Religious Involvement and 6-Year Course of Depressive Symptoms in Older Dutch Citizens:

Results From the Longitudinal Aging Study Amsterdam

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Objectives: Expanding on cross-sectional studies, associations are examined between religious involvement and the 6-year course of depressive symptoms in older adults. **Methods:** Subjects are 1,840 community-dwelling older adults (aged 55 to 85) participating in three measurement cycles of the Longitudinal Aging Study, Amsterdam. Assessments include aspects of religious involvement, depressive symptoms, physical health, self-perceptions, social integration, urbanization, and alcohol use. **Results:** Church attendance is negatively associated with the course of depressive symptoms, also after adjustment for explanatory variables. Among respondents with functional limitations, lower depression scores are found for those who attend church on a regular basis. For respondents who are bereaved or nonmarried, however, slightly higher depression scores are found for those with high levels of orthodox beliefs. **Discussion:** There is a consistent negative association over time between church attendance and depressive symptoms in older Dutch citizens. Both stress-buffering as well as depression-evoking effects of religious involvement are found.

Keywords: *religion; depression; aging*

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Accumulating evidence in psychiatric and gerontological literature shows that religious involvement is generally associated with lower levels of depressive symptoms in later life (Braam, Beekman, & van Tilburg, 1999; Koenig, McCullough, & Larson, 2001). This evidence warrants further interest in religion as an important resource for older people. One may assume that religion enhances positive feelings of consolation, hope, inner peace, and relatedness with other people and offers an interpretive scheme (Idler, 1987) for questions of life, suffering, and death. As it is embedded in religious traditions, religious involvement consists of several aspects that can be derived from religious behaviors, motivations, and beliefs (Wulff, 1991). The aspect that is most intensively examined is church attendance. The majority of findings in this field are based on cross-sectional studies, and questions about the dynamics of how religious involvement protects against depressive symptoms over time need further elucidation.

So far, the results of the limited number of prospective studies on aspects of religious involvement and depression in later life are mixed. Associations between church attendance and (lower levels of) depression were not significant, or turned to insignificance after adjustment for physical health status in several studies (Idler & Kasl, 1992; Kennedy, 1998; Koenig, George, & Peterson, 1998; Schnittker, 2001). In the study of Strawbridge, Shema, Cohen, and Kaplan (2001), church attendance predicted remission of depression after an unusually protracted follow-up period of 30 years. Musick, Blazer, and Hays (2000) described a differential result for elderly Baptists in North Carolina: Church attendance was associated with less depression after 1 year of follow-up in urban areas but not in rural areas. With respect to prospective studies on a second aspect of religious involvement, religious denomination, there is conflicting evidence. Compared with Protestants, Roman Catholic elderly in the United States were found to develop more depressive symptoms in one study (Idler & Kasl, 1992)

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and fewer depressive symptoms in another study (Miller, Warner, Wickramaratne, & Weismann, 1997); no difference between denominations was observed in a third study (Schnittker, 2001). Another aspect of religious involvement that has been included in prospective studies is the salience of religion. In at least three studies, salience of religion is associated with a better outcome of depression or fewer depressive symptoms at follow-up for those who suffer from a physical disease (Idler & Kasl, 1992; Braam, Beekman, Deeg, Smit, & van Tilburg, 1997; Koenig et al., 1998). Findings by Schnittker (2001) are similar, although he found higher depression scores not only for those with very low levels of salience of religion but also for those with very high levels. There are no longitudinal studies on the degree of adherence to traditional religious ideas, also known as orthodoxy. In a cross-sectional study in the Netherlands, orthodoxy was negatively associated with depressive symptoms (Braam, Beekman, Deeg, & van Tilburg, 1996). Therefore, it may be worthwhile to examine the association between orthodoxy and the course of depressive symptoms.

From a theoretical point of view, the complex relationship between religious involvement and higher or lower levels of depression is approached from several directions. Early ideas can be found in monographs from grand theorists from the turn of the previous century. In these, sociological conceptions are found on connections between religious background and social support (Durkheim, 1897/1960) or on the historical development to a pessimistic outlook ("de-enchantment of the world") among Calvinist Protestants (Weber, 1904/1965). The initial psychological theories focus on psychodynamic pathways of religiousness, as described by James (1902/1985) and Freud (1907/1957). James (1902/1985) characterized religion as a deep, singular emotion that should be understood at the subliminal (unconcious) level. Freud (1907/1957) observed parallels between religion and compulsive neurosis and postulated psychodynamic explanations for this observation.

