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ABSTRACT
              In the early 1970s A. Constantinople wrote a seminal
article that led to the development of the construct of psychological
androgyny. The Bem Sex-Role Inventory is a popular measure of the
construct, but the measure remains controversial. The construct
validity of scores from the measure was explored using confirmatory
factor analysis on data from 791 college students. Neither a model
positing zero factors nor a model positing a single factor fit the
data. The correlation between the two factors identified was
negligible, suggesting that the two constructs may be orthogonal. Fit
statistics presented do not make one optimistic about the validity of
scores from the measure, at least when computed with conventional
scoring keys. More favorable results might be obtained from the short
form of the measure. Two tables are provided. One appendix presents
the analysis of the correlation matrix, and the other gives parameter
estimates. (Contains 23 references.) (SLD)

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THE FACTOR STRUCTURE OF THE BEM SEX-ROLE INVENTORY (BSRI):

A CONFIRMATORY ANALYSIS

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ABSTRACT

In the early 70's Constantinople wrote a seminal article that subsequently led to the elaboration of the development of the construct of psychological androgyny. The *Bem Sex-Role Inventory* is a popular measure of the construct, but the measure remains controversial. We explored construct validity of scores from the measure using confirmatory factor analytic methods on data from 791 subjects.

THE FACTOR STRUCTURE OF THE BEM SEX-ROLE INVENTORY (BSRI):
A CONFIRMATORY ANALYSIS

Many researchers acknowledge the prominent role that factor analysis can play in efforts to establish construct validity. For example, Nunnally (1978, p. 111) noted that, historically, "construct validity has been spoken of as [both] 'trait validity' and 'factorial validity.'"

Similarly, Gorsuch '1983, p. 350) noted, "A prime use of factor analysis has been in the development of both the operational constructs for an area and the operational representatives for the theoretical constructs." In short, "factor analysis is intimately involved with questions of validity.... Factor analysis is at the heart of the measurement of psychological constructs" (Nunnally, 1978, pp. 112-113).

In the present study we employed confirmatory factor analytic methods (Jöreskog & Sörbom, 1989) to explore the construct validity of scores from a popular measure of psychological androgyny, the *Bem Sex-Role Inventory* (BSRI) (Bem, 1981). The measure has been controversial, as explained by Thompson (1989). For example, Pedhazur and Tetenbaum (1979) presented a stinging critique of the measure, to which Bem (1979) responded.

The development of the *Bem Sex-Role Inventory* can be traced to Constantinople (1973), who argued that persons could possess stereotypically masculine and stereotypically feminine

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psychological traits in any combination, regardless of physical gender. For example, persons who are *both* masculine and feminine in their psychological outlook are termed "androgynous".

The structure underlying responses to the *Bem Sex-Role Inventory* has been investigated using various analytic methods across diverse samples (see Thompson, 1989). Thompson and Melancon (1986) provide an example of the use of exploratory methods with scores from the measure. Confirmatory methods have been applied to BSRI data from adolescents (Thompson & Melancon, 1988). Second-order confirmatory methods have also been used (Marsh, 1985).

It is important to employ confirmatory methods in such validity studies, when possible, because such methods test models that are potentially "falsifiable" (Mulaik, 1987, 1988). Furthermore, if properly used, the methods reward the development of more parsimonious models (Mulaik, James, van Alstine, Bennett, Lind & Stilwell, 1989).

Method

Subjects

In the present study we used confirmatory factor analytic methods to investigate structure associated with BSRI data provided by 791 graduate and undergraduate students enrolled at a large university. The sample was predominantly white (82.9%), though the sample also included Hispanics (9.5%), and African-Americans (4.2%). There were slightly more women (50.9%) in the sample. The mean age was 20.23 (SD=4.04).

Results

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Confirmatory factor analyses were conducted using LISREL covariance structure analyses (Jöreskog & Sörbom, 1989). Bivariate correlation matrices were used as the basis for each analysis, to produce "scale-free" parameters. We could use correlation matrices, because all our models involved variables correlating with only one factor, and each factor had factor variance fixed to one (Cudeck, 1989).

