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Mother-Daughter Attachment and Family Cohesion

Single- and Multi-Construct Latent State-Trait Models of Current and Retrospective Perceptions*

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Summary: This contribution investigates the psychometric properties of two scales for measuring family cohesion and mother-daughter attachment. The scales were administered to 206 adult female subjects on three occasions of measurement 9 months apart. Various single-construct latent state-trait models with and without method factors were tested against the data and compared to each other. The most parsimonious version of a latent state-trait model with method factors was found to fit the data best for both constructs. The parameter estimates of this model reveal (1) that both scales are very reliable, (2) that they measure stable traits, (3) that test halves (formed by randomly splitting items) are not strictly parallel, but have their own test half-specific (method) factors, and (4) that the test scores vary across time due to systematic effects of the situation at the occasion of measurement. The last result indicates that the scales measure not only cohesion and attachment traits, but also cohesion and attachment states. In a second series of analyses, the two single-construct models were combined to a multi-construct latent state-trait model in order to determine the correlation of the latent traits and the correlations between the latent state residuals of the two constructs within the same occasion of measurement. The correlation between the two traits amounted to .61 and was considerably higher than the correlations between the corresponding manifest variables. Furthermore, the within-occasion correlations of the latent state residuals are substantial, indicating that the occasion-specific effects influenced the measures of both constructs in the same direction, i. e., attachment and cohesion states fluctuate synchronously across time.

Various attempts have been made in anthropology, sociology, and psychology to describe the structure of families and to investigate their causes as well as their effects for individuals and the social, cultural, and physical context in which they live. In psychology, variables of family interaction, cohesion, and attachment have been considered in at least three different research areas.

1) In research on socialization and individual development, cognitive abilities, moral values, achievement motivation, and social skills of the developing individual have been related to family variables, for instance, to the child-rearing practices of the parents, to the general emotional atmosphere and cohesion in the family, to the affective ties and attachments among specific members of the family, as well as to the physical ecology the child encounters at home (e. g., Hoffmann & Salzstein, 1967; Schneewind, Ruppert & Harrow, 1998; Trudewind, 1982; Harvey, Gore, Frank & Batres, 1997).
2) Family models have been proposed in clinical psychology (family therapy) to describe types of family systems that differ among each other in the extent to which they foster individual, marital, and family development (e. g., Epstein, Baldwin, & Bishop, 1983; Olson, Sprenkle, & Russell, 1979; Shadish et al., 1993). In these models, family cohesion and emotional attachment are assumed to determine, in conjunction with other variables, the psychological well-being of the family and the mental health of its individual members.

* The original data upon which this paper is based are available at http://www.hhpub.com/journals/ejpa

3) A third line of research has focused on the explanation of family solidarity and, more specifically, mutual aid exchanged among certain family members (e. g., between parents and children). Family cohesion and emotional attachment are among the many variables considered. Both family cohesion and emotional attachment were found to be very important system variables for the prediction of prosocial commitments of adult children toward their aging parents (e. g., Cicirelli, 1983, 1990; Montada, Schmitt, & Dalbert, 1990).

In the research areas just mentioned, many instruments (primarily questionnaires) have been developed to measure psychological attributes of the family in general, and cohesion and emotional attachment in particular (Cierpka, 1987; Epstein et al., 1983; Montada et al., 1990; Schneewind et al., 1998). Two of these instruments are considered in the present paper.

The first instrument was designed to measure *cohesion*. Engfer, Schneewind, and Hinderer (1977) translated the Family Environment Scale (FES; developed by Moos, 1974) into German and used it in research on child-rearing practices (Schneewind, Beckmann, & Engfer, 1982; Schneewind et al., 1998). The Family Environment Scale consists of 10 subscales, one of them measuring family cohesion. Several items of the first German version of this scale were not satisfactory with regard to item difficulty and item-total correlation (Engfer et al., 1977). Therefore, Engfer et al. (1977) replaced these items with new ones. Schmitt, Dalbert, and Montada (1982) changed the wording of the final set of items from present to past tense in order to assess retrospective perceptions of family cohesion. The nine items of the Schmitt et al. (1982) version of the scale translate to English as follows:

1) In our family, everyone cared about the problems of the others. (T)
2) In our family, everyone had the same rights if something had to be decided. (T)
3) We got along very well with each other. (T)
4) If something had to be done at home, almost everyone tried to avoid doing it. (F)
5) At times it was difficult in our family to get things coordinated. (F)
6) Whatever we did at home, we did it with great enthusiasm. (T)
7) In our family, everyone felt that he was being listened to empathically. (T)
8) If important decisions had to be made in our family, everyone had the same vote. (T)
9) There were times in our family when we did not like to help each other. (F)

Six-point rating scales, ranging from 1 (totally true) to 6 (totally wrong), were used for answering the items. The scale has an internal consistency of .88 (Schmitt, Dalbert, & Montada, 1983).