In contemporary theoretical overviews on the relationship between religiousness and depression (Chatters, 2000; Ellison & Levin, 1998), two main groups of explanatory factors can be distinguished, in which some of the early conceptions can still be recognized. The first group of explanatory mechanisms constitutes a set of factors that influence

both religiousness and depression. Examples are (a) physical health, (b) social integration, (c) personality characteristics, or even (d) genetic characteristics, such as an inherited tendency to transcendence. The first three factors are often denoted as confounding factors, which should be included in empirical studies, as is strongly advocated by Sloan, Bagiella, and Powell (1999).

The second group of explanatory mechanisms consists of de facto mediating factors. Here, religiousness activates processes that influence the emergence of depressive complaints. Examples are (a) healthy lifestyles, or physical experiences by way of relaxation exerting a positive effect on the stress system; (b) mobilization of social support, or less fortunately, being under social pressure; (c) positive cognitions, such as hope and optimism, or negative cognitions, such as the expectation of punishment; and (d) positive emotions, such as feelings of consolation, or the opposite, feelings of religious fear or discontent. Although these explanatory mechanisms suggest a direction of causality, reverse pathways may be thought of as well.

In addition, possible protective effects of religious involvement can be further conceptualized following the stress–social support models as formulated by Cohen and Wills (1985), who distinguish between a main-effect model and a stress-buffering model. Applied to religious involvement, the main-effect model assumes that religious involvement has a beneficial effect on depression, regardless of whether stress (e.g., due to disease) is present. Evidence for the main-effect model was found in two cross-sectional studies (Braam, Beekman, van Tilburg, Deeg, & van Tilburg, 1997; Krause & Tran, 1989). According to the stress-buffering model, religious involvement mitigates the negative influence of stress on depression, for which support was found in a follow-up study by Musick, Koenig, Hays, and Cohen (1998). Sources of stress that are often studied are physical decline and partner loss. In the present study, the degree of urbanization is also included, both as a possible sociodemographic confounder and as a source of stress, as was found in a previous, cross-sectional study, based on the sample that is also used in the current contribution (Beekman et al., 1995).

The purpose of the present study is to explore associations between several aspects of religious involvement and depressive symptoms during a 6-year period in a large nationwide Dutch sample of

community-dwelling older adults. Subsequent questions are whether (possible) associations can be attributed to confounding factors or explanatory factors such as self-perceptions, social integration, or health behavior. Finally, it will be examined whether associations are modified by sources of stress, such as poor physical health, living without a spouse, or living in an urbanized living environment. This is the first European longitudinal study on this subject, as the available studies, so far, are all from North America. The religious climates of the two continents, however, differ profoundly (Halman & de Moor, 1994). For example, rates of church membership in the Netherlands are substantially lower than those in the United States (51% vs. 77% in 1990). Therefore, it is not certain whether findings from North America can be extrapolated to European populations.

Method

SAMPLING AND PROCEDURES

The present study is part of the Longitudinal Aging Study Amsterdam (LASA), an ongoing interdisciplinary study of predictors and consequences of changes in autonomy and well-being in the aging population (Deeg & Westendorp de Serière, 1994). The sampling and procedures adopted to achieve the baseline sample are described in detail elsewhere (Beekman et al., 1995). In short, a nationally representative random sample of older adults (aged 55 to 85), stratified for age and sex, was drawn from the population registers of 11 municipalities in three regions of the Netherlands. The sample was used in two studies. Respondents were first interviewed for the Netherlands Program for Research on Aging (NESTOR, from the Dutch title) Living Arrangements and Social Networks of Older Adults (LSN; Broese van Groenou, van Tilburg, de Leeuw, & Liefbroer, 1995). About 10 months later, 3,107 (81.7%) of the 3,805 respondents to the NESTOR-LSN study took part in the LASA baseline interview (T1). Three and six years later, all accessible participants to the baseline measurement were approached again, generally using the same instruments and procedures as were used in the baseline measurement. Of the original sample at T1 ($N = 3{,}107$), 6 years later, 24.5% ($n = 761$) had died, 8.7% ($n = 270$) were lost to follow-up for other reasons

(refused, $n = 160$; ineligible, $n = 81$; not contacted, $n = 29$), and 7.6% were lost due to item nonresponse ($n = 236$). Complete data for depression and church attendance is available for 1,840 subjects (78.4% of 2,346 respondents still alive).

