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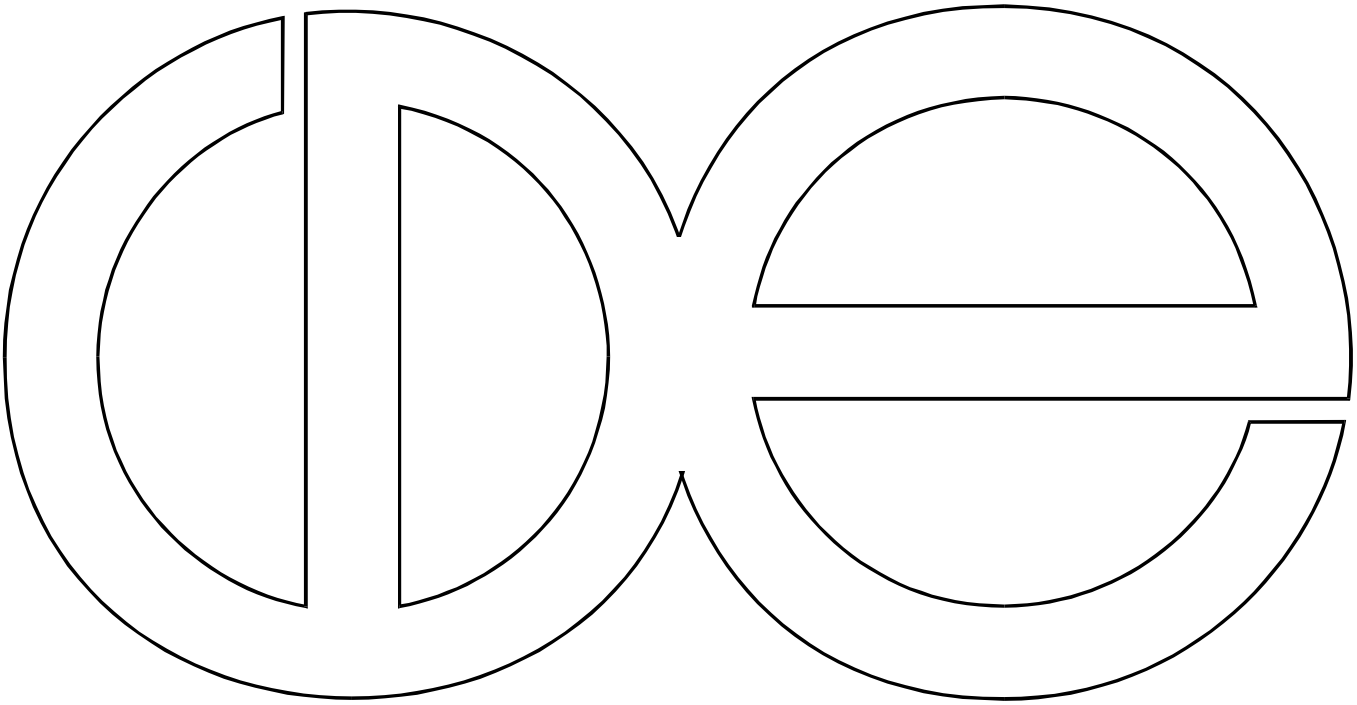

Measuring Depression among Adult Siblings[1]

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Measuring Depression among Adult Siblings

Depression is described by some researchers as an enduring trait and by others as a temporary state. On the one hand, behavior geneticists treat depression as an enduring trait, shaped by heredity and childhood environment (Rowe, 1994; Kendler et al., 1994; Baker, Cesa, Gatz, & Mellins, 1992). These theorists focus on the extent of family resemblance reflected in depressive symptoms. On the other hand, feminist theories of depression focus on the situational nature of the condition (Nolen-Hoeksema, Larson, & Grayson, 1999; Roberts & O'Keefe, 1981; Aneshensel, Frerichs, & Clark, 1981). According to this work, women are more likely to be depressed than men because they occupy relatively powerless positions in society (Bandura, 1986). Regardless of depressive state, women may also be more likely than men to experience "distress," which may mistakenly be measured by the indicators of depression (Newmann, 1986).

In this paper, we estimate sibling models using adult reports of depressive symptoms measured by the Centers for Epidemiologic Studies Depression (CES-D) Scale. These models allow us to explore the extent to which male and female adult siblings resemble each other with regard to depression. We find that there is only moderate sibling resemblance with regard to depression. The depression factors for siblings are correlated between $r = 0.04$ and $r = 0.14$; that is, between 4 and 14 percent of the variance in depression is common to sibling pairs. This weak correlation lends support to the argument that depression, at least as measured by the CES-D, is primarily determined by adult context, rather than given by genetic endowment and childhood experiences. Depression is situational, rather than a characteristic: a state, rather than a trait.

Depression as a Trait: The Work of the Behavior Geneticists

Work in the behavior genetic tradition looks at the correlations of characteristics shared by family members and uses factor models to allocate portions of this correlation to heredity, and shared and non-shared environment. Behavior geneticists suggest that shared childhood environment, along with genes, plays a role in adult symptoms of depression (Rowe, 1994; Kendler et al., 1994; Baker et al., 1992). This quantitative behavior genetic research generally suggests that gender does not affect sibling resemblance in depression (McGue & Christensen, 1997; Kendler et al,, 1994; but see also Tambs, Harris & Magnus, 1995; Tambs & Moum, 1993).

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 & 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 uncorrelated. This more biological approach rests on the assumption that development is multi-dimensional and non-linear (Gottlieb, Wahlsten, & Lickliter, 1998). So far, molecular geneticists have failed to identify a candidate gene locus to account for observed differences in depression (Moldin, Reich, & Rice, 1991).

The behavior genetic research acknowledges that sibling correlations for depression are low (Kendler et al., 1994). However, the implication of this line of reasoning suggests that siblings should resemble each other in their depressive symptoms. Additionally, there should be no gender difference in sibling reports of depressive symptoms.

Depression as a State: Examinations of Gender Differences in Depression

Feminist theories of depression focus on the situational nature of the condition (Nolen-Hoeksema et al., 1999). According to this work, women are more likely to be depressed because they occupy relatively powerless positions in society (Bandura, 1986). Research on gender differences in depression focuses on the different expectations faced by men and women in the family and at work. Women's greater responsibilities within the family may predict depression (Roberts & O'Keefe, 1981; Aneshensel et al., 1981). In addition, the CES-D may at least partly measure "distress," which women more commonly experience than do men (Newmann, 1986).

It is not that behavior genetic research completely denies the role of gender. The behavior genetic concept of non-shared environment could apply to the different socialization that boys and girls go through. But, unlike in feminist theory, the concept of non-shared environment applies primarily to childhood rather than adulthood. In addition, behavior genetics focuses on family similarities rather than, as does feminist theory, on adult differences.

If the feminist theory of depression is true, we should expect to find less sibling resemblance for depression among pairs that are composed of a man and a woman. This is because these siblings should have different, sex-typed roles in adulthood. We should also expect to find higher levels of depression among women than among men.

Data and Methods

The Wisconsin Longitudinal Study

The data for the current analysis 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 the 1957 graduates or their parents in 1957, 1964, 1975, and 1992-93. 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 1992-93, the WLS carried out four major surveys: Telephone and mail surveys of WLS graduates and parallel telephone and mail surveys of brothers and sisters of the graduates. The sample design has become increasingly complex over time. Briefly, there are now active samples of 8,500 WLS graduates out of 9,750 survivors and of 5,300 of their siblings. The present analysis is based, in part, on data from 6,613 graduates who responded to the 1992 mail survey, and in part on 2,825 pairs of brothers and sisters, in which both members of the pair responded to the mail survey.

The Centers for Epidemiologic Study Depression Scale

The CES-D 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). 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 (McCallum et al., 1995; Iwata & Roberts, 1996; Knight et al., 1997; MacKinnon et al., 1998).

In the WLS sample, 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. 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. One might argue that “number of days” is a natural metric with equal intervals, but we do not take the survey responses literally. 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. Yet, many analyses that use the CES-D adopt these assumptions (see, for instance, Hays et al., 1998; Cheung & Bagley, 1998). There are a number of possible strategies to correct for either or both the ordinal and the skewed nature of the data. In the analyses we compare results obtained through several strategies.

Models

The first set of four models is based on correlations among brothers (male graduates and male siblings) and sisters (female graduates and female siblings). As shown in Figure 1, the single factor model says that all questions answered by an individual indicate a single depression factor for that individual. The depression factor is normalized by fixing a unit loading of the first indicator (*blues*) on the depression factor. The two individual depression factors may correlate across siblings. The second model says that each question indicates one of the four sub-factors: negative affect, positive affect, somatic and interpersonal (See Figure 2). When this model is extended to siblings, all of the four factors are freely intercorrelated within and across siblings (See Figure 3). Each factor is normalized by fixing the slope of its first indicator. One variant of this model, shown in Figure 4, says that each of the four factors correlates only with the corresponding factor of the sibling. In other words, the factors are not all correlated with one another, but only linked to the same factor across siblings. Another variant of this structure, shown in Figure 5, says that the four factors load onto an underlying depression factor for each sibling. The second order factor is normalized on the slope from the factor to the first sub-factor, *negative affect*. Then, the second order factors correlate across siblings. Within this context, parameters are equated across siblings to arrive at a preferred model for same-sex siblings (Figure 6). The equations for this model are shown in Figure 7.

The multiple group models include not just same-sex pairs, but all pairs of siblings. Various parameters are equated to test the equivalence of measurement and structure separately for men and for women (regardless of whether they are graduates or siblings) and, finally, for all respondents.

Findings

In this section, we first compare the effect of different distributional assumptions on the findings for a subset of the data. Then we develop a preferred sibling model using data for single-sex sibling pairs. Finally, we present findings from a multiple group model that uses data for all sibling pairs. All estimates are from *Mplus* 2.01 (Muthén & Muthén, 2001).

Different Distributional Assumptions

Table 1 compares the fit statistics and parameter estimates when different distributional assumptions are used to analyze the relationship between seven indicators and one of the sub-factors of depression, negative affect. The estimates are based on a sample of 6,613 graduates who provided complete answers to this subset of CES-D items. The first column presents results derived when the data are treated as continuous, the way that they are treated in many analyses of the CES-D. In this column, the calculation is based on the standard measurement model:

$$y = \lambda_y \eta + \varepsilon, \qquad [1]$$

in which y is a 7 by 1 vector of the indicator variables; η is the unobserved factor; λ_y is a 7 by 1 vector of coefficients of the regression of y on η; and ε is a 7 by 1 vector of measurement errors in y. The second column presents the results from a covariance matrix of data transformed using the started natural log of the response, that is, $ln(1 + x)$. The third column presents estimates derived when the data are treated as categorical. This relies on a weighted least squares calculation, in which the weights are derived from the asymptotic variance-covariance matrix of the sample statistics. In this column, each of the 7 indicators has eight categories, yielding seven thresholds. This means that when y = i, then $\alpha_{i-1} < \eta \leq \alpha_i$ where $\alpha_0 = -\infty$, $\alpha_1 < \alpha_2 < \ldots < \alpha_6$, and

$\alpha_7 = \infty$, are threshold values. It is possible to specify or constrain values of the thresholds. The dependence of each indicator on a continuous latent variable is specified as a multiple probit function.

The table shows that the model fits the data best when the outcomes are treated as categorical. Logging the data before estimation improves the fit compared to simply treating the data as continuous without transformation. In addition, the strength of the relationship between the factors and the indicators is improved when the data are treated as categorical. For instance, the negative affect factor explains more than three quarters of the variance of the *blues* indicator when the data are treated as categorical, as opposed to only slightly more than half the variance when the data are treated as categorical or are logged.

The ideal, in terms of estimated strength of factor-indicator relationships and goodness of fit, would appear to be to estimate the model with categorical data. In theory, the only drawbacks to this strategy are the usual ones associated with correlation matrices. Parameter estimates are inherently standardized and, thus, more difficult to interpret. Likewise, second order factors cannot be normalized in any meaningful way, e.g., relative to the metrics of first order factors.

This alternative did not work for our full set of depression indicators because the data are too skewed and the sample size too small to allow these models to converge. An alternative estimation routine for the categorical data is to apply mean- and variance-adjustment. In this procedure, however, χ^2 statistics are calculated directly from sample statistics for each model. This means that nested models cannot be compared using the traditional χ^2 statistic. In addition,

the Bayesian Information Criterion, *BIC* (Raftery, 1995), cannot be used to compare models calculated using weighted least squares.[2]

The Preferred Multiple Group Model

In this section we review the steps used to arrive at the preferred multiple group model. Because of the difficulties in estimation just described, we estimate the model in two ways and compare the results. First, we use the log-transformed data to do comparisons of model fit. This has several advantages over the other possible strategies. Unlike the categorical method, the results are relatively more easily interpreted, and a second order factor can be specified, normalizing the second order factor on one of the sub-factors. In addition, as shown in Table 1, the logged data yield better fitting models than the raw data. We begin by looking at models for single-sex pairs, and then move to a multiple group context.

The preferred model, for same-sex pairs of brothers and sisters, is the second order factor structure with all parameters equated across siblings. Table 2 shows the fit statistics for various models. The patterns are the same for both brothers and sisters. The single factor model (model A) has the worst fit. Among brothers, the single factor model has a χ^2 of 2,552, with 739 degrees of freedom, for a *BIC* of –2,233. Model C, the second order factor model, fits slightly better than the other models.

Based on parameter constraints across siblings, the analysis indicates that, at least for same-sex siblings, both the graduates and their siblings come from the same population. In other words, the sisters constitute a sample of women and the brothers constitute a sample of men. In model E, we constrain the factor loadings (λ^y) across siblings. This says that each indicator

[2] Personal communication, Linda Muthén, July 1999.

loads to the same extent on its causal factor for each sibling. For instance, the indicator *blues* is equally affected by the negative affect factor for female graduates and their sisters. We next constrain the error variances of corresponding indicators (Θ^y) to be equal across siblings. This is shown in model F. Thus, each indicator must have the same accuracy as an indicator of its sub-factor for each sibling. *BIC* drops for each constraint on the parameters. Then, in model G, we constrain the loadings of the primary factors on the second-order factor (β) to be the same for each sibling, which says that increases in the depression factor lead to the same pattern and level of increases in the sub-factors for each sibling. Both *BIC* and the χ^2 indicate that this hypothesis should be accepted for both sister and brother sub-samples. Finally, in model H, we constrain the disturbance variances of the primary factors (Ψ) to be equal. This says that factors other than the depression factor have an equal effect on the sub-factors for each sibling. In addition, the variance of the secondary depression factor is the same for graduates as for siblings in these pairs. This highly constrained model fits well in both the male-male and female-female pairs.