Models

Each model freed (a) one factor parameter per variable, (b) the factor correlation coefficients, and (c) the measurement error variance for each variable. All other parameters were fixed.

Model #1 (v=40; n=791). This model posited a single bipolar factor defined by the 40 variables--20 per scale.

Model #2 (v=40; n=791). This model posited two uncorrelated factors defined by the 40 variables.

Model #3 (v=40; n=791). This model posited two correlated factors defined by the 40 variables.

Table 1 presents the fit statistics (Bentler, 1990, 1994) for the three models. Table 2 presents the maximum-likelihood parameter estimates for Model #3. The analyzed correlation matrix and the other parameter estimates are appended.

INSERT TABLES 1 AND 2 ABOUT HERE.

Discussion

At the outset it must be emphasized that our data and our results do not *alone* determine our constructs (Mulaik, 1994). As

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Mulaik (1987, p. 301) emphasized, "It is we who create meanings for things in deciding how they are to be used. Thus we should see the folly of supposing that exploratory factor analysis will teach us what intelligence is, or what personality is." We can not avoid the existential responsibility for defining our constructs. Of course, as Huberty (1994, p. 265) explains, our data can be used to guide our decisions as to what constructs are, i.e., theory development and theory testing are "joint bootstrap operations" (Hendrick & Hendrick, 1986, p. 393).

Several features of the results are noteworthy. First, neither a model positing no factors nor a model positing a single bipolar factor fit the data, as indicated by the various fit statistics reported in Table 1. The failure to fit a bipolar single factor supports Constantinople's (1973) original theory as regards these constructs.

Second, the correlation ($r = -.022$) between the two factors was negligible, as reported in Table 2. This last result suggests that the two constructs may be orthogonal, as implied by a classification scheme presented as the 2x2 contingency table typically employed by researchers using the Bem Sex-Role Inventory.

Third, the fit statistics presented in Table 1 would not make one sanguine about the validity of scores from the measure, or at least of scores computed using conventional scoring keys. Models #2 and #3 fit the data equally well, but neither provided a particularly good fit. These results are generally consistent with related work reported by others (cf. Marsh & Myers, 1984).

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However, it must be remembered that the characteristics of reliability and validity inure to *scores* and not to tests (Thompson, 1994), and that sometimes scores from shorter tests are more reliable than scores from longer tests (Thompson, 1990, p. 586). The 20-item short-form of the Bem generally yields more reliable scores than does the 40-item long-form, especially on the Feminine scale (Bem, 1981, p. 14). Thus, it is possible that more favorable results would be achieved by analyzing only the 20 short-form items. This possibility remains to be explored in future research.

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References

Bem, S.L. (1979). Theory and measurement of androgyny: A reply to the Pedhazur-Tetenbaum and Locksley-Colten critiques. _Journal of Personality and Social Psychology, 37,_ 1047-1054.

Bem, S.L. (1981). _Bem Sex-Role Inventory: Professional manual._ Palo Alto, CA: Consulting Psychologists Press.

Bentler, P.M. (1990). Comparative fit indices in structural models. _Psychological Bulletin, 107,_ 238-246.

Bentler, P.M. (1994). On the quality of test statistics in covariance structure analysis: Caveat emptor. In C.R. Reynolds (Ed.), _Cognitive assessment: An multidisciplinary perspective_ (pp. 237-260). New York: Plenum Press.

Constantinople, A. (1973). Masculinity-femininity: An exception to the famous dictum. _Psychological Bulletin, 80,_ 389-407.

Cudeck, R. (1989). The analysis of correlation matrices using covariance structure models. _Psychological Bulletin, 105,_ 317-327.

Gorsuch, R.L. (1983). _Factor analysis_ (2nd ed.). Hillsdale, NJ: Erlbaum.

Hendrick, C., & Hendrick, S. (1986). A theory and method of love. _Journal of Personality and Social Psychology, 50,_ 392-402.

Huberty, C.J. (1994). _Applied discriminant analysis._ New York: John Wiley & Sons.

Jöreskog, K.G., & Sörbom, D./SPSS. (1989). _LISREL 7: A guide to the program and applications_ (2nd ed.). Chicago: SPSS.

