Measuring Religiosity in Later Life

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The purpose of this study is to devise and test a multidimensional measurement model of late life religiosity that is composed of three major components: organizational religiosity, subjective religiosity, and religious beliefs. The religious belief dimension, which has been overlooked frequently in prior research, is assessed in part with items that ask about belief in the Ten Commandments. Alternative ways of specifying the relationships among these dimensions are explored, including first- and second-order factor models. The findings that are derived from estimating these confirmatory factor models are supplemented with additional analyses that examine the differential impact of the religiosity factors on an external criterion measure (i.e., life satisfaction). Throughout, the goal is to provide investigators with a practical approach to evaluating the utility of complex multidimensional factor models of religiosity.

A growing number of gerontologists are turning to the study of religiosity to better understand how feelings of subjective well-being emerge and are maintained in later life (see Koenig, Smiley, and Gonzales 1988, for a review of this research). Although well-being may be operationalized in a number of different ways, a small but important cluster of studies focus on the relationship between religious involvement and life satisfaction. Unfortunately, the findings from this research are equivocal. Although some investigators report that more religious involvement is associated with greater life satisfaction (e.g.,

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Koenig, Kvale, and Ferrel 1988), other researchers are unable to replicate these findings (e.g., Markides, Levin, and Ray 1987).

Undoubtedly, there are a number of reasons for these contradictory results. However, the measurement of religiosity represents one of the most persistent problems in this literature (Levin and Vanderpool 1987). In particular, researchers have had difficulty capturing the depth and breadth of this far-flung conceptual domain. Social scientists have recognized for decades that religiosity is a multidimensional phenomenon. For example, Glock and Stark (1965) suggest that religiosity comprises five dimensions reflecting belief, experience, ritual, knowledge, and consequences. Nonetheless, these conceptual insights have not been implemented fully in empirical studies of religiosity that involve older adults. Instead, most researchers place a disproportionate emphasis on some dimensions without exploring other components of religiosity fully.

The purpose of the present study is to develop and test a measurement model of religiosity that encompasses a wider range of dimensions than is typically investigated in most gerontological studies. In the process, an effort is made to address practical problems that investigators encounter as they explore these complex multidimensional phenomena. One problem involves how to model the relationships among the various dimensions of religiosity. Alternative measurement specifications are proposed and a basic strategy is presented that facilitates the identification of the best formulation. This strategy includes contrasting the fit of the alternative models to the data, examining the psychometric properties of the indicators, and evaluating whether the various dimensions of religiosity are differentially related to external criterion measures.

The discussion that follows is divided into five sections. First, previous multidimensional models of religiosity are reviewed and a frequently overlooked dimension of religious involvement is identified. Following this, the measurement model that will be evaluated empirically in this study is introduced. In the process, this model is contrasted with an equally plausible alternative formulation. Next, a structural equation model is introduced that provides a forum for evaluating the competing measurement models by assessing whether the dimensions of religiosity are differentially related to a relevant external criterion measure (i.e., life satisfaction). The study sample is

described briefly after this. Finally, the findings derived from estimating the measurement and structural equation models are reviewed.

Previous Multidimensional Models of Religiosity

The multidimensional measurement models of religiosity that have appeared in the gerontological literature typically contain two or three dimensions (see, e.g., Ainlay and Smith 1984; Krause and Tran 1989; Chatters, Levin, and Taylor forthcoming). Although these factors are labeled in a number of different ways, the nomenclature used by Chatters et al. (forthcoming) will be adopted here. They refer to these frequently explored dimensions as organizational religiosity, non-organizational religiosity, and subjective religiosity.

Organizational religious activity involves participation in formal religious institutions. This dimension is usually assessed by asking about the frequency of attendance at church or synagogue services. In contrast, nonorganizational religious activity includes private religious behaviors that do not necessarily take place within a formal institutional setting. Items that are used to tap this factor typically ask about the frequency of private prayer or how often a respondent listens to religious programs on the radio. Finally, subjective religiosity is concerned with the level of commitment and importance of religion in people's lives. Survey indicators used to operationalize this domain often ask study participants to rate how religious they are and to indicate the importance of the church in their lives.

Research based on these multidimensional specifications has greatly increased our understanding of the role played by religiosity in later life. In particular, it is becoming increasingly clear that the various dimensions do not exert the same effect on some mainstream psychosocial outcome measures. For example, a recent study by Krause (1992) indicates that subjective religiosity, but not organizational religiosity, exerts a significant impact on self-esteem. Similarly, Idler (1987) reports that organizational religiosity exerts a significant direct effect on depressive symptoms among older women, whereas subjective religiosity fails to have a comparable impact.

The findings described above have important implications for further work on religiosity and well-being in later life. If the various

components of religiosity affect well-being in a similar manner, then it is not necessary to work with complex multidimensional measurement models. Instead, focusing on one dimension should be sufficient. However, because the various religiosity factors appear to have differential effects on well-being, further work with additional dimensions is needed so that investigators do not underestimate the impact of religiosity in later life by excluding key dimensions of this conceptual domain from their analyses.

Although the research reviewed above makes a valuable contribution to the literature, the measurement models developed by these investigators do not contain all of the dimensions of religiosity that have been identified by Glock and Stark (1965) and others. The belief dimension is perhaps the most frequently overlooked factor. As Glock and Stark (1965) point out, this dimension refers to the extent to which a person acknowledges and endorses the basic tenets or doctrines of his or her chosen faith.

The lack of research on the belief dimension is understandable because the plethora of beliefs in our religiously diverse society makes it difficult for researchers to devise concise measures of this factor. This problem is illustrated in one of the few studies that attempt to examine the belief dimension with a sample consisting of older adults. Koenig et al. (1988) measure religious beliefs with four items that ask study participants whether they believe in God, Jesus, the devil, and the miracles performed by Jesus. Although these investigators are to be commended for their ground-breaking work, there are two shortcomings in this measurement strategy. First, because two of the items refer to Jesus, the scale is more relevant for Christian respondents than study participants of other faiths (e.g., Jews). In addition, the scope of the items involves more general beliefs about the existence of God and Jesus without evaluating beliefs about the specific teachings provided by these religious figures.

