoy	0.272	0.047	0.079	0.261	0.095	-0.008	0.152
lnshope	0.213	0.096	0.098	0.228	0.135	0.071	0.129
lnsprapp	-0.068	0.036	-0.081	-0.029	-0.049	0.038	0.004
lnssleep	0.049	0.062	0.026	0.056	-0.081	-0.136	-0.164
lnstlkls	0.067	0.030	-0.013	0.132	0.058	0.060	0.067
lnsefrt	0.090	0.049	0.018	0.053	-0.069	0.004	0.005
lnsgetgo	-0.031	0.011	-0.043	0.058	-0.070	-0.125	-0.100
lnsfail	-0.023	0.013	-0.013	-0.077	-0.100	-0.051	-0.083
lnsasgd	0.127	-0.027	0.048	0.152	0.093	0.109	0.151
lnsbothe	0.038	0.066	0.021	0.074	-0.016	-0.010	-0.125
lnskpmnd	-0.023	0.130	0.055	0.010	-0.046	0.016	-0.072
lnsfear	-0.040	0.133	0.053	0.066	0.042	-0.013	-0.030
lnsunfri	0.026	0.088	-0.008	0.100	-0.062	-0.068	-0.128
lnsdislk	-0.071	0.062	0.070	-0.112	-0.030	-0.110	-0.099

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1.000						
lnbother	-0.012	1.000					
lnkepmin	-0.025	0.229	1.000				
lnfear	0.163	0.407	0.247	1.000			
lnunfrin	0.036	0.302	0.135	0.291	1.000		
lndislik	0.169	0.338	0.184	0.355	0.485	1.000	
lnsblues	-0.103	0.226	0.084	0.108	0.135	0.176	1.000
lnslonel	0.052	-0.020	0.038	0.047	-0.058	-0.012	0.191
lnscry	-0.049	-0.040	-0.065	-0.058	-0.005	-0.019	0.326
lnssad	0.095	-0.055	-0.030	0.057	-0.108	-0.006	0.236
lnsdeprs	0.108	-0.052	-0.016	-0.001	-0.109	-0.004	0.326
lnshappy	0.021	0.188	-0.042	0.148	0.216	0.228	0.399
lnsenjoy	0.118	0.179	-0.083	0.177	0.200	0.263	0.437
lnshope	0.131	0.230	0.050	0.152	0.150	0.209	0.338
lnsprapp	-0.082	-0.035	0.069	0.008	-0.071	-0.019	0.200
lnssleep	0.143	-0.119	-0.040	0.008	-0.021	0.027	0.110
lnstlkls	-0.003	-0.041	-0.050	-0.044	0.133	-0.001	0.192
lnsefrt	0.118	-0.077	-0.052	0.052	-0.047	-0.004	0.185
lnsgetgo	0.078	-0.085	-0.063	0.005	-0.062	0.057	0.165
lnsfail	-0.019	-0.037	-0.010	-0.057	-0.072	-0.080	0.379
lnsasgd	-0.042	0.190	0.008	0.110	0.185	0.209	0.338
lnsbothe	0.100	-0.098	-0.094	-0.031	-0.015	0.079	0.252
lnskpmnd	0.047	0.012	0.096	0.000	-0.098	0.007	0.107
lnsfear	0.036	0.061	0.092	-0.068	-0.021	-0.036	0.229
lnsunfri	0.108	-0.056	-0.001	0.003	0.019	0.057	0.107
lnsdislk	-0.077	-0.040	-0.034	-0.085	-0.065	-0.084	0.248