We next estimate the second-order factor model simultaneously in the four groups of sibling pairs classified by gender of graduate and gender of sibling. This multiple group version of the measurement model suggests that depression has different measurement and structural properties among men and among women. The base model in Table 3 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. In model D, the loadings of second-order factors, but not their variances or covariances, are equated within sex. In model E, all parameters are the same within each sex. Model E has a χ^2 of 6,511 with 3,188

degrees of freedom, yielding a *BIC* statistic of –18,822. When we equate the λ^y for all types of respondents, regardless of sex, in model F, the fit deteriorates. The χ^2 for this model is 6,919, with 3,204 degrees of freedom, for a *BIC* of –18,540. Because *BIC* increases, 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 depression factors for coed pairs. This improves the fit and is the preferred model in the multiple group context.

The Sibling Resemblance in Depressive Symptoms

In this section, we compare results obtained with the logged continuous data to those obtained from an estimation using weighted least squares with mean and variance adjustment (WLSMV). The WLSMV models treat the data as categorical. This allows a close examination of parameters that cannot be examined when the data are treated as continuous, such as the thresholds of the indicator variables.

The findings differ slightly depending on whether the indicators are assumed to be categorical or continuous. We refer to relationships between primary factors and indicators as measurement properties and to relationships between primary factors and the second-order factor – or between factors of graduates and siblings – as structural. With continuous indicators, depression has different measurement and structural properties among men and among women. With categorical indicators, only the measurement properties differ by gender. In both specifications, the results also indicate that there is little family similarity. Female sibling pairs have the largest correlation in both specifications. Male sibling pairs have the smallest, and only non-significant, correlation.

In Table 4, we compare estimates from the model estimated with continuous and with categorical outcomes. The models estimated with categorical outcomes increase the explanatory power of the sub-factors. Though the parameters for men and for women are not the same, they do display similar patterns in the two types of models, shown in Figure 8.[3] For only six of the indicators do the sub-factors explain more than 50 percent of the variance for both women and men. Both among women and men, the somatic factor explains less than one-fifth of the variance in the indicator for having trouble sleeping. Among men, negative affect explains less than 15 percent of the variance in the responses to the question regarding crying spells. Among the remaining indicators, the first order factors explain between 20 percent and 40 percent of the variance.

The categorical models also allow us to look more closely at the characteristics of the indicators, particularly the thresholds for the categorical variables. The original eight category indicators were recategorized into variables with four categories. This results in the estimation of three thresholds for each of the twenty variables. There are therefore sixty thresholds to compare across gender. More than half the differences in thresholds, 37, are statistically different from zero. Despite these statistical differences, the male and female thresholds reveal the same general patterns, as shown in Figure 9.

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. In fact, the loadings of the primary factors are different for men and for women. For instance, as shown in Table 5a (reporting estimates from models with

[3] Figure 8 refers to the estimates for women, but the same general conclusion holds for men (see Appendix D).

continuous outcomes), relative to the reference indicator for *negative affect* (*blues*), *failure* loads more highly on the *negative affect* factor for men (0.81) than for women (0.68), while *cry* loads more highly for women (0.65) than for men (0.23). Table 5b shows that models estimated with categorical data yield gender differences that are smaller and pertain to other indicators. The biggest gender difference in this model is for *dislike*, which loads more highly on the *interpersonal* sub-factor for women (1.33) than for men (1.17). *Sleep* also loads more highly on the *somatic* factor for men (.73) than for women (.63). Other gender differences in the primary factor loadings are smaller in both estimations. However, when continuous outcomes are assumed, the loading of *negative affect* on the second-order depression factor would not have the same interpretation for men and for women, say, if *failure* or *cry* were the reference variable, than with other choices of reference variable. With categorical outcomes, the loading of the *somatic* or *interpersonal* factors on the second-order depression factor would not have the same interpretation if *sleep* or *dislike* were used as the reference variables. Therefore, despite loss of fit, 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.

Selected estimates from this model, estimated with continuous outcomes, are shown in Table 6a. In this specification, the structural properties of depression differ by gender. Relative to *negative affect*, all first-order factors load more highly on the depression factor for men than for women. Thus, increases in the depression factor lead to greater increases in the other sub-factors for men than for women. Also, the depression factor explains relatively more of the variance of *negative affect* for women than for men. For women, the depression factor explains 93 percent of the variance of this first order factor, while for men, the depression factor explains

88 percent of the variance in *negative affect*. However, the depression factor explains relatively more of the variance in the other factors for men than for women, especially in the case of the *somatic* factor. Among men, the depression factor explains 82 percent of the variance in somatic symptoms, while among women it explains 70 percent. However, the depression factor explains less than half the variance in the *positive affect* and *interpersonal* factors for men and for women.

When the model is estimated with categorical outcomes with equality constraints on the thresholds and first-order loadings across gender (as shown in Table 6b), the structural properties no longer differ by gender. One reason for the difference is that the first-order loadings are standardized when categorical outcomes are used, but not when continuous outcomes are. In the model with continuous outcomes, the first order factors load more highly on the depression factor for men than for women. The reverse is true when categorical outcomes are used. The *positive affect* and *somatic* factors load more highly on the depression factor for women than for men. However, the differences in these loadings are not statistically significant. The depression factor explains more of the variance in all of the first order factors for men than for women. The categorical estimates also reveal the same explanatory pattern as the continuous estimates regarding the relationship of the depression factor to the first order factors. That is the depression factor explains nearly all of the variance in *negative affect* and more than three quarters of the variance in the *somatic* factor among both men and women. The depression factor explains only half the variance in *positive affect* and less than that in the *interpersonal* factor regardless of gender.

Gender differences in the loadings of the second-order factors on the first-order factor might also affect estimates of other second-order parameters. Therefore, in addition to continuing to equate the primary factor loadings (λ^{y}) across gender, we also equate the secondary

factor loadings (β). This allows direct comparisons of the variances and correlations of depression factors for women and men. The results from the continuous version of this model are also in Table 6a. This shows that the variance in the depression factor is slightly greater for women than for men, 0.099 compared to 0.090. This conclusion is reversed when the model is estimated with continuous outcomes. As shown in Table 6b, the variance in the depression factor is slightly greater for men than for women, .753 compared to .726. This difference is statistically significant.

Finally, the model gives little support to the hypothesis that siblings resemble each other in current depressive states. In both the versions of the model, only among single-sex female pairs is the correlation higher than 0.1. In the both estimations, for both brothers and coed pairs, the correlation is less than .1. For brothers, the correlation is not statistically significant. The analysis suggests that siblings resemble each other in current depressive state to a limited extent. The correlation in depression ranges from r = 0.04 to r = 0.14, depending on the type of sibling pair. That is, only 4 to 14 percent of the variance in the depression factor is common to members of the same sibship.

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 symptoms appears to differ by gender as does the variance in gender. Sibling depression levels are only moderately correlated. Gender of siblings affects the correlation.

The lack of sibling resemblance in depression supports the hypothesis that depression, as measured by the CES-D, is situational, rather than a characteristic that family members share.

The existence of a correlation among siblings may provide some support for the behavior genetic proposition that depression is an enduring trait. Yet the findings seem more consistent with feminist position that depression is situational, a temporary state.

Contrary to the expectations of behavior genetics, gender affects the sibling resemblance in depressive symptoms. However, it is not true, as the feminist position would suggest, that coed siblings pairs are less alike than single-sex pairs. Of the pairs of siblings, all-male pairs have the lowest, not statistically significant, correlation in depression.

The small, but statistically significant correlation, among sisters presents a puzzle. If depression is situational, are adult sisters more likely to share similar life circumstances than brothers and coed sibling pairs? We believe that this represents a promising direction for future research.

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TABLE 1.
Fit Statistics and Parameter Estimates from Alternative Analyses of Negative Affect: WLS Graduates

	Continuous	Logged Continuous	Categorical
Chi-Square	724.47	546.95	329.17
Loadings on Negative Affect of			
Blues	1.00	1.00	1.00
	---	---	---
Failure	0.78	0.75	0.92
	(0.02)	(0.02)	(0.01)
Lonely	1.20	1.13	0.86
	(0.02)	(0.02)	(0.01)
Cry	0.49	0.50	0.87
	(0.01)	(0.01)	(0.02)
Sad	1.410	1.34	1.01
	(0.02)	(0.02)	(0.01)
Depressed	1.45	1.39	1.06
	(0.02)	(0.02)	(0.01)
Fearful	0.95	0.94	0.78
	(0.02)	(0.02)	(0.01)
Squared Multiple Correlations for			
Blues	0.57	0.54	0.76
Failure	0.42	0.39	0.64
Lonely	0.41	0.40	0.56
Cry	0.28	0.27	0.58
Sad	0.63	0.58	0.78
Depressed	0.78	0.71	0.86
Fearful	0.30	0.31	0.47
Variance of Negative Affect			
	0.59	0.10	0.71
	(0.02)	(0.00)	(0.01)

TABLE 2.
Goodness of Fit Statistics: Measurement Models of Depression

	χ^2	df	BIC
Sisters			
A. One factor	3,129.21	739	-2,140.08
B. Four-factor, freely intercorrelated	1,534.08	712	-3,223.59
C. Second order and four sub-factors	1,574.86	731	-3,343.17
D. D + λ_y same	1,607.90	747	-3,383.64
E. E + Θ same	1,646.19	767	-3,478.99
F. F + β same	1,646.64	770	-3,498.58
G. G + y same	**1,652.10**	**775**	**-3,526.53**
Brothers			
A. One factor	2,552.43	739	-2,232.92
B. Four-factor, freely intercorrelated	1,385.22	712	-3,225.28
D. Second order and four sub-factors	1,403.27	731	-3,362.65
E. D + λ_y same	1,450.42	747	-3,386.73
F. E + Θ same	1,556.47	767	-3,410.19
G. F + β same	1,560.05	770	-3,426.03
H. G + y same	**1,566.54**	**775**	**-3,451.92**

TABLE 3.
Goodness of Fit Statistics: Multiple Group Models of Depression

	χ^2	df	BIC
A. Base model	6,127.23	3,012	-17,806.90
B. λ_y same by gender	6,268.26	3,076	-18,174.50
C. B + Θ same by gender	6,449.16	3,156	-18,629.30
D. C + β same by gender	6,470.64	3,168	-18,703.10
E. D + ψ same by gender	6,510.97	3,188	-18,821.70
F. E + λ_y same for all	6,919.52	3,204	-18,540.30
G. E + $Y_{3,5,10} = Y_{4,5,10}$	**6,511.12**	**3,189**	-18,829.50

TABLE 4.
Squared Multiple Correlations: Preferred Multiple Group Model of Depression

	Women		Men	
	Continuous	Categorical	Continuous	Categorical
Negative Affect				
Blues	0.57	0.78	0.55	0.77
Failure	0.38	0.67	0.43	0.68
Lonely	0.40	0.52	0.40	0.55
Cry	0.33	0.52	0.14	0.54
Sad	0.58	0.68	0.57	0.67
Depressed	0.71	0.82	0.68	0.79
Fearful	0.29	0.43	0.32	0.49
Positive Affect				
Happy	0.65	0.73	0.63	0.72
Enjoy	0.71	0.86	0.69	0.85
As good	0.23	0.42	0.22	0.40
Hopeful	0.40	0.59	0.39	0.57
Somatic				
Bother	0.36	0.53	0.35	0.49
Attention	0.31	0.37	0.30	0.40
Appetite	0.21	0.39	0.23	0.41
Effort	0.38	0.51	0.34	0.48
Sleep	0.17	0.21	0.20	0.27
Talk	0.35	0.47	0.35	0.48
Get going	0.42	0.52	0.42	0.51
Interpersonal				
Unfriendly	0.34	0.48	0.39	0.54
Dislike	0.61	0.84	0.52	0.73

TABLE 5a.
Parameter Estimates: Preferred Multiple Group Model with Continuous Outcomes

	Women		Men	
Loadings on negative affect sub-factor of				
Blues	1.00	---	1.00	---
Failure	0.68	(.02)	0.81	(.03)
Lonely	1.10	(.03)	1.09	(.03)
Cry	0.65	(.02)	0.23	(.01)
Sad	1.28	(.03)	1.25	(.03)
Depressed	1.32	(.03)	1.33	(.03)
Fearful	0.88	(.03)	0.91	(.03)
Loadings on positive affect sub-factor of				
Happy	1.00	---	1.00	---
Enjoy	1.08	(.03)	1.08	(.02)
As good	0.72	(.03)	0.67	(.03)
Hopeful	0.93	(.03)	0.90	(.03)
Loadings on somatic sub-factor of				
Bother	1.00	---	1.00	---
Attention	1.09	(.05)	1.09	(.05)
Appetite	0.65	(.03)	0.64	(.03)
Effort	1.29	(.05)	1.30	(.05)
Sleep	1.00	(.05)	1.08	(.05)
Talk	1.06	(.04)	1.08	(.05)
Get going	1.29	(.05)	1.25	(.05)
Loadings on interpersonal sub-factor of				
Unfriendly	1.00	---	1.00	---
Dislike	1.10	(.06)	0.94	(.05)

TABLE 5b.
Parameter Estimates: Preferred Multiple Group Model of Depression with Categorical Outcomes

	Women		Men	
Loadings on negative affect sub-factor of				
Blues	1.00	---	1.00	---
Failure	0.92	(.02)	0.94	(.02)
Lonely	0.81	(.02)	0.85	(.02)
Cry	0.81	(.02)	0.84	(.05)
Sad	0.93	(.01)	0.93	(.02)
Depressed	1.02	(.01)	1.01	(.02)
Fearful	0.74	(.02)	0.80	(.02)
Loadings on positive affect sub-factor of				
Happy	1.00	---	1.00	---
Enjoy	1.09	(.02)	1.09	(.02)
As good	0.76	(.02)	0.75	(.02)
Hopeful	0.89	(.02)	0.90	(.02)
Loadings on somatic sub-factor of				
Bother	1.00	---	1.00	---
Attention	0.84	(.03)	0.90	(.03)
Appetite	0.86	(.04)	0.91	(.04)
Effort	0.98	(.03)	0.98	(.03)
Sleep	0.63	(.03)	0.73	(.03)
Talk	0.94	(.03)	0.99	(.03)
Get going	0.99	(.03)	1.02	(.03)
Loadings on interpersonal sub-factor of				
Unfriendly	1.00	---	1.00	---
Dislike	1.33	(.06)	1.17	(.05)

TABLE 6a.
Parameter Estimates: Multiple Group Models of Depression with Continuous Outcomes

	Women		Men	
Loadings on depression of				
Negative affect	1.00	---	1.00	---
Positive affect	1.04	(.04)	1.20	(.04)
Somatic	0.72	(.03)	0.85	(.03)
Interpersonal	0.53	(.03)	0.65	(.03)
Squared Multiple Correlations				
Negative affect	0.93		0.88	
Positive affect	0.43		0.43	
Somatic	0.70		0.82	
Interpersonal	0.32		0.36	
Variance of Depression Factor	0.099	(.004)	0.090	(.004)

Correlations of Depression Factors by Sibling Pairs

Female	.11	(.04)
Male	.04	(.04)
Male-Female	.06	(.03)

TABLE 6b.