A major contribution of the present study arises from the fact that an attempt is made to probe the belief dimension more deeply by using survey items that overcome the limitations described above. More specifically, the measurement model that is introduced in the next section includes indicators that assess belief in the Ten Commandments, which form the cornerstone of the Christian and Jewish faiths. Because approximately 86% of the people in this country are either

Catholic, Protestant, or Jewish (U.S. Bureau of the Census 1991), these items can be administered to a wide majority of older adults. Moreover, the Ten Commandments are a set of explicit laws or tenets that discourage some types of behavior (e.g., Thou shalt not bear false witness against thy neighbor) while encouraging other kinds of activities (e.g., Remember the Sabbath and keep it holy). Consequently, these items come closer to evaluating the religious belief dimension as it is conceptualized in the classic theoretical works on religiosity (e.g., Glock and Stark 1965).

Although it is important to identify neglected dimensions of religiosity in gerontological research, it is equally important to evaluate the interface between these overlooked components and the other more frequently examined religiosity factors. A measurement model that was designed to perform this important function is introduced in the next section.

A Measurement Model of Religiosity in Later Life

The measurement model of religiosity that is empirically evaluated in this study is presented in Figure 1. The observed indicators that are used to measure the latent constructs contained in this conceptual scheme are listed in Table 1. This table also includes a listing of the life satisfaction measures that will be used in the structural equation models that are described later in this report. The notation used in Figure 1 was developed by Jöreskog and Sörbom (1988). More specifically, the η_i are first-order latent factors that stand for five specific dimensions of religiosity, whereas the y_i are observed indicators that are thought to reflect (i.e., are caused by) these underlying or latent religiosity factors. The ε_i denote random measurement error in the observed indicators and the ζ_i stand for disturbance terms (i.e., residual errors) in the structural equations predicting the five latent religion dimensions (i.e., the η_i).

The five first-order factors were initially identified with an exploratory factor analysis (a table containing the results of the exploratory factor analysis is available from the author on request). This initial structure was subsequently refined with confirmatory factor analytic procedures described below. It should be emphasized that it is gener-
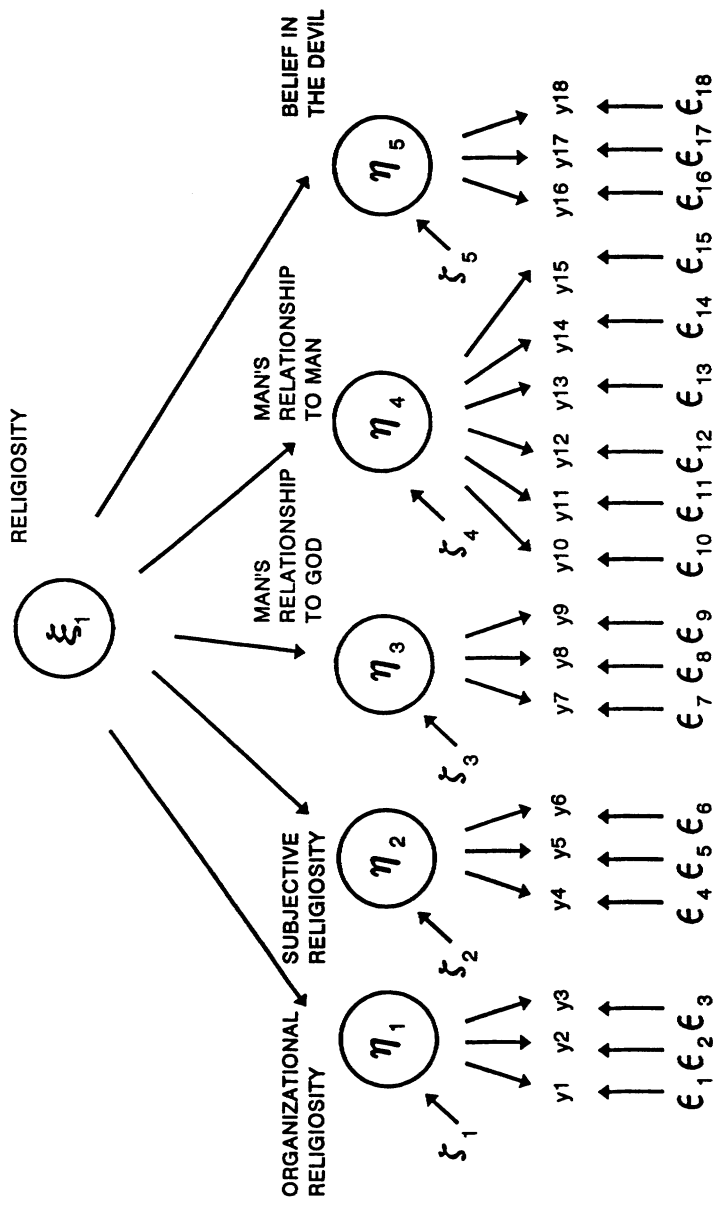
Figure 1: A Second-Order Factor Model of Religiosity

TABLE 1
Observed Indicators Used in All Study Models

Variable	Item Description
η_1	Organizational religiosity (see Figures 1 and 2)
	y_1 Do you belong to a church or religious organization?[a]
	y_2 Do you currently do any unpaid voluntary work for a church or religious organization?[a]
	y_3 Apart from weddings, funerals, and baptisms, about how often do you attend religious services?[b]
η_2	Subjective religiosity (see Figures 1 and 2)
	y_4 Independent of whether you go to church or not, would you say you are a religious person, not a religious person, or a convinced atheist?[c]
	y_5 How important is God in your life?[d]
	y_6 Do you find that you get comfort and strength from religion or not?[a]
η_3	Man's relationship with God[e] (see Figures 1 and 2)
	y_7 Which of the following statements apply fully today for yourself? I am the Lord thy God, thou shalt have no other gods before me.
	y_8 Thou shalt not take the name of the Lord thy God in vain.
	y_9 Thou shalt keep the Sabbath holy.
η_4	Man's relationship to man[e] (see Figures 1 and 2)
	y_{10} Thou shalt not kill.
	y_{11} Thou shalt not commit adultery.
	y_{12} Thou shalt not steal.
	y_{13} Thou shalt not bear false witness against thy neighbor.
	y_{14} Thou shalt not covet thy neighbor's wife.
	y_{15} Thou shalt not covet thy neighbor's goods.
η_5	Belief in the devil[a] (see Figures 1 and 2)
	y_{16} Do you believe in the devil?
	y_{17} Do you believe in hell?
	y_{18} Do you believe in sin?
η_7	Life satisfaction[f] (see Figures 3 and 4)
	1. All things considered, how satisfied are you with your life as a whole these days?
	2. And where would you rate yourself as you were 5 years ago?
	3. And where do you expect you will be 5 years from now?