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1.000						
lnscry	0.263	1.000					
lnssad	0.478	0.284	1.000				
lnsdeprs	0.399	0.286	0.698	1.000			
lnshappy	0.164	0.110	0.266	0.275	1.000		
lnsenjoy	0.261	0.136	0.305	0.374	0.740	1.000	
lnshope	0.218	0.099	0.261	0.311	0.589	0.601	1.000
lnsprapp	0.298	0.397	0.297	0.296	0.136	0.169	0.222
lnssleep	0.206	0.115	0.243	0.274	0.164	0.190	0.163
lnstlkls	0.151	0.194	0.225	0.256	0.265	0.264	0.180
lnsefrt	0.235	0.211	0.389	0.403	0.281	0.346	0.198
lnsgetgo	0.220	0.215	0.442	0.519	0.261	0.290	0.217
lnsfail	0.304	0.363	0.475	0.547	0.223	0.324	0.288
lnsasgd	0.155	0.118	0.110	0.116	0.427	0.459	0.578
lnsbothe	0.342	0.278	0.389	0.415	0.237	0.293	0.211
lnskpmnd	0.284	0.240	0.391	0.399	0.166	0.179	0.208
lnsfear	0.264	0.304	0.369	0.425	0.238	0.296	0.339
lnsunfri	0.352	0.191	0.392	0.338	0.184	0.239	0.200
lnsdislk	0.203	0.326	0.376	0.356	0.140	0.138	0.151

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1.000						
lnssleep	0.220	1.000					
lnstlkls	0.277	0.341	1.000				
lnsefrt	0.425	0.252	0.328	1.000			
lnsgetgo	0.292	0.378	0.403	0.466	1.000		
lnsfail	0.333	0.138	0.234	0.302	0.323	1.000	
lnsasgd	0.174	0.050	0.225	0.038	0.054	0.224	1.000
lnsbothe	0.293	0.396	0.385	0.305	0.401	0.300	0.175
lnskpmnd	0.248	0.213	0.182	0.381	0.472	0.280	0.027
lnsfear	0.316	0.240	0.342	0.365	0.332	0.397	0.179
lnsunfri	0.187	0.207	0.251	0.357	0.316	0.230	0.041
lnsdislk	0.187	0.088	0.182	0.252	0.191	0.359	0.114

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1.000				
lnskpmnd	0.291	1.000			
lnsfear	0.269	0.266	1.000		
lnsunfri	0.289	0.312	0.310	1.000	
lnsdislk	0.261	0.244	0.287	0.401	1.000

Appendix C. Correlation Matrix for Transformed Data for Female Graduates and Male Sibs

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1.000						
lnlonely	0.495	1.000					
lncry	0.185	0.305	1.000				
lnfelsad	0.577	0.539	0.345	1.000			
lndepres	0.722	0.466	0.264	0.630	1.000		
lnhappy	0.506	0.412	0.171	0.353	0.557	1.000	
lnenjoy	0.424	0.497	0.225	0.398	0.490	0.726	1.000
lnhope	0.365	0.386	0.180	0.333	0.436	0.652	0.624
lnbadapp	0.252	0.186	0.242	0.199	0.227	0.290	0.295
lnsleep	0.396	0.303	0.115	0.348	0.322	0.336	0.322
lntalkls	0.386	0.419	0.190	0.379	0.368	0.334	0.427
lnflefrt	0.465	0.432	0.144	0.405	0.379	0.361	0.391
lngetgo	0.362	0.313	0.138	0.305	0.301	0.392	0.453
lnfail	0.524	0.487	0.380	0.457	0.572	0.405	0.469
lnasgood	0.223	0.241	0.166	0.181	0.244	0.494	0.485
lnbother	0.695	0.473	0.184	0.535	0.497	0.382	0.361
lnkepmin	0.440	0.348	0.154	0.406	0.383	0.314	0.329
lnfear	0.604	0.471	0.202	0.557	0.528	0.347	0.384
lnunfrin	0.384	0.244	0.175	0.238	0.367	0.264	0.131
lndislik	0.184	0.305	0.360	0.358	0.223	0.115	0.119
lnsblues	0.063	0.117	-0.069	0.185	-0.045	-0.014	0.013
lnslonel	-0.028	0.049	-0.046	0.136	-0.138	-0.118	-0.017
lnscry	-0.041	-0.007	-0.014	0.022	0.071	0.024	0.055
lnssad	0.015	-0.034	-0.053	0.085	-0.049	-0.053	-0.075
lnsdeprs	-0.039	0.047	0.039	0.074	-0.043	0.025	0.074
lnshappy	-0.116	0.048	-0.042	0.009	-0.170	-0.091	0.019
lnsenjoy	-0.007	0.072	-0.010	0.015	0.062	0.164	0.237
lnshope	0.124	0.026	-0.004	0.034	0.044	0.148	0.098
lnsprapp	0.088	0.107	-0.017	0.166	-0.084	-0.131	-0.112
lnssleep	-0.139	0.020	0.016	0.000	-0.117	-0.173	-0.110
lnstlkls	0.135	0.208	0.050	0.235	0.102	-0.045	-0.032
lnsefrt	-0.076	0.051	-0.035	0.097	-0.044	-0.089	-0.047
lnsgetgo	-0.036	0.090	0.044	0.125	-0.125	-0.106	-0.063
lnsfail	0.030	0.054	-0.034	0.190	0.030	0.019	0.057
lnsasgd	0.060	0.116	-0.035	0.065	-0.052	0.098	0.105
lnsbothe	-0.039	0.093	-0.063	0.136	-0.120	-0.123	-0.087
lnskpmnd	-0.095	0.049	-0.039	0.093	-0.156	-0.213	-0.118
lnsfear	-0.107	0.054	-0.090	0.076	-0.227	-0.228	-0.155
lnsunfri	-0.120	-0.100	-0.011	-0.071	0.002	-0.019	0.011
lnsdislk	-0.089	-0.047	-0.057	-0.026	0.003	0.006	0.074