Respondents who were lost to follow-up for reasons other than mortality ($n = 270$) were compared with those with complete data ($n = 1,840$) on demographic characteristics, physical health, depressive symptoms, church attendance, and religious denomination. Nonresponse was significantly predicted by lower levels of education, higher age, more functional limitations and more depressive symptoms at baseline, and lower frequency of church attendance. In a multivariate logistic model, the significant differences only held for age ($B = 0.03$; $p = .001$), education ($B = –0.05$; $p = .035$), church attendance ($B = –0.10$; $p = .013$), and at borderline for depressive symptoms ($B = 0.01$; $p = .086$).

MEASUREMENTS

Dependent Variable

Depressive symptoms were measured with the Center for Epidemiologic Studies Depression scale (CES-D). This is a 20-item self-report scale designed to measure depressive symptoms in the community (Radloff, 1977). Subjects were asked how often they experienced each symptom during the previous week. Items were coded in four response categories, ranging from 0 ("rarely or none of the time") to 3 ("most of or all the time"), yielding a score range of 0 to 60. The Cronbach's alpha in the current sample is .86.

Independent Variables

Religious involvement is operationally defined in terms of frequency of church attendance, religious denomination, salience of religion, and orthodoxy of beliefs. Frequency of church attendance, measured at T1 and T3, was assessed using five response categories (1 = "once a year or less," 2 = "several times a year," 3 = "monthly," 4 = "2 or 3 times a month," 5 = "once a week or more"). Frequency of church attendance is used as a predicting variable. In addition, a number of

course types of church attendance are distinguished. Change over time is defined as a difference between church attendance at T3 relative to T1 with at least 2 points, representing a change of more than one standard deviation. In this way, two change categories emerge, "decrease" and "increase." With respect to course types that are stable over time, the largest categories ("yearly or less" and "once a week or more") remain intact, whereas the three course types in between are merged into the category "occasionally."

Religious denomination, assessed at T1, consists of three categories: non–church members, Protestants, and Roman Catholics. Denominations that fall outside these categories were omitted from analysis because of very small numbers. The Protestant category consists of the following congregations (see Braam et al., 1998, for a more detailed summary): Dutch Reformed Church, Reformed Calvinist churches, small conservative Calvinist congregations, and other Protestant congregations (denoting a very mixed group of non-Calvinist, predominantly liberal Protestant denominations; Becker & Vink, 1994).

Orthodoxy, defined as the level of adherence to traditional (i.e., Christian) religious beliefs, was assessed at T2 by the Orthodoxy Scale, which has been regularly used in studies by the Dutch Social and Cultural Planning Office (Becker & Vink, 1994). Doctrines included were (asked as, "Do you believe in . . . ?") life after death, heaven, purgatory, hell, the devil, the actual existence of Adam and Eve, and the Bible as God's word. Answers could be yes (score = 1) or no (score = 0), yielding a score range of 0 to 7. Cronbach's alpha amounts to .86.

Salience of religion was assessed by a 5-item scale (Felling, Peters, & Schreuder, 1986) at T2, probing the relevance of religion in personal life. An example of an item is "When I make important decisions, my religious faith plays a considerable role," with response categories between 0 ("totally disagree") and 5 ("totally agree"). The Cronbach's alpha of this scale is .87.

Covariates

Covariates in this study have been shown to be related to depression and religion in previous studies and thus may act as potential con-

founders. Sociodemographic variables include age, sex, marital status, and years of education. Marital status (0 = "nonmarried or no longer married" versus 1 = "married") is also included as a modifying variable.

Stress or Modifying Variables

Physical health was assessed using two measures: number of chronic physical diseases and functional limitations. For chronic disease, self-reports were obtained for six physical chronic conditions that are most prevalent in the older population: chronic lung disease, cardiovascular disease, stroke, diabetes, cancer, and arthritis (Statistics Netherlands, 1989). The number of chronic diseases was calculated by adding up all specific diseases reported to be present. In a validation study, respondents' self-reports were compared with information obtained from their general practitioners and proved to be sufficiently reliable (Kriegsman, Penninx, van Eijk, Boeke, & Deeg, 1996).

Functional limitations were assessed by asking respondents whether they experienced difficulties with (a) climbing stairs, (b) using own or public transport, or (c) cutting own toenails (Kriegsman, Deeg, van Eijk, & Penninx, 1997; van Sonsbeek, 1988). Response categories ranged from 0 "no difficulty" to 3 "unable" (score range of 0 to 9). The reliability of the scale is satisfactory (Cronbach's alpha = .73).

Urbanization was assessed at all three measurements applying a postal code rubrication system designed by the national institute for statistics (Statistics Netherlands, 1999), which links the postal codes to five categories of the number of addresses per squared kilometer (ranging from 1 = "< 500 addresses per km^2" to 5 = "> 2500 addresses per km^2").