a. These variables are scored in the following manner (coding in parentheses): no (1), yes (2).
b. This variable is scored on an 8-point scale where 1 stands for never and 8 denotes more than once a week.
c. This variable is coded in the following manner: a convinced atheist (1), not a religious person (2), a religious person (3).
d. This item was scored on a scale ranging from 1 to 10 where 1 represents not at all important and 10 denotes very important.
e. These items are coded in the following manner: does not apply (1), applies to a limited extent (2), applies fully (3).
f. These items are scored on a scale ranging from 1 to 10 where 1 stands for dissatisfied and 10 represents satisfied.

ally not advisable to perform exploratory and confirmatory factor analyses with the same data. Under ideal circumstances, the sample should be split into two or preferably three subsamples. Exploratory factor analyses are performed with one subsample and the findings are then subsequently replicated in the remaining subsamples with confirmatory factor analytic procedures. Unfortunately, this strategy could not be implemented here because the resulting subsamples would not contain a sufficient number of cases to fully evaluate the complex models proposed in this study (see, for example, Figure 1).

Returning to Figure 1, the first factor, organizational religiosity (η_1) is measured with three observed indicators that assess church membership, the frequency of church attendance, and whether a respondent does volunteer work at his or her church. A high score on these items denotes greater religious involvement.

Following the work of Chatters et al. (forthcoming), the second factor, subjective religiosity (η_2), stands for the importance of religion in the life of the respondent. This dimension is measured with three items that assess the importance of God in the study participant's life, whether a respondent feels that he or she is a religious person, and whether his or her religion is a source of strength.

The remaining first-order factors (η_3 to η_5) reflect specific dimensions of religious belief. The first two factors were created from items that ask respondents whether they feel that the Ten Commandments apply fully and personally in their lives. The exploratory factor analysis suggests that the Ten Commandments form two separate dimensions. The first appears to contain beliefs about man's relationship to God (η_3). Among the items loading on this factor is the belief in the commandment that "thou shalt not take the name of the Lord in vain." In contrast, the second dimension seems to deal more with laws about a person's relationship with his or her fellow man (man's relationship to man - η_4). Belief in the commandment that "thou shalt not steal" is among the observed indicators used to measure this construct. A high score on either dimension represents greater belief in the importance of the Ten Commandments in one's own personal life.

Taken together, the two factors formed by belief in the Ten Commandments consist of nine observed indicators. Belief in one commandment ("Thou shalt honor thy mother and father") was deleted

from further analysis because the exploratory factor analysis revealed that it was not strongly related to belief in the remaining commandments.

The model depicted in Figure 1 contains one additional belief dimension that is not associated with the Ten Commandments. Following the work of Koenig et al. (1988), this factor reflects belief in the devil. This dimension is assessed with three items that ask respondents whether they believe in the devil, hell, and sin, respectively. A high score on these indicators reflects stronger beliefs in the devil.

The model contained in Figure 1 is somewhat unique in gerontological research because it specifies that the five first-order dimensions (η_1 to η_5) are, in turn, indicators of a more abstract and overarching construct labeled *religiosity* (ξ_1). By relating the first-order factors to a higher-order factor in this manner, the model in effect specifies that the individual dimensions are part of a broader construct that extends beyond the immediate domains that are assessed by each first-order factor. In essence, this specification suggests that it may be possible for researchers to study religiosity from a more abstract yet more encompassing vantage point. It appears as though only one other study in the gerontological literature has taken this more sophisticated approach to modeling religiosity in later life (Chatters et al. forthcoming).

ALTERNATIVE SPECIFICATIONS

Although specifying a more sophisticated second-order factor model may help to advance our thinking about the nature of religiosity in later life, care must be taken to make sure that this complex specification is justified. One way to empirically evaluate the utility of this formulation is to compare it to a second model that does not contain the higher-order religiosity factor.

The resolution of this issue has important practical implications for researchers seeking to evaluate the impact of religiosity in later life. If the comparison described above indicates that the second-order factor model is justified, investigators would have some empirical basis for collapsing the five first-order dimensions into a single summary score denoting overall religious orientation. However, if the comparison of the alternative models calls the utility of the second-order specification into question, then researchers should consider treating the five first-order dimensions as separate subscales.

As Cattell (1978) and others have pointed out, there are a number of other ways to specify higher-order factor models in addition to the formulation presented in Figure 1. For example, the three belief factors (η_3 to η_5) may fit a higher-order model denoting religious beliefs, whereas the remaining dimensions (organizational religiosity and subjective religiosity) may be more adequately represented by first-order factors only. However, given the complexity of the analyses needed to estimate these models as well as the limitation in journal space, only one alternative formulation will be examined here. This alternative specification, which is presented in Figure 2, was selected because it represents the most parsimonious alternative to the second-order factor model described above.

Essentially, the difference between the models shown in Figures 1 and 2 arises from the way in which the correlations among the first-order factors are handled. In the second-order model shown in Figure 1, it is assumed that the correlation among these dimensions (i.e., the η_i) is due to their common dependence on a more abstract higher-order construct reflecting one's overall religious orientation (ξ_1). In contrast, the model shown in Figure 2 does not make the same theoretical assumption. Instead, this alternative formulation acknowledges that the first-order factors may indeed be intercorrelated (this is accomplished by allowing the ζ_i to correlate freely), but it does not attribute these correlations to a common higher-order religiosity construct.