Appendix C. Correlation Matrix for Transformed Data for Female Graduates and Male Sibs

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1.000						
lnbadapp	0.300	1.000					
lnsleep	0.332	0.257	1.000				
lntalkls	0.288	0.347	0.426	1.000			
lnflefrt	0.315	0.347	0.359	0.446	1.000		
lngetgo	0.393	0.394	0.483	0.499	0.594	1.000	
lnfail	0.399	0.191	0.240	0.309	0.385	0.266	1.000
lnasgood	0.582	0.289	0.239	0.275	0.263	0.346	0.281
lnbother	0.263	0.202	0.369	0.456	0.435	0.356	0.376
lnkepmin	0.302	0.270	0.382	0.390	0.455	0.451	0.374
lnfear	0.379	0.187	0.410	0.381	0.429	0.321	0.427
lnunfrin	0.217	0.067	0.128	0.214	0.135	0.051	0.352
lndislik	0.063	0.111	0.064	0.202	0.160	0.054	0.308
lnsblues	0.044	0.035	0.148	0.134	0.146	0.127	-0.023
lnslonel	0.016	-0.016	0.104	0.051	0.093	0.089	-0.050
lnscry	0.010	0.103	-0.006	0.068	0.077	-0.015	0.032
lnssad	0.047	-0.036	0.108	-0.002	0.069	0.061	-0.093
lnsdeprs	0.074	-0.002	0.080	0.049	0.076	0.079	-0.034
lnshappy	0.011	0.039	0.063	0.011	0.078	0.097	-0.097
lnsenjoy	0.232	0.070	0.154	0.121	0.081	0.112	0.021
lnshope	0.114	0.039	0.130	0.048	0.069	0.120	-0.072
lnsprapp	-0.150	-0.044	0.076	0.084	0.110	0.061	-0.051
lnssleep	-0.150	-0.101	-0.059	-0.036	-0.044	-0.128	-0.025
lnstlkls	-0.027	-0.113	0.109	0.152	0.167	0.057	0.145
lnsefrt	-0.067	-0.025	0.001	0.061	0.024	-0.027	-0.033
lnsgetgo	-0.090	-0.023	0.023	0.017	0.043	-0.028	-0.018
lnsfail	0.036	0.060	0.149	0.087	0.171	0.123	-0.017
lnsasgd	0.094	0.021	0.129	0.139	0.103	0.122	-0.032
lnsbothe	-0.025	-0.073	0.005	0.021	0.035	-0.024	-0.008
lnskpmnd	-0.169	-0.133	-0.064	-0.064	-0.085	-0.115	-0.081
lnsfear	-0.169	-0.098	0.005	0.033	0.022	-0.017	-0.137
lnsunfri	0.035	0.068	0.007	0.040	0.030	0.051	-0.006
lnsdislk	0.025	0.030	-0.005	0.002	-0.004	0.022	-0.042