Mediating (Explanatory) Variables

Social networks of persons with whom the respondents maintained an important and frequent relationship were determined by using a procedure based on Cochran, Larner, Riley, Gunnarson, & Henderson (1990; van Tilburg, 1994). In each of seven categories (persons living

in the same household, children and children-in-law, other relatives, neighbors, persons with whom one has been working or studying, contacts in organizations, and other contacts), the respondents were asked to name persons older than 18 years who were important to them and with whom they were in touch regularly. The size of the network was determined by the number of people named in the seven categories. Questions on instrumental and emotional support were asked about a maximum of nine relationships, other than that of spouse and partner, with the highest contact frequency. For each of the nine, or for all relationships if there were fewer, two questions were asked: (a) "How often did it occur in the past year that X helped you with daily chores in and around the house, such as preparing meals, cleaning the house, transportation, small repairs, or filling out forms?" (instrumental support); (b) " . . . that you told X about your personal experiences and feelings?" (emotional support). The four responses to choose from were never (0), rarely (1), sometimes (2), and often (3). The mean of both forms of support across the various relationships was computed for each respondent. This resulted in two scales, each ranging from 0 (*no relationships, or all relationships are never supportive*) to 3 (*all relationships are often supportive*). It might be of influence whether all network members are equally supportive or whether a couple or even one network member only is greatly supportive. Therefore, the individuals' standard deviations on the emotional and instrumental support measures were computed. These variables reflect the diversity in the amount of support received from the various network members. In preliminary analyses, both diversity measures had small, positive associations with depressive symptoms. For ease of survey, the diversity measures were not used further, as they did not provide any additional insight in the associations between religious involvement and depressive symptoms.

Sense of mastery was measured using a 5-item version of the Mastery Scale (Pearlin & Schooler, 1978). A characteristic item of this scale is, "I have little control over the things that happen to me." Response categories range from 1 (*strongly disagree*) to 5 (*strongly agree*). Total scores range from 5 to 25, high scores reflecting a high sense of mastery; the Cronbach's alpha for this scale in the current sample is .69.

Self-esteem was assessed on the basis of the answers to the statement, "On the whole, I am satisfied with myself" (1 = *totally disagree* to 5 = *totally agree*).

An indication of previous alcohol use was obtained through several questions on amount and frequency of alcohol use (Statistics Netherlands, 1989) in a separate section of the LASA interview at T1, which took place several weeks after the main interview. A 4-point rank-order scale was constructed (ranging from 0 = *never* to 3 = *heavy drinker*), similar to the procedure described by Garretsen (1983).

DATA ANALYSIS

The dependent variable is depressive symptoms, measured at three waves. The main independent variables are frequency of church attendance and religious denomination. Orthodoxy and salience of religion are examined in additional analyses, because these variables were assessed at the second measurement only. On the assumption that orthodoxy and salience are stable over time, orthodoxy and salience are examined on their possible role as effect modifiers for associations between depressive symptoms and sources of stress.

Generalized estimating equations analysis (GEE) is carried out to investigate the longitudinal relationship between depressive symptoms and religious involvement. GEE is a type of regression analysis that includes cross-sectional (between-subjects) and longitudinal (within-subjects) relationships simultaneously. Moreover, GEE takes into account the correlation of the repeated measures within a person over time (Zeger & Liang, 1986). The regression coefficient estimated with GEE analysis reflects both the cross-sectional part and the longitudinal part of the analysis. Furthermore, GEE can handle missing values so that respondents with only two, instead of three, observations can also be analyzed. Thus, basically, GEE analysis can be seen as an extension of "standard" linear regression analysis, in which the extension is a correction for the within-subjects correlations.

In the regression models, church attendance and denomination are separately entered in the first two steps (Models I and II). For denomination, dummy variables are computed, with the non–church members constituting the reference category. In the three subsequent steps

(III-V), demographic and physical health variables, as well as urbanization, are entered. Explanatory variables are tested in the next three steps (VI-VIII): self-perceptions, social integration, and alcohol use. In an additional series of models, with a slightly lower number of respondents, orthodoxy and salience of religion are examined, first in separate steps (Model Ias and IIa), next together with all religious involvement variables (IIIa), and finally with adjustment for demographics and physical health (IVa). In the study by Schnittker (2001), low scores as well as high scores on a salience of religion measure were associated with higher levels of depressive symptoms at follow-up, indicating a nonlinear ("U"-shaped) association. Because of this, it is explored whether a noncurvilenear association between salience of religion and depressive symptoms can be found in the current sample. Therefore, both the salience of religion variable and its quadratic term are entered in the regression analysis. After these regression models, interactions are examined in the associations between depressive symptoms and the religious variables for sources of stress (i.e., physical decline, living alone, and urbanization). Each interaction term is tested in a separate model. When significant interaction terms are detected, the direction of the association is determined, comparing the mean depression scores at each measurement moment for the relevant subgroups.