The second instrument was designed to measure *attachment*. Kreuzer and Montada (1983) developed a scale for measuring the emotional attachment between a daughter and her mother from the daughter's perspective. The seven items of the scale may be translated into English as follows:

1) I really love my mother. (T)
2) My mother likes me a lot. (T)
3) I hate the way my mother treats me. (F)
4) My mother has little interest in me. (F)
5) I have no warm feelings for my mother. (F)
6) My mother is full of warmth and love towards me. (T)
7) I believe that my mother rejects me somewhat. (F)

The same rating scales as for cohesion were used for these items. The scale has an internal consistency of .93 (Schmitt et al., 1983).

Most sociological and psychological research on the family has been concerned not only with patterns of interaction, communication, and mutual attachment per se, but also with correlations among these variables and their relations with presumed causes and effects. In addition, researchers have attempted to describe and explain changes in family variables due to critical life events (e. g., severe illness of a family member), clinical treatment, or role changes that occur over the common lifespans of family members.

For each of these research goals, it is important to know how reliable the measurement instruments are and how much they depend on systematic influences to which the subject is exposed on the occasion of measurement considered. Most researchers are aware of the consequences of measurement error. However, many researchers are not aware of the consequences of occasion-specific effects (Steyer & Schmitt, 1990). Consider this example: If a person answers items of a scale intended to measure general family cohesion, his or her answers may depend (partly) on some recent experience, e. g., having had a confrontation with another family member. Even though this recent experience may not be representative of typical functioning in that family, it probably influences the current perception of the general family atmosphere. Another subject may have had an uncommonly positive experience recently and therefore might give positively biased answers – compared to the general state of affairs in his or her family – to the same scale. Different test scores of the two subjects may therefore not be due only to differences in general family cohesion, but also to *systematic*, albeit *unstable* effects that influenced

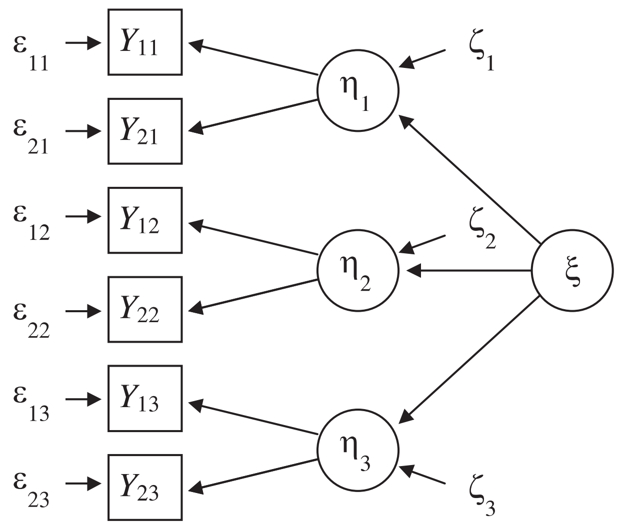

Figure 1. Latent state-trait model for two tests measuring one construct on three occasions of measurement (restrictive version with all loadings equal to 1).

responding only at the particular occasion of measurement. In other words, the scale measures *reliably* both stable and unstable differences between individuals.

Steyer (1987; Steyer, Ferring, & Schmitt, 1992) has proposed a psychometric theory that allows for the separation of these stable and unstable individual differences. Additionally, these effects can be separated from (random) measurement error. The single-construct latent state-trait model (see Figure 1) assumes three sources of variance in the observed variables Y_{ik}: (1) The latent trait (denoted by ξ in Figure 1), which reflects individual differences that are stable across the times of measurement considered; (2) occasion-specific effects (denoted by ζ_k in Figure 1), which generate systematic and therefore reliable but unstable differences between individuals; (3) random measurement error (denoted by ε_{ik} in Figure 1), which represents unreliable and unstable differences between individuals in the observed variables Y_{ik}. The combined influence of the first two sources of variances – the latent trait and the occasion-specific effects – constitute the latent states (denoted η_k in Figure 1) pertaining to a single time k of measurement.

The latent state-trait model was used in the present study to answer five research questions: First, how reliable are the measures obtained by the two scales described above. Second, to what extent are daughters' perceptions of family cohesion and attachment, as measured by the two scales described above, due to stable characteristics or traits? Third, how highly do these traits correlate with each other? Fourth, do perceived family cohesion and attachment exhibit fluctuations due to systematic but unstable effects that are present at the specific occasion of measurement? Fifth, are the fluctuations in the two perceptions – family cohesion and attachment – independent of one another, or do the latent state variables correlate, i. e., do they fluctuate in a parallel manner?