Marsh, H. W. (1985). The structure of masculinity/femininity: An

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application of confirmatory factor analysis to higher-order factor structures and factorial invariance. <u>Multivariate Behavioral Research</u>, <u>20</u>, 427-449.

Marsh, H. W., & Myers, M. (1984). Masculinity, femininity and androgyny: A methodological and theoretical critique. <u>Collected papers of 1984 National Conference of the Australian Association for Research in Education</u> (pp. 566-581). Perth, Western Australia: Australian Association for Research in Education. (ERIC Document Reproduction Service No. ED 242 758)

Mulaik, S.A. (1987). A brief history of the philosophical foundations of exploratory factor analysis. <u>Multivariate Behavioral Research</u>, <u>22</u>, 267-305.

Mulaik, S.A. (1988). Confirmatory factor analysis. In R.B. Cattell & J.R. Nesselroade (Eds.), <u>Handbook of multivariate experimental psychology</u>. New York: Plenum.

Mulaik, S. A. (1994). The critique of pure statistics: Artifact and objectivity in multivariate statistics. In B. Thompson (Ed.), <u>Advances in social science methodology</u> (Vol. 3, pp. 247-296). Greenwich, CT: JAI Press.

Mulaik, S.A., James, L.R., van Alstine, J., Bennett, N., Lind, S., & Stilwell, C.D. (1989). Evaluation of goodness-of-fit indices for structural equation models. <u>Psychological Bulletin</u>, <u>105</u>, 430-445.

Nunnally, J.C. (1978). <u>Psychometric theory</u> (2nd ed.). New York: McGraw-Hill.

Pedhazur, E. J., & Tetenbaum, T. J. (1979). *Bem Sex-Role Inventory*:

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A theoretical and methodological critique. _Journal of Personality and Social Psychology_, _37_, 996-1016.

Thompson, B. (1989). Meta-analysis of factor structure studies: A case study example with Bem's androgyny measure. _Journal of Experimental Education_, _57_, 187-197.

Thompson, B. (1990). ALPHAMAX: A program that maximizes coefficient alpha by selective item deletion. _Educational and Psychological Measurement_, _50_, 585-589.

Thompson, B. (1994). Guidelines for authors. _Educational and Psychological Measurement_, _54_, 837-847.

Thompson, B., & Melancon, J.G. (1986). Factor structure of the Bem Sex-Role Inventory. _Measurement and Evaluation in Counseling and Development_, _19_, 77-83.

Thompson, B., & Melancon, J.G. (1988, January). _Confirmatory and second-order factor analyses of androgyny data from adolescents_. Paper presented at the annual meeting of the Southwest Educational Research Association, San Antonio. (ERIC Document Reproduction Service No. ED 295 958)

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Table 1
Fit Statistics for Three Models
($\underline{n}$ = 791; $\underline{v}$ = 40)

Model	1	2	3
Null chi sq	12628.22	12628.22	12628.22
Null df	780	780	780
Noncentrality	11848.22	11848.22	11848.22[a]
Model chi sq	8891.26	5415.64	5415.35
Model df	740	740	739
Noncentrality	8151.26	4675.64	4676.35[a]
NC / df	11.01522	6.31843	6.32794[b]
GFI	0.482	0.728	0.728
Pars Ratio	0.90244	0.90244	0.90122[c]
GFI*Pars	0.43498	0.65698	0.65609[d]
CFI	0.31203	0.60537	0.60531[e]
Pars Ratio	0.94872	0.94872	0.94744[f]
CFI*Pars	0.29603	0.57433	0.57349[g]

[a] Noncentrality = χ^2 - df

[b] Noncentrality / df

[c] Parsimony Ratio = Model df / [($\underline{variables}$ * ($\underline{variables}$ + 1)) / 2]

[d] GFI * Parsimony Ratio

[e] CFI = $\dfrac{[(\text{Null } \chi^2 - \text{Null df}) - (\text{Model } \chi^2 - \text{Model df})]}{(\text{Null } \chi^2 - \text{Null df})}$

[f] Parsimony Ratio = Model df / [($\underline{variables}$ * ($\underline{variables}$ - 1)) / 2]

[g] CFI * Parsimony Ratio

Note. These fit statistics are described by Bentler (1990, 1994) and by Mulaik, James, van Alstine, Bennett, Lind, and Stilwell (1989).