Appendix C. Correlation Matrix for Transformed Data for Female Graduates and Male Sibs

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1.000						
lnbother	0.218	1.000					
lnkepmin	0.218	0.431	1.000				
lnfear	0.175	0.515	0.379	1.000			
lnunfrin	0.118	0.274	0.106	0.320	1.000		
lndislik	0.125	0.286	0.253	0.177	0.352	1.000	
lnsblues	0.090	0.196	0.171	0.180	-0.140	0.234	1.000
lnslonel	0.006	0.114	0.140	0.102	-0.163	0.095	0.590
lnscry	0.016	-0.040	0.072	0.004	-0.033	-0.017	0.249
lnssad	-0.008	0.099	0.069	0.085	-0.031	0.086	0.545
lnsdeprs	0.099	0.105	0.098	0.038	-0.109	0.140	0.550
lnshappy	0.089	-0.015	0.050	0.000	-0.144	0.102	0.460
lnsenjoy	0.230	0.027	0.073	0.012	0.021	-0.010	0.274
lnshope	0.056	0.112	0.021	0.103	0.167	-0.015	0.224
lnsprapp	-0.059	0.257	0.195	0.091	-0.065	0.246	0.547
lnssleep	-0.047	-0.018	-0.023	-0.068	-0.087	0.168	0.331
lnstlkls	-0.092	0.255	0.216	0.148	-0.005	0.207	0.444
lnsefrt	0.100	0.031	0.062	-0.050	-0.074	0.228	0.418
lnsgetgo	-0.053	0.079	0.193	-0.022	-0.057	0.241	0.428
lnsfail	0.159	0.110	0.137	0.104	-0.091	0.155	0.565
lnsasgd	0.141	0.166	0.132	0.103	-0.008	0.100	0.323
lnsbothe	0.026	0.121	0.155	0.034	-0.089	0.245	0.620
lnskpmnd	-0.143	0.056	0.023	-0.070	-0.174	0.146	0.438
lnsfear	-0.132	0.106	0.038	0.058	-0.122	0.077	0.508
lnsunfri	0.119	-0.074	-0.011	-0.164	-0.121	0.046	0.174
lnsdislk	0.108	-0.076	-0.060	-0.155	-0.144	-0.014	0.160

Appendix C. Correlation Matrix for Transformed Data for Female Graduates and Male Sibs

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1.000						
lnscry	0.285	1.000					
lnssad	0.594	0.232	1.000				
lnsdeprs	0.561	0.233	0.644	1.000			
lnshappy	0.456	0.115	0.359	0.416	1.000		
lnsenjoy	0.365	0.185	0.345	0.446	0.559	1.000	
lnshope	0.235	0.127	0.299	0.265	0.359	0.416	1.000
lnsprapp	0.441	0.160	0.332	0.351	0.311	-0.016	0.102
lnssleep	0.339	0.085	0.298	0.319	0.238	0.140	-0.019
lnstlkls	0.423	0.177	0.311	0.308	0.258	0.071	0.064
lnsefrt	0.392	0.248	0.347	0.435	0.388	0.214	0.165
lnsgetgo	0.421	0.161	0.381	0.381	0.369	0.176	0.196
lnsfail	0.507	0.289	0.465	0.512	0.441	0.353	0.260
lnsasgd	0.378	0.073	0.193	0.263	0.375	0.373	0.374
lnsbothe	0.435	0.160	0.406	0.389	0.331	0.117	0.166
lnskpmnd	0.404	0.163	0.444	0.384	0.298	0.023	0.075
lnsfear	0.469	0.188	0.377	0.342	0.275	0.100	0.153
lnsunfri	0.254	0.176	0.227	0.274	0.162	0.198	0.053
lnsdislk	0.252	0.242	0.269	0.236	0.212	0.228	0.138