Method

Design and Sample

The scales for family cohesion and attachment were administered as part of a large study on helping behavior of adult daughters towards their mothers (Montada et al., 1990). Data were collected on three occasions of measurement. Adjacent occasions of measurement were approximately 9 months apart. The sample consisted of 807 female subjects aged 25 to 48. The sample was heterogeneous with regard to social class and other demographic variables. The results reported here are based on a subsample of 206 participants who took part in all three occasions of measurement and provided valid answers to all items of the two scales at issue, which were embedded in a large set of questionnaires. Details regarding the sample, the design, the measurement instruments, and the substantive issues studied are provided elsewhere (Montada et al., 1990).

Constructing Test Halves

Separating measurement error from systematic occasion-specific effects requires that at least two tests of the same construct are obtained on at least two occasions of measurement. Test halves were generated by randomly splitting the items of the two scales for measuring cohesion *(CO)* and attachment *(AT)*. CO_1 contains four items (5, 6, 8, 9), CO_2 five (1, 2, 3, 4, 7), AT_1 four (1, 2, 3, 6), and AT_2 three (4, 5, 7). In order to equalize the metric of the test halves, the scale score of CO_1 was weighted by 5/4 and the scale score of AT_2 by 4/3. The means, variances, covariances, and correlations of the four tests taken on the three occasions of measurement are given in Table 1.

Latent State-Trait Models

Single Construct Models

Latent trait model (Model 1). For each of the two constructs, cohesion and attachment, the most parsimonious model possible was tested first. This model is the latent trait model, which represents the assumption that all six manifest variables (two test halves administered on three

Table 1. Means, variances (diagonal), covariances (below diagonal), and correlations (italics, above diagonal) of the two cohesion (co) and attachment (at) test halves on three occasions of measurement.

	CO_{11}	CO_{21}	CO_{12}	CO_{22}	CO_{13}	CO_{23}	AT_{11}	AT_{21}	AT_{12}	AT_{22}	AT_{13}	AT_{23}
M	15.9	14.1	16.0	14.0	15.9	13.9	7.4	6.2	7.4	6.3	7.4	6.3
CO_{11}	24.9	*.83*	*.76*	*.71*	*.77*	*.74*	*.52*	*.43*	*.49*	*.46*	*.46*	*.43*
CO_{21}	20.5	25.9	*.72*	*.82*	*.72*	*.81*	*.56*	*.45*	*.51*	*.49*	*.52*	*.49*
CO_{12}	19.9	19.2	27.5	*.85*	*.80*	*.78*	*.47*	*.44*	*.54*	*.49*	*.44*	*.39*
CO_{22}	18.1	21.7	23.3	28.7	*.73*	*.83*	*.54*	*.49*	*.57*	*.51*	*.48*	*.44*
CO_{13}	19.5	18.8	22.7	20.8	27.4	*.84*	*.44*	*.45*	*.48*	*.41*	*.53*	*.48*
CO_{23}	19.3	22.1	22.5	24.4	24.3	29.4	*.49*	*.47*	*.47*	*.42*	*.57*	*.52*
AT_{11}	9.3	8.7	8.5	8.3	9.4	8.6	15.4	*.85*	*.82*	*.75*	*.82*	*.80*
AT_{21}	10.4	9.3	9.1	9.7	10.7	9.4	13.8	16.4	*.77*	*.80*	*.78*	*.81*
AT_{12}	8.9	8.6	10.0	9.6	11.1	9.6	12.6	12.2	15.0	*.85*	*.78*	*.71*
AT_{22}	10.3	9.5	11.1	10.8	11.8	10.2	12.4	13.6	13.1	15.9	*.73*	*.72*
AT_{13}	8.9	9.5	9.9	9.5	12.5	10.6	13.9	14.0	13.9	13.8	17.8	*.88*
AT_{23}	10.1	10.2	10.9	10.7	13.6	11.8	13.0	14.2	12.7	13.8	15.3	16.6

Note. The first index of a variable pertains to the test half, the second to the occasion of measurement. For example, CO_{23} refers to the second test half for the Cohesion scale administered at the third occasion of measurement.

Table 2. Overall goodness of fit of the models tested via LISREL.