Table 2
Correlated Two-Factor Model
Maximum Likelihood Parameter Estimates

LAMBDA X

	MASCULIN	FEMININE
DEFENDMY	0.465	0.000
INDEPEND	0.452	0.000
ASSERTIV	0.654	0.000
STRONGPE	0.627	0.000
FORCEFUL	0.373	0.000
LEADERSH	0.715	0.000
TAKERISK	0.480	0.000
DOMINANT	0.587	0.000
TAKESTAN	0.618	0.000
AGRESSIV	0.554	0.000
SELFRELI	0.472	0.000
ATHLETIC	0.375	0.000
ANALYTIC	0.189	0.000
DECIEASY	0.444	0.000
SELFSUFF	0.444	0.000
INDIVIDU	0.347	0.000
MASCULIN	0.232	0.000
COMPETIT	0.490	0.000
AMBITIOU	0.559	0.000
ASLEADER	0.727	0.000
AFFECTIO	0.000	0.637
SYMPATHE	0.000	0.679
SENSITIV	0.000	0.688
UNDERSTA	0.000	0.639
COMPASSI	0.000	0.760
SOOTHEHU	0.000	0.644
WARM	0.000	0.771
TENDER	0.000	0.790
LOVECHIL	0.000	0.393
GENTLE	0.000	0.766
YIELDING	0.000	0.341
CHEERFUL	0.000	0.427
SHY	0.000	0.072
FLATTERA	0.000	0.211
LOYAL	0.000	0.328
SOFTSPOK	0.000	0.176
GULLIBLE	0.000	0.193
CHILDLIK	0.000	0.077
NOHARSH	0.000	0.247
FEMININE	0.000	0.366

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	MASCULIN	FEMININE
MASCULIN	1.000	
FEMININE	-0.022	1.000

