Bierman, A., & Statland, D. (2010). Timing, social support, and the effects of physical limitations on psychological distress in late life. *Journal of Gerontology: Social Sciences, 65B(5)*, 631–639, doi:10.1093/geronb/gbp128. Advance Access published on January 6, 2010.

Timing, Social Support, and the Effects of Physical Limitations on Psychological Distress in Late Life

Alex Bierman[1] and Denise Statland[2]

[1]Department of Sociology, University of Calgary, Alberta, Canada.
[2]Department of Sociology, California State University, Northridge.

Objectives. Previous research shows that limitations in activities of daily living (ADLs) are related to greater psychological distress. This study uses a synthesis of life course and stress process perspectives to examine how social support resources and the timing of limitations intersect to shape the relationship between ADL limitations and changes in psychological distress.

Methods. Data are derived from a longitudinal study of adults aged 65 and older in the Washington, DC, metropolitan area over a 2-year period (2001–2003).

Results. ADL limitations are positively related to change in depressive symptoms. This relationship is weakened for older individuals, but only at higher levels of perceived social support.

Discussion. The contribution of this research is to offer a more nuanced view of the mental health consequences of physical limitations in late life by demonstrating that perceived social support provides an important context for age-variegated associations between ADL limitations and changes in psychological distress.

Key Words: Activities of daily living—ADLs—Depression—Life course perspective—Mental health—Physical limitations—Psychological distress—Stress process perspective—Social support—Timing.

DIFFICULTIES performing daily self-maintenance tasks, or "activities of daily living" (ADLs), tend to increase in late life (Himes, 2000). Loss of these competencies can be psychologically distressing by posing a threat to one's ability to participate in social roles (Gayman, Turner, & Cui, 2008) and to live safely and independently (Albert, 2004). Research has in fact shown that ADL limitations precipitate depression (Kennedy, Kelman, & Thomas, 1990; Schnittker, 2005), and additional research suggests that effects of ADL limitations on depression are much stronger than influences of depression on ADL limitations (Gayman et al.; Ormel, Rijsdijk, Sullivan, Sonderen, & Kempen, 2002; Yang, 2006).

Sociological perspectives of development and mental health suggest, however, that the effects of limitations in ADLs on depression may not be unitary. A life course perspective suggests that transitions within trajectories of development may affect individuals differently depending on the *timing* of these transitions (Elder, Johnson, & Crosnoe, 2003; Giele & Elder, 1998). The paradigmatic perspective in the sociology of mental health, a stress process perspective, suggests that the effects of a stressor on mental health will vary according to an individual's access to social resources (Pearlin, 1999). Research supports the importance of both perspectives for understanding the effects of ADL limitations on depression in late life as effects of ADL limitations on depression may vary by older adults' ages (e.g., Jang, Borenstein, Chiriboga, & Mortimer, 2005; Schnittker, 2005) and levels of social support (e.g., Prince, Harwood, Thomas, & Mann, 1998). Little research has examined, though, how these two perspectives can be *combined* to understand effects of ADL limitations on depression. This lack of attention to the synthesis of these perspectives is particularly notable in light of recent interest in the knowledge that may be gained by a "paradigmatic alliance" between stress process and life course perspectives (Pearlin, Schieman, Fazio, & Meersman, 2005; Pearlin & Skaff, 1996).

Thus, the contribution of this research is to offer a more nuanced view of the repercussions of ADL limitations in late life by demonstrating how developmental and social contingencies *intersect* to shape the mental health consequences of ADL limitations. We do this by using a longitudinal study of older adults to demonstrate how timing and social support interact to modify the way in which ADL limitations are related to changes in depressive symptoms in late life. Below, we discuss in more depth how the mental health consequences of ADL limitations may vary by timing before turning to a discussion of how and why the consequences of timing, may further hinge on social support.