There are at least two ways to determine whether the model in Figure 1 is more useful than the model depicted in Figure 2. The first involves comparing the fit of these models to the data. In the process, this information can be supplemented by examining the size and significance of the second-order factor loadings. If the fit of the second-order model to the data is relatively poor or the second-order factor loadings are relatively small, then the higher-order model may not be justified. In addition, it is possible to use another procedure for selecting between these alternative specifications. This approach involves determining whether the first-order factors are differentially related to selected external criterion measures. The structural equation model that will be used to implement this latter strategy is described in detail in the following section.
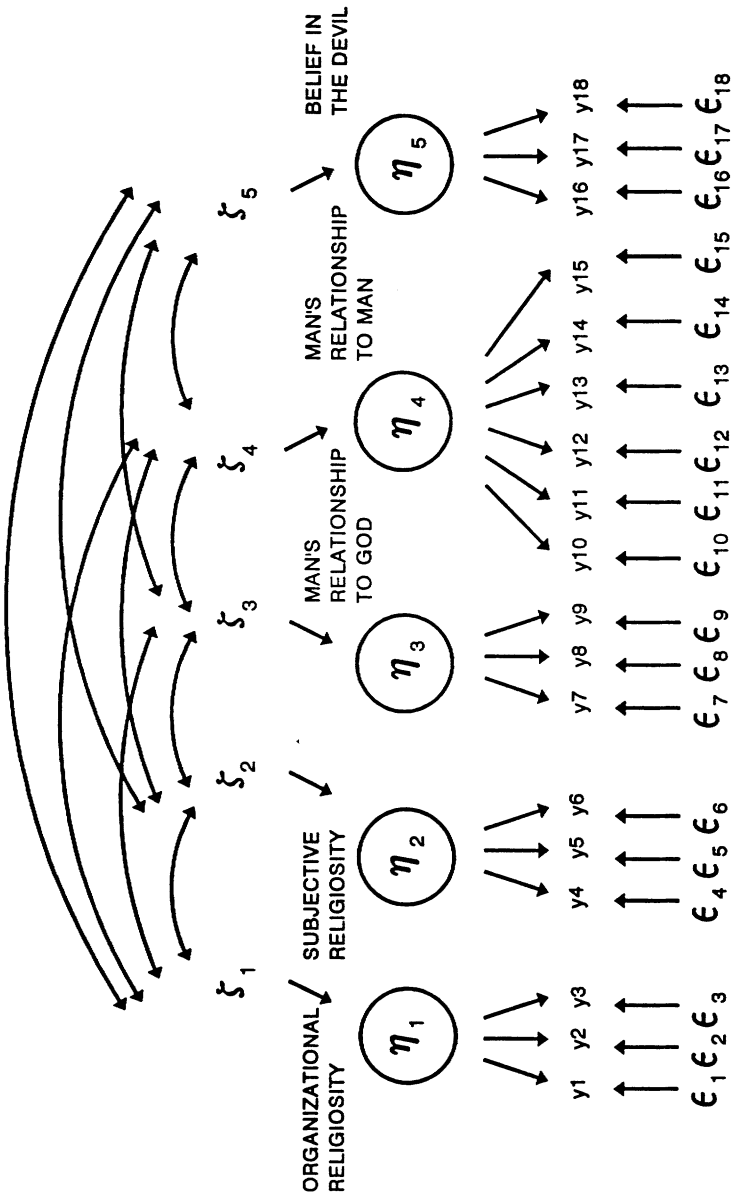
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Figure 2: A First-Order Factor Model of Religiosity

A Structural Equation Model of Religiosity and Life Satisfaction

A model designed to evaluate the independent effects of the five religiosity factors on life satisfaction is presented in Figure 3. To simplify the presentation of this conceptual scheme, the observed indicators are not depicted graphically. It should be emphasized that the purpose of this model is not to test a fully articulated theory of how feelings of life satisfaction emerge among older adults. Instead, the intent is to use the logic of construct validation to determine whether a second-order factor model of religiosity is justified.

The observed indicators used to measure the five religiosity constructs in Figure 3 are the same as those used to develop the measurement models described in the previous section (see Table 1). In addition, Table 1 also contains the three indicators that are used to assess life satisfaction. The observed indicators are coded so that a high score denotes greater life satisfaction. Finally, the substantive model depicted in Figure 3 also contains four demographic control measures that are included in this conceptual scheme primarily to control for the effects of population heterogeneity. Age is coded continuously in years, whereas sex is represented by a binary variable where a score of 1 represents men and a score of 0 denotes women. The education variable reflects the age of the respondent at the time he or she completed his or her last year of full-time education. Finally, the measure of nationality refers to whether a respondent resides in the United States (scored 1) or Canada (scored 0). The rationale for including a measure of nationality in the model will be presented when the study sample is reviewed in the following section.