		Single-construct models					
		Cohesion			Attachment		
Model	version	χ^2	df	*p*	χ^2	df	*p*
1	restrictive	180.97	19	<.01	102.66	19	<.01
	liberal	156.55	9	<.01	90.77	9	<.01
2	restrictive	129.97	18	<.01	67.02	18	<.01
	liberal	105.59	6	<.01	55.33	6	<.01
3	restrictive	24.43	17	=.11	16.12	17	=.52
4	restrictive	164.65	18	<.01	95.17	18	<.01
	liberal	134.62	3	<.01	79.22	3	<.01
		Multi-construct models					
Model		χ^2	df	*p*			
5		86.48	66	= .05			
6		85.76	61	= .02			

Notes.
Model 1: Latent trait model
Model 2: Latent state-trait model
Model 3: Latent state-trait model with method factors
Model 4: Latent trait model with method factors
Model 5: Simultaneous latent state-trait model with method factors, correlated traits, and correlated latent state-residuals across constructs within occasions of measurement
Model 6: Simultaneous latent state model with method factors and all possible cross-construct correlations of the latent states

occasions of measurement) share only one common source of variance (Figure 2). Given the high correlations in the upper left and lower right quadrants of Table 1, this assumption does not seem unreasonable. According to the latent trait model, the common factor or latent trait is the only reason for the nonzero correlations among the six tests. Furthermore, this assumption implies that random measurement error is the only reason for relative differences between the test halves on the same occasions of measurement and the only reason for lack of perfect correlation across time. Note that the latent trait model can be interpreted as a special version of the latent state-trait model (depicted in Figure 1) with zero variances of the latent state residuals.

Two versions of the latent trait model were tested via LISREL (Jöreskog & Sörbom, 1996): (a) the more restrictive version with equal factor loadings and equal error variances, and (b) the less restrictive congeneric model with factor loadings and error variances unconstrained. The restrictive model of strictly parallel tests had to be rejected for both Cohesion (χ^2_{19} = 180.98, $p < .01$) and Attachment (χ^2_{19} = 102.66, $p < .01$) (Table 2,

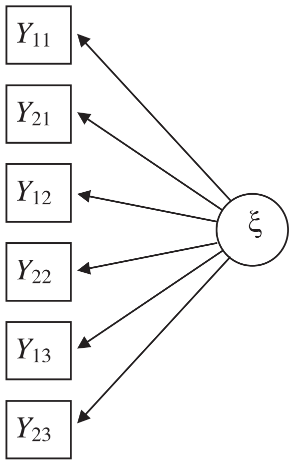

Figure 2. Latent trait model for two tests measuring one construct on three occasions of measurement (restrictive version with all loadings equal to 1).

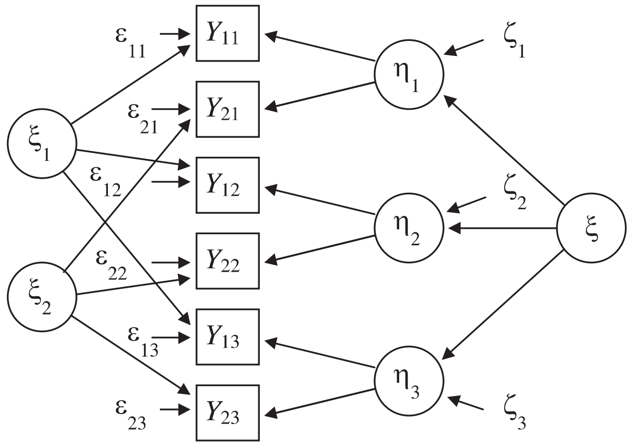

Figure 3. Latent state-trait model with method factors for two tests measuring one construct on three occasions of measurement (restrictive version with all loadings equal to 1).

Model 1, Line 1). The more liberal latent trait models, the congeneric models, had fit indices of $\chi^2_9 = 156.55$, $p < .01$ (Cohesion) and $\chi^2_9 = 99.77$, $p < .01$ (Attachment) (Table 2, Model 1, Line). Hence, the congeneric versions of the latent trait model do not adequately account for the data either. Further, χ^2 difference tests indicate that the liberal version of the model fits the data significantly better than the restrictive version only for Cohesion ($\chi^2_{19} = 24.42$, $p < .01$), but not for Attachment ($\chi^2_{19} = 11.89$, $p > .05$).

The unacceptable fit of the latent trait model with equal loadings implies that the correlations within the upper left and lower right quadrants of Table 1 differ significantly among each other. If the restrictive version of the latent trait model were valid, all correlations among the six measures of the trait would be equal in the population. Besides being significantly different, there appears to be a systematic pattern in the size of these correlations: For both constructs, the highest correlations are those between the two test halves taken on the *same occasion of measurement* (underlined in Table 1). This pattern would be expected if systematic occasion-specific effects existed.