ADL Limitations, Psychological Distress, and the Importance of Timing

ADL limitations constitute an important life course transition for older adults because they require a fundamental reorientation to daily functioning and renegotiation of participation in the social world, thereby precipitating changes in the performance of a number of professional and leisure roles, as well as changes in how individuals see themselves

Received January 21, 2009; Accepted November 30, 2009
Decision Editor: Kenneth F. Ferraro, PhD

(e.g., Brown & Warner, 2008; Choi, Burr, Mutchler, & Caro, 2007; Kelley-Moore & Ferraro, 2001; Kelley-Moore, Schumacher, Kahana, & Kahana, 2006). However, a life course perspective indicates that the impacts of important transitions often vary according to when these transitions occur in a person's life (Elder, 1998). Individual experiences that do not conform to socially based expectations of normative timing may be viewed from the perspective of being "early" or "late" (Elder et al., 2003), and perceptions of the timing of an experience will shape the meaning of the experience for both the individual and the larger social milieu (van Solinge & Henkens, 2007).

In the case of ADL limitations, societal norms that equate younger ages with vitality and independence are likely to accentuate the stress of these limitations by increasing their undesirability for individuals at younger stages of late life (Schieman & Turner, 1998). Norms that shape the sense that these limitations are "early" may also accentuate stress by creating unfavorable self-comparisons to similarly aged peers (van Solinge & Henkens, 2007). In addition, these norms are likely to result in inhibited physical functioning appearing more conspicuous and discordant at younger ages in late life (Laz, 1998; Rozario & Derienzis, 2009), leading to greater risk of social stigma and discrimination (e.g., Calsyn & Winter, 2001; Gayman et al., 2008). Conversely, a higher prevalence of disability among age peers may lead to a greater desensitization to these problems among the older old (Jang, Poon, & Martin, 2004), as suggested by research indicating that functional impairment is less likely to be associated with perceptions of health at later ages in late life (Pinquart, 2001). That these limitations will be more normative later in late life is also likely to decrease their social visibility (Rozario & Derienzis), leading to lesser likelihood of stigma and discrimination.

Empirical evidence is inconsistent, though, as to how the effects of ADL limitations on distress may vary by age. In a sample of older adults, Schnittker (2005) found that ADL limitations were less likely to affect mental health at older ages, and Jang and colleagues (2004) indicated a similar finding. However, Jang and colleagues (2005) found evidence indicating that, for some individuals, ADL limitations may have *stronger* effects on mental health at older ages. These conflicting results could be due to a lack of attention to the way in which age-based contingencies are framed by the social support context in which they occur. As we demonstrate below, a sociological perspective on mental health suggests that social support resources are particularly critical for framing the experience of the stress associated with ADL limitations.

Social Support and Age-Contingent Effects of Limitations in ADLs

From a stress process perspective, social-based resources are critical for modifying the effects of stress on mental health (Pearlin, 1999). One of the most important of these resources is social support because social support forms a "fund" of coping resources from which people can draw during times of troubles (Thoits, 1995). Social support may have beneficial direct effects on mental health, but a review of research underscores that social support is particularly important for mental health during times of stress exposure (Turner & Turner, 1999). Furthermore, research demonstrates that the subjective aspects of support, in terms of what is known as "perceived support," are more important as a resource when stress is experienced than the actual receipt of support (Wethington & Kessler, 1986).

Perceptions of social support are likely to be particularly important for individuals with ADL limitations. Seeing the social environment as helpful and responsive to one's needs increases a "sense of coherence" that leads individuals to see experiences as less stressful (Antonovsky, 1979). Furthermore, greater perceived social support increases the sense of a "psychological safety net" during times of trouble, motivating more active and creative coping efforts because individuals will be secure in the knowledge that they possess a supportive social system should these efforts fail (Bolger, Zuckerman, & Kessler, 2000; Wethington & Kessler, 1986). Greater social support may also prevent self-neglect (Dyer, Goodwin, Pickens-Pace, Burnett, & Kelly, 2007), thereby blunting the extent to which ADL limitations detrimentally affect daily life.

Research and theory therefore suggest that the presence or absence of perceived social support influences the degree to which older adults are able to manage limitations or see these limitations as posing burdensome obstacles in daily life. As a result, age differences in the effects of ADL limitations on distress may in turn vary by levels of perceived social support. Research has in fact demonstrated that age and social support intersect to influence the effects of other types of stressors on psychological distress in late life, including natural disasters (Tyler & Hoyt, 2000) and financial strains (Krause, 2005). However, little research has examined how these factors intersect to shape the effects of ADL limitations on distress.

Aims

In summary, this article has two related aims. The first is to examine whether and how age moderates the effects of ADL limitations on psychological distress in late life. The second is to examine whether age contingencies in the effects of ADL limitations on psychological distress are in turn contingent on perceived social support.