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1.000						
lnssleep	0.345	1.000					
lnstlkls	0.492	0.363	1.000				
lnsefrt	0.365	0.338	0.312	1.000			
lnsgetgo	0.538	0.378	0.418	0.417	1.000		
lnsfail	0.416	0.206	0.231	0.403	0.352	1.000	
lnsasgd	0.246	0.135	0.235	0.166	0.217	0.338	1.000
lnsbothe	0.533	0.414	0.470	0.472	0.541	0.380	0.175
lnskpmnd	0.483	0.395	0.477	0.470	0.490	0.266	0.179
lnsfear	0.391	0.322	0.375	0.346	0.380	0.285	0.220
lnsunfri	0.049	0.186	0.207	0.317	0.182	0.199	0.104
lnsdislk	0.079	0.217	0.163	0.275	0.209	0.248	0.154

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1.000				
lnskpmnd	0.493	1.000			
lnsfear	0.385	0.466	1.000		
lnsunfri	0.153	0.201	0.069	1.000	
lnsdislk	0.142	0.235	0.099	0.580	1.000

Appendix C. Correlation Matrix for Transformed Data for Male Graduates and Female Sibs

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1.000						
lnlonely	0.488	1.000					
lncry	0.451	0.186	1.000				
lnfelsad	0.678	0.653	0.360	1.000			
lndepres	0.760	0.616	0.318	0.748	1.000		
lnhappy	0.443	0.409	0.180	0.491	0.513	1.000	
lnenjoy	0.476	0.334	0.203	0.408	0.542	0.717	1.000
lnhope	0.371	0.300	0.168	0.333	0.505	0.451	0.565
lnbadapp	-0.043	0.071	-0.041	-0.010	0.086	0.129	0.125
lnsleep	0.386	0.428	0.187	0.397	0.565	0.335	0.341
lntalkls	0.289	0.120	0.453	0.305	0.249	0.301	0.204
lnflefrt	0.448	0.530	0.259	0.482	0.565	0.412	0.442
lngetgo	0.366	0.266	0.361	0.384	0.474	0.190	0.293
lnfail	0.698	0.462	0.236	0.587	0.559	0.375	0.448
lnasgood	0.164	0.116	-0.057	0.152	0.129	0.179	0.241
lnbother	0.705	0.382	0.499	0.585	0.606	0.365	0.335
lnkepmin	0.140	0.226	0.292	0.305	0.294	0.131	0.124
lnfear	0.156	0.123	0.209	0.285	0.182	0.257	0.189
lnunfrin	0.280	0.369	0.294	0.230	0.289	0.251	0.234
lndislik	0.446	0.389	0.392	0.429	0.411	0.222	0.167
lnsblues	-0.020	0.136	-0.084	0.085	0.131	0.103	0.005
lnslonel	0.157	0.192	0.047	0.306	0.217	0.199	0.082
lnscry	-0.078	-0.035	-0.071	0.039	0.045	0.010	0.000
lnssad	0.043	0.019	0.036	0.171	0.082	0.091	0.006
lnsdeprs	-0.048	0.091	-0.130	0.102	0.062	0.177	0.061
lnshappy	0.174	0.186	0.057	0.277	0.222	0.248	0.163
lnsenjoy	0.162	0.182	-0.004	0.269	0.195	0.240	0.145
lnshope	0.093	0.297	-0.067	0.242	0.182	0.201	0.112
lnsprapp	0.253	-0.006	0.427	0.179	0.284	0.238	0.335
lnssleep	-0.213	-0.052	-0.174	-0.078	-0.130	-0.090	-0.126
lnstlkls	0.038	-0.043	-0.126	0.033	0.050	0.025	0.025
lnsefrt	0.225	0.133	0.185	0.222	0.204	0.217	0.219
lnsgetgo	0.063	-0.045	0.148	0.101	0.076	0.065	0.072
lnsfail	0.023	0.219	-0.083	0.254	0.183	0.223	0.064
lnsasgd	0.165	0.029	0.293	0.164	0.069	0.146	0.084
lnsbothe	-0.103	-0.125	-0.093	-0.071	-0.055	0.061	0.018
lnskpmnd	0.049	0.095	-0.148	0.102	0.142	0.099	0.139
lnsfear	0.036	0.057	0.120	0.120	0.063	0.141	0.073
lnsunfri	-0.181	-0.083	-0.144	-0.051	-0.129	0.018	0.020
lnsdislk	-0.137	-0.092	-0.095	-0.055	-0.215	-0.045	-0.091