Parameter Estimates: Multiple Group Models of Depression with Categorical Outcomes

	Women		Men	
Loadings on depression of				
Negative affect	1.000	---	1.000	---
Positive affect	0.712	(.019)	0.693	(.019)
Somatic	0.707	(.020)	0.735	(.020)
Interpersonal	0.522	(.023)	0.526	(.022)
Squared Multiple Correlations				
Negative affect	0.927		0.972	
Positive affect	0.500		0.508	
Somatic	0.705		0.797	
Interpersonal	0.385		0.416	
Variance of Depression Factor	0.726	(.019)	0.753	(.021)

Correlations of Depression Factors by Sibling Pairs

Female	.14	(.04)
Male	.09	(.05)
Male-Female	.09	(.03)

Figure 1. Single Factor Model of Depression:
Wisconsin High School Graduates

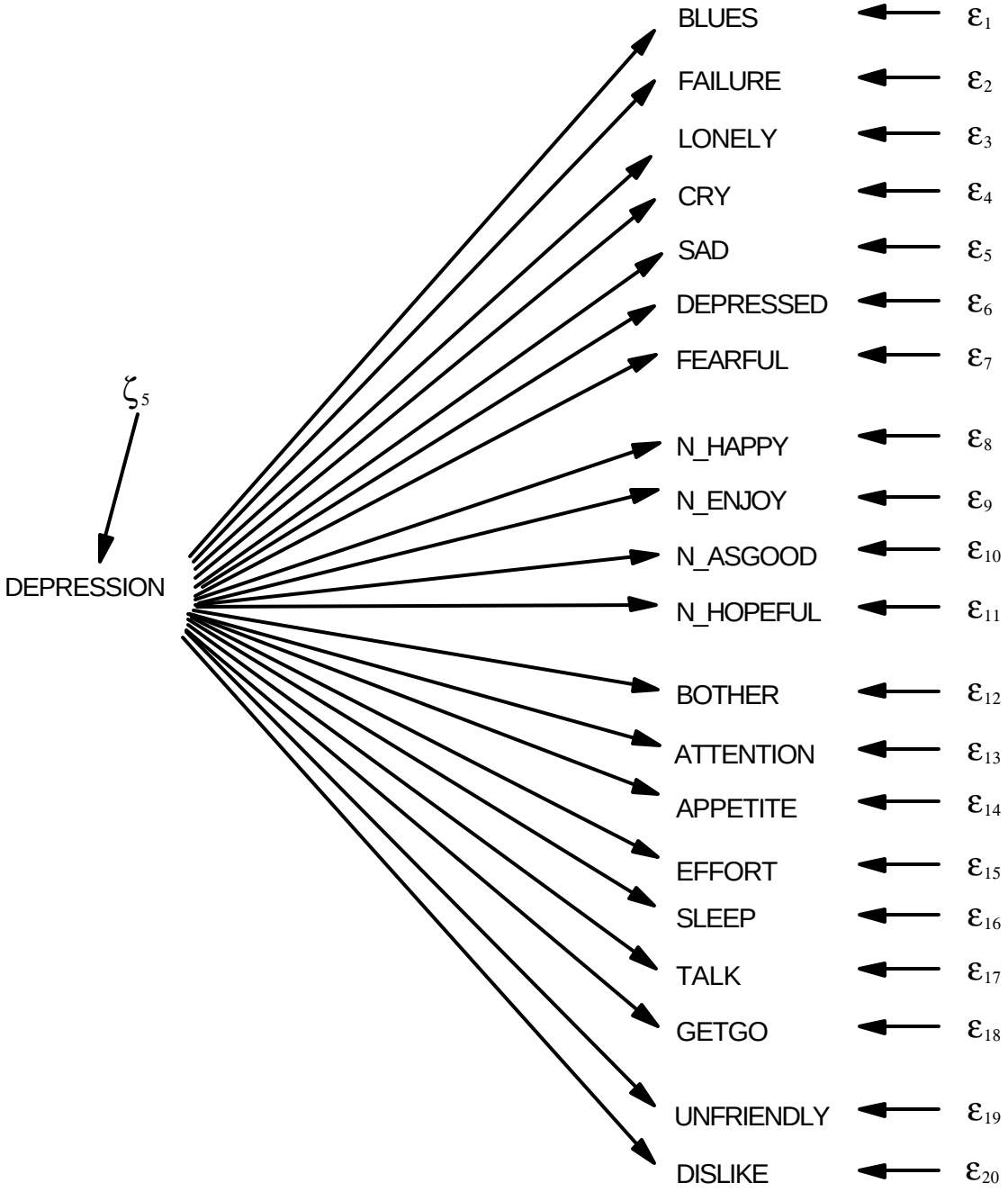


Figure 2. Four Factor Model of Depression:
Wisconsin High School Graduates

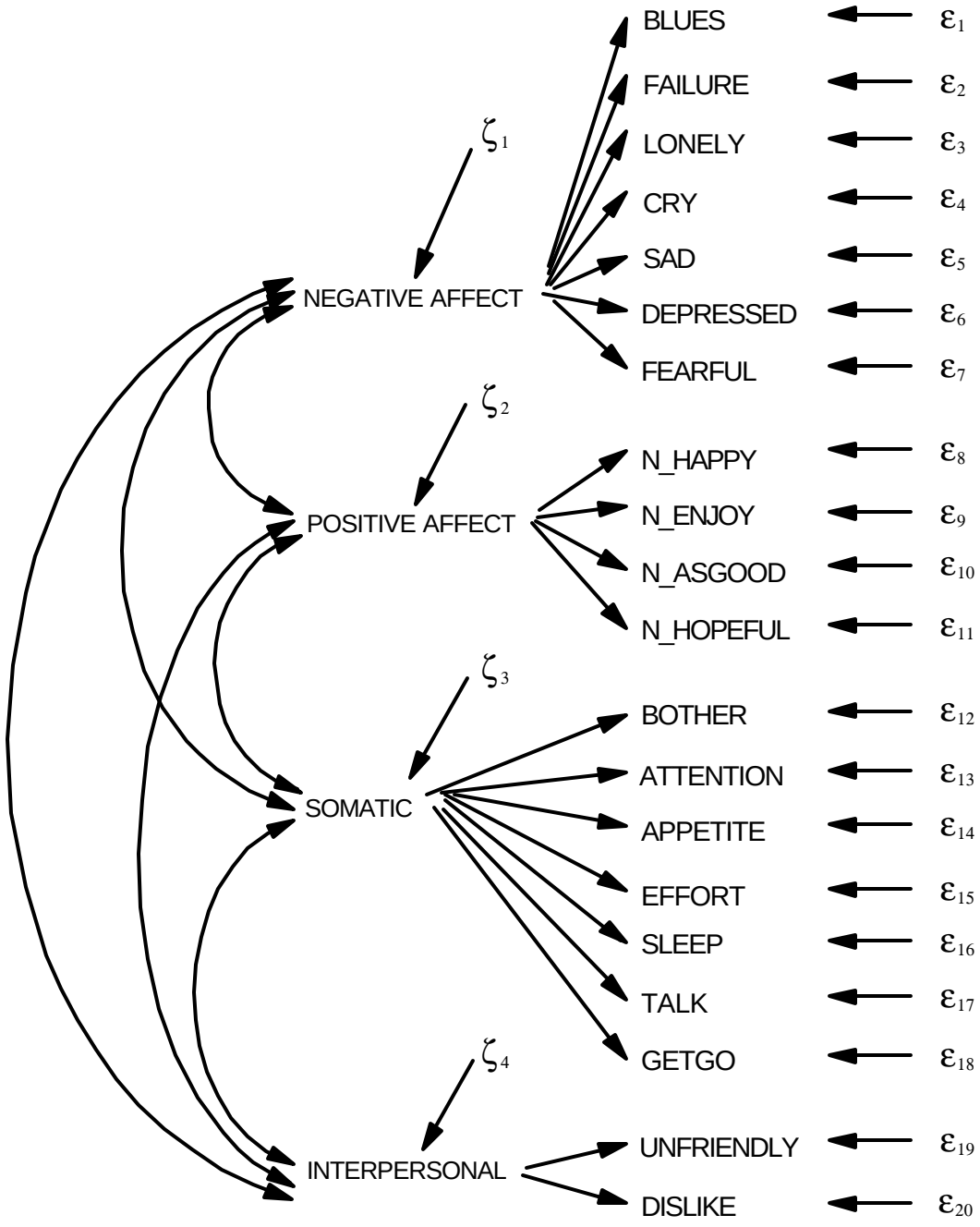


Figure 3. Four Factor Model of Sibling Resemblance in Depression

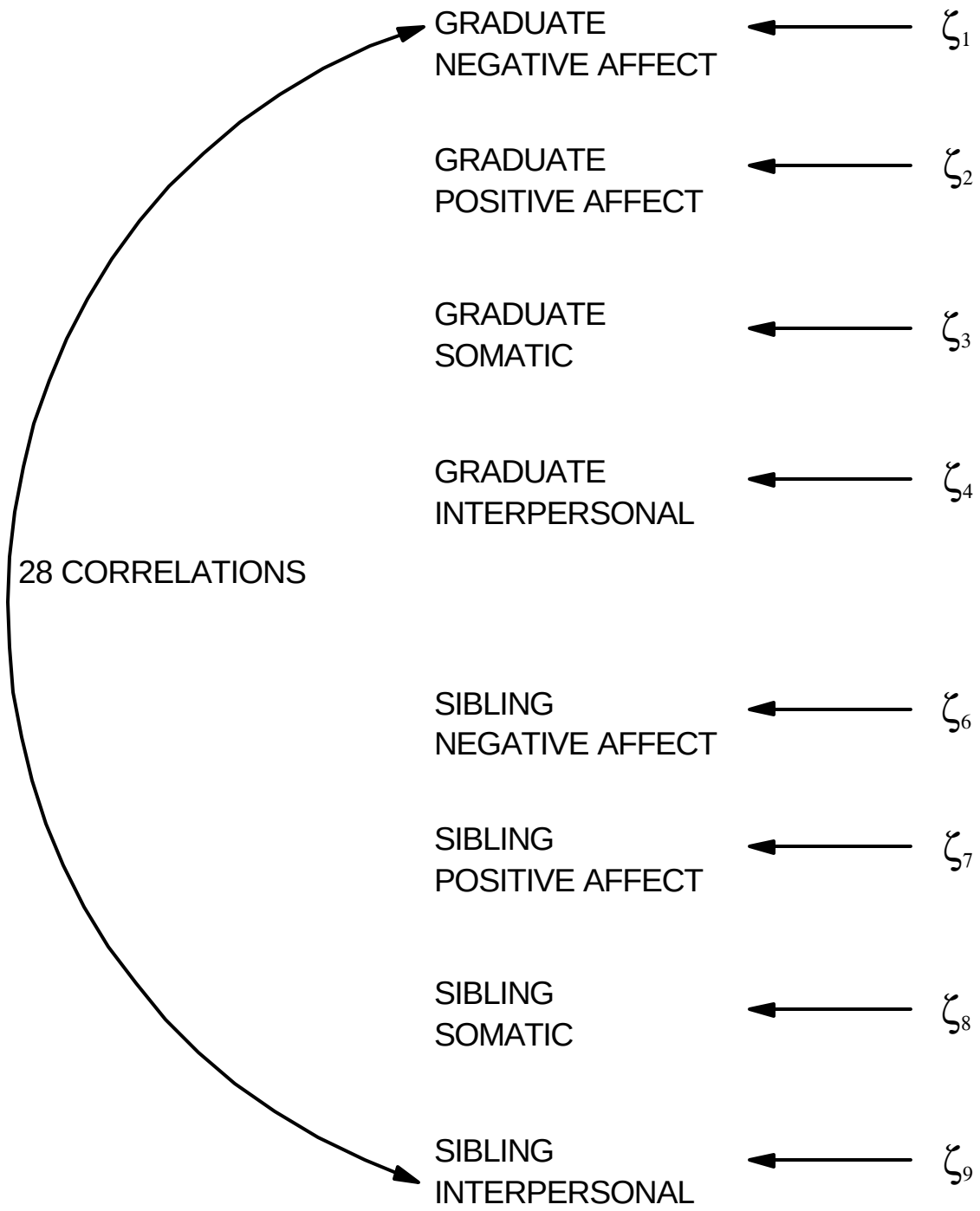


Figure 4. Alternate Four Factor Model of Sibling Resemblance in Depression

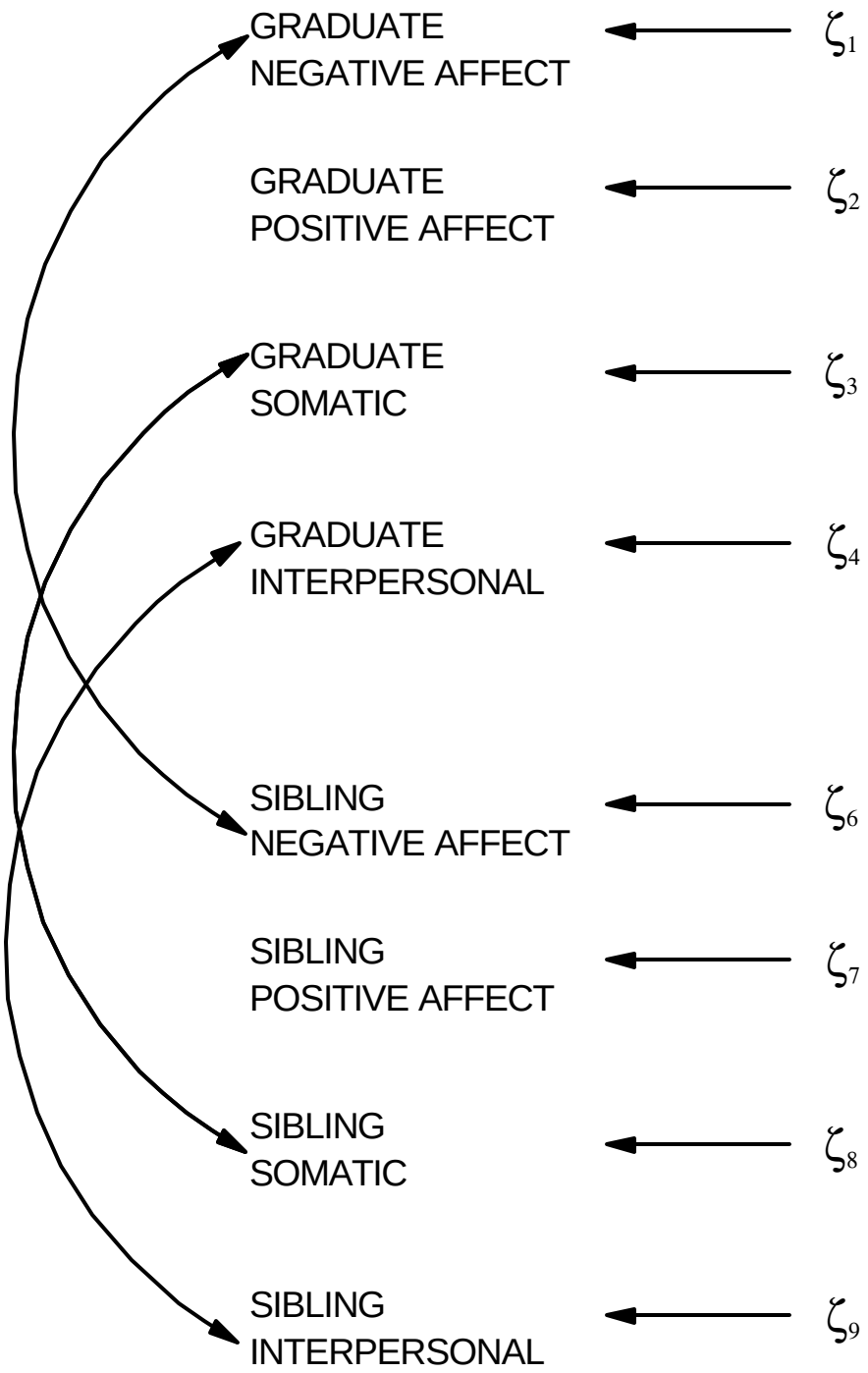


Figure 5. Second Order Factor Model of Depression with Four Sub-factors: Wisconsin High School Graduates

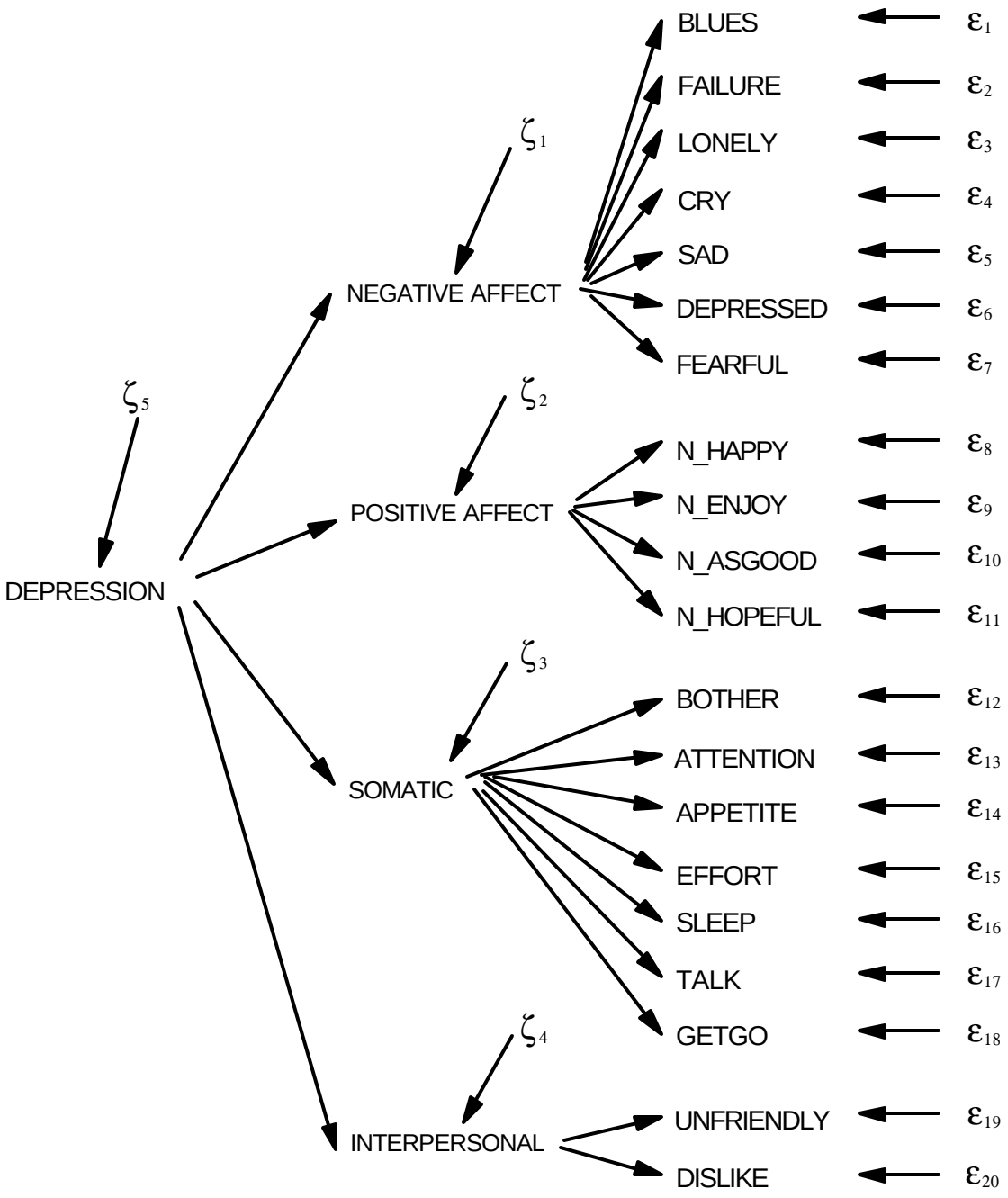


Figure 6. Second-Order Factor Model of Sibling Resemblance in Depression

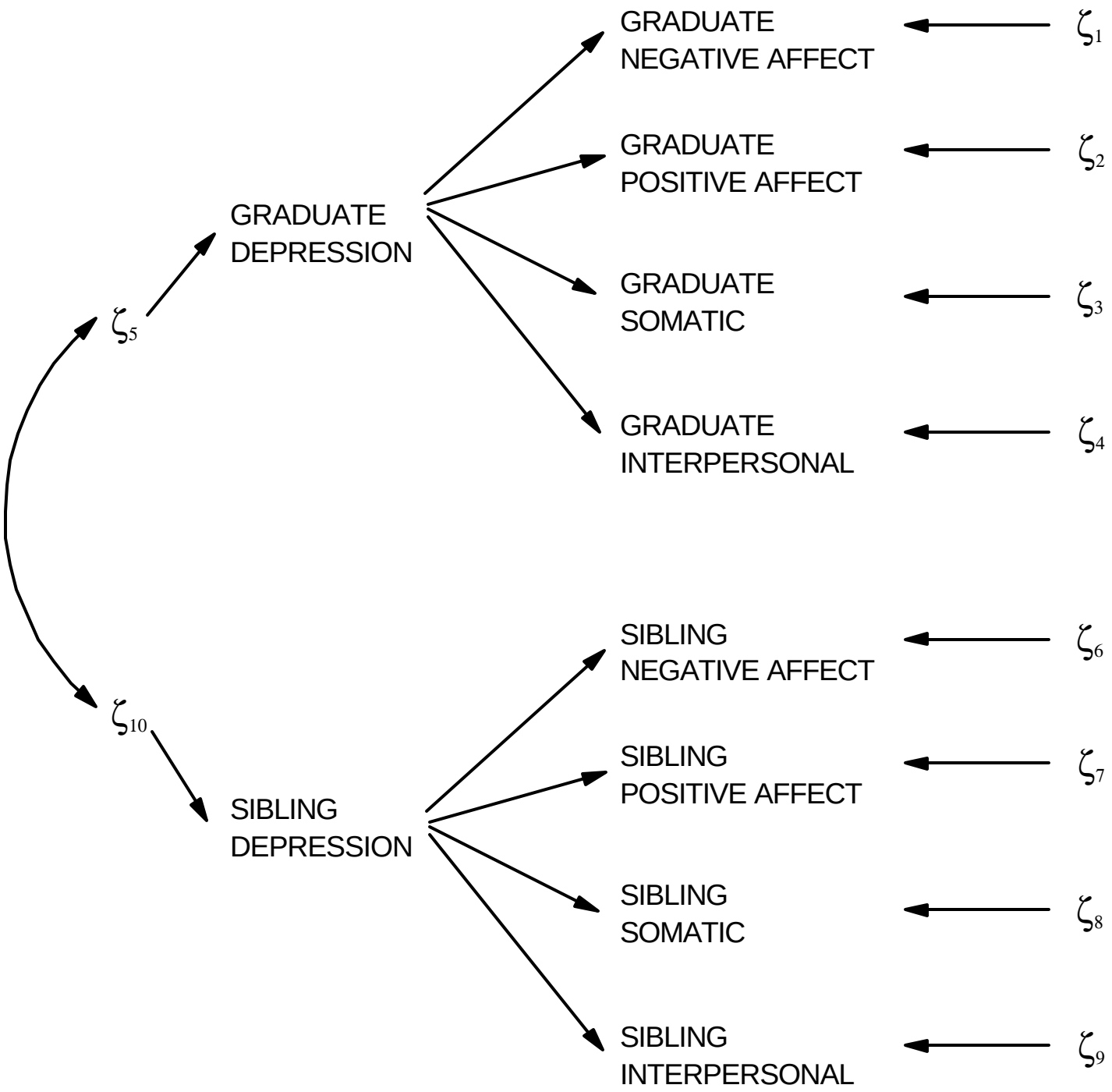


Figure 7. Equations for Measurement Model of Sibling Depression

$y_1 = \eta_1 + \varepsilon_1$ (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)