Methods

Sample

Data for this study come from the Aging, Stress, and Health (ASH) study, which is a longitudinal study of people

aged 65 years and older residing in the District of Columbia and two adjoining Maryland counties, Prince George's and Montgomery. Consistent with the purpose of the project to investigate status inequality and health disparities, a socially and an economically diverse sample was sought. The three locales subsume this diversity. Sample selection and recruitment began with the Medicare beneficiary files for the three areas. In addition to the names of all people aged 65 years and older who are entitled to Medicare, the files provided information about the race and gender of each beneficiary. To maximize the social and economic diversity within the sample, a total of 4,800 names were randomly selected, equally divided among the three locales, Blacks and Whites, women and men, creating 12 groups, each containing 400 names. The goal was to enlist a sample of 1,200 people living independently, with approximately 100 people in each of the 12 groups. Approximately 65% of all eligible respondents who were contacted agreed to participate, yielding 1,167 cases. The age distribution within the four gender–race groups was roughly similar to the population from the 2000 Census (Schieman, Pearlin, & Meersman, 2006). Interviews for Wave 1 occurred during 2001–2002; of the original 1,167 elders, 925 individuals were reinterviewed 2 years later (a 79.26% retention rate).

Measures

Depression.—Psychological distress was measured using an indicator of depressive symptoms. Depression is useful as a primary indicator of distress because feelings of depression are a common type of distress that correlates with other aspects of distress, such as anxiety and anger, as well as clinical diagnoses of depression (Ross & Mirowsky, 2006). Depressive symptoms were measured using four items taken from the Hopkins Symptoms Checklist (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), which asked about the occurrence of each symptom over the past week: "feel downhearted or blue," "lack enthusiasm for doing anything," "feel bored or have little interest in things," and "cry easily or feel like crying." Respondents indicated how often they had experienced each symptom from *no days* (1) to *five or more days* (4). A principal component analysis of these items indicated one component with an eigenvalue more than 1, which accounted for almost 60% of the variance in the items, and all items loaded on this component at 0.683 or higher. Responses were averaged to create a scale (Cronbach's αs = .76 at baseline and .71 at follow-up), with higher scores indicating higher levels of depression.

Activities of daily living.—ADLs are most often categorized into "basic" ADLs, which entail fundamental self-care activities, and "instrumental activities of daily living" or "IADLs," which tend to be more complex activities that facilitate independence (Jefferson, Barakat, Giovannetti, Paul, & Glosser, 2006). This research focuses on basic ADLs because limitations in these ADLs entail decreased abilities to perform the most essential of self-maintenance activities and are therefore likely to have the most dramatic consequences for psychological distress. Furthermore, because limitations in these basic activities often underlie limitations in more complex IADLs (Femia, Zarit, & Johansson, 2001; Yang, 2006), a focus on basic ADLs will tend to encompass IADLs as well. Measurement of ADLs is similar to several recent studies of ADLs (e.g., Boyle, Buchman, Wilson, Bienias, & Bennett, 2007; Guilley & d'Epinay, 2008; Jefferson, Cahn-Weiner, et al., 2006; Kurland, Gill, Patrick, Larson, & Phelan, 2006) and uses a 6-item scale involving bathing, dressing, toileting, transferring, and ambulation (climbing stairs and walking balance). Also, as in several previous studies, limitations were measured along gradients of independence from *without difficulty* (1) to *unable to do this without complete help from someone or special equipment* (4). A principal component analysis of these items indicated one component with an eigenvalue more than 1, and all items loaded on this component at 0.75 or higher, supporting using them as one measure of basic ADLs. Responses were therefore averaged to create a scale of ADL limitations (Cronbach's $\alpha = .86$), with higher scores indicating higher levels of limitations.

Age.—Age was coded as the respondent's age in years. Preliminary analyses indicated that age did not have a nonlinear relationship with change in depression.