Appendix C. Correlation Matrix for Transformed Data for Male Graduates and Female Sibs

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1.000						
lnbadapp	0.051	1.000					
lnsleep	0.291	0.159	1.000				
lntalkls	0.238	0.028	0.069	1.000			
lnflefrt	0.350	0.202	0.509	0.078	1.000		
lngetgo	0.345	0.000	0.377	0.218	0.531	1.000	
lnfail	0.363	-0.047	0.371	0.043	0.426	0.252	1.000
lnasgood	0.318	0.005	0.076	-0.087	0.070	0.061	0.292
lnbother	0.325	0.004	0.281	0.396	0.323	0.332	0.430
lnkepmin	0.170	0.025	0.230	0.276	0.327	0.510	0.015
lnfear	0.236	0.007	0.010	0.490	0.077	0.084	0.079
lnunfrin	0.222	0.201	0.199	0.135	0.241	0.060	0.212
lndislik	0.174	0.046	0.160	0.249	0.182	0.201	0.287
lnsblues	0.137	0.024	0.020	0.062	-0.051	-0.164	-0.080
lnslonel	0.022	-0.089	-0.028	0.152	0.015	-0.113	0.030
lnscry	0.161	-0.030	-0.025	0.052	-0.034	-0.070	-0.082
lnssad	0.027	-0.141	-0.133	0.171	-0.122	-0.109	-0.099
lnsdeprs	0.097	-0.064	-0.138	0.236	-0.127	-0.219	-0.149
lnshappy	0.142	-0.059	-0.007	0.152	0.072	0.008	0.132
lnsenjoy	0.049	-0.076	-0.039	0.106	0.036	-0.040	0.108
lnshope	0.197	-0.061	0.019	0.129	0.123	0.040	0.152
lnsprapp	0.163	0.101	0.109	0.257	0.180	0.255	0.053
lnssleep	-0.088	0.020	-0.046	-0.088	0.056	0.031	-0.145
lnstlkls	0.070	-0.063	-0.091	0.004	-0.187	-0.069	-0.101
lnsefrt	0.183	-0.013	0.049	0.206	0.145	-0.046	0.196
lnsgetgo	0.114	-0.146	-0.136	0.324	-0.114	-0.083	-0.075
lnsfail	0.078	-0.028	-0.043	0.154	-0.011	-0.163	-0.117
lnsasgd	0.007	-0.013	-0.071	0.238	0.036	0.068	-0.020
lnsbothe	-0.013	0.027	-0.097	0.007	-0.023	-0.141	-0.085
lnskpmnd	0.198	-0.070	0.018	0.104	-0.003	-0.048	0.020
lnsfear	0.164	-0.050	-0.163	0.370	-0.037	-0.109	-0.089
lnsunfri	0.005	0.014	-0.148	0.124	-0.070	-0.138	-0.142
lnsdislk	-0.057	-0.081	-0.197	0.142	-0.127	-0.097	-0.043

Appendix C. Correlation Matrix for Transformed Data for Male Graduates and Female Sibs