Latent state-trait model (Model 2). Consequently, the second model tested was the simple latent state-trait model that takes into account systematic effects of the occasion and allows for the estimation of the magnitude of these effects (Figure 1). Besides specifying the most parsimonious version of the latent state-trait model, a most liberal version of the model (unequal error variances, unequal factor loadings, unequal latent state residuals) was tested as well. According to the χ^2 difference tests, the liberal version of the model (Table 2, Model 2, Line 3) fits the data significantly better than the restrictive versions (Table 2, Model 2, Line 4) for Cohesion ($\chi^2_{12} = 24.38$, $p < .05$), but not for Attachment ($\chi^2_{12} = 11.69$, $p > .05$). Yet, none of the four models specified was acceptable based on the likelihood ratio test. Again, the reason for this can be seen from the pattern of correlations in Table 1: The autocorrelations of the *same* test half across occasions (coefficients with same first but different second indices) are generally higher than the correlations of *different* test halves across occasion (coefficients with different first and different second indices). Obviously, each test half has a specific component of its own that is stable across time. That is, each test half *reliably* measures, besides the common latent state, a factor which is specific for the method used (here: the test half).

Latent state-trait model with method factors (Model 3). Consequently, the latent-state-trait model was supplemented by test-half-specific factors or *method factors* (denoted ξ_i in Figure 3). This model fits the data well, even in its most restrictive version with equal variances of the three latent states, equal variances of the two method factors, and equal error variances (Table 2, Model 3, Line 5). Some readers may wonder why we use the term "method" in the present context as our "methods" are nothing else but test halves. The term method suggests that any kind of measurement method or indicator may have its own specific source of variance not shared with any other method, even if most similar methods such as test halves are used. The need to include method or test half-specific factors in our measurement models reveals that our scales lack perfect homogeneity, i. e., our scales are not unidimensional in a strict sense, although their internal consistencies are very high in relation to the number of items (.88 for cohesion and .93 for attachment). Consequently, our test halves are not strictly parallel. If methods more different than test halves had been

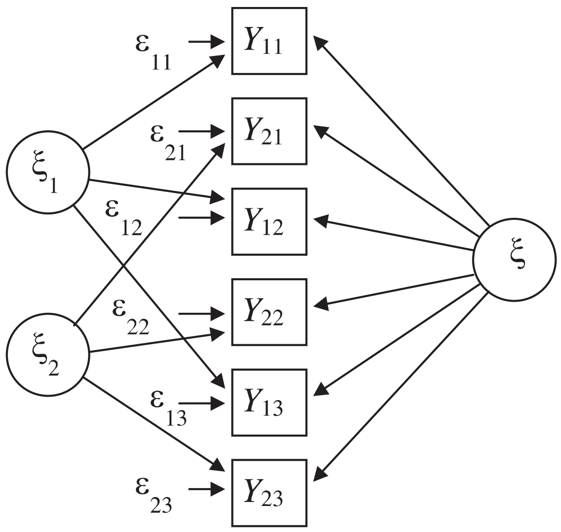

Figure 4. Latent trait model with method factors for two tests measuring one construct on three occasions of measurement (restrictive version with all loadings equal to 1).

used, such as self reports and peer ratings, method factors would have been even more important, i. e., explained even larger proportions of variance than the test half specific factors of the present models.

Latent trait model with method factors (Model 4). Before this model was accepted, a latent trait model with method factors was tested (see Figure 4). This model does not allow for systematic effects pertaining to the occasions of measurement; the latent states are identical with the latent trait. However, the model assumes that the test halves are not strictly parallel but measure specific factors of their own. Neither the most restrictive nor the most liberal versions of this model can account for the data (Table 2, Model 4, Lines 6 and 7).

Based on the preceding series of model tests, the latent state-trait model with method factors (Model 3) was accepted. This model has only four parameters: The variance of the latent trait ξ, the variance of the latent state residuals ζ_k, the variance of the error variables e_{ik}, and the variance of the method factors x_i. These parameters can be used to identify the coefficients of reliability, common consistency, method specificity, and occasion specificity of the observed variables (Steyer et al., 1992). The coefficients in Table 3 are the same for each of the six measures for a construct because the most restrictive model that fits the data restricts each of the variance terms to be invariant across test halves and occasions.

Table 3 contains the coefficients for test halves and the coefficients for total tests. The coefficients for test halves were computed from the parameters of the accepted model. From a substantive point of view, models for test halves are only of technical interest. Once the parameters have been estimated for test halves, the Spearman-Brown formula for lengthened tests and the analogous formulas for the consistency and specificity coefficients may be used to determine these coefficients for the total tests (Steyer & Schmitt, 1990).