To facilitate comparison in more than one way with other longitudinal studies, a final, tentative series of GEE analyses includes change categories of church attendance: "yearly or less," "occasionally," "increase," and "decrease," which are used as dummy variables, with "weekly" as the reference category.

Results

SAMPLE CHARACTERISTICS

The characteristics of the study sample are summarized in Table 1. Due to the sampling procedure, men and women are fairly evenly represented. With regard to the religion variables, a significant decline in church attendance is found during the 6-year follow-up period. Furthermore, there is a significant increase in the outcome variable,

Table 1
Characteristics of the Sample (N = 1,844; relevant item nonresponse is specified)

	Range	*T1* M (SD) *or %*	*T2 (3 years)* M (SD) *or %*	*T3 (6 years)* M (SD) *or %*	*Change T1-T3 Statistic*[a] (F)
Age	55-85	68.1 (8.2)			
Female	—	55%			
Not/no longer married	—	33%	39%	44%	47 (= χ^2)***
Years of education	5-18	9.1 (3.3)			
Number of chronic diseases	0-6	0.8 (0.9)	1.1 (1.0)	1.2 (1.1)	75***
Functional limitations	0-3	0.5 (0.9)	0.8 (1.0)	1.0 (1.1)	19***
Urbanization	0-5	2.6 (1.6)	2.7 (1.6)	2.6 (1.6)	3.6*
Sense of mastery	5-25	17.6 (3.3)	17.5 (3.3)	17.3 (3.4)	4.4*
Self-esteem	0-5	4.0 (0.8)	4.0 (0.7)	4.0 (0.8)	0.6
Size of social network	0-75	14.7 (8.4)	15.1 (8.7)	14.7 (8.8)	1.5
Instrumental support	0-3	0.8 (0.7)	0.8 (0.7)	0.8 (0.7)	3.2*
Emotional support	0-3	1.8 (0.7)	1.6 (0.8)	1.6 (0.8)	21***
Previous alcohol use (n = 1,689)	0-3	1.6 (0.8)			
Church attendance	1-5	2.7 (1.8)		2.4 (1.7)	35***
"yearly or less"		45%		56%	
"several times a year"		11%		8%	
"monthly"		5%		4%	
"2 or 3 times a month"		7%		6%	
"weekly"		33%		26%	
Religious denomination (n = 1,821)					
Non–church members		37%			
Protestant		33%			
Roman Catholic		30%			
Orthodoxy (n = 1,744)	0-8		2.9 (2.2)		
Salience (n = 1,743)	0-20		12.4 (4.5)		
Depressive symptoms	0-60	7.2 (7.3)	7.4 (7.5)	8.6 (7.6)	19***

a. Analysis of variance (testing for F) or chi-square comparing values on all three measurement moments.
*$p < .05$. **$p < .01$. ***$p < .001$.

depressive symptoms. Other notable changes are the decline of physical health (twofold more functional limitations in 6 years), as well as a gradual increase of respondents who lost their partner (11% in 6 years).

ASSOCIATIONS BETWEEN RELIGIOUS INVOLVEMENT AND DEPRESSIVE SYMPTOMS

As is shown in Table 2, church attendance is negatively associated with course of depressive symptoms. The strength of the association (computed to standardized regression coefficient: $\beta = -.07$) is hardly affected after adjustment for religious denomination or demographic variables (Model III), physical health (IV), self-perceptions (VI), social integration (VII), or alcohol use (VIII). Only adjustment for the level of urbanization (Step V) leads to a slightly lower strength of the association, which can be explained by the fact that rates of church attendance are higher in rural areas. For Roman Catholics (Model II), there is a slightly negative association with depressive symptoms, which turns to insignificance when the religious variables are entered simultaneously.

In Figure 1, the course of depressive symptoms across is illustrated for the different categories of frequency of church attendance. The difference between the most frequent groups, on the one hand, and the yearly-or-less group on the other hand, is largely maintained during the 6 years. There remains quite a sharp difference between the "2 or 3 times a month" category and the "monthly" category.