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1.000						
lnbother	0.112	1.000					
lnkepmin	-0.003	0.237	1.000				
lnfear	-0.045	0.234	0.180	1.000			
lnunfrin	0.008	0.341	0.139	0.067	1.000		
lndislik	0.007	0.504	0.241	0.191	0.466	1.000	
lnsblues	0.041	0.197	0.078	0.003	0.264	0.175	1.000
lnslonel	-0.062	0.247	0.113	0.148	0.085	0.134	0.533
lnscry	0.137	0.102	0.113	-0.089	0.011	-0.081	0.529
lnssad	-0.031	0.213	0.164	0.138	0.040	0.131	0.592
lnsdeprs	-0.078	0.110	0.060	0.211	0.073	0.079	0.709
lnshappy	0.092	0.228	0.120	0.079	0.099	0.146	0.464
lnsenjoy	0.039	0.243	0.126	0.093	0.098	0.133	0.487
lnshope	0.135	0.092	0.070	0.094	0.046	0.124	0.376
lnsprapp	-0.088	0.310	0.173	0.225	0.158	0.150	-0.033
lnssleep	-0.095	-0.225	0.129	-0.053	-0.105	-0.208	0.105
lnstlkls	0.015	0.142	0.053	0.069	0.124	0.198	0.495
lnsefrt	0.096	0.234	0.018	0.130	0.121	0.170	0.272
lnsgetgo	-0.031	0.209	0.095	0.294	0.094	0.193	0.452
lnsfail	-0.075	0.206	0.127	0.150	0.112	0.114	0.614
lnsasgd	-0.114	0.224	0.142	0.261	0.149	0.219	0.123
lnsbothe	-0.036	-0.053	-0.008	-0.025	0.016	-0.173	0.398
lnskpmnd	0.001	0.051	0.012	0.122	0.001	0.025	0.377
lnsfear	-0.138	0.142	0.110	0.278	0.102	0.154	0.425
lnsunfri	-0.044	-0.111	-0.034	0.058	-0.069	-0.187	0.222
lnsdislk	-0.077	-0.132	-0.036	0.164	-0.152	-0.124	0.059

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1.000						
lnscry	0.475	1.000					
lnssad	0.745	0.534	1.000				
lnsdeprs	0.716	0.517	0.760	1.000			
lnshappy	0.518	0.306	0.488	0.501	1.000		
lnsenjoy	0.597	0.334	0.561	0.554	0.761	1.000	
lnshope	0.320	0.150	0.257	0.368	0.572	0.499	1.000
lnsprapp	0.231	0.108	0.218	0.139	0.075	0.170	-0.149
lnssleep	0.249	0.281	0.217	0.191	0.069	0.103	0.035
lnstlkls	0.440	0.289	0.502	0.466	0.331	0.343	0.170
lnsefrt	0.320	0.231	0.252	0.303	0.313	0.257	0.291
lnsgetgo	0.478	0.330	0.526	0.570	0.371	0.321	0.309
lnsfail	0.750	0.450	0.670	0.747	0.517	0.599	0.367
lnsasgd	0.304	-0.028	0.255	0.228	0.345	0.408	0.302
lnsbothe	0.439	0.397	0.428	0.442	0.288	0.358	0.117
lnskpmnd	0.399	0.345	0.409	0.509	0.295	0.239	0.329
lnsfear	0.516	0.304	0.525	0.640	0.393	0.377	0.349
lnsunfri	0.346	0.353	0.250	0.332	0.201	0.156	0.189
lnsdislk	0.172	0.046	0.164	0.285	0.123	0.073	0.196

Appendix C. Correlation Matrix for Transformed Data for Male Graduates and Female Sibs

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1.000						
lnssleep	0.007	1.000					
lnstlkls	0.183	0.117	1.000				
lnsefrt	0.262	0.035	0.194	1.000			
lnsgetgo	0.182	0.100	0.440	0.510	1.000		
lnsfail	0.149	0.175	0.410	0.218	0.410	1.000	
lnsasgd	0.271	-0.009	0.196	0.208	0.273	0.317	1.000
lnsbothe	0.246	0.235	0.324	0.236	0.260	0.326	0.095
lnskpmnd	0.123	0.137	0.322	0.399	0.430	0.431	0.054
lnsfear	0.120	0.091	0.294	0.330	0.459	0.549	0.317
lnsunfri	0.047	0.227	0.134	0.224	0.297	0.326	0.050
lnsdislk	-0.021	0.093	0.066	0.219	0.212	0.141	0.169

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1.000				
lnskpmnd	0.278	1.000			
lnsfear	0.226	0.412	1.000		
lnsunfri	0.360	0.286	0.353	1.000	
lnsdislk	0.196	0.169	0.364	0.485	1.000