Perceived social support.—Perceived social support was measured using a 4-item scale adapted from Schieman (2005): "You have a friend or relative whose opinions you trust," "You have people around you who help you to keep your spirits up," "You have at least one friend or relative you want to be with when you feel down or discouraged," and "There are people who do things they know will please you." Respondents indicated agreement with each statement from *strongly disagree* (1) to *strongly agree* (4). It should be pointed out that this measure of support indicates informational support, such as opinions that can be trusted for guidance, as well as affective support, and also aspects of instrumental support, such as people doing things for the respondent. Although some researchers separate these types of support, such measurement strategies ignore that these dimensions are often intermixed within social relationships, and may even be performed by the same actor in a social setting. Thus, a measure such as ours, which combines these aspects of support, likely provides a more complete representation of the overall level of perception of support from one's social network and is in keeping with previous research on social support among older adults (e.g., Jang, Haley, Small, & Mortimer, 2002). A principal component analysis of these items bolsters this rationale as the analysis indicated that all items loaded quite strongly on one component at 0.75 or higher. Responses on the four items were

therefore averaged to create a scale of perceived social support (Cronbach's $\alpha = .79$).

Covariates.—All covariates were measured at baseline. Core social and economic statuses included race (1 = *Black* and 0 = *White*), gender (1 = *women* and 0 = *men*), education, income, work status (1 = *working* and 0 = *not working*), marital status (1 = *married* and 0 = *not married*), and number of children. Education was measured with response choices ranging from 1 (*eighth grade or less*) to 6 (*college graduate or more*). Income was measured by asking for total household income before taxes in the past year, including salaries for everyone in the household, money market funds, social security, pensions, real estate, or government entitlements, with response choices ranging from 1 (*<$10,000*) to 11 (*≥$100,000*).

Because ADL limitations may be associated with other aspects of illness that also have negative effects on mental health, it was important to include alternative measures of health status as controls. Two types of measures were included. Individuals were asked if they had been diagnosed by a doctor in the past 5 years with several conditions, including arthritis, diabetes, high blood pressure, heart disease, cancer, stroke, and osteoporosis. Each disease is indicated by a dichotomous variable (0 = *no diagnosis* and 1 = *diagnosed*). In addition, respondents' ratings of their overall level of health were controlled using a one-item measure of self-rated health, in which respondents indicated their current health on a scale of *excellent* (1) to *poor* (5). This measure was dichotomized so that a score of 1 indicated fair or poor health.

Because perceived social support will likely vary with levels of social integration, social integration was also controlled. Formal social integration was controlled using three measures—frequency of attendance at religious meetings, secular meetings, and volunteering. Informal social integration was controlled using measures of frequency of visiting friends and frequency of speaking to friends and relatives on the telephone. Responses ranged from *never* (1) to *daily* (6) for each measure.

Summary statistics for all study variables are provided in Table 1.

Table 1. Means and Standard Deviations for Variables Used in Analyses

	M	*SD*
Change in depression	0.003	0.570
Baseline depression	1.403	0.566
ADL limitations	1.139	0.372
Age	74.565	6.537
Perceived social support	3.279	0.462
Race	0.496	0.500
Gender	0.499	0.500
Education	4.400	1.718
Income	6.094	3.283
Work status	0.219	0.414
Marital status	0.529	0.499
Number of children	2.868	2.184
Arthritis	0.478	0.500
Diabetes	0.200	0.400
High blood pressure	0.564	0.496
Heart disease	0.207	0.405
Stroke	0.073	0.260
Cancer	0.164	0.370
Osteoporosis	0.142	0.349
Self-rated health	0.242	0.429
Religious attendance	3.060	1.402
Organizational attendance	1.968	1.123
Volunteering	2.114	1.432
Frequency visiting friends	3.390	1.465
Frequency speaking on the telephone	4.963	1.269

Note: ADL = activities of daily living.

Statistical Analyses

Multivariate models are analyzed using full information maximum likelihood (FIML) regression. FIML estimation of regression models is preferable to the more typical ordinary least squares regression because estimates are produced using the information that is available for each observation (Bollen & Curran, 2006), "including information about the mean and variance of missing portions of a variable, given the observed portion(s) of other variables" (Wothke, 2000, p. 224), so that FIML estimation is capable of providing unbiased efficient parameter estimates in the presence of missing data (Enders, 2006), and, in the presence of sample attrition, FIML provides far more unbiased estimates compared with more conventional missing data methods (such as listwise deletion or mean imputation; Wothke). Use of FIML does assume that data are "missing at random" (MAR), but even when data are not MAR, methods that assume MAR often present results that are better than those produced using more conventional estimation procedures (Allison, 2003). Simulation studies that compare FIML and multiple imputation procedures indicate a large degree of similarity of results (Collins, Schafer, & Kam, 2001), and because FIML could be directly employed to estimate regressions using MPLUS 5.0, its use was favored in this research. Following previous research examining how physical limitations influence changes in mental health among older adults (Schieman & Plickert, 2007), difference scores in depression are analyzed as the dependent variable, controlling for Time 1 status to control for regression to the mean. To reduce multicolinearity, variables used in interactions are centered over their respective means prior to the creation of the interaction terms (Aiken & West, 1991).