Associations between orthodoxy and salience of religion and course of depressive symptoms, examined in additional analyses (Table 3, Models Ia and IIa), do not reach statistical significance. After inclusion of the other religious variables (Model IIIa), there is, however, a small, significant, positive association between salience of religion and depressive symptoms (standardized coefficient $\beta = .07$), which remains unaffected after adjustment for demographics and physical health (Model IVa). Following the approach employed by Schnittker (2001), the quadratic term of salience is included in an additional model, but this term does not reach statistical significance ($B = -0.01$, $SE = 0.01$, $p = .196$).

Table 2
Six-Year Course of Depressive Symptoms and Church Attendance and Religious Denomination, Multivariate Model Based on Generalized Estimating Equations Analysis (GEE), Unstandardized GEE Regression Coefficients (B), and Standard Errors (SE)

	I (n = *1,844*)		*II* (n = *1,821*)		*III* (n = *1,820*)		*IV* (n = *1,819*)		*V* (n = *1,819*)		*VI* (n = *1,807*)		*VII* (n = *1,801*)		*VIII* (n = *1,665*)	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Church attendance	–0.29	0.08***			–0.37	0.10***	–0.30	0.10**	–0.23	0.10*	–0.32	0.08***	–0.30	0.10**	–0.29	0.10**
Protestant[a]			–0.52	0.35	–0.05	0.42	–0.17	0.40	0.03	0.39	–0.30	0.34	–0.04	0.40	–0.25	0.40
Roman Catholic[a]			–0.85	0.36*	–0.26	0.43	–0.35	0.41	–0.30	0.41	–0.08	0.35	–0.37	0.41	–0.32	0.42
Female vs. male					1.90	0.28***	1.65	0.26***	1.61	0.26	1.19	0.22***	1.70	0.27***	1.65	0.28***
Age					0.08	0.02***	–0.01	0.02	–0.02	0.02	–0.04	0.02*	–0.02	0.02	–0.01	0.02
Education					–0.18	0.04***	–0.11	0.04**	–0.13	0.04**	–0.12	0.03***	–0.09	0.04*	–0.11	0.04**
Married					–2.56	0.29***	–1.98	0.29***	–1.90	0.29***	–1.83	0.25***	–1.83	0.29***	–2.09	0.30***
Chronic diseases							0.73	0.12***	0.72	0.12***	0.48	0.11***	0.77	0.12***	0.70	0.13***
Functional limitations							1.67	0.12***	1.66	0.12***	1.26	0.11***	1.54	0.12***	1.67	0.12***
Urbanization									0.33	0.08***						
Mastery											–0.69	0.04***				
Self–esteem											–1.20	0.13***				
Network size													–0.04	0.01**		
Instrumental support													0.30	0.15*		
Emotional support													0.11	0.14		
Alcohol use															–0.09	0.20

a. Versus nonmember.
*$p < .05$. **$p < .01$. ***$p < .001$.

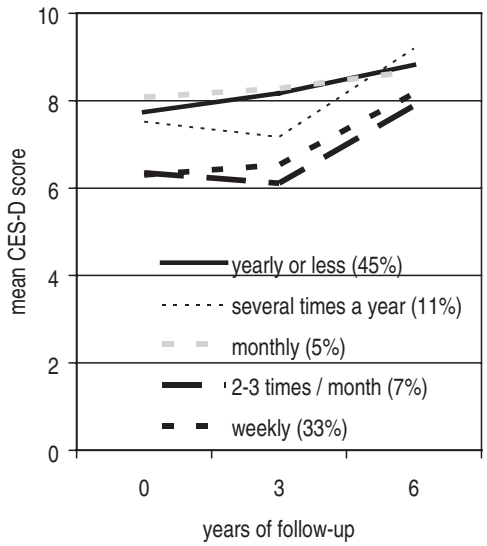

Figure 1. **Six-year course of depressive symptoms (CES-D score), adjusted for effects of demographics and physical health, for frequency of church attendance at T1.**

EFFECT MODIFICATION BY SOURCES OF STRESS

A modest interaction between functional limitations and church attendance is found ($B = -0.10$, $SE = 0.06$, $p = .096$). The difference in depression scores between regular church attenders and nonfrequent church attenders is small in the group without functional limitations (less than 1 point in the CES-D), but it is substantial (around 3 points on the CES-D higher for nonfrequent church attenders), for those with many functional limitations.

Functional limitations also interact with the level of orthodoxy ($B = -0.10$, $SE = 0.05$, $p = .063$). The difference in depression scores between the respondents with the highest and lowest levels of orthodoxy is negligible in the group without functional limitations (less than 1 point in the CES-D), but it is substantial (3 or more points higher for those with low levels of orthodoxy) for those with many functional limitations.