Appendix D. Thresholds of Depression Indicators for Male and Female Respondents

	Point Estimate		Standard Error	
	Female	Male	Female	Male
BLUES$1	0.782	0.932	0.026	0.029
BLUES$2	1.313	1.43	0.032	0.036
BLUES$3	1.62	1.725	0.039	0.043
BOTHER$1	0.386	0.493	0.024	0.025
BOTHER$2	1.148	1.228	0.03	0.032
BOTHER$3	1.662	1.703	0.04	0.043
FAILURE$1	1.117	1.093	0.03	0.03
FAILURE$2	1.584	1.559	0.038	0.038
FAILURE$3	1.833	1.844	0.044	0.047
NHAPPY$1	-0.286	-0.38	0.024	0.025
NHAPPY$2	0.249	0.112	0.024	0.025
NHAPPY$3	0.784	0.582	0.026	0.026
UNFRIEND$1	0.295	0.227	0.024	0.025
UNFRIEND$2	1.084	0.967	0.028	0.029
UNFRIEND$3	1.519	1.449	0.036	0.037
LONELY$1	0.339	0.582	0.023	0.026
LONELY$2	0.862	1.054	0.026	0.03
LONELY$3	1.217	1.378	0.03	0.035
NENJOY$1	0.143	0.102	0.024	0.025
NENJOY$2	0.532	0.488	0.025	0.026
NENJOY$3	0.92	0.832	0.027	0.028
CRY$1	1.016	1.911	0.028	0.05
CRY$2	1.528	2.304	0.036	0.071
CRY$3	1.907	2.448	0.047	0.085
DISLIKE$1	0.732	0.722	0.026	0.027
DISLIKE$2	1.42	1.381	0.034	0.035

Appendix D. Thresholds of Depression Indicators for Male and Female Respondents

	Point Estimate		Standard Error	
	Female	Male	Female	Male
DISLIKE$3	1.834	1.812	0.044	0.046
SAD$1	-0.071	0.33	0.024	0.025
SAD$2	0.73	1.035	0.025	0.03
SAD$3	1.209	1.509	0.03	0.038
DEPRESSE$1	0.374	0.538	0.024	0.026
DEPRESSE$2	1.015	1.112	0.028	0.031
DEPRESSE$3	1.42	1.531	0.034	0.038
ATTENTIO$1	0.069	0.181	0.024	0.025
ATTENTIO$2	0.773	0.809	0.026	0.028
ATTENTIO$3	1.28	1.39	0.032	0.035
APPETITE$1	1.082	1.146	0.029	0.031
APPETITE$2	1.457	1.594	0.035	0.04
APPETITE$3	1.741	1.912	0.042	0.051
NASGOOD$1	0.203	0.33	0.024	0.025
NASGOOD$2	0.505	0.595	0.025	0.026
NASGOOD$3	0.732	0.812	0.026	0.027
EFFORT$1	0.162	0.205	0.024	0.025
EFFORT$2	0.793	0.804	0.026	0.028
EFFORT$3	1.183	1.187	0.03	0.032
NHOPEFU$1	-0.142	-0.103	0.023	0.025
NHOPEFU$2	0.214	0.195	0.024	0.025
NHOPEFU$3	0.53	0.497	0.025	0.026
FEARFUL$1	0.406	0.666	0.024	0.026
FEARFUL$2	0.98	1.16	0.028	0.031
FEARFUL$3	1.329	1.485	0.032	0.038
SLEEP$1	-0.174	-0.036	0.024	0.025
SLEEP$2	0.359	0.512	0.024	0.026
SLEEP$3	0.777	0.938	0.026	0.029
TALK$1	0.264	0.344	0.024	0.025
TALK$2	0.968	0.992	0.028	0.03
TALK$3	1.522	1.566	0.036	0.039
GETGO$1	0.004	0.243	0.023	0.025
GETGO$2	0.722	0.923	0.025	0.029
GETGO$3	1.217	1.445	0.031	0.036

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