Appendix A: Correlation Matrix Analyzed

	DEFENDMY	INDEPEND	ASSERTIV	STRONGPE	FORCEFUL	LEADERSH	TAKERISK	DOMINANT	TAKESTAN	AGRESSIV
DEFENDMY	1.0000000									
INDEPEND	0.2766390	1.0000000								
ASSERTIV	0.3054530	0.2848940	1.0000000							
STRONGPE	0.3680130	0.2394920	0.4794710	1.0000000						
FORCEFUL	0.1397800	0.1579290	0.3330300	0.2057260	1.0000000					
LEADERSH	0.2570690	0.2164360	0.4458170	0.4611010	0.1569480	1.0000000				
TAKERISK	0.1923970	0.2456300	0.3131790	0.3310120	0.1618040	0.2570650	1.0000000			
DOMINANT	0.2207400	0.2295210	0.4386610	0.3963750	0.4618450	0.3831240	0.3101770	1.0000000		
TAKESTAN	0.5099260	0.2645530	0.4024700	0.3962340	0.2216660	0.4170560	0.3606820	0.3411280	1.0000000	
AGRESSIV	0.1963000	0.2019360	0.4576090	0.3311650	0.4923660	0.3159090	0.3038530	0.5250190	0.3109050	1.0000000
SELFRELI	0.2577890	0.5229590	0.2797310	0.2321800	0.0940021	0.2637380	0.2506830	0.1739370	0.2904440	0.1710700
ATHLETIC	0.0994353	0.1010450	0.2069900	0.2488600	0.0693406	0.2797810	0.3039340	0.1875220	0.1697590	0.2205560
ANALYTIC	0.0965866	0.1395880	0.0776790	0.0515203	0.0202088	0.1673850	0.0402564	0.0478020	0.1384690	0.0015094
DECIEASY	0.2090290	0.2684580	0.2571400	0.2323910	0.1478780	0.3056270	0.2635550	0.2456600	0.3074020	0.2354940
SELFSUFF	0.2653030	0.4697640	0.2311580	0.2023570	0.0983701	0.2573300	0.2232430	0.1405450	0.3107420	0.1546250
INDIVIDU	0.2608180	0.3618160	0.1909640	0.2449570	0.0770444	0.1954340	0.1870580	0.1621810	0.2579720	0.1403320
MASCULIN	0.0463351	0.0281217	0.0995842	0.0885388	0.0898941	0.1429500	0.2835270	0.1362280	0.1677460	0.1756870
COMPETIT	0.1612820	0.1455940	0.2949430	0.2747420	0.1956630	0.3020020	0.3179200	0.3118570	0.2851870	0.3178840
AMBITIOU	0.2782840	0.2985350	0.3554320	0.3530260	0.1359960	0.4361730	0.2112060	0.2350530	0.2933600	0.2365950
ASLEADER	0.2611660	0.2274150	0.4437410	0.4523290	0.2011400	0.8102820	0.2433900	0.4226070	0.4068520	0.3758550
AFFECTIO	0.1047070	-0.1101760	0.0191873	0.0928520	-0.1261720	0.1217310	0.0186840	-0.0563816	0.0244801	-0.0617476
SYMPATHE	0.0033206	-0.0803177	-0.1298860	-0.0705023	-0.1281160	-0.0183748	-0.0963388	-0.1904590	-0.1179300	-0.2175800
SENSITIV	0.0202284	-0.0905064	-0.0796181	-0.0143351	-0.1989200	0.0124018	-0.0970063	-0.1920600	-0.0383139	-0.1704380
UNDERSTA	0.0711756	0.0492024	-0.0383442	0.1169060	-0.1580590	0.0680149	-0.0051717	-0.1024250	-0.0110984	-0.1008930
COMPASSI	0.0746840	-0.0440783	0.0094638	0.0767927	-0.0873556	0.0699046	-0.0378870	-0.1083350	-0.0367584	-0.0742200
SOOTHEHU	0.1037830	-0.0770325	0.0432679	0.0572619	-0.1216560	0.1884100	-0.0097736	-0.0791543	0.0296066	-0.0961924
WARM	0.1051020	-0.0808416	0.0281633	0.1037000	-0.0904222	0.1024600	0.0489487	-0.0793677	0.0455623	-0.0501970
TENDER	0.0174329	-0.1245930	-0.0394678	0.0058389	-0.1145350	0.0518524	-0.1041420	-0.1080410	-0.0583388	-0.0915618
LOVECHIL	0.1348240	-0.0235495	0.0375900	0.0975545	-0.0318069	0.1485560	-0.0286814	-0.0100934	0.0682706	0.0171613
GENTLE	0.0373555	-0.0743285	-0.0766245	0.0065701	-0.1434000	0.0560103	-0.0864523	-0.1652530	-0.0182679	-0.1537600
YIELDING	-0.1074750	-0.0732605	-0.1352180	-0.1095160	-0.1500530	-0.0512656	-0.0706040	-0.1590760	-0.1152710	-0.1237550
CHEERFUL	0.1177580	0.0312142	0.1620350	0.2226170	0.0326227	0.1570960	0.0976639	0.0201192	0.1019260	0.0798523
SHY	-0.1450820	-0.1212780	-0.3431690	-0.3233690	-0.0828504	-0.3129880	-0.1664390	-0.2883840	-0.2477710	-0.2419720
FLATTERA	-0.0394373	-0.0677375	0.0677375	0.1125750	0.0636754	0.0924651	-0.0158284	0.0372472	0.0134544	0.6430309
LOYAL	0.1200860	0.0650815	0.0814497	0.1475150	0.0556635	0.1571030	0.0466062	-0.0366975	0.1021040	0.0100059
SOFTSPOK	-0.1875770	-0.1304760	-0.3495110	-0.3306050	-0.1803050	-0.2442560	-0.1883760	-0.3145360	-0.2494020	-0.2656730
GULLIBLE	-0.1571790	-0.1937880	-0.1082310	-0.1575700	-0.0858236	-0.1139460	-0.1529840	-0.1312050	-0.1877710	-0.1289370
CHILDLIK	-0.0253971	-0.1318110	0.0404046	0.0349489	0.0950715	-0.0051582	0.0889025	0.0493006	0.0088103	0.0629814
NOHARSH	-0.0689614	-0.0304477	-0.1103950	-0.1178950	-0.1272880	-0.0263564	-0.1496160	-0.1433770	-0.1068520	-0.2152130
FEMININE	-0.0021989	-0.0082455	-0.0552753	-0.0410059	-0.0613254	-0.0919351	-0.2605190	-0.0927975	-0.1181450	-0.1245840

