Michael J. Gilewski and K. Warner Schaie. Objective performance and self-reports of cognitive abilities in the aged. Paper presented at the Thirteenth International Congress of Gerontology, New York, July 1985.

Gilewski (1983) examined the relationships among four factors: Self-Reported Memory Functioning, Memory Performance, Intellectual Performance, and Symptomatic Depression. The relationships were examined using the structural modeling techniques of LISREL (Joreskog & Sorbom, 1981). The major result was a significant bidirectional relationship between Self-Reported Memory Functioning and Symptomatic Depression, and a significant residual covariance between Memory Performance and Intellectual Performance. One possible explanation for these finding is that the first two measures were both self-report measures and the last two measures both objective tests of performance. The present study investigated this hypothesis employing a 2 x 2 blocked-design model contrasting memory and intellectual abilities and contrasting subjective and objective sources of information.

Method

The methodology included three of the same factors from the Gilewski (1983) and replaced the fourth, Depression factor with Intellectual Self-Report. Pilot studies with samples independent of the one in this study were used to identify all factors and obtain estimates of factor loadings, factor variances, and unique variances. Figure 1 represents the model tested using LISREL V (Joreskog & Sorbom, 1981) in 89 young-old (ages 55-70) and 50 old-old (ages 71-85) adults. The Memory Performance factor was measured by immediate and delayed recall of a 20-word list, delayed recognition of the same word list embedded in 10 synonyms and 10 other distractors, and immediate free recall of a 209-word

essay on parakeets. The Memory Self-Report factor was composed of four 7-point scale summary scores from the Zelinski, Gilewski, and Thompson (1980) Metamemory Questionnaire. The four scales used were: overall rating of memory functioning, frequency of forgetting (the average of 18 situations), frequency of forgetting when reading (the average over 10 situations), and effort made to recall (average of 18 situations). The Intellectual Performance factor consisted of four subtests of the Schaie-Thurstone Adult Mental Abilities Test (STAMAT; Schaie, in press): Figure Rotation, Recognition Vocabulary, Letter Series, and Word Series. Finally, the Intellectual Self-Report factor was composed of four of the dimensions from the Scheidt and Schaie (1978) Q-Sort, in which individuals self-rated their relative competence in 80 real-life situations. The dimensions employed for this factor were: a) social-low activity-common-supportive (e.g., entering a darkened night club to take dinner), b) nonsocial-high activity-common-supportive (e.g., gardening in the yard, planting seeds, weeding), c) nonsocial-high actvity-uncommon-supportive (e.g., preparing a large meal for friends), and d) nonsocial-low activity-common-supportive (e.g., making plans for the future). The rationale for the Q-Sort is that it serves as a better criterion for intelligence in older people than more traditional criteria of school or job performance.

Results

Results of fitting the model to the data are summarized in Table 1. A null model tested that there were no significant relationships in the data. The significant value of the chi-square indicates that the model is incorrect. (A nonsignificant chi-square is desireable in LISREL.) There is quite a significant drop in the value of chi-square for the hypothesis presented in Figure 1 despite the increase in degrees of freedom. Bentler and Bonett's

(1980) delta of .33, though, indicates a poor fit. Ideally, delta should be over .80, but smaller values may be acceptable with restrictive models. Relaxing some constraints by permitting LISREL to estimate parameters from the data led to increasingly better fits from Model 2 (freeing measurement error parameters) to Model 3 (freeing residual factor variances) to Model 4 (freeing the factor loadings for paragraph recall and Word Series; see Gilewski, 1983, for the rationale). The best-fitting model indicated a moderate fit to the data (delta=.67).

Resultant structural parameters for Model 4 are presented in Table 2. The only statistically significant parameter was the bidirectional relationship between Memory Performance and Intellectual Performance in both age groups. As standardized values indicate, there are sizeable relationships between the two self-report factors and between Intellectual Performance and Intellectual Self-Report in the young-old, but the standard errors are large.

Discussion

The results of the present study do not conclusively support the hypothesis that the results in the Gilewski (1983) study were due to the objective vs. subjective nature of the measures. Only the objective performance factors were related, not the subjective ones. The relationship between Intellectual Self-Report and Memory Self-Report and the one between Intellectual Self-Report and Intellectual Performance were equally large in the young-old but nonsignificant.