Figure 8. Squared Multiple Correlations for Depression Indicators among Women

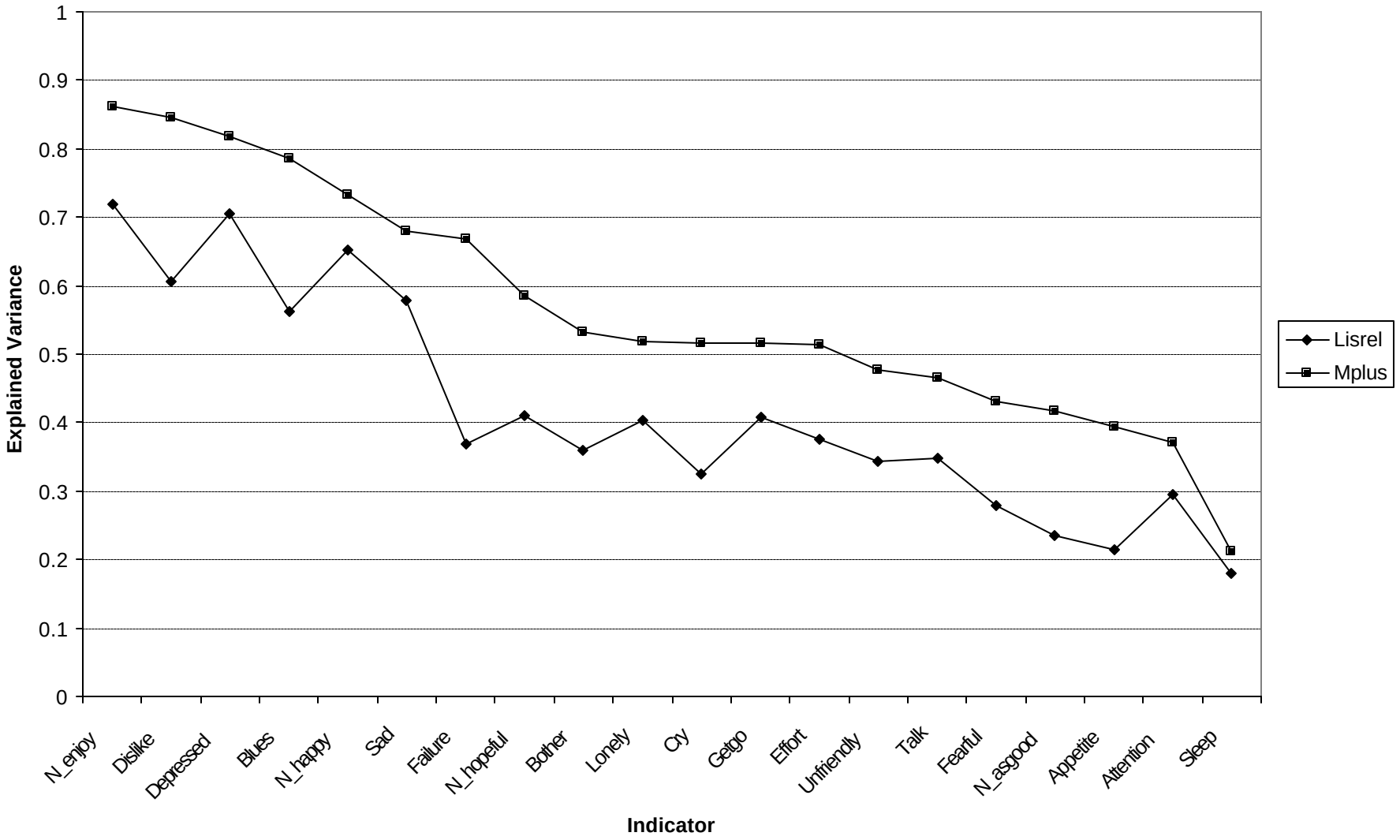
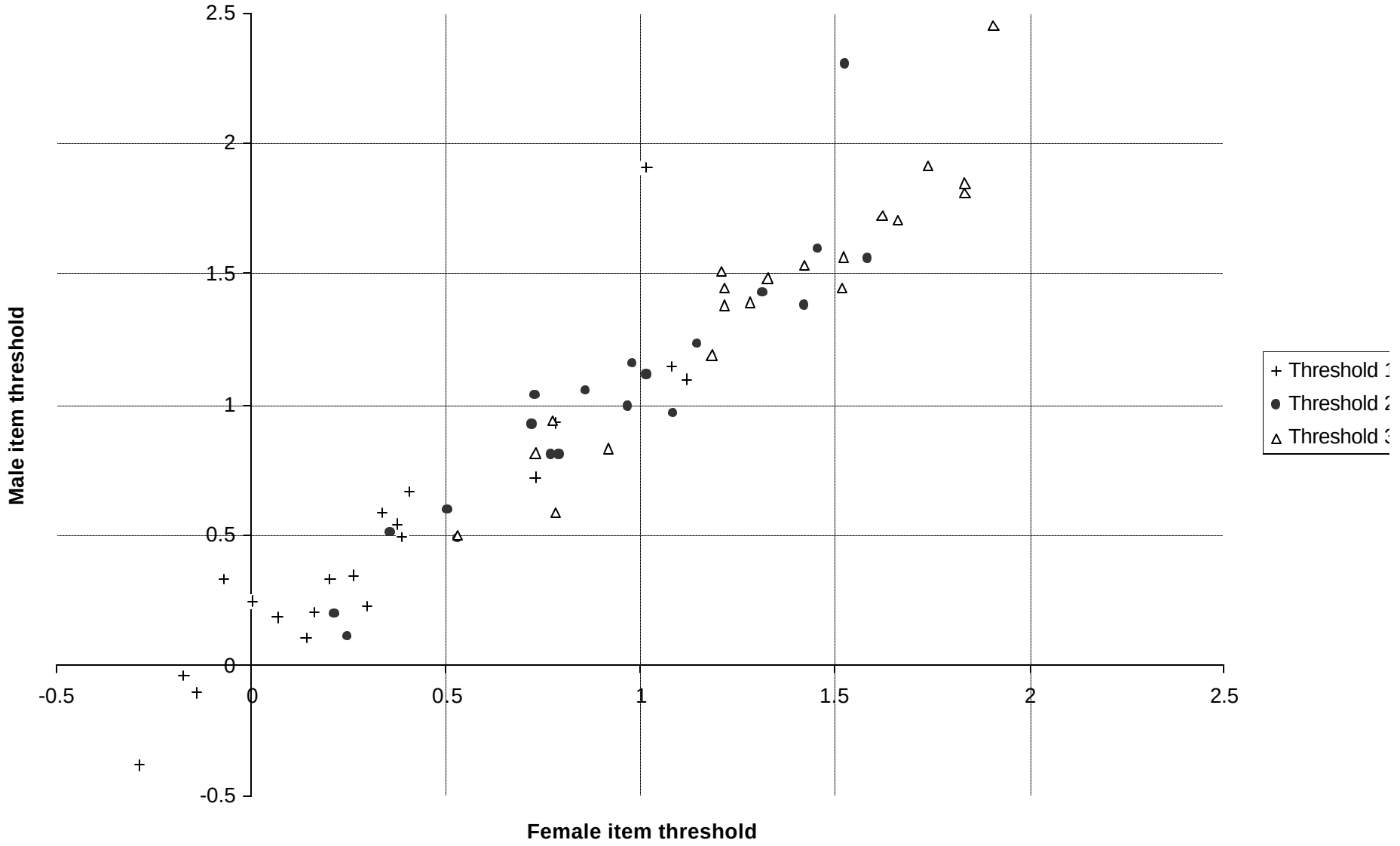


Figure 9. Comparison of Male and Female Item Thresholds



Appendices:

Appendix A: CESD questions

To each question, respondents provided an answer from zero to seven. 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.

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 Skewness for CESD questions

Variable	Mean	Std. Dev.	Skewness
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 C. Correlation Matrix for Transformed Data for Sisters

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1						
lnlonely	0.1733	1					
lncry	0.2542	0.4183	1				
lnfelsad	0.3599	0.4686	0.4914	1			
lndepres	0.3986	0.4625	0.5825	0.5817	1		
lnhappy	0.2128	0.2424	0.1554	0.2327	0.3417	1	
lnenjoy	0.25	0.2804	0.3602	0.366	0.4581	0.5631	1
lnhope	0.351	0.1185	0.1211	0.2596	0.2047	0.4382	0.483
lnbadapp	0.2842	0.0933	0.1187	0.1019	0.1778	0.1473	0.1127
lnsleep	0.0991	0.1647	0.2402	0.2428	0.2456	0.0373	0.1333
lntalkls	0.3865	0.1832	0.2742	0.3399	0.3416	0.1245	0.2826
lnflefrt	0.1739	0.2408	0.4141	0.2252	0.3686	0.0742	0.2361
lngetgo	0.1983	0.4183	0.4739	0.3879	0.4642	0.257	0.3619
lnfail	0.3842	0.307	0.337	0.3258	0.4395	0.4084	0.4795
lnasgood	0.257	0.1548	0.2027	0.2185	0.2062	0.3672	0.3413
lnbother	0.4215	0.1359	0.2338	0.3035	0.3864	0.2815	0.3176
lnkepmin	0.2353	0.078	0.1917	0.2265	0.2213	0.0759	0.2067
lnfear	0.2292	0.1172	0.1955	0.2618	0.2949	-0.0361	0.2083
lnunfrin	0.2955	0.1855	0.0023	0.1228	0.004	-0.0492	0.0075
lndislik	0.2884	0.2177	0.3783	0.352	0.3328	-0.0337	0.2405
lnsblues	-0.0107	0.0111	0.2517	0.071	0.1977	-0.0138	0.1856
lnslonel	0.1402	-0.0896	-0.0357	0.0436	-0.0708	0.0771	0.0836
lnscry	-0.0351	0.1011	0.2485	0.0996	0.1501	-0.1299	0.104
lnssad	0.1005	-0.0233	0.134	0.1744	0.0762	-0.0983	0.1318
lnsdeprs	0.0434	0.0151	0.0765	0.1372	0.0289	-0.1747	0.0311
lnshappy	0.1474	-0.044	0.0627	0.1435	-0.0344	-0.0027	0.1774
lnsenjoy	0.2381	-0.0028	0.1274	0.1729	0.0507	0.0608	0.2346
lnshope	0.0762	-0.0519	-0.0718	-0.0344	0.0059	0.1829	0.0273
lnsprapp	-0.0188	-0.0354	-0.0368	-0.0142	0.0303	0.067	-0.0058
lnssleep	-0.0101	0.0712	0.1215	0.149	0.0382	-0.1029	-0.0094
lnstlkls	-0.0576	0.1053	0.2318	0.1404	0.1652	0.0622	0.2425
lnsefrt	-0.0267	0.0817	0.1052	0.024	-0.0151	-0.0375	0.0891
lnsgetgo	-0.0195	0.0964	0.1037	0.0576	0.0546	-0.0496	0.0657
lnsfail	0.0303	-0.0609	-0.0809	-0.074	0.0419	0.0439	0.0093
lnsasgd	0.0365	0.0455	-0.0023	0.0289	-0.007	0.1341	0.0953
lnsbothe	0.0262	-0.0157	0.0431	0.0365	0.0083	0.1208	0.0721
lnskpmnd	0.0218	0.0293	0.1801	0.1683	0.0768	0.0088	0.2548
lnsfear	-0.0969	-0.0819	-0.0328	-0.0863	-0.0091	-0.006	-0.0193
lnsunfri	-0.0483	-0.1293	-0.1198	-0.1636	-0.0988	-0.0131	-0.0542
lnsdislk	-0.0399	-0.033	0.0691	0.0155	0.0115	0.0759	0.1375

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

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1						
lnbadapp	0.0699	1					
lnsleep	0.0518	0.0785	1				
lntalkls	0.2085	0.2378	0.2234	1			
lnflefrt	0.0382	0.2144	0.342	0.2426	1		
lngetgo	0.1927	0.2343	0.1952	0.3914	0.5202	1	
lnfail	0.2773	0.1551	0.1219	0.232	0.1368	0.2746	1
lnasgood	0.4867	0.1332	0.0961	0.1424	0.0514	0.1569	0.3102
lnbother	0.2031	0.2027	0.1379	0.341	0.1451	0.2293	0.3972
lnkepmin	0.2079	0.1689	0.4396	0.3149	0.3724	0.2979	0.2265
lnfear	0.0784	0.1118	0.4036	0.2449	0.4843	0.2172	0.1875
lnunfrin	0.1115	0.1216	0.1263	0.237	0.1023	0.0079	0.1402
lndislik	0.1508	0.1302	0.1624	0.3383	0.1724	0.2277	0.2182
lnsblues	-0.0878	-0.0587	0.0811	0.0863	0.1968	0.2191	0.0091
lnslonel	0.2239	-0.0241	-0.0587	0.1292	-0.0652	-0.0067	0.0985
lnscry	-0.1598	-0.0134	0.125	0.1786	0.2188	0.2206	-0.0337
lnssad	0.0286	-0.0202	0.2074	0.2735	0.0401	0.1463	0.0425
lnsdeprs	-0.0824	-0.0607	0.1682	0.1991	0.0296	0.1437	-0.0614
lnshappy	0.1417	-0.0039	0.0116	0.1915	-0.02	0.0844	0.0625
lnsenjoy	0.2545	-0.0371	-0.0484	0.1541	0.0286	0.0788	0.0961
lnshope	0.1477	0.0525	-0.1268	-0.0422	-0.0759	-0.0133	0.0688
lnsprapp	0.0328	0.0378	0.0304	0.0265	-0.0084	0.0416	0.012
lnssleep	0.0214	-0.037	0.2893	0.0662	0.2524	0.056	-0.0237
lnstlkls	0.0112	-0.0004	0.0892	0.1293	0.1473	0.2757	0.1302
lnsefrt	-0.0861	0.0345	0.0203	0.1597	0.0904	0.1803	0.0387
lnsgetgo	-0.0778	-0.0429	0.0002	0.1494	0.0304	0.1788	0.0188
lnsfail	0.0533	-0.0434	-0.0084	0.0008	-0.0642	-0.0047	0.0018
lnsasgd	0.1534	-0.0171	0.005	0.0767	-0.1115	0.039	0.1821
lnsbothe	-0.0095	0.0325	0.0529	0.082	-0.0446	0.0896	0.1429
lnskpmnd	0.1158	-0.0385	0.1708	0.2701	0.0254	0.1832	0.1214
lnsfear	-0.065	0.0012	0.1237	-0.0379	0.1838	-0.0748	0.0611
lnsunfri	-0.0442	0.0758	0.1626	-0.0497	0.179	-0.0882	0.0146
lnsdislk	0.1411	0.0821	0.0055	0.1528	-0.0095	0.0205	0.082

Appendix C. Correlation Matrix for Transformed Data for Sisters

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1						
lnbother	0.231	1					
lnkepmin	0.1628	0.2662	1				
lnfear	0.0019	0.0853	0.4083	1			
lnunfrin	0.0209	0.139	0.2306	0.2654	1		
lndislik	0.1575	0.1894	0.2826	0.3155	0.3684	1	
lnsblues	0.0019	0.0689	0.0828	0.1065	-0.0985	0.1711	1
lnslonel	0.153	0.0462	0.0513	-0.1243	0.0245	0.0253	0.2283
lnscry	-0.086	-0.0048	0.1147	0.1325	-0.0305	0.2232	0.5453
lnssad	0.0146	0.0671	0.2462	0.1368	0.0758	0.2429	0.3992
lnsdeprs	-0.0587	-0.0074	0.1847	0.1652	0.0935	0.2255	0.5091
lnshappy	0.0687	0.0465	0.0981	0.047	0.0548	0.2356	0.2824
lnsenjoy	0.1257	0.0931	0.1088	0.0769	0.0509	0.2683	0.3176
lnshope	0.1407	0.1641	-0.0549	-0.1522	-0.0268	-0.0603	0.1324
lnsprapp	0.057	0.0729	0.0107	-0.0645	-0.0593	0.0103	0.2818
lnssleep	0.0417	-0.089	0.2195	0.2632	0.1505	0.0445	0.1066
lnstlkls	0.0734	0.1065	0.1837	0.0522	-0.0576	0.2029	0.4343
lnsefrt	-0.014	0.0074	0.0501	-0.001	-0.0275	0.0208	0.3353
lnsgetgo	0.0147	0.0085	0.0127	0.0118	-0.0154	0.0393	0.3696
lnsfail	0.0772	0.0295	0.0327	-0.1009	-0.0517	-0.0334	0.2801
lnsasgd	0.1767	0.1458	0.0113	-0.1308	-0.0136	-0.0722	0.0351
lnsbothe	0.0693	0.1494	0.0928	-0.088	-0.0089	-0.0468	0.3861
lnskpmnd	0.0985	0.0878	0.2352	0.0818	0.0466	0.2066	0.2602
lnsfear	-0.0089	0.0702	0.1265	0.1839	0.0962	-0.0812	0.0929
lnsunfri	0.0186	0.0423	0.154	0.1669	0.054	-0.0938	0.1155
lnsdislk	0.1702	0.1628	0.0695	-0.0981	0.0073	-0.0292	0.1158