	SELFRELI	ATHLETIC	ANALYTIC	DECIEASY	SELFSUFF	INDIVIDU	MASCULIN	COMPETIT	AMBITIOU	ASLEADER
SELFRELI	1.0000000									
ATHLETIC	0.1517190	1.0000000								
ANALYTIC	0.1236350	0.0679729	1.0000000							
DECIEASY	0.2915530	0.1606010	0.0711877	1.0000000						
SELFSUFF	0.5956100	0.1241710	0.1203520	0.2528910	1.0000000					
INDIVIDU	0.3225610	0.0428583	0.1240900	0.1309080	0.3396030	1.0000000				
MASCULIN	0.0440010	0.3468490	0.0981107	0.2409000	0.0829209	-0.0135275	1.0000000			
COMPETIT	0.1825550	0.4582120	0.1331470	0.1873710	0.1895130	0.0796031	0.3493950	1.0000000		
AMBITIOU	0.3174500	0.2185250	0.1824330	0.2129470	0.2885520	0.2289620	-0.0222697	0.3600430	1.0000000	
ASLEADER	0.2679880	0.2461070	0.1714500	0.3087270	0.2439380	0.1601240	0.1140190	0.3292950	0.4719970	1.0000000
AFFECTIO	-0.0616014	0.0808320	0.0295628	-0.0568361	-0.0188796	0.0381557	-0.1465750	-0.0602380	0.1281300	0.0708259
SYMPATHE	-0.0146061	-0.0576133	-0.0280177	0.0779047	0.0461828	0.0349205	-0.2108610	-0.1294960	0.0484503	-0.0259864
SENSITIV	-0.0358358	-0.0004933	-0.0244691	-0.0714160	0.0292384	-0.0053808	-0.2347570	-0.1139570	0.0497587	-0.0016215
UNDERSTA	0.1010670	0.0320721	-0.0027424	0.0135192	0.1426570	0.1029930	-0.1395080	-0.0688299	0.1189690	0.0596215
COMPASSI	0.0256708	0.0004001	0.0319419	-0.0380886	0.0764470	0.0884117	-0.2130620	-0.0514003	0.1590890	0.0499294
SOOTHEHU	-0.0055738	0.0116459	0.0377439	-0.0104939	0.0604446	0.0503652	-0.1642530	-0.0456659	0.1726180	0.1154280
WARM	0.0074503	0.0813362	0.0132427	-0.0163211	0.0847158	0.0591639	-0.1767910	-0.0025691	0.1910460	0.0621517
TENDER	-0.0360464	0.0344368	0.0152075	-0.0795199	0.0244804	0.0273873	-0.2532330	-0.0997162	0.0984059	0.0204997
LOVECHIL	0.0427216	0.0818094	-0.0402886	-0.0125836	0.0623216	0.0249792	-0.1525690	0.0036224	0.1489370	0.1276180
GENTLE	-0.0067647	0.0599676	-0.0188439	0.0379884	0.0508180	0.0426955	-0.1953940	-0.0657713	0.0664612	0.0039120
YIELDING	0.0273127	-0.0109212	0.0059849	-0.0599081	0.0016614	0.0067201	-0.1137110	-0.1012590	-0.0347451	-0.0432246
CHEERFUL	0.1023260	0.1168690	-0.0294908	0.1015310	0.0996136	0.1569830	-0.0981015	0.0993126	0.2245320	0.2134790
SHY	-0.0693285	-0.0847898	0.0737661	-0.1237540	-0.0837076	-0.0682968	0.0407598	-0.0874100	-0.1672560	-0.3291990
FLATTERA	-0.0009657	0.1091080	0.0314028	0.0498273	-0.0163622	0.0535606	-0.0391554	-0.0479964	0.1049810	0.0468404
LOYAL	0.1398940	0.0264230	0.1165190	0.0451073	0.2000590	0.1672550	-0.1083610	0.0441769	0.2089420	0.1334990
SOFTSPOK	-0.0682029	-0.0782816	0.0214990	-0.0806535	-0.0303067	0.0184861	0.0060098	-0.1733280	-0.2052300	-0.2977500
GULLIBLE	-0.1542890	-0.1058000	-0.0336674	-0.1820800	-0.0963683	-0.0542448	-0.1605870	-0.1455400	-0.0639284	-0.1348670
CHILDLIK	-0.0774347	-0.1327640	-0.0100943	-0.0201351	-0.1122130	0.0060777	-0.1343010	0.1119220	-0.0461575	-0.0145780
NOHARSH	0.0079168	-0.0929620	0.0725558	-0.0075873	0.0103331	-0.0123143	-0.2364680	-0.1016800	0.0609614	0.0070716
FEMININE	0.0050506	-0.2899570	-0.0670491	-0.2187580	-0.0157418	0.0575779	-0.8892850	-0.3127520	0.0680477	-0.0594842