The model depicted in Figure 3 specifies that each of the five first-order religiosity factors (η_1 to η_5) exerts a direct effect on life satisfaction (η_6). The utility of this model will be determined by comparing the results derived from estimating this formulation with the findings obtained with an alternative specification in which the second-order measurement model of religiosity is used to predict feelings of life satisfaction. This alternative specification is shown in Figure 4. If the direct effects of the five religiosity factors shown in Figure 3 are found to differ significantly, then the utility of the second-order factor model would be called into question. In contrast, should the effects of the first-order factors be relatively uniform, and
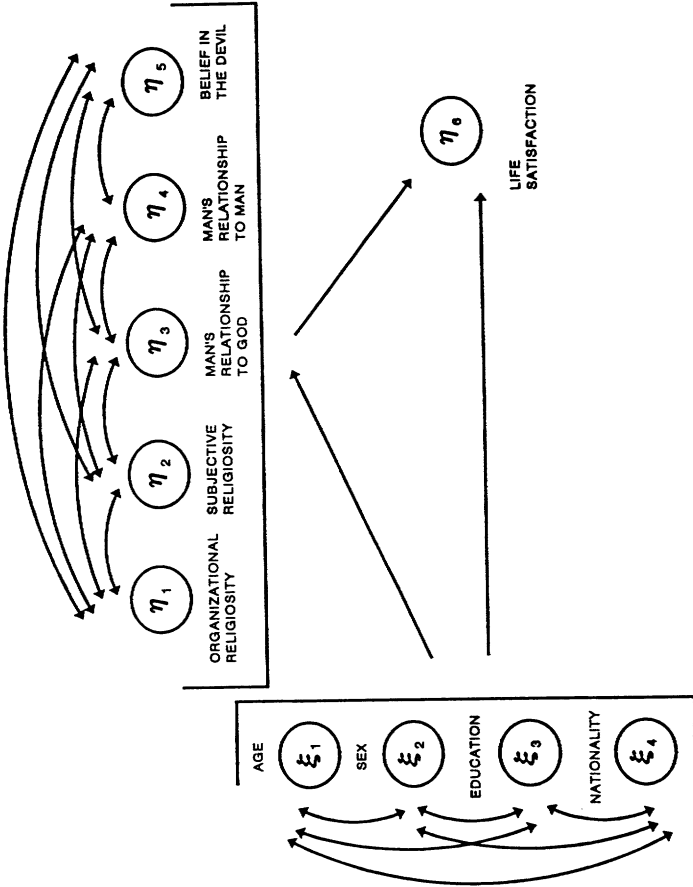
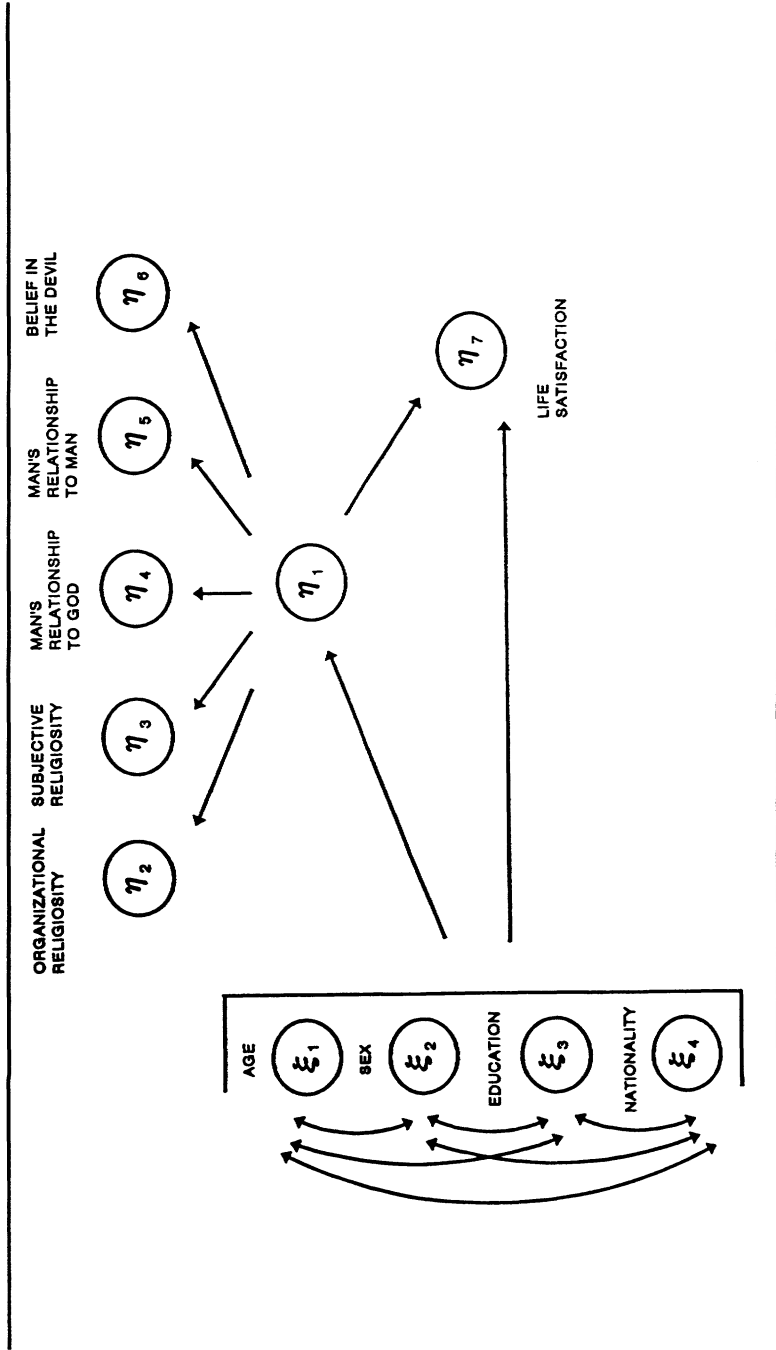**Figure 3:** A Structural Equation Model With a First-Order Factor Model of Religiosity

Figure 4: A Structural Equation Model With a Second-Order Factor Model of Religiosity

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if the second-order specification provides a better (or at least compa-
rable) fit to the data, then we can conclude that researchers are justified
in focusing on a more global conceptualization when examining the
impact of religiosity on life satisfaction among the elderly.

Study Sample

The data for this study come from the World Values Survey that
was conducted between 1981 and 1983. This impressive project was
directed by a steering committee of prominent researchers from nine
countries. The World Values Survey was designed to facilitate cross-
national comparisons of basic values and norms in a wide range of
areas, including leisure, work, the meaning and purpose of life, family
values, and contemporary social issues (e.g., abortion). Face-to-face
interviews were conducted with a random probability sample of adults
from all age groups residing within 22 countries. A total of 28,764
interviews were completed successfully.

The analyses presented below are based on the data obtained in the
United States and Canada. The sample was restricted to these two
nations because Americans and Canadians share a common religious
heritage. Only those individuals who were 55 years of age and older
at the time of the interview are included in the analyses presented
below. Five hundred and forty respondents are from the United States,
whereas 396 study participants are from Canada. The data provided
by the respondents in both nations were pooled to insure that there
would be sufficient statistical power for the complex analyses that are
required for this study. It was for this reason that a variable assessing
nationality was included in the structural equation models shown in
Figures 3 and 4. It should be emphasized that the analyses presented
below are based on weighted data that take into account the differential
probabilities of selection in these surveys.