Table 3. Consistency, method specificity, occasion specificity, and reliability of the observed variables (coefficients for total tests are given in parentheses).

	Consistency	Method Specificity	Occasion Specificity	Reliability
Cohesion	.73 (.79)	.07 (.04)	.11 (.12)	.91 (.95)
Attachment	.80 (.86)	.04 (.02)	.07 (.07)	.91 (.95)

The results presented in Table 3 have several implications. First, both scales clearly measure stable traits. By far the largest proportion of test score variance (79% and 86% for the Cohesion and Attachment total test, respectively) can be attributed to the latent trait variable. Second, a small, but significant proportion of stable individual differences (4% and 2% for the Cohesion and Attachment total test, respectively) is due to the existence of test half-specific factors (method factors). Third, a small, but significant proportion of reliable individual differences on a particular occasion of measurement stems from systematic, but unstable effects of the situation in which the subjects were when answering the scales. This proportion of variance amounts to 12% and 7% for Cohesion and Attachment (total tests), respectively. Hence, there are systematic fluctuations in the perceptions of family cohesion and attachment, but they are small compared to the amount of stable individual differences, i. e., trait differences, in these perceptions.

The fourth result is an implication of the first three results mentioned above: The reliabilities of the twelve test halves are considerably higher than any of the manifest correlations among them (see Table 1, upper left and lower right quadrants). Both the test-retest correlations and the split-half correlations are lower than the reliability estimates determined from the latent state-trait model with method factors – which was accepted as the most appropriate model to represent the data. This is because the test-retest correlations and the split-half correlations do not take into account all systematic sources of variance: (a) The test-retest correlations of the same test halves do not contain systematic effects of the situation; (b) the split-half correlations *within* each occasion of measurement do not contain systematic effects of the method factors; and (c) the correlations of two different test halves across two different occasions of measurement neglect both, systematic effects of the situation and systematic effects of the method. Consequently, the correlations of two different test halves across two different occasions are the smallest ones in Table 1, on average. These correlations are the ones in the upper left and lower right quadrants of Table 1 that have no index in common. Furthermore, the split-half correlations within each occasion of measurement (correlations underlined in the upper left and lower right quadrants of Table 1) are higher on the average than the test-retest correlations of the same test halves across two different occasions (correlations in the upper left and lower right quadrants of Table 1 with the same first index). This difference between the average size of the split-half correlations within each occasion and the average size of the test-retest correlations of the same test halves across occasions is reflected in the difference between the size of the coefficients of occasion specificity and method specificity given in Table 3. The coefficients of occasion specificity, reflecting systematic effects of the situation of measurement and affecting the split-half correlations within an occasion of measurement, are larger than the coefficients of method specificity, reflecting the systematic effects of the method factors and affecting the test-retest correlation of the same test halves across occasions.

Multi-Construct Models

For the psychological interpretation of the small, but significant occasion-specific effects on the perceptions of cohesion and attachment, it would be interesting to know whether these fluctuations occur independently from each other or in a synchronous manner. If the former were the case, different systematic effects of the situation would have to be assumed for causing reliable but unstable individual differences in the variables considered. If the latter were true, one could argue that the occasion-specific effects were common for both variables, at least partly. In fact, this seems likely given the pattern of the manifest cross-construct correlations in the upper right quadrant of Table 1: In most cases, the cross-construct correlations *within the same occasion* (italicized coefficients) are higher than the cross-construct correlations *across different occasions*.

Multi-construct latent state-trait model with method factors, correlated traits, and correlated latent state residuals across constructs within-occasions of measurement (Model 5). To investigate this issue, the two single-construct latent-state trait models with method factors (Model 3) were combined into a multi-construct model (Figure 5). First, the most restrictive version of this model was tested. In addition to the parameters from the corresponding single-construct models, only two parameters were estimated: The covariance between the latent traits and the covariance between the latent state residuals within the same occasion of measurement, constrained to be equal across occasions of measurement. This model did not fit the data adequately ($\chi^2_{68} = 91.20$; $p = .03$). In a second step, the equality constraint for the covariances of the latent state residuals was loosened. This more liberal model fits, yet barely ($\chi^2_{66} = 86.48$; $p = .05$; Model 5 in Table 2), and not significantly better than the more restrictive version with equal covariances for the latent state residuals ($\chi^2_2 = 4.72$; $.05 < p < .10$). Before the more liberal model with unequal covariances of the latent state residuals was accepted, it was tested whether the cross-construct correlations between the latent state-residuals across different occasions of measurement are indeed zero as the model presupposes, or whether the fit would improve considerably if this restriction built into Model 5 were dropped.