	AFFECTIO	SYMPATHE	SENSITIV	UNDERSTA	COMPASSI	SOOTHEHU	WARM	TENDER	LOVECHIL	GENTLE
AFFECTIO	1.0000000									
SYMPATHE	0.3845600	1.0000000								
SENSITIV	0.3715700	0.5592340	1.0000000							
UNDERSTA	0.3217490	0.5269150	0.4998720	1.0000000						
COMPASSI	0.5207640	0.5643950	0.5332550	0.4950580	1.0000000					
SOOTHEHU	0.4459460	0.4883260	0.4664790	0.4376580	0.5153380	1.0000000				
WARM	0.5617890	0.4625240	0.5300720	0.4532160	0.5743560	0.4960850	1.0000000			
TENDER	0.5635510	0.4943210	0.4837580	0.4562010	0.6098220	0.4770330	0.6576400	1.0000000		
LOVECHIL	0.2790670	0.2306960	0.2551030	0.2237870	0.2959810	0.2343080	0.3386860	0.2863180	1.0000000	
GENTLE	0.4783270	0.5034720	0.5044240	0.5011620	0.5479860	0.4491710	0.5928510	0.6522940	0.2944500	1.0000000
YIELDING	0.1465550	0.2791220	0.2345860	0.2119730	0.2118700	0.1823330	0.2605530	0.2541950	0.1139570	0.3300990
CHEERFUL	0.2741840	0.2511150	0.2926530	0.3179290	0.3270760	0.2387190	0.3795640	0.2834300	0.2726930	0.3074760
SHY	-0.0844810	0.1455140	0.0922783	0.0842616	0.0170323	0.0054830	0.0071160	0.0477142	-0.0748762	0.1287180
FLATTERA	0.1552420	0.1255190	0.1338910	0.1095730	0.1520850	0.1335570	0.1927810	0.1558840	0.0416741	0.1623790
LOYAL	0.1802470	0.1686050	0.2369050	0.2388570	0.1738610	0.2330070	0.2665070	0.2345720	0.2120160	0.2790600
SOFTSPOK	0.0254462	0.1829720	0.1059540	0.1820970	0.0943515	0.0375971	0.0549432	0.1822750	-0.0182799	0.2317070
GULLIBLE	0.0400068	0.1789100	0.1360520	0.0812436	0.0977278	0.1304890	0.1178650	0.1419260	0.1169620	0.1531230
CHILDLIK	0.0736725	0.0197596	-0.0230101	0.0225224	0.0418176	0.0790549	0.0796358	0.0662851	0.0409308	0.1058730
NOHARSH	0.0338488	0.1849420	0.1979030	0.1670360	0.1457200	0.1504280	0.1476150	0.1793510	0.1406640	0.2211440
FEMININE	0.1829550	0.2648120	0.2823870	0.1998910	0.2587610	0.2167710	0.2696260	0.3187730	0.1897160	0.2597560