After using listwise deletion to eliminate cases with missing values,
a total of 709 cases were available for analysis of the first- and
second-order factor models. Preliminary data analyses revealed that
the average age of the respondents in this group was 67.1 years ($SD =$
7.9 years). Approximately 43% of the study participants were men.
Because the study originally involved 22 nations, it is difficult to

devise a measure of educational attainment that can be used in countries with diverse educational systems. It was for this reason that the study participants were merely asked to report their age at the time they completed their last year of full-time education. The preliminary analyses revealed that the average respondent left school at approximately age 17. Finally, 59% of the respondents in this subsample are from the United States.

Results

EVALUATING ALTERNATIVE
MEASUREMENT MODELS OF RELIGIOSITY

Based on the data analysis strategy that was described above, the findings obtained from estimating the measurement models of religiosity will be presented in two sections. The results derived from estimating the less complicated measurement model (i.e., the first-order factor model shown in Figure 2) will be presented first. Then the results from this analysis will be used as a baseline for determining whether the second-order factor model provides any additional insight into the structure of religiosity among older adults. Table 2 contains the goodness-of-fit statistics that were derived by estimating these as well as the structural equation models that are reviewed in the next section. All parameter estimates were derived with the LISREL 7 statistical software program (Jöreskog and Sörbom 1988). The maximum likelihood estimator was used throughout this study.

The goodness-of-fit indexes associated with the first-order factor model depicted in Figure 2 reveal that, although this measurement specification provides an adequate fit to the data, there is room for improvement. As shown in Table 2, the adjusted-goodness-of-fit estimate is .893 (Jöreskog and Sörbom 1988). Although a minimum cut-point score has not been established, experience suggests that values in excess of .900 are adequate. In contrast, the coefficient computed with the Bentler-Bonett (1980) Normed Fit Index (.910) exceeds the recommended minimum value of .900. However, the estimates derived with the formula provided by Tucker and Lewis (1972) (.912) as well as Bollen's (1989) nonnormed fit index (.930)

TABLE 2
Goodness-of-Fit Information for All Study Models

Model	χ^2	df	Goodness-of-Fit Statistic			
			AGFI[a]	NFI[b]	NNFI[c]	Tucker-Lewis[d]
Null Model for Factor Models	6010.72	153	—	—	—	—
First-Order Factor Model	538.56	125	.893	.910	.930	.912
First-Order Factor Model (correlated ε_i)	429.20	124	.913	.929	.948	.936
Second-Order Factor Model	514.88	129	.900	.914	.934	.923
Null Model for Substantive Model	5359.11	300	—	—	—	—
Substantive Model/First-Order Religiosity	638.42	233	.896	.881	.921	.897
Substantive Model/Second-Order Religiosity	732.39	258	.892	.863	.907	.891

a. Adjusted Goodness of Fit Index (Jöreskog and Sörbom 1988).
b. Bentler-Bonett Normed Fit Index (Bentler and Bonett 1980).
c. Bollen's nonnormed fit index (Bollen 1989).
d. Tucker-Lewis coefficient (Tucker and Lewis 1972).

are only marginally acceptable when compared to the ideal value of 1.0 for these indexes.

Although there are several ways to conduct a model specification search, one commonly used procedure involves examining the standardized residuals associated with pairs of observed indicators. A large standardized residual indicates that the relationship between two items has not been described adequately by the model. An examination of the standardized residuals for the first-order factor model revealed that the indicators between two of the measures associated with the dimension dealing with man's relationship to man were not captured adequately by the model (i.e., "Thou shalt not covet thy neighbor's wife" and "Thou shalt not covet thy neighbor's goods"). Although the reason for this misspecification is not clear, it is important to point out that these are the only two indicators that deal with the problem of coveting. The large standardized residual associated with these measures suggests that some unmeasured substantive or methodological factor that is unique to the problem of coveting may affect the correlation between these items.

The first-order factor model was reestimated after permitting the measurement error terms associated with the coveting items (i.e. ε_{14}

and ε_{15}) to correlate freely. The difference in the chi-square values for the original and reestimated models is 109.36 (with 1 degree of freedom), which is significant at the .001 level. This figure suggests that allowing the measurement error terms to be correlated significantly improved the fit of the model to the data. The improvement in fit is also reflected in the Adjusted Goodness of Fit Index (AGFI) (.913), the Normed Fit Index (.929), the nonnormed fit index (.948), and the Tucker-Lewis coefficient (.936) (see Table 2). Based on these findings, the error terms associated with the coveting indicators were permitted to correlate freely for the remainder of the analyses that were performed in this study.

Having identified an acceptable first-order factor model, the next step involves estimating the second-order factor model shown in Figure 1 to see if this specification improves our understanding of the underlying religiosity construct. Subsequent data analysis revealed that the fit of the second-order factor model to the data is not quite as good as the fit of the best first-order model. More specifically, the difference in χ^2 values between the two models is 85.68 (with 5 degrees of freedom). However, although the difference in chi-square values between the two models is significant at the .001 levels, the incremental fit indexes listed in Table 2 do not change substantially. For example, the Tucker-Lewis coefficient (1972) for the second-order factor model (.923) is only slightly below the corresponding estimate for the first-order model (.936). When this relatively small change is viewed in light of conceptual advantages associated with working at the second-order factor level, the decision to reject the second-order factor model on the basis of fit alone may not be justified. Additional information is needed to make a more informed decision.