Furthermore, there is a significant association between marital status and the level of orthodoxy ($B = -0.31$, $SE = 0.12$, $p = .011$). Among the married, depression scores are somewhat higher (1 point on the

Table 3
Six-Year Course of Depressive Symptoms and Four Estimates of Religious Involvement, Multivariate Model Based on Generalized Estimating Equations Analysis (GEE), Unstandardized GEE Regression Coefficients (B), and Standard Errors (SE)

	Ia (n = *1,746*)		*IIa* (n = *1,745*)		*IIIa* (n = *1,717*)		*IVa* (n = *1,715*)	
	B	SE	B	SE	B	SE	B	SE
Church attendance					-0.51	0.13***	-0.44	0.12 ***
Protestant[a]					0.07	0.51	-0.20	0.45
Roman Catholic[a]					0.05	0.52	-0.13	0.45
Orthodoxy	-0.03	0.07			0.11	0.10	0.05	0.09
Salience of religion			0.05	0.03	0.11	0.04**	0.09	0.01*
Female vs. male							1.68	0.27***
Age							-0.01	0.02
Education							-0.10	0.04*
Married							-1.87	0.29***
Chronic diseases							0.72	0.12***
Functional limitations							1.64	0.12***

a. Versus nonmember.
*$p < .05$. **$p < .01$. ***$p < .001$.

CES-D) among those with low levels of orthodoxy, compared with those with high levels of orthodoxy. Among those who are not or no longer married, the association changes in direction: Slightly lower depression scores are found among those with low levels of orthodoxy compared with those with high levels of orthodoxy.

No significant interactions are found with the presence of chronic diseases or degree of urbanization as sources of stress, or with religious denomination or salience of religion as aspects of religious involvement (results not shown).

PROBING A CHANGE MODEL FOR CHURCH ATTENDANCE AND DEPRESSIVE SYMPTOMS

One of the five course types of church attendance, increase, is omitted from further analysis because of the low number of respondents in this category ($n = 30$). The association between the yearly-or-less category ($n = 750$) and course of depressive symptoms, compared with the weekly category ($n = 454$), is significant in the unadjusted model ($B = 1.54$, $SE = 0.33$, $p < .001$). This association remains significant

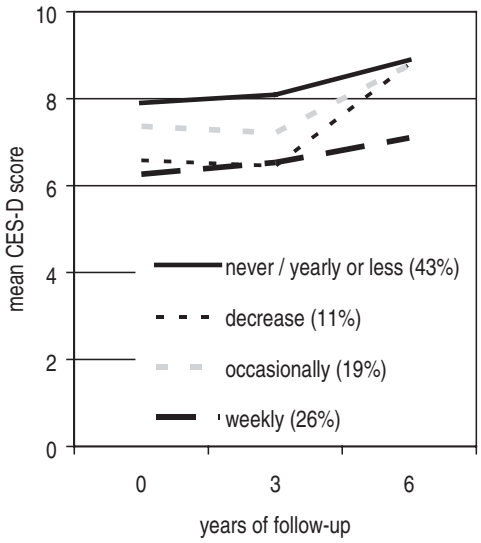

Figure 2. **Six-year course of depressive symptoms (CES-D score), adjusted for effects of demographics and physical health, comparing patterns of church attendance.**

after adjustment for religious denomination, demographics, and physical health ($B = 0.95$, $SE = 0.43$, $p = .028$). Between the occasionally category ($n = 322$) and course of depressive symptoms, there is a positive association as well ($B = 0.88$, $SE = 0.42$, $p = .058$), which becomes significant after adjustment for the covariates mentioned above ($B = 1.01$, $SE = 0.38$, $p = .007$). The substantial decrease category ($n = 172$) is also positively associated with course of depressive symptoms ($B = 2.29$, $SE = 0.57$, $p < .001$), although this association turns to insignificance after adjustment for the covariates ($B = 0.55$, $SE = 0.54$, $p = .315$).

In Figure 2, the mean CES-D scores are drawn for the course patterns of church attendance. The difference between the yearly-or-less group and the regular group at baseline is largely maintained during the follow-up. The "occasionally" group resides in between but moves to the higher levels of depressive symptoms shown by the

yearly-or-less group. The decrease group starts at the level of the weekly category and moves to the level of the yearly-or-less group as well.