	YIELDING	CHEERFUL	SHY	FLATTERA	LOYAL	SOFTSPOK	GULLIBLE	CHILDLIK	NOHARSH	FEMININE
YIELDING	1.0000000									
CHEERFUL	0.1159590	1.0000000								
SHY	0.1566140	-0.1676760	1.0000000							
FLATTERA	0.0867866	0.1659180	-0.0127205	1.0000000						
LOYAL	0.1427900	0.2557170	0.0291258	0.0554605	1.0000000					
SOFTSPOK	0.2110260	-0.0555819	0.5505810	-0.0058548	0.0289246	1.0000000				
GULLIBLE	0.1860310	0.1154910	0.0711549	0.1720810	0.0538494	0.1115030	1.0000000			
CHILDLIK	0.0457085	0.1342080	-0.0057291	0.1109870	-0.0404856	-0.0131121	0.2357750	1.0000000		
NOHARSH	0.0987066	0.1683500	0.1352720	-0.0291575	0.1951850	0.1860460	0.1209420	-0.0948981	1.0000000	
FEMININE	0.1175190	0.1613020	-0.0491754	0.0865032	0.1672260	0.0003823	0.2050770	-0.1195820	0.2667940	1.0000000

Appendix B.1
One-Factor Model Maximum Likelihood Parameter Estimates

LAMBDA X

	MASCULIN
DEFENDMY	0.461
INDEPEND	0.440
ASSERTIV	0.668
STRONGPE	0.640
FORCEFUL	0.383
LEADERSH	0.700
TAKERISK	0.488
DOMINANT	0.605
TAKESTAN	0.620
AGRESSIV	0.573
SELFRELI	0.446
ATHLETIC	0.374
ANALYTIC	0.167
DECIEASY	0.439
SELFSUFF	0.415
INDIVIDU	0.325
MASCULIN	0.252
COMPETIT	0.494
AMBITIOU	0.539
ASLEADER	0.715
AFFECTIO	0.014
SYMPATHE	-0.173
SENSITIV	-0.130
UNDERSTA	-0.014
COMPASSI	-0.024
SOOTHEHU	0.022
WARM	0.024
TENDER	-0.093
LOVECHIL	0.081
GENTLE	-0.103
YIELDING	-0.172
CHEERFUL	0.196
SHY	-0.412
FLATTERA	0.069
LOYAL	0.125
SOFTSPOK	-0.420
GULLIBLE	-0.244
CHILDLIK	0.023
NOHARSH	-0.153
FEMININE	-0.188

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Appendix B.1
Uncorrelated Two-Factor Model
Maximum Likelihood Parameter Estimates

LAMBDA X

	MASCULIN	FEMININE
DEFENDMY	0.465	0.000
INDEPEND	0.452	0.000
ASSERTIV	0.654	0.000
STRONGPE	0.628	0.000
FORCEFUL	0.372	0.000
LEADERSH	0.716	0.000
TAKERISK	0.480	0.000
DOMINANT	0.587	0.000
TAKESTAN	0.618	0.000
AGRESSIV	0.553	0.000
SELFRELI	0.472	0.000
ATHLETIC	0.375	0.000
ANALYTIC	0.189	0.000
DECIEASY	0.444	0.000
SELFSUFF	0.444	0.000
INDIVIDU	0.348	0.000
MASCULIN	0.231	0.000
COMPETIT	0.490	0.000
AMBITIOU	0.560	0.000
ASLEADER	0.727	0.000
AFFECTIO	0.000	0.637
SYMPATHE	0.000	0.678
SENSITIV	0.000	0.687
UNDERSTA	0.000	0.639
COMPASSI	0.000	0.760
SOOTHEHU	0.000	0.644
WARM	0.000	0.772
TENDER	0.000	0.790
LOVECHIL	0.000	0.393
GENTLE	0.000	0.766
YIELDING	0.000	0.341
CHEERFUL	0.000	0.427
SHY	0.000	0.071
FLATTERA	0.000	0.211
LOYAL	0.000	0.329
SOFTSPOK	0.000	0.176
GULLIBLE	0.000	0.193
CHILDLIK	0.000	0.077
NOHARSH	0.000	0.246
FEMININE	0.000	0.366

PHI

	MASCULIN	FEMININE
MASCULIN	1.000	
FEMININE	0.000	1.000

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