Examining the size of the factor loadings provides another way to determine the utility of the second-order factor solution. As Bollen (1989) and others point out, the factor loadings provide preliminary information on the reliability and validity of the study measures. Although no firmly established guidelines exist in the literature, experience suggests that factor loadings in excess of .400 are acceptable. The parameter estimates derived from estimating the second-order factor model are presented in Table 3. These data reveal that the first-order factor loadings range from .521 to .922 (these loadings are virtually identical to the loadings obtained from estimating the model

TABLE 3

Second-Order Religiosity Factor Model Estimates $(N = 709)$[a]

Item	First-Order Factors (η_i)					Error Variances (ε_i)
	Organizational Religiosity	Subjective Religiosity	Man's Relationship to God	Man's Relationship to Man	Belief in Devil	
y_1	.723					.477
y_2	.590					.652
y_3	.711					.494
y_4		.638				.593
y_5		.780				.392
y_6		.740				.453
y_7			.786			.382
y_8			.785			.385
y_9			.708			.498
y_{10}				.750		.438
y_{11}				.663		.560
y_{12}				.798		.364
y_{13}				.754		.431
y_{14}				.670		.551
y_{15}				.775		.399
y_{16}					.876	.233
y_{17}					.922	.149
y_{18}					.521	.729
					$(\varepsilon_{15}, \varepsilon_{14})$	.210[b]

	Second-Order Factor (ξ_1)	
	Religiosity	*Structural Disturbance Term*
First-order factor		
Organizational religiosity	.608	.631
Subjective religiosity	.833	.306
Man's relationship to God	.951	.095[c]
Man's relationship to man	.464	.784
Belief in the devil	.574	.670

a. All parameter estimates are from the standardized solution. The first-listed indicator in each factor was fixed at 1.0 in the unstandardized solution. Unless otherwise indicated, all parameter estimates are significant at the .001 level.

b. Correlated measurement error terms estimate (see text for a discussion of this estimate).

c. Parameter estimate significant at the .05 level.

that consisted of first-order factors only—see Figure 1). Table 3 also contains the second-order factor loadings, which indicate how strongly the first-order factors are related to the higher-order religiosity dimension. These second-order loadings range from .464 to .833, suggesting that in both instances, the first- and second-order factor loadings are within acceptable limits.

It is possible to compute some additional estimates that provide an alternative and a perhaps more intuitively pleasing way of assessing the reliability of the measures used in a study. More specifically, Rock, Werts, Linn, and Jöreskog (1977) supply a formula that provides a joint estimate of the reliability of all the observed indicators used to measure a given latent variable. This means, for example, that it is possible to compute a single reliability coefficient for all of the observed indicators that are used to measure the organizational religiosity construct. Applying this formula to the data provided in Table 3 indicates that the reliability estimates of the first-order religiosity measures are good. More specifically, these additional analyses (not shown in Table 3) reveal that the reliability of the factors reflecting organizational religiosity (.716), subjective religiosity (.764), man's relationship to God (.804), man's relationship to man (.876), and belief in the devil (.829) are generally acceptable by contemporary social and behavioral science standards (Nunnally 1978). It is also possible to use the formula developed by Rock et al. (1977) to obtain an estimate of the reliability of the second-order religiosity factor that is formed from the first-order factor loadings listed in Table 3. The reliability of the second-order religiosity construct (.826) also appears to be within acceptable limits.

Taken together, the data presented in this section suggest that there is only a marginal difference in fit between the first- and second-order factor religiosity models. Given the parsimony associated with the second-order specification, it would appear at this point that this is the preferred formulation. The utility of the second-order specification is further illustrated by the reliability estimates that were derived with the formula provided by Rock et al. (1977). At this juncture it appears that it is acceptable to sum the observed indicators used in this study to form a global religiosity measure.

In spite of the evidence presented above, it would be premature to make a final recommendation about the structure of the religiosity

measures examined in this study. To arrive at a better understanding of how to use these measures, the first- and second-order factor models must be embedded in a structural equation model to see whether the five dimensions of religiosity are differentially related to select external criterion measures. The results of the analyses that were designed to address this issue are presented in the next section.

A STRUCTURAL EQUATION MODEL OF RELIGIOSITY AND LIFE SATISFACTION

Table 4 contains the findings that emerged from estimating the model in which the five religiosity factors were permitted to exert direct effects on life satisfaction. However, before turning to the findings in this table, it is necessary to examine two preliminary issues; the first has to do with the psychometric properties of the life satisfaction indicators, whereas the second issue involves the fit of the model to the data.

The parameter estimates derived from the structural equation model depicted in Figure 3 suggest that the life satisfaction indicators have acceptable psychometric properties. More specifically, the standardized factor loadings associated with the three observed indicators that form the composite are .936, .496, and .625, respectively. Based on the formula provided by Rock et al. (1977), the overall reliability of this brief index also appears to be adequate (.740).

The goodness-of-fit information contained in Table 2 reveals that the fit of the complex structural equation model to the data is marginally acceptable. In particular, the AGFI (.896) and the Normed Fit Index (.881) values fall just short of the recommended minimum value of .900. Similarly, the estimates computed with the formulas provided by Bollen (1989) (.921) as well as Tucker and Lewis (1972) (.897) are also below the ideal value of 1.0 for these indexes.

Although the fit of this model to the data can be improved, two important findings emerge from the results reported in Table 4. First, the data suggest that only one of the five religiosity factors exerts a significant direct effect on life satisfaction. More specifically, the findings reveal that as feelings of subjective religiosity intensify, the older adults in this study report being more satisfied with their lives in general (Beta = .261; $p < .05$). In contrast, neither organizational religiosity (Beta = −.020), beliefs about man's relationship to God

TABLE 4
Impact of First-Order Religiosity Factors on Life Satisfaction (N = 620)

	Dependent Variable					
Independent variable	Organizational Religiosity	Subjective Religiosity	Man's Relationship to God	Man's Relationship to Man	Belief in Devil	Life Satisfaction
Age	−.038[a]	−.028	.049	−.033	−.029	−.030
	(−.002)[b]	(−.001)	(.002)	(−.001)	(−.002)	(−.007)
Sex	.130**	.239***	.242***	.134**	.142**	−.085
	(.097)	(.094)	(.181)	(.040)	(.122)	(−.293)
Education	.015	−.094*	−.125**	.021	−.060	.041
	(.002)	(−.006)	(−.016)	(.001)	(−.009)	(.025)
Nationality	.238***	.180***	.181***	.086	.292***	−.115**
	(.181)	(.072)	(.138)	(.026)	(.254)	(−.406)
Organizational Religiosity						−.020
						(−.091)
Subjective Religiosity						.261*
						(2.296)
Man's Relationship to God						−.098
						(−.454)
Man's Relationship to Man						.015
						(.173)
Belief in Devil						.025
						(.103)

a. Standardized regression coefficient.
b. Unstandardized regression coefficient.
*p < .05; **p < .01; ***p < .001.