Results

Table 2 reports the results of the multivariate analyses of change in depressive symptoms. Model 1 presents the main effects model. This model indicates that, independent of controls, greater limitations in ADLs are positively related

Table 2. Association Between ADL Limitations and Change in Symptoms of Depression

	Model 1		Model 2		Model 3	
	b	*SE*	*b*	*SE*	*b*	*SE*
Focal variables						
ADL limitations	.156**	0.058	.153*	0.063	.172*	0.073
Age	.004	0.003	.004	0.003	.003	0.003
Perceived social support	.003	0.035	.003	0.035	.016	0.036
ADL Limitations × Age			.001	0.007	−.004	0.008
ADL Limitations × Perceived Social Support					.047	0.146
Age × Perceived Social Support					.002	0.005
ADL Limitations × Age × Perceived Social Support					−.046**	0.016
Control variables						
Race	−.009	0.038	−.009	0.038	−.013	0.038
Gender	−.008	0.037	−.008	0.037	−.006	0.037
Education	.006	0.012	.006	0.012	.007	0.012
Income	−.009	0.007	−.009	0.007	−.010	0.007
Work status	.000	0.039	.000	0.039	.000	0.039
Marital status	−.030	0.038	−.030	0.038	−.029	0.038
Number of children	.001	0.008	.001	0.008	.000	0.008
Arthritis	.040	0.033	.041	0.033	.043	0.032
Diabetes	.005	0.041	.006	0.041	.007	0.041
High blood pressure	.023	0.033	.024	0.033	.022	0.033
Heart disease	.010	0.041	.010	0.041	.010	0.041
Stroke	−.032	0.064	−.032	0.064	−.042	0.064
Cancer	.026	0.044	.026	0.044	.015	0.044
Osteoporosis	.119*	0.048	.119*	0.048	.114*	0.048
Self-rated health	.083	0.044	.083	0.044	.091*	0.044
Religious attendance	−.012	0.012	−.012	0.012	−.014	0.012
Organizational attendance	−.010	0.015	−.010	0.015	−.010	0.015
Volunteering	−.026*	0.012	−.026*	0.012	−.027*	0.012
Frequency visiting friends	.020	0.012	.020	0.012	.021	0.012
Frequency speaking on the telephone	.006	0.014	.006	0.014	.005	0.014
Baseline depression	−.614***	0.029	−.614***	0.029	−.617	0.029
Constant	0.849***	0.112	0.849***	0.112	0.871***	0.112
R^2	.349		.349		.363	

Notes: Unstandardized coefficients are presented; *SE* indicates the standard errors of the coefficients. ADL = activities of daily living.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

to changes in depressive symptoms over the course of the study. In Model 2, an interaction between ADL limitations and age is entered into the model. This interaction is not significant, suggesting that the relationship between ADL limitations and change in symptoms does not vary by an individual's age. This would appear to be evidence against a life course perspective's view that the timing of ADL limitations in an individual's life will modify the influence of these limitations. However, a stress process perspective suggests that social support resources form a larger context in which age-graded effects of ADL limitations occur. To address this question, Model 3 tests a three-term interaction between perceived social support, limitations, and age. This interaction is significant, suggesting that perceived social support and age intersect to shape how ADL limitations are related to changes in depressive symptoms.

Table 3 helps clarify the significant three-term interaction. The models in Table 3 test the age–ADL interaction separately for those with high and low levels of perceived social support. High and low perceived social support was defined by splitting the sample at the approximate median. Although these models should be seen as comparisons along a continuum, rather than discrete differences, they are nevertheless useful because they examine subsamples of relatively equal sample sizes; consequently, differences in significance are unlikely to be due to differences in statistical power between models.