One thing the present results do indicate is the limitations inherent in the LISREL procedure. The relationship between the memory and intellectual performance factors is reliable in almost any setting. A problem arises, though, when two factors ave a strong relationship to one another relative to

the relationships among others. All the common variance tends to go into the strongest relationship, leaving little variance for the other relationships to account for. Although almost impossible in the present situation, the strength of relationships should be relatively balanced.

Another limitation of the LISREL procedure is the significance test (Bentler & Bonett, 1980). Unlike most tests of significance, large N's actually make it more difficult to get a model to the fit the data. Also with many variables, the LISREL procedure is sensitive to even slight differences in data structure. For instance in the present study, the large drop in chi-square from Model 1 to Model 2 (see Table 1) does not reflect that 18 of the 32 unique variances were actually replicated in the two age groups. Model fit is also indicated by the proximity of derivatives to zero. In the present study, actual values of derivatives for all fixed parameters had significant digits only to the hundredths. Such sensitivity poses problems for this study as it will for others with data that do not fit limited structure. Thus, our major recommendation from this study is to caution other investigators before engaging the considerable cost of using LISREL as a methodology in aging research.

References

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Table 1. LISREL Results to Find Best-Fitting Model

	Model	Chi-Square	Df	p	Delta	Chi-Square Difference	Df	p
0.	Null	901.43	240	.000	--	--	--	--
1.	Hypothesized Model	605.65	264	.000	.33	--	--	--
2.	Model 1+ Free Meas. Error (diagonal Thetas)	382.11	232	.000	.58	223.54	32	.000
3.	Model 2+ Free residual variances (diagonal Psis)	339.70	224	.000	.62	42.41	8	.001
4.	Model 3+ Free factor loadings for Paragraph Recall and word series	294.66	222	.001	.67	45.04	2	.000

Table 2. Structural Parameters from Best-Fitting Model

Group	Betas		Psis	
	MP-IP	MSR-ISR	MP-MSR	IP-ISR
Young-old	.16 (.07)*	-.13 (.10)	.16 (.12)	.07 (.06)
standardized	.30	-.25	.17	.26
Old-old	.20 (.07)*	-.03 (.17)	-.05 (.14)	.02 (.06)
standardized	.37	-.06	-.05	.07

Note. Standard errors are in parenthesis.

Abbreviations: MP (Memory Performance), IP (Intellectual Performance), MSR (Memory Self-Report), ISR (Intellectual Self-Report).

*$p < .05$.

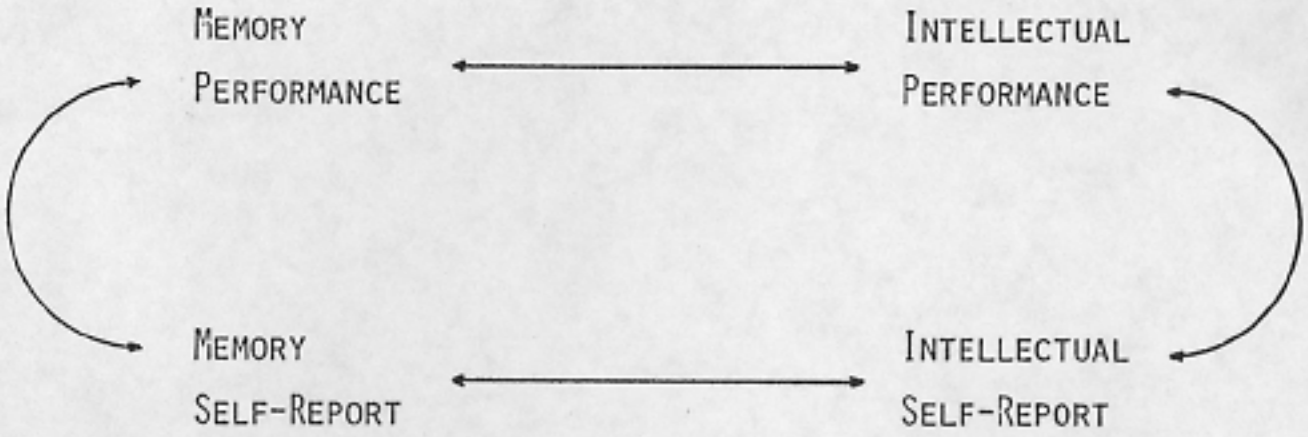

Figure 1. Hypothesized model comparing path coefficients (Betas) between methods (objective performance versus self-report) and residual covariances (psis) between constructs (memory versus intelligence.)