(Beta = –.098), beliefs about man's relationship to man (Beta = .015), or belief in the devil (Beta = .025) are significantly related to assessments of life satisfaction.

The findings further indicate that some of the demographic measures may also exert a differential impact on the five religiosity factors. In particular, the data indicate that, although education is significantly related to subjective religiosity (Beta = –.094; $p < .05$) and man's relationship to God (Beta = –.125; $p < .01$), it fails to exert a significant effect on either organizational religiosity (Beta = .015), man's relationship to man (Beta = .021), or belief in the devil (Beta = –.060).

Consistent with the data analysis strategy that was described earlier, the structural equation model was reestimated after the second-order factor model of religiosity was substituted in place of the first-order specification. In effect, this second-order formulation specifies that the five first-order factors do not exert a direct effect on life satisfaction. Instead, these dimensions are constrained to influence life satisfaction only indirectly through the higher-order religiosity factor shown in Figure 4.

The goodness-of-fit information presented in Table 2 indicates that imposing a second-order factor specification on the religiosity items does not improve the fit of the structural equation model to the data. The difference in chi-square values for the two alternative structural equation models ($\chi^2 = 93.97$ with 25 degrees of freedom) is significant at the .001 level. However, the AGFI (.897), Normed Fit Index (.863), nonnormed fit index (.907), and the Tucker-Lewis (1972) coefficient (.891) are only slightly lower than the corresponding estimates that were obtained with the first-order specification (see Table 2).

Based on goodness-of-fit information alone, it is difficult to determine whether the first-order specification in Figure 3 is preferable to the second-order formulation in Figure 4. However, important additional information is provided by the parameter estimates that represent the impact of the higher-order religiosity construct on feelings of life satisfaction. More specifically, the data (not shown in Table 4) reveal that the relationship between the second-order religiosity factor and life satisfaction is statistically significant (Beta = .163; $p < .01$). However, the previous analyses suggest that this is due entirely to the effects of subjective religiosity alone (Beta = .261; see Table 4). In essence, forcing the subjective religiosity dimension to operate solely

through the higher-order religiosity factor serves to reduce the observed relationship between religion and life satisfaction by 38%.

Taken together, the findings in this section serve to highlight the utility of supplementing standard model evaluation procedures with data provided by models that are designed to examine the differential impact of multidimensional factor structures on relevant external criterion measures. This is not the first study to call the attention of the academic community to this useful data analytic approach (see for example, Cattell 1978). However, these procedures have rarely been implemented by researchers investigating the measurement of religiosity in later life.

Conclusions

The overall thrust of this study has been to empirically evaluate a dimension or facet of religiosity (i.e., religious beliefs) that has been largely overlooked in previous work with older adults. Alternative measurement models were tested to fully explicate the nature of the interface between this dimension and more standard measures of religiosity (e.g., organizational religiosity). Estimation of these preliminary measurement models initially revealed that the five dimensions may be part of a broader second-order factor reflecting a global religious orientation. Moving beyond previous work in this area, an attempt was made to evaluate the utility of this second-order formulation by assessing whether the first-order factors are differentially related to an external criterion measure (i.e., life satisfaction). Subsequent analyses suggest that only subjective religiosity was related to feelings of life satisfaction, whereas the other dimensions failed to exert a significant effect. Taken as a whole, these findings indicate that it may not be best to use a second-order factor specification when examining the impact of religiosity on feelings of life satisfaction among older adults.

It should be emphasized that only one external outcome measure was evaluated in this study, life satisfaction. Consequently, it cannot be claimed that religiosity is always best evaluated with a first-order specification. Instead, it is entirely possible that the five dimensions of religiosity that are examined in this study may exert a more uniform

influence on some other external criterion measure, such as depressive symptomatology. At a broader level, this point serves to underscore the notion that there may not be any one "best" way to specify a measurement model and that the form a measurement specification takes is inextricably linked to the nature of the theoretical question that is posed and the type of outcome measure that is used in the model. At the very least, the findings that emerged from this study suggest that researchers who are interested in assessing the impact of religiosity on well-being in later life are well-advised to examine the effects of these dimensions in disaggregated as well as aggregated forms.

To place the findings from this study in a proper perspective, it is important to review some of the limitations in the analyses that have been performed. Three of these shortcomings are discussed here. The first problem has to do with the scope of religious beliefs that were evaluated in this study. In a closely related vein, the second limitation arises from the fact that not all of the relevant dimensions of religiosity were examined in this study. The final problem concerns the use of cross-sectional data in the structural equation models.

In addition to including beliefs about the devil, the measure of religious beliefs focused on the Ten Commandments. Although the Ten Commandments are clearly basic tenets of the Judeo-Christian faith, these laws obviously do not exhaust all of the basic religious tenets. Because of this, it is premature to conclude that religious beliefs do not affect assessments of life satisfaction. Other beliefs that cut across specific faiths should be explored including the belief that God intervenes on one's behalf in difficult situations or the belief that God rewards those who adhere to the basic teachings of the church.

The measurement model of religiosity that was examined in this study does not contain all of the dimensions that have emerged from previous research. In particular, items pertaining to nonorganizational religiosity (e.g., the frequency of private prayer) were not included in the formulations that were examined here. This suggests that, despite the complexity of the measurement model examined in the present study, even more elaborate models of religiosity are needed before we can fully understand why this complex phenomenon is capable of influencing the lives of many older adults.

Finally, the structural equation models depicted in Figures 3 and 4 assume that religiosity affects feelings of life satisfaction among older

adults. It is not possible to use cross-sectional data to determine conclusively whether this causal assumption is valid. Clearly, data that have been gathered at more than one point in time are needed to fully evaluate the temporal ordering between these constructs.

Despite the limitations discussed above, the analyses presented in this study take a modest step toward increasing our awareness of the extent and complexity of the vast domain encompassed by the religiosity construct. In the process, an attempt was made to provide a blueprint for other researchers to follow as they continue to map out the boundaries of this important social force in later life.

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