Model 1 in Table 3 tests the interaction between age and ADL limitations for those low in social support, and this interaction is not significant. This indicates that age did not moderate the relationship between ADL limitations and changes in depressive symptoms for those low in perceived social support. However, ancillary analyses that dropped the interaction term and tested a main effects model for this group indicated that the main effect for ADL limitations remained significant and positive ($b = .149$, $p < .05$). Model 2 in Table 3 tests the interaction between age and ADL limitations for those high in social support, and this interaction is significant and *negative*. The direction of the coefficient for this interaction therefore indicates that the relationship between ADL limitations and changes in depressive symptoms was stronger earlier in late life. Hence, the models in Table 3 indicate that ADL limitations were less likely to increase depressive symptoms for older individuals in late

Table 3. Association Between ADL Limitations and Change in Symptoms of Depression, Stratified by Perceived Social Support

	Model 1		Model 2	
	Low perceived social support		High perceived social support	
	b	*SE*	*b*	*SE*
Focal variables				
ADL limitations	.104	0.072	.289*	0.135
Age	.005	0.004	.001	0.004
ADL Limitations × Age	.015	0.008	−.035*	0.014
Control variables				
Race	.020	0.056	−.059	0.050
Gender	−.023	0.055	−.009	0.049
Education	.042*	0.017	−.023	0.017
Income	−.014	0.011	−.005	0.009
Work status	.064	0.060	−.037	0.051
Marital status	.052	0.054	−.097	0.052
Number of children	.007	0.012	−.007	0.011
Arthritis	−.027	0.048	.096*	0.043
Diabetes	.014	0.058	.036	0.057
High blood pressure	.005	0.049	.043	0.043
Heart disease	.075	0.059	−.062	0.057
Stroke	−.074	0.087	−.043	0.091
Cancer	−.066	0.064	.086	0.058
Osteoporosis	.145*	0.071	.098	0.063
Self-rated health	.167**	0.061	−.002	0.061
Religious attendance	−.008	0.018	−.022	0.016
Organizational attendance	−.053*	0.025	.013	0.019
Volunteering	−.019	0.018	−.022	0.015
Frequency visiting friends	.045**	0.017	−.012	0.017
Frequency speaking on the telephone	.004	0.019	.004	0.021
Baseline depression	−.554***	0.040	−.716***	0.042
Constant	0.549***	0.145	1.293***	0.172
R^2	.366		.409	

Notes: Unstandardized coefficients are presented; *SE* indicates the standard errors of the coefficients. ADL = activity of daily living.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

life but only if these individuals also possessed a relatively strong degree of social support.

In sum, these analyses demonstrate that age moderates the association between ADL limitations and changes in symptoms of depression, but the extent of these age-based variations in turn varies by levels of perceived social support. The importance of timing for effects of ADL limitations on distress is clarified by a stress process perspective's emphasis on the social support context in which stressful circumstances occur.

Discussion

This research demonstrates the utility of a synthesis of life course and stress process perspectives for understanding how ADL limitations influence psychological well-being in late life. A life course perspective suggests that, because limitations in ADLs tend to be greater with age, ADL limitations at earlier ages in late life are likely to be considered "off time" and therefore more stressful. The results of the current research support this perspective, but suggest that the social support context in which these limitations occur shapes age-graded effects of ADL limitations. With relatively high levels of perceived social support, adults in late life do experience less distress from ADL limitations at later ages. At lower levels of perceived social support, ADL limitations in late life are likely to lead to increases in psychological distress irrespective of age.

This research therefore suggests that the experience of limitations in ADLs may be less distressing as individuals age, as long as there is also a sense that one is immersed in a supportive social network. Socially inculcated normative expectations condition the anticipation of undesirable changes in late life (Heckhausen, Dixon, & Baltes, 1989). As a result, in the presence of perceived support, these limitations may be difficult but not unexpected, and the perception of support helps aid the sense that these limitations can be managed so that they do not adversely affect life an appreciable amount. If these social support resources are not available, though, ADL limitations are likely to bespeak of final years encumbered by limitations that restrict freedom and efficacy, smothering vitality and creating distress.

For younger individuals in late life, however, the experience of ADL limitations is likely to be disturbing because this experience is considered to be "early" and therefore indicative of "premature" aging. Experiences of ADL limitations

are therefore likely to be especially undesirable and incur stronger negative comparisons with others. The early nature of these limitations is also likely to make them appear more conspicuous and unusual to others, thereby increasing the risk of stigma and discrimination. Furthermore, even if social resources are available, one's peers are less likely to have experienced these limitations and ARE therefore less familiar with how best to provide support (van Solinge & Henkens, 2007). For younger individuals in late life, then, ADL limitations are likely to be related to increases in depression, even at higher levels of perceived social support.