Discussion

The present prospective study examined the longitudinal relationship between indicators of religious involvement and the 6-year course of depressive symptoms among older adults in the Netherlands. The main conclusion is that levels of depressive symptoms remain lower for those who attended church frequently, compared with those who attended church on a less regular basis or never, or who decreased in frequency of church attendance during follow-up. Adjustment for possibly confounding variables or explanatory factors did not alter these findings. No significant associations were found between course of depressive symptoms and either religious denomination or orthodoxy. Salience of religion was associated with slightly higher levels of depressive symptoms.

Church attendance and orthodoxy buffered the depression-evoking effects of functional disability in a modest degree. On the other hand, for respondents who were bereaved or nonmarried, slightly higher depression scores were found for those with high levels of orthodox beliefs.

The present, European, findings are largely in line with results of North-American studies and make clear that church attendance does not necessarily predict a decrease of depressive symptoms, as has been shown in Northern American studies (Idler & Kasl, 1992; Kennedy, 1998; Koenig, George, & Peterson, 1998; Schnittker, 2001), but that at least lower levels of depression are maintained among regular church attenders compared with nonfrequent attenders during the follow-up period. A contrast with previous results (Braam, Beekman, Deeg, et al., 1997; Idler & Kasl, 1992; Koenig, George, & Peterson, 1998; Schnittker, 2001) is that salience of religion did not influence the course of depressive symptoms. As in the study of Strawbridge, Shema, Cohen, Roberts, & Kaplan (1998), there was a stress-buffering effect of religious involvement against the depression-evoking effect of functional disability. Moreover, and also in line with the study of

Strawbridge et al., there was a provoking effect of at least one aspect of religious involvement, orthodoxy, on the depression-evoking effects of bereavement or living without a spouse.

With respect to stress-buffering effects, one may question how religious involvement seems to protect against the depressogenic effects of certain stressors and exaggerates those from other stressors. Religion may offer a frame of reference toward questions of life, suffering and death, and may help to accept a decrease in physical functioning in light of religious and spiritual values. Regarding loss of the partner, these supportive values may be opposed by other values related to religion, such as the importance of family life (Strawbridge et al., 1998).

Limitations of the study are related to attrition and measurement. A first concern is the loss of subjects during the study. Attrition was significantly associated with higher age, lower church attendance, lower education, and slightly more depressive symptoms. The considerable nonresponse among the very old subjects in the present study may have affected the results. The oldest age cohort is generally more dedicated to religion (Braam, Beekman, van Tilburg, et al., 1997), so that religious involvement could represent an important resource in this group, compared with younger cohorts. Underrepresentation of the oldest cohort may therefore lead to underestimation of the association between religious involvement and depression. On the other hand, the sampling procedure was weighted for age, with oversampling of the oldest cohort. The effects of attrition due to higher age may therefore be limited. Attrition due to depression may be related to generally more incapacitating forms of depression, such as melancholic depression or psychotic depression. Because of this, the findings of the present study cannot be extrapolated to samples of clinically depressed older adults.

Another limitation is related to the measurement of aspects of religious involvement. Although several measures were used, more insight into the dynamics of religious coping and depression would have been gained when more detailed measures had been available, such as on private prayer or emotional aspects of religiousness and spirituality. Also, among the explanatory variables, more detailed assessment of social support, such as how support was perceived and with whom it was exchanged, could have added to their specificity.

Moreover, other explanatory factors have been suggested (e.g., Ellison & Levin, 1998): positive cognitions, such as hope and optimism (or negative, such as expectance of penitence); positive emotions, such as feelings of grace (or negative, like religious anger, or feeling abandoned by God); and somatic states that can be influenced by religion, such as relaxation.

As in the majority of generally cross-sectional studies on religious involvement and depression, the present 6-year follow-up study demonstrates again a robust association between church attendance and depression. The question remains, "What sort of processes underlie the apparently beneficial effect of attending church meetings?" The identification of several underlying or explanatory processes might be found among the therapeutic factors for group psychotherapy, as described by Yalom (1995). Parallels between group therapy sessions and church meetings can be found in several external characteristics, such as frequency and duration of the church meetings. There may be other parallels as well. Yalom distinguishes the following 11 therapeutic factors for group psychotherapy: (a) installation of hope, (b) universality, (c) imparting information, (d) altruism, (e) the corrective recapitulation of the primary family group, (f) development of socializing techniques, (g) imitative behavior, (h) interpersonal learning, (i) group cohesiveness, (j) catharsis, and (k) existential factors. All factors may apply, in at least some degree, to the religious ceremony in the church.

The suggested mechanisms open hypotheses for advanced research, employing more sophisticated study designs. The present findings support the notion of religious involvement as a valuable resource for older adults, also in the Netherlands.

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