Multi-construct latent state model with method factors and all possible cross-construct correlations of the latent states (Model 6). The model shown in Figure 6 is appropriate to investigate this question. The within-construct parts of this model are equivalent to Model 5 because the

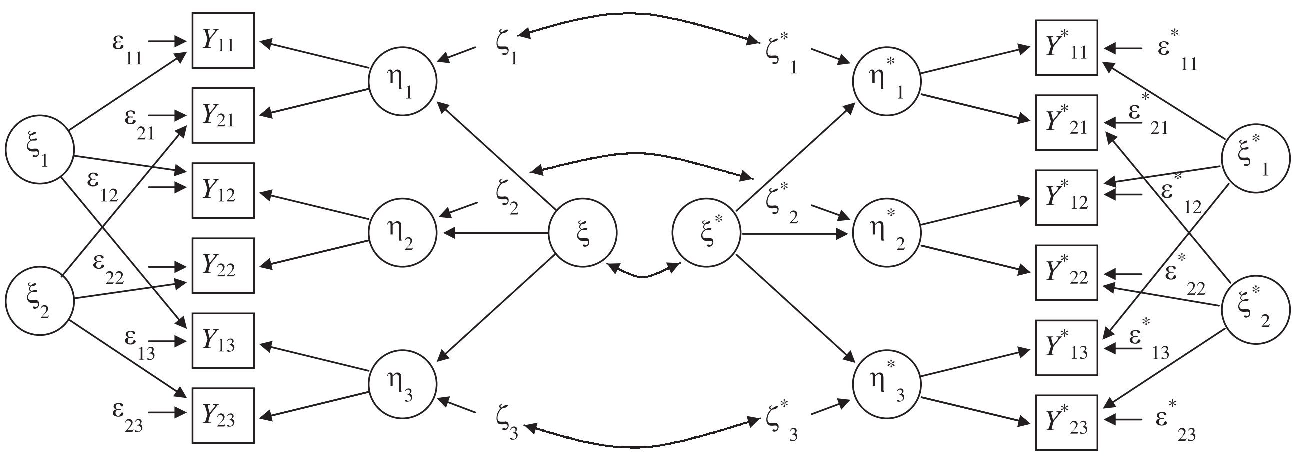

Figure 5. Latent state-trait model with method factors for two tests measuring two constructs on three occasions of measurement (restrictive version with all loadings equal to 1).

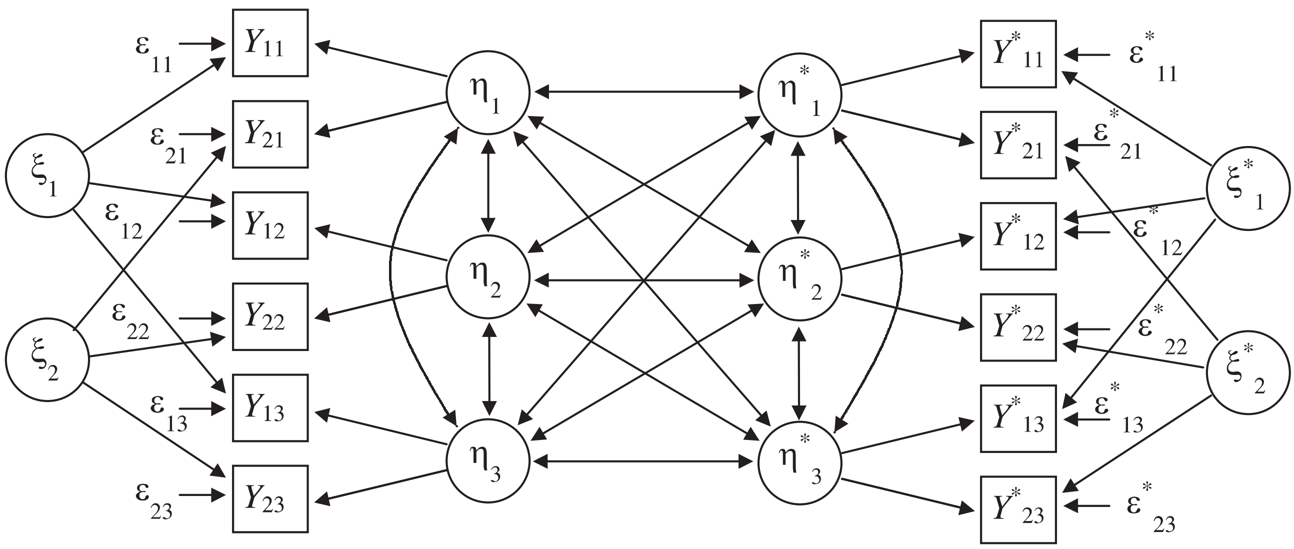

Figure 6. Latent state model with method factors for two tests measuring two constructs on three occasions of measurement (restrictive version with all loadings equal to 1).

correlations between the latent states are restricted to be equal within each construct. Model 6 differs from Model 5 in that all possible cross-construct correlations of the latent state variables are unconstrained. This is equivalent to letting all latent state-residuals in Model 5 correlate freely. Even though Model 6 is less restrictive than Model 5, it does not fit the data better (χ^2_{61} = 85.76; p = .02).