An alternative interpretation of these results may be that they indicate boundaries in the extent to which ADL limitations can influence psychological distress. Older individuals may be less likely to continue experiencing increases in distress due to limitations. However, in these circumstances, we would expect the two-term interaction between age and ADL limitations to be significant, regardless of perceived social support, and this was not the case. The results also showed that ADL limitations were related to increases in distress irrespective of age for those low in social support, further indicating a lack of ceiling effect. An additional alternative interpretation to the three-term interaction may be that, when compared with younger adults in late life, older adults in late life are more adept at utilizing social support resources when they experience ADL limitations. However, alternative analyses that split the sample at the median for age and tested a support–limitations interaction did not indicate a significant interaction for either subsample. These additional analyses suggest that the most appropriate interpretation of the results is that the effects of ADL limitations on psychological distress are contingent on the timing of these limitations, and perceived social support provides an important context for these timing effects.

This also leads to a question of timing-contingent effects of changes in limitations, but additional analyses of change scores in ADL limitations indicated no significant moderation beyond the moderation with baseline limitations. Similar results were obtained when only individuals who experienced onset of limitations were studied. However, it should also be noted that increases in ADL limitations in this sample tended to be relatively incremental, suggesting that these increases probably did not incur substantial impacts on individuals' lives. Additional research examining whether age and social support moderate the effects of changes in ADL limitations using greater changes in ADL limitations is therefore an important direction for future research. Especially useful in this additional research may be a measure with more detailed indications of physical impairments as a more detailed measure may be more likely to detect greater changes over time than the measure used here.

These findings may also help to elucidate several contradictions in the literature. For example, several studies that have examined reciprocal relationships between ADL limitations and depression indicate a stronger relationship between limitations and subsequent depression than the reverse (e.g., Gayman et al., 2008; Ormel et al., 2002). However, in a cross-lagged analysis, Kelley-Moore and Ferraro (2005) did not find that limitations were related to subsequent depression. Notably, Gayman and colleagues used a sample that included adults who were not in late life, which the results of this research suggest would strengthen the relationship between ADL limitations and depression. In addition, these studies did not take the social support context of the limitations–distress relationship into account. It is possible that differences in these findings could be due to differences between samples in the social support context. Similarly, research also demonstrates different findings regarding age differences in the effects of ADL limitations on distress (e.g., Jang et al., 2005; Schnittker, 2005), and the results of the current research suggest that these differences may be due to differences between samples in levels of social support. This research therefore suggests that future research should carefully consider how the age and social support context of a sample may influence the observation of relationships between ADL limitations and psychological distress.

Four limitations to this study should also be noted. First, it was not nationally representative, so the question of whether the pattern of results observed here will generalize to broader samples remains. However, the diversity with which this sample was purposely gathered suggests that these results are likely to be applicable to different subpopulations, especially in contrast to national probability samples that often contain much smaller proportions of racial minorities. A relatively substantial dispersion of socioeconomic statuses within each racial group also bolsters the applicability of these results. Evidence of the generalizability of these analyses is suggested by a series of preliminary analyses in which three-term interactions indicated that the extent to which age moderated the effects of ADL limitations did not vary by race or gender, and similar analyses suggested that the extent to which social support moderated the effects of ADL limitations also did not vary by race or gender; a series of additional controls for cohort membership using a set of dichotomous indicators in which age was divided into categories also did not substantially alter focal results. Second, it would be useful in the future to include a greater focus on older adults who may not have matured in a U.S. setting. Norms of aging and appropriate aging are likely to vary by culture, and, as a result, both expectations of and reactions to ADL limitations may vary by cultural background. Third, ADL limitations may have greater effects on the lives of older adults living in more rural settings because these locales tend to be more geographically isolated and have fewer services available to older adults; however, this would also suggest that the effects of ADL limitations observed in this study are conservative. Fourth, it should be noted that although the rate of nonresponse to the baseline wave of the

ASH survey is similar to other surveys used in studies of aging and the life course (e.g., the Americans' Changing Lives survey or