Appendix C. Correlation Matrix for Transformed Data for Sisters

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1						
lnscry	0.1258	1					
lnssad	0.3926	0.5391	1				
lnsdeprs	0.2943	0.52	0.8026	1			
lnshappy	0.3431	0.2551	0.4795	0.4939	1		
lnsenjoy	0.4057	0.2034	0.3107	0.3264	0.7186	1	
lnshope	0.2698	-0.0037	0.0104	0.0675	0.2973	0.3652	1
lnsprapp	0.2258	0.2239	0.2667	0.2731	0.1028	0.1475	0.1821
lnssleep	0.1463	0.1313	0.2228	0.2422	0.1674	0.2023	0.0148
lnstlkls	0.1775	0.3801	0.419	0.3915	0.2574	0.2271	0.0818
lnsefrt	0.1328	0.3657	0.4813	0.5406	0.3105	0.1845	0.0668
lnsgetgo	0.1686	0.3744	0.4169	0.4798	0.287	0.2333	0.2469
lnsfail	0.2047	0.1908	0.2162	0.2192	0.1832	0.2051	0.2844
lnsasgd	0.1618	0.0708	0.1463	0.1482	0.3027	0.2463	0.5142
lnsbothe	0.2006	0.1567	0.3561	0.3502	0.2201	0.1194	0.1961
lnskpmnd	0.2846	0.2992	0.5627	0.5153	0.41	0.3062	0.052
lnsfear	0.1511	0.0652	0.0947	0.1067	-0.0021	0.0242	0.1761
lnsunfri	0.169	0.0627	0.0582	0.0438	-0.0738	-0.0092	0.0672
lnsdislk	0.1813	0.1079	0.1427	0.0279	0.067	0.1511	0.2167

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1						
lnssleep	0.0746	1					
lnstlkls	0.2216	0.1241	1				
lnsefrt	0.2063	0.1526	0.3934	1			
lnsgetgo	0.256	0.2088	0.4759	0.5817	1		
lnsfail	0.3076	0.049	0.169	0.096	0.2144	1	
lnsasgd	0.0984	0.0344	0.1575	0.1771	0.2231	0.2004	1
lnsbothe	0.2762	0.0691	0.3827	0.3692	0.3336	0.2067	0.27
lnskpmnd	0.1569	0.2348	0.4204	0.4672	0.4405	0.1152	0.1764
lnsfear	0.2117	0.325	0.0854	0.0831	0.1442	0.1518	0.0668
lnsunfri	0.2514	0.1239	0.1048	0.0779	0.089	0.1593	0.0213
lnsdislk	0.1355	0.0318	0.248	0.1165	0.1739	0.201	0.1675

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1				
lnskpmnd	0.3541	1			
lnsfear	0.1291	0.0966	1		
lnsunfri	0.1878	0.01	0.3573	1	
lnsdislk	0.2292	0.1619	0.227	0.3325	1

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1						
lnlonely	0.6006	1					
lncry	0.1905	0.1367	1				
lnfelsad	0.626	0.5654	0.2101	1			
lndepres	0.6028	0.538	0.1495	0.6643	1		
lnhappy	0.4341	0.3172	0.0506	0.3652	0.4126	1	
lnenjoy	0.4598	0.4066	0.0334	0.3822	0.4155	0.72	1
lnhope	0.3634	0.2829	0.0645	0.3271	0.3528	0.6171	0.6001
lnbadapp	0.2483	0.2217	0.1822	0.2086	0.2064	0.1003	0.1534
lnsleep	0.2233	0.2229	0.0885	0.2487	0.2856	0.1281	0.1185
lntalkls	0.3947	0.3261	0.1742	0.3703	0.3638	0.3855	0.3377
lnflefrt	0.4165	0.4055	0.1467	0.3452	0.3397	0.3516	0.3828
lngetgo	0.4034	0.4639	0.0961	0.3942	0.467	0.3208	0.3
lnfail	0.6151	0.5351	0.3375	0.5159	0.6116	0.3687	0.3779
lnasgood	0.0725	0.068	0.0677	0.1396	0.2368	0.2908	0.302
lnbother	0.6336	0.4777	0.1856	0.4913	0.4281	0.306	0.3119
lnkepmin	0.2405	0.2474	0.0914	0.3004	0.2362	0.1648	0.1336
lnfear	0.4408	0.4337	0.2323	0.5411	0.4564	0.2974	0.2537
lnunfrin	0.3299	0.3186	0.1333	0.2696	0.1718	0.2585	0.2405
lndislik	0.4181	0.2846	0.1464	0.4097	0.2476	0.2996	0.2785
lnsblues	0.2981	0.1549	-0.0544	0.1763	0.0664	0.1398	0.1583
lnslonel	-0.0374	-0.0441	-0.0046	0.049	0.0584	-0.0493	0.0008
lnscry	-0.0324	-0.0467	0.0612	-0.053	-0.039	-0.0624	-0.0826
lnssad	-0.0727	-0.115	-0.0417	-0.0124	0.0114	-0.1277	-0.0857
lnsdeprs	-0.044	-0.0949	0.0157	0.0366	0.0275	-0.0552	-0.018
lnshappy	0.1964	0.1366	-0.0644	0.1417	0.1458	0.2095	0.2361
lnsenjoy	0.2136	0.1373	-0.0334	0.1607	0.1342	0.2019	0.2502
lnshope	0.1639	0.1678	-0.0002	0.1977	0.158	0.1396	0.1696
lnsprapp	-0.0466	-0.0639	0.0298	0.0457	-0.0012	-0.0688	-0.0147
lnssleep	-0.1376	-0.1526	-0.0005	-0.0324	-0.0047	0.013	0.0678
lnstlkls	0.0083	-0.0506	0.0154	-0.0136	0.0673	0.1316	0.0752
lnsefrt	-0.0721	-0.0897	-0.0004	-0.0107	0.0238	0.0677	0.038
lnsgetgo	-0.0821	-0.1686	0.011	-0.025	0.0157	-0.0478	-0.0145
lnsfail	-0.0572	-0.099	-0.049	-0.0477	-0.06	-0.0883	-0.0502
lnsasgd	0.2006	0.1433	0.0346	0.1457	0.0855	0.1085	0.0939
lnsbothe	-0.0935	-0.1006	-0.012	0.0316	0.0011	0.0102	0.024
lnskpmnd	-0.1012	-0.1185	0.0544	0.0274	0.03	-0.0248	-0.0785
lnsfear	-0.0354	-0.073	-0.0108	-0.0261	0.0008	-0.0553	-0.0204
lnsunfri	-0.0974	-0.1051	0.001	-0.0458	-0.0302	-0.0282	-0.0353
lnsdislk	-0.118	-0.1171	-0.0055	-0.1448	-0.1519	-0.0683	-0.0995

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1						
lnbadapp	0.0766	1					
lnsleep	0.1927	0.159	1				
lntalkls	0.2865	0.2241	0.1334	1			
lnflefrt	0.2533	0.298	0.2179	0.3297	1		
lngetgo	0.2477	0.2507	0.321	0.2907	0.4132	1	
lnfail	0.3448	0.155	0.1225	0.2756	0.3925	0.3609	1
lnasgood	0.4623	0.1589	0.089	0.1382	0.0321	0.1014	0.1461
lnbother	0.2667	0.2105	0.1885	0.3628	0.3924	0.3592	0.494
lnkepmin	0.0842	0.1289	0.2102	0.1777	0.3065	0.3156	0.0919
lnfear	0.3358	0.2106	0.2967	0.3183	0.3449	0.3452	0.4064
lnunfrin	0.1645	0.0788	0.0982	0.2784	0.3699	0.2622	0.2964
lndislik	0.2637	0.1442	0.1737	0.3976	0.2883	0.2606	0.2088
lnsblues	0.1337	-0.0621	0.0749	0.1168	0.086	0.0056	0.1191
lnslonel	0.0045	0.1149	0.0199	0.0283	-0.0326	0.0119	0.0003
lnscry	-0.0739	0.0024	-0.0751	-0.0421	-0.0775	-0.0608	-0.0225
lnssad	0.0009	0.1107	0.0777	-0.012	-0.1132	-0.0623	-0.0575
lnsdeprs	0.003	0.0439	0.1005	-0.023	-0.0965	-0.0829	-0.1052
lnshappy	0.2033	0.0515	0.101	0.1822	0.1562	0.064	0.1385
lnsenjoy	0.2715	0.0472	0.0792	0.2611	0.0946	-0.0077	0.1519
lnshope	0.2126	0.0958	0.0979	0.2276	0.1351	0.0706	0.1291
lnsprapp	-0.068	0.0356	-0.0814	-0.0285	-0.0492	0.0376	0.0044
lnssleep	0.0493	0.062	0.026	0.0564	-0.081	-0.1358	-0.1638
lnstlkls	0.067	0.0295	-0.0129	0.1317	0.0575	0.06	0.0671
lnsefrt	0.0899	0.049	0.0184	0.0534	-0.069	0.004	0.005
lnsgetgo	-0.0306	0.011	-0.0429	0.0575	-0.07	-0.1246	-0.1003
lnsfail	-0.0229	0.0129	-0.0126	-0.077	-0.1001	-0.0509	-0.083
lnsasgd	0.1274	-0.0272	0.0484	0.1521	0.0928	0.1089	0.151
lnsbothe	0.0375	0.0656	0.0207	0.0744	-0.0159	-0.0095	-0.1251
lnskpmnd	-0.0227	0.1299	0.0551	0.0103	-0.0464	0.0163	-0.0717
lnsfear	-0.0404	0.1334	0.0528	0.0664	0.0424	-0.0127	-0.0297
lnsunfri	0.0255	0.0877	-0.0076	0.1002	-0.0622	-0.0679	-0.1275
lnsdislk	-0.0714	0.0616	0.0695	-0.1116	-0.0296	-0.1098	-0.0993

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1						
lnbother	-0.012	1					
lnkepmin	-0.0253	0.229	1				
lnfear	0.1632	0.4067	0.2468	1			
lnunfrin	0.0358	0.3024	0.135	0.2906	1		
lndislik	0.1687	0.3378	0.1843	0.3553	0.4846	1	
lnsblues	-0.103	0.226	0.0839	0.1083	0.1351	0.1759	1
lnslonel	0.0521	-0.0203	0.0383	0.0468	-0.0575	-0.0118	0.1912
lnscry	-0.0487	-0.0404	-0.0645	-0.0578	-0.0052	-0.0194	0.3257
lnssad	0.0947	-0.055	-0.0299	0.0565	-0.1082	-0.0061	0.2355
lnsdeprs	0.1078	-0.0519	-0.0157	-0.0005	-0.1086	-0.0036	0.3262
lnshappy	0.0208	0.1878	-0.0415	0.1478	0.216	0.2283	0.3987
lnsenjoy	0.1183	0.1785	-0.0827	0.1768	0.1996	0.2633	0.437
lnshope	0.1306	0.2304	0.0502	0.152	0.1497	0.2094	0.3381
lnsprapp	-0.0817	-0.0354	0.0687	0.0082	-0.0708	-0.0191	0.2
lnssleep	0.1429	-0.1194	-0.0402	0.0082	-0.0212	0.027	0.1102
lnstlkls	-0.0033	-0.0408	-0.0502	-0.044	0.1333	-0.0014	0.1919
lnsefrt	0.1184	-0.0769	-0.052	0.0524	-0.0471	-0.0035	0.1845
lnsgetgo	0.0779	-0.0848	-0.063	0.0048	-0.0621	0.0568	0.1648
lnsfail	-0.0189	-0.0371	-0.0097	-0.0571	-0.0715	-0.0802	0.3787
lnsasgd	-0.0416	0.1898	0.0081	0.1103	0.1848	0.2088	0.3376
lnsbothe	0.1003	-0.0977	-0.0937	-0.0309	-0.0151	0.0791	0.2521
lnskpmnd	0.0471	0.0117	0.0961	0.0002	-0.098	0.0069	0.1069
lnsfear	0.036	0.0614	0.0915	-0.0677	-0.0207	-0.0363	0.2286
lnsunfri	0.1081	-0.0559	-0.0012	0.0027	0.0191	0.0572	0.1069
lnsdislk	-0.0774	-0.0398	-0.0343	-0.0849	-0.0645	-0.0844	0.2477

Appendix C. Correlation Matrix for Transformed Data for Brothers

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1						
lnscry	0.2632	1					
lnssad	0.478	0.2841	1				
lnsdeprs	0.3988	0.2856	0.6979	1			
lnshappy	0.1635	0.1098	0.2655	0.2746	1		
lnsenjoy	0.261	0.1361	0.3053	0.3738	0.7397	1	
lnshope	0.218	0.0993	0.261	0.3105	0.5894	0.6014	1
lnsprapp	0.298	0.3969	0.2967	0.2956	0.1356	0.1692	0.2223
lnssleep	0.2063	0.1149	0.2433	0.2735	0.164	0.1896	0.1634
lnstlkls	0.1508	0.194	0.2253	0.2555	0.2652	0.2644	0.1796
lnsefrt	0.2347	0.2114	0.3888	0.403	0.2805	0.3455	0.1984
lnsgetgo	0.2204	0.2145	0.4416	0.5193	0.2613	0.2904	0.217
lnsfail	0.3036	0.363	0.4754	0.5467	0.2234	0.3244	0.2875
lnsasgd	0.1551	0.1183	0.1097	0.1164	0.427	0.4585	0.5782
lnsbothe	0.3421	0.2775	0.3888	0.4154	0.237	0.2925	0.211
lnskpmnd	0.2838	0.2402	0.391	0.3987	0.1663	0.1793	0.2082
lnsfear	0.2641	0.3038	0.3688	0.4248	0.2375	0.2958	0.3394
lnsunfri	0.3521	0.1911	0.3923	0.3384	0.1844	0.2389	0.1999
lnsdislk	0.2031	0.3259	0.376	0.3559	0.1402	0.1379	0.1507

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1						
lnssleep	0.2204	1					
lnstlkls	0.2765	0.3405	1				
lnsefrt	0.4245	0.2515	0.3282	1			
lnsgetgo	0.292	0.3777	0.403	0.466	1		
lnsfail	0.3334	0.1376	0.2341	0.302	0.3229	1	
lnsasgd	0.1742	0.0501	0.2254	0.0384	0.0544	0.2239	1
lnsbothe	0.2932	0.3964	0.3848	0.3046	0.4009	0.2997	0.1752
lnskpmnd	0.2483	0.2126	0.1822	0.3811	0.4718	0.2802	0.0268
lnsfear	0.3157	0.2398	0.3424	0.3649	0.3321	0.3973	0.1789
lnsunfri	0.1869	0.2067	0.251	0.3568	0.3159	0.2296	0.0409
lnsdislk	0.1874	0.088	0.1818	0.252	0.191	0.3594	0.1143

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1				
lnskpmnd	0.2906	1			
lnsfear	0.2689	0.2659	1		
lnsunfri	0.2889	0.3121	0.3098	1	
lnsdislk	0.2608	0.2437	0.2873	0.4009	1

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

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1						
lnlonely	0.4954	1					
lncry	0.185	0.3054	1				
lnfelsad	0.5769	0.5385	0.3452	1			
lndepres	0.7219	0.4656	0.264	0.6296	1		
lnhappy	0.5055	0.4118	0.1712	0.353	0.5567	1	
lnenjoy	0.4238	0.4973	0.2254	0.3981	0.4902	0.7256	1
lnhope	0.3648	0.3855	0.1796	0.3329	0.4356	0.652	0.6243
lnbadapp	0.2521	0.1858	0.2415	0.1992	0.2273	0.2899	0.2948
lnsleep	0.3959	0.3025	0.1152	0.3481	0.3221	0.3364	0.3221
lntalkls	0.3864	0.4185	0.1899	0.3794	0.3678	0.334	0.427
lnflefrt	0.4649	0.4319	0.144	0.4053	0.3785	0.3611	0.391
lngetgo	0.362	0.3132	0.138	0.3049	0.3012	0.392	0.4534
lnfail	0.5241	0.4866	0.38	0.4574	0.5715	0.405	0.4688
lnasgood	0.2229	0.2408	0.1663	0.1811	0.2444	0.4936	0.4851
lnbother	0.6947	0.4726	0.1843	0.5353	0.4972	0.3821	0.3607
lnkepmin	0.4398	0.3479	0.1536	0.4058	0.383	0.3135	0.3289
lnfear	0.6036	0.4712	0.2016	0.5569	0.5283	0.3472	0.3841
lnunfrin	0.3839	0.2435	0.1747	0.2378	0.367	0.2642	0.1305
lndislik	0.1841	0.3048	0.36	0.3583	0.2234	0.1152	0.119
lnsblues	0.0626	0.1173	-0.0689	0.1854	-0.045	-0.0141	0.0131
lnslonel	-0.0279	0.0489	-0.0462	0.1363	-0.1382	-0.1175	-0.0166
lnscry	-0.0405	-0.0074	-0.0136	0.0222	0.0707	0.0239	0.0553
lnssad	0.0153	-0.0342	-0.0527	0.0845	-0.0486	-0.0533	-0.0747
lnsdeprs	-0.0388	0.0465	0.0393	0.0738	-0.0432	0.0247	0.0743
lnshappy	-0.1155	0.048	-0.0415	0.0085	-0.1695	-0.0908	0.0186
lnsenjoy	-0.0065	0.0718	-0.0097	0.0145	0.0617	0.164	0.2367
lnshope	0.124	0.0255	-0.0038	0.0339	0.0444	0.1482	0.0975
lnsprapp	0.0879	0.1073	-0.0165	0.1662	-0.0839	-0.131	-0.1117
lnssleep	-0.139	0.0203	0.0164	-0.0002	-0.1167	-0.1732	-0.1101
lnstlkls	0.1354	0.2081	0.0496	0.2345	0.1017	-0.045	-0.0323
lnsefrt	-0.0759	0.0507	-0.0346	0.0968	-0.044	-0.0887	-0.0474
lnsgetgo	-0.036	0.0899	0.0443	0.125	-0.1251	-0.1058	-0.0634
lnsfail	0.0301	0.0544	-0.0339	0.1898	0.0298	0.0188	0.0573
lnsasgd	0.0597	0.1159	-0.0348	0.0646	-0.0519	0.0976	0.1049
lnsbothe	-0.039	0.0926	-0.0634	0.1355	-0.1196	-0.1231	-0.0869
lnskpmnd	-0.0953	0.0493	-0.0388	0.0928	-0.1562	-0.2129	-0.1179
lnsfear	-0.1072	0.0542	-0.0895	0.0756	-0.2266	-0.2277	-0.1552
lnsunfri	-0.1204	-0.0998	-0.0106	-0.0709	0.0022	-0.0188	0.011
lnsdislk	-0.0885	-0.0466	-0.057	-0.0262	0.0029	0.006	0.0743

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

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1						
lnbadapp	0.2995	1					
lnsleep	0.3324	0.2568	1				
lntalkls	0.2878	0.3468	0.4261	1			
lnflefrt	0.3153	0.3467	0.359	0.4462	1		
lngetgo	0.3933	0.3937	0.4832	0.4985	0.5943	1	
lnfail	0.3992	0.1907	0.2403	0.3085	0.3854	0.2664	1
lnasgood	0.5822	0.2889	0.2392	0.2754	0.2629	0.3457	0.2807
lnbother	0.2629	0.2024	0.3686	0.4562	0.4348	0.3558	0.3761
lnkepmin	0.3024	0.2702	0.3821	0.39	0.4551	0.4506	0.3744
lnfear	0.3794	0.1868	0.4095	0.3808	0.4287	0.3212	0.4265
lnunfrin	0.2172	0.0667	0.1284	0.2142	0.1351	0.0512	0.3523
lndislik	0.0634	0.1114	0.0637	0.2015	0.1597	0.0541	0.3075
lnsblues	0.0437	0.0349	0.1484	0.1335	0.1461	0.1266	-0.0232
lnslonel	0.0157	-0.0156	0.1036	0.0512	0.0926	0.0891	-0.0495
lnscry	0.0098	0.1033	-0.0064	0.0681	0.0771	-0.0148	0.0323
lnssad	0.0469	-0.036	0.1081	-0.0015	0.0691	0.0612	-0.0927
lnsdeprs	0.0737	-0.0022	0.0795	0.0488	0.0757	0.0793	-0.0338
lnshappy	0.0109	0.0388	0.0631	0.0113	0.0777	0.0965	-0.0965
lnsenjoy	0.232	0.0696	0.1541	0.1208	0.0814	0.1122	0.0205
lnshope	0.1144	0.039	0.1303	0.0478	0.0685	0.1196	-0.0719
lnsprapp	-0.1496	-0.0443	0.076	0.0843	0.1098	0.0606	-0.0513
lnssleep	-0.15	-0.1006	-0.0585	-0.0361	-0.0444	-0.1283	-0.0248
lnstlkls	-0.0272	-0.1125	0.1086	0.1516	0.1671	0.0572	0.1445
lnsefrt	-0.0674	-0.0247	0.0009	0.0605	0.0243	-0.0265	-0.0333
lnsgetgo	-0.09	-0.0233	0.0234	0.017	0.0432	-0.0283	-0.018
lnsfail	0.0358	0.0596	0.1491	0.0866	0.1706	0.1227	-0.0174
lnsasgd	0.0941	0.0207	0.129	0.1391	0.1025	0.1216	-0.0316
lnsbothe	-0.0252	-0.0733	0.0046	0.0213	0.035	-0.0239	-0.0077
lnskpmnd	-0.1686	-0.1327	-0.0639	-0.0644	-0.0847	-0.1146	-0.0811
lnsfear	-0.1691	-0.098	0.0047	0.0333	0.0224	-0.0169	-0.1368
lnsunfri	0.0345	0.0681	0.0066	0.0401	0.0296	0.0511	-0.0062
lnsdislk	0.0246	0.0298	-0.0046	0.0015	-0.0036	0.0224	-0.0415

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

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1						
lnbother	0.2177	1					
lnkepmin	0.2183	0.4308	1				
lnfear	0.1751	0.5148	0.3793	1			
lnunfrin	0.118	0.2743	0.1064	0.3201	1		
lndislik	0.1252	0.2857	0.2529	0.1772	0.3521	1	
lnsblues	0.09	0.1957	0.1709	0.1801	-0.1403	0.2344	1
lnslonel	0.0063	0.1144	0.1396	0.1023	-0.1633	0.0953	0.5896
lnscry	0.0155	-0.0402	0.0721	0.0043	-0.0327	-0.0174	0.2488
lnssad	-0.0077	0.0991	0.0685	0.0852	-0.0313	0.0859	0.5448
lnsdeprs	0.099	0.1048	0.0984	0.0381	-0.1085	0.1402	0.5502
lnshappy	0.0894	-0.0149	0.0498	0.0002	-0.1441	0.1016	0.46
lnsenjoy	0.2299	0.0266	0.0729	0.0116	0.021	-0.0104	0.2744
lnshope	0.0556	0.1123	0.0214	0.1027	0.1674	-0.0148	0.2244
lnsprapp	-0.0587	0.2573	0.1947	0.0914	-0.065	0.2455	0.5472
lnssleep	-0.0465	-0.0184	-0.0225	-0.068	-0.0871	0.1683	0.3306
lnstlkls	-0.0915	0.2548	0.2157	0.1475	-0.0047	0.2066	0.4442
lnsefrt	0.1004	0.031	0.0615	-0.0499	-0.074	0.2279	0.4175
lnsgetgo	-0.0527	0.0791	0.1925	-0.0215	-0.0574	0.2406	0.4276
lnsfail	0.1592	0.1104	0.1367	0.1041	-0.0914	0.1553	0.5645
lnsasgd	0.1407	0.1662	0.1316	0.1031	-0.0076	0.0996	0.3232
lnsbothe	0.0261	0.1214	0.1548	0.0336	-0.0894	0.2449	0.6196
lnskpmnd	-0.1426	0.0557	0.0228	-0.0696	-0.1742	0.1456	0.4375
lnsfear	-0.1317	0.106	0.0382	0.0577	-0.1218	0.0768	0.5083
lnsunfri	0.1193	-0.0744	-0.0113	-0.1643	-0.1205	0.0463	0.1743
lnsdislk	0.1076	-0.0762	-0.0599	-0.1552	-0.1439	-0.0136	0.1596

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

	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1						
lnscry	0.2849	1					
lnssad	0.5942	0.2321	1				
lnsdeprs	0.5609	0.2332	0.644	1			
lnshappy	0.4559	0.1145	0.3585	0.4164	1		
lnsenjoy	0.3653	0.1846	0.3449	0.4461	0.5588	1	
lnshope	0.2352	0.1265	0.299	0.2652	0.359	0.4163	1
lnsprapp	0.4412	0.16	0.3322	0.351	0.3114	-0.0163	0.1018
lnssleep	0.3386	0.0851	0.2978	0.3193	0.2383	0.1397	-0.0191
lnstlkls	0.4228	0.1774	0.3106	0.3078	0.258	0.0709	0.0644
lnsefrt	0.3919	0.2476	0.3473	0.435	0.3878	0.2138	0.1646
lnsgetgo	0.4214	0.1609	0.3809	0.3812	0.3689	0.1757	0.1963
lnsfail	0.507	0.2892	0.4653	0.5115	0.4412	0.3532	0.2595
lnsasgd	0.3781	0.0733	0.1934	0.2633	0.3746	0.3727	0.3742
lnsbothe	0.4351	0.1596	0.406	0.3885	0.3313	0.1173	0.1658
lnskpmnd	0.4041	0.1629	0.4437	0.3839	0.2978	0.0228	0.075
lnsfear	0.4685	0.1884	0.3769	0.3422	0.2751	0.1004	0.1525
lnsunfri	0.2538	0.1756	0.2269	0.2737	0.1617	0.1978	0.0525
lnsdislk	0.2517	0.2416	0.2693	0.2361	0.2124	0.2284	0.1376

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1						
lnssleep	0.3448	1					
lnstlkls	0.4916	0.3633	1				
lnsefrt	0.3648	0.338	0.3122	1			
lnsgetgo	0.5376	0.3782	0.4176	0.4171	1		
lnsfail	0.4156	0.2062	0.2307	0.4026	0.3522	1	
lnsasgd	0.2459	0.1351	0.235	0.1657	0.217	0.338	1
lnsbothe	0.533	0.4138	0.4704	0.4716	0.5412	0.3804	0.1749
lnskpmnd	0.4829	0.395	0.4773	0.4696	0.49	0.2658	0.179
lnsfear	0.3908	0.3222	0.3749	0.3455	0.3799	0.285	0.2195
lnsunfri	0.049	0.1858	0.2071	0.3169	0.1816	0.1991	0.1043
lnsdislk	0.0792	0.217	0.1627	0.2746	0.2094	0.248	0.1541

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1				
lnskpmnd	0.493	1			
lnsfear	0.3854	0.4664	1		
lnsunfri	0.1533	0.2006	0.0685	1	
lnsdislk	0.1422	0.2346	0.0985	0.5803	1

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

	lnblues	lnlonely	lncry	lnfelsad	lndepres	lnhappy	lnenjoy
lnblues	1						
lnlonely	0.4881	1					
lncry	0.4506	0.186	1				
lnfelsad	0.678	0.653	0.3599	1			
lndepres	0.76	0.6156	0.3176	0.7476	1		
lnhappy	0.4426	0.4093	0.1795	0.4912	0.513	1	
lnenjoy	0.4758	0.3335	0.2028	0.4079	0.5422	0.7165	1
lnhope	0.3711	0.3001	0.1677	0.3334	0.5047	0.4509	0.5653
lnbadapp	-0.0431	0.0706	-0.041	-0.0098	0.0862	0.1293	0.1248
lnsleep	0.386	0.4279	0.1874	0.3968	0.5654	0.3345	0.341
lntalkls	0.2891	0.1195	0.453	0.305	0.2485	0.3011	0.2043
lnflefrt	0.4475	0.5302	0.2591	0.4821	0.5653	0.4117	0.4423
lngetgo	0.3663	0.2664	0.3606	0.3843	0.4736	0.1899	0.2932
lnfail	0.6976	0.4623	0.2364	0.5867	0.5588	0.3745	0.4477
lnasgood	0.1638	0.116	-0.0565	0.152	0.1285	0.1792	0.241
lnbother	0.7054	0.3819	0.4994	0.5846	0.606	0.3648	0.3353
lnkepmin	0.1401	0.2258	0.2922	0.3052	0.2942	0.1309	0.1235
lnfear	0.1557	0.1225	0.2093	0.2853	0.1822	0.2572	0.1887
lnunfrin	0.28	0.3692	0.2943	0.2298	0.2891	0.2505	0.2336
lndislik	0.4455	0.3893	0.392	0.4292	0.4112	0.2219	0.1672
lnsblues	-0.0195	0.136	-0.084	0.0849	0.1307	0.1026	0.0048
lnslonel	0.157	0.1921	0.0467	0.3056	0.2167	0.1987	0.0821
lnscry	-0.0781	-0.0353	-0.0709	0.0389	0.0447	0.0096	0.0002
lnssad	0.043	0.0187	0.036	0.1707	0.0824	0.0907	0.0062
lnsdeprs	-0.0478	0.0913	-0.1304	0.1023	0.062	0.1767	0.0608
lnshappy	0.174	0.1863	0.057	0.2767	0.2216	0.2482	0.163
lnsenjoy	0.1623	0.182	-0.0036	0.2686	0.1953	0.2398	0.1453
lnshope	0.0932	0.2966	-0.0666	0.2417	0.1821	0.201	0.1117
lnsprapp	0.253	-0.0063	0.4265	0.1791	0.2835	0.2378	0.3348
lnssleep	-0.2125	-0.0516	-0.1744	-0.078	-0.1303	-0.0899	-0.1255
lnstlkls	0.0384	-0.0433	-0.126	0.0328	0.0495	0.0252	0.0252
lnsefrt	0.2254	0.1332	0.1848	0.2216	0.204	0.2166	0.2185
lnsgetgo	0.0625	-0.0449	0.1479	0.1008	0.0761	0.0648	0.0724
lnsfail	0.0226	0.219	-0.0826	0.2535	0.1832	0.2226	0.064
lnsasgd	0.1646	0.0285	0.2927	0.164	0.0688	0.1462	0.0839
lnsbothe	-0.1031	-0.1253	-0.0934	-0.0713	-0.0545	0.0605	0.0175
lnskpmnd	0.0489	0.095	-0.1477	0.1019	0.1415	0.0988	0.1393
lnsfear	0.036	0.057	0.1196	0.1197	0.0632	0.1405	0.0731
lnsunfri	-0.1808	-0.0831	-0.1443	-0.0506	-0.1294	0.0179	0.0203
lnsdislk	-0.1369	-0.0915	-0.0952	-0.0545	-0.2154	-0.0445	-0.0906

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

	lnhope	lnbadapp	lnsleep	lntalkls	lnflefrt	lngetgo	lnfail
lnhope	1						
lnbadapp	0.0507	1					
lnsleep	0.2913	0.1589	1				
lntalkls	0.2378	0.0284	0.0693	1			
lnflefrt	0.3495	0.2016	0.5086	0.0777	1		
lngetgo	0.3454	0.0003	0.3772	0.2181	0.5313	1	
lnfail	0.3633	-0.0465	0.3714	0.043	0.4256	0.2521	1
lnasgood	0.3182	0.0054	0.0757	-0.0869	0.0702	0.0607	0.2922
lnbother	0.3246	0.0042	0.2809	0.3956	0.3229	0.3323	0.4304
lnkepmin	0.1698	0.0248	0.2299	0.2764	0.3268	0.5099	0.0151
lnfear	0.2358	0.0067	0.0098	0.4896	0.0772	0.084	0.0792
lnunfrin	0.222	0.2012	0.1989	0.1353	0.2405	0.0598	0.2121
lndislik	0.1735	0.0462	0.1603	0.249	0.182	0.2005	0.2871
lnsblues	0.1372	0.0241	0.0202	0.0621	-0.051	-0.1635	-0.0795
lnslonel	0.022	-0.089	-0.0279	0.1518	0.0145	-0.1129	0.0296
lnscry	0.1614	-0.0299	-0.0253	0.0522	-0.0338	-0.0696	-0.082
lnssad	0.027	-0.1406	-0.1328	0.1706	-0.1215	-0.1091	-0.0989
lnsdeprs	0.0967	-0.0644	-0.1381	0.2355	-0.1272	-0.2186	-0.149
lnshappy	0.1415	-0.0586	-0.0065	0.1515	0.0723	0.0077	0.1316
lnsenjoy	0.049	-0.0763	-0.0387	0.1064	0.0356	-0.0395	0.1084
lnshope	0.1968	-0.0612	0.0185	0.1285	0.1228	0.0403	0.1518
lnsprapp	0.1633	0.1005	0.1094	0.257	0.1796	0.255	0.0525
lnssleep	-0.0878	0.0201	-0.0463	-0.088	0.0556	0.0307	-0.1454
lnstlkls	0.0701	-0.0627	-0.091	0.0042	-0.1871	-0.0687	-0.101
lnsefrt	0.1829	-0.0134	0.0486	0.2064	0.1445	-0.0462	0.196
lnsgetgo	0.1135	-0.1456	-0.1355	0.3244	-0.1136	-0.0833	-0.0748
lnsfail	0.0784	-0.0282	-0.0426	0.1544	-0.0106	-0.163	-0.1165
lnsasgd	0.0074	-0.0134	-0.0705	0.2381	0.0359	0.0677	-0.0203
lnsbothe	-0.0128	0.0273	-0.0972	0.007	-0.0226	-0.1407	-0.0848
lnskpmnd	0.1976	-0.0695	0.0175	0.1036	-0.0027	-0.0479	0.02
lnsfear	0.1639	-0.0504	-0.163	0.3703	-0.0374	-0.1089	-0.0893
lnsunfri	0.0047	0.0135	-0.1479	0.1239	-0.0696	-0.1375	-0.1421
lnsdislk	-0.0568	-0.0813	-0.1971	0.1422	-0.1272	-0.0971	-0.0427

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

	lnasgood	lnbother	lnkepmin	lnfear	lnunfrin	lndislik	lnsblues
lnasgood	1						
lnbother	0.1124	1					
lnkepmin	-0.003	0.2368	1				
lnfear	-0.0449	0.2336	0.1804	1			
lnunfrin	0.008	0.3413	0.1392	0.067	1		
lndislik	0.0072	0.5043	0.2406	0.1908	0.4663	1	
lnsblues	0.0408	0.197	0.0779	0.0033	0.2635	0.1749	1
lnslonel	-0.0618	0.2472	0.1131	0.1484	0.0851	0.1337	0.5325
lnscry	0.137	0.1016	0.1125	-0.0885	0.0112	-0.0807	0.529
lnssad	-0.0311	0.2125	0.1639	0.1381	0.0397	0.1311	0.5918
lnsdeprs	-0.0779	0.1097	0.0598	0.2105	0.0733	0.0789	0.7086
lnshappy	0.0922	0.2277	0.1203	0.0793	0.0988	0.1461	0.4641
lnsenjoy	0.0386	0.243	0.1259	0.0927	0.0981	0.1332	0.4867
lnshope	0.1347	0.0922	0.0703	0.0938	0.0464	0.1239	0.3755
lnsprapp	-0.0877	0.3103	0.1733	0.2252	0.1582	0.1495	-0.0328
lnssleep	-0.0945	-0.2251	0.1287	-0.0527	-0.1053	-0.208	0.1045
lnstlkls	0.0146	0.1416	0.0528	0.0691	0.1236	0.1976	0.4946
lnsefrt	0.096	0.234	0.0178	0.1296	0.1213	0.1701	0.2721
lnsgetgo	-0.0314	0.2092	0.0954	0.2943	0.0944	0.1928	0.4519
lnsfail	-0.0746	0.2063	0.1265	0.1495	0.1116	0.1143	0.614
lnsasgd	-0.1135	0.2242	0.1416	0.2605	0.1491	0.2186	0.1227
lnsbothe	-0.0355	-0.0531	-0.0078	-0.0247	0.0164	-0.1727	0.3976
lnskpmnd	0.0013	0.0512	0.0124	0.1223	0.0012	0.0245	0.3765
lnsfear	-0.1378	0.1415	0.1104	0.2782	0.1019	0.1544	0.4254
lnsunfri	-0.0444	-0.1113	-0.0343	0.0577	-0.0687	-0.1872	0.2217
lnsdislk	-0.0767	-0.1319	-0.0359	0.1639	-0.1522	-0.1242	0.059

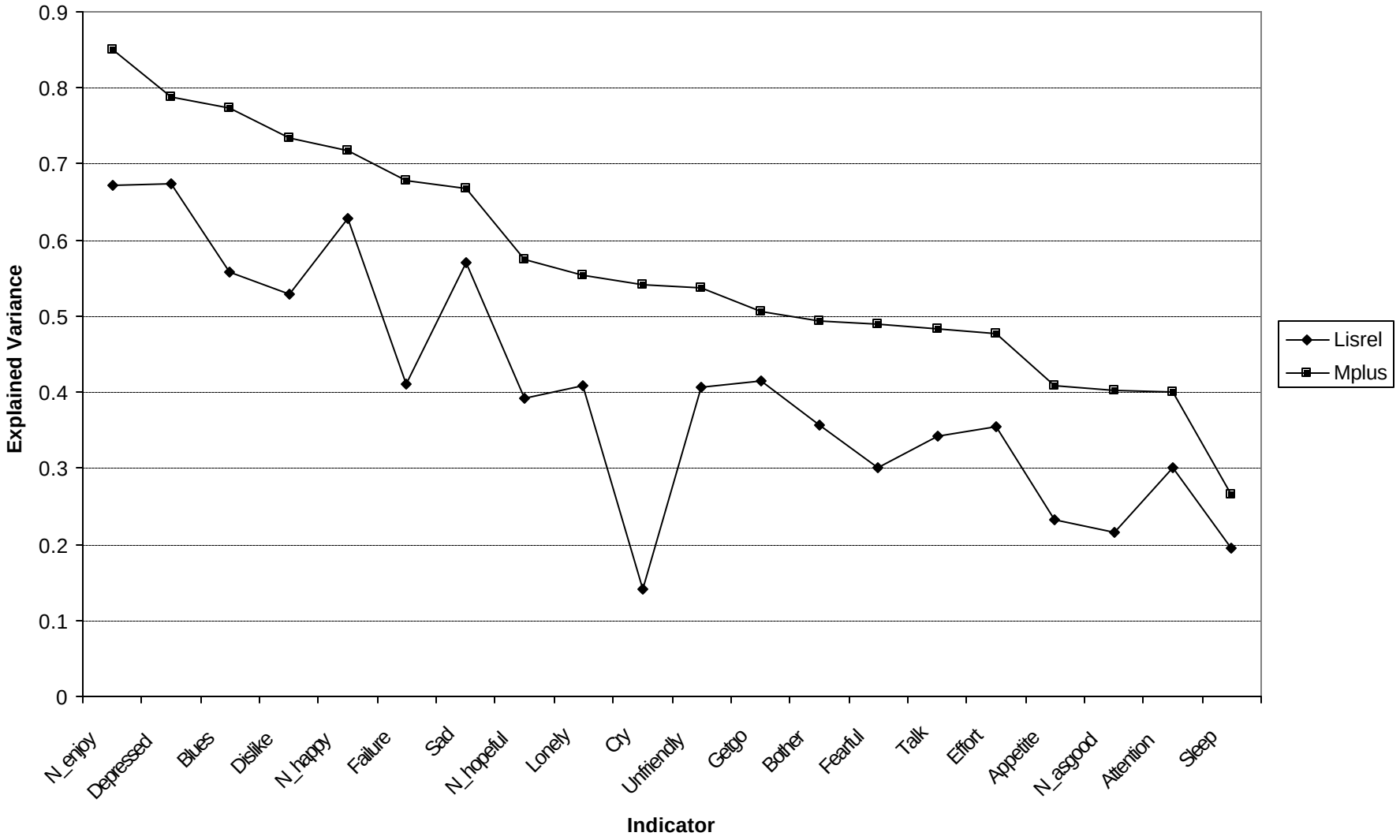
	lnslonel	lnscry	lnssad	lnsdeprs	lnshappy	lnsenjoy	lnshope
lnslonel	1						
lnscry	0.4754	1					
lnssad	0.7454	0.534	1				
lnsdeprs	0.7159	0.5172	0.7604	1			
lnshappy	0.5182	0.3055	0.4878	0.5014	1		
lnsenjoy	0.5966	0.3337	0.5614	0.554	0.7609	1	
lnshope	0.3199	0.1495	0.2567	0.3677	0.5715	0.4993	1
lnsprapp	0.2311	0.1081	0.2176	0.1387	0.0747	0.1703	-0.1485
lnssleep	0.2486	0.2807	0.2169	0.1913	0.0694	0.1025	0.0345
lnstlkls	0.4403	0.2887	0.5015	0.4661	0.3314	0.3426	0.1701
lnsefrt	0.3201	0.2314	0.2516	0.3029	0.3127	0.2569	0.2913
lnsgetgo	0.478	0.3297	0.5257	0.5701	0.3706	0.3205	0.3089
lnsfail	0.7499	0.4504	0.6701	0.7471	0.5169	0.5987	0.367
lnsasgd	0.3038	-0.0278	0.2553	0.2281	0.3451	0.4081	0.3016
lnsbothe	0.4387	0.3973	0.4283	0.4417	0.2876	0.3583	0.117
lnskpmnd	0.3994	0.3447	0.409	0.5093	0.2954	0.2389	0.3291
lnsfear	0.5156	0.3035	0.5253	0.6397	0.3934	0.3767	0.3492
lnsunfri	0.3457	0.3526	0.2498	0.3321	0.2008	0.1556	0.1885
lnsdislk	0.1722	0.0459	0.164	0.2848	0.1227	0.0734	0.1955

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

	lnsprapp	lnssleep	lnstlkls	lnsefrt	lnsgetgo	lnsfail	lnsasgd
lnsprapp	1						
lnssleep	0.0072	1					
lnstlkls	0.1827	0.1172	1				
lnsefrt	0.2621	0.0351	0.1936	1			
lnsgetgo	0.1824	0.1001	0.4401	0.5097	1		
lnsfail	0.1491	0.1752	0.4095	0.2178	0.4102	1	
lnsasgd	0.2709	-0.0085	0.1958	0.208	0.2731	0.3171	1
lnsbothe	0.2464	0.2354	0.3243	0.2358	0.2599	0.3264	0.0949
lnskpmnd	0.1226	0.1372	0.3216	0.3986	0.43	0.4309	0.0542
lnsfear	0.1202	0.0911	0.2936	0.3296	0.4593	0.5488	0.3167
lnsunfri	0.0466	0.2272	0.1338	0.2236	0.2968	0.3257	0.0502
lnsdislk	-0.0207	0.0926	0.066	0.2186	0.2123	0.1407	0.1692

	lnsbothe	lnskpmnd	lnsfear	lnsunfri	lnsdislk
lnsbothe	1				
lnskpmnd	0.2778	1			
lnsfear	0.2261	0.4122	1		
lnsunfri	0.3603	0.2859	0.3525	1	
lnsdislk	0.1963	0.1688	0.3637	0.4848	1

Appendix D. Squared Multiple Correlations for Depression Indicators among Men



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