Consequently, Model 5 was accepted. Its relatively poor fit is in part due to the fact that the two sets of test halves differ between constructs in skewness. Whereas the distributions of the six cohesion tests are close to normal, the distributions of the six attachment tests are skewed substantially. The χ^2 statistic is rather sensitive to differences between manifest variables with respect to the form of their distributions.

The four parameters of Model 5 that were estimated in addition to the parameters from the single-construct models (Model 3) were as follows: Cor(ξ, ξ^*) = .61; Cor(ζ_1, ζ_1^*) = .46; Cor(ζ_2, ζ_2^*) = .43; Cor(ζ_3, ζ_3^*) = .84. These parameter estimates are interesting in at least two regards. First, the correlation between the latent traits (r = .61) is higher than any of the manifest cross-construct correlations in the upper right quadrant of Table 1. This reflects the fact that the six tests are not perfectly reliable indicators, but contain measurement errors. Second, the latent state residuals correlate substantially across constructs – yet only within the same occasion of measurement. These correlations were .46, .43, and .84, for occasions 1, 2, and 3, respectively. The positive signs of these correlations indicate that the systematic occasion-specific effects influenced the measures of both constructs in the same direction. Even though these systematic effects of the situation account for only small proportions of individual differences (see the coefficients of occasion specificity in Table 3), they lead to synchronous fluctuations of both variables across time. As mentioned earlier, these synchronous fluctuations were evident in the pattern of manifest correlations in the upper right quadrant of Table 1: In general, the manifest cross-construct correlations are higher within the same occasion of measurement than across different occasions of measurement.

Discussion

What do these cross-construct correlations of the latent state residuals within the same occasion of measurement mean psychologically? Note that the wording of the items of the two scales differs in an important aspect: Whereas attachment refers to the current emotional closeness between an adult daughter and her mother, cohesion refers to the past, i. e., to the time when the adult daughter was still living as a child or an adolescent with her parents in a nuclear family. A subject's perception of current attachment may be influenced by recent experiences, e. g., by having gotten along better (or worse) than usual with her mother. Apparently, this kind of systematic occasion-specific factor leads not only to fluctuations in the perception of the current relationship, but also to changes (biases) in one's perception of the past. Perhaps, recent positive or negative experiences that change a subject's perceived attachment to her mother may also remind the subject of similar positive or negative experiences that occurred a long time ago. These experiences may then become salient when the daughter reflects about family cohesion in the past and thereby influence the subject's judgment in the same direction as her judgment of current attachment. Of course, this interpretation is speculative; there is no way of testing it directly with the data presented here. Furthermore, it remains open why the correlation of the latent state residuals is much larger at the third occasion of measurement than at the first and second occasion.

The results of the present investigation reveal that scales for measuring attachment and cohesion as two widely considered family constructs are very reliable, measure predominantly stable (trait-like) characteristics of the family, contain little method variance, yet vary to some extent across time due to systematic effects of the situation present on a particular occasion of measurement. Consequently, the scales do measure attachment and cohesion not only as traits, but also as states that change intraindividually across time. For reasons not yet well understood, intraindividual changes in the attachment and cohesion states covary.

The results of the present investigation demonstrate the usefulness of structural equation models in general and Steyer's (1987) latent state-trait theory in particular. These models make possible a theory-driven conceptualization of psychological constructs (latent variables) that are assumed to explain the variation and covariation among a number of manifest variables. In addition, structural equation models can be used to identify the amount of variation in the manifest variables determined by the various latent variables specified in a particular model. Obviously, a formal approach of structural equation modeling is superior to a mere inspection of the manifest correlations and an intuitive partitioning of variances – especially if large numbers of manifest variables have to be considered simultaneously. Furthermore, structural equation modeling makes possible to test which of several competing models describe best the structure of empirical data. The clear-cut conclusions drawn from the various model tests reported in this article would not have been possible on intuitive grounds. The results of the present research reveal that very simple models, i. e., models with few parameters, can be adequate to reconstruct quite well empirical data that may not look structured in simple ways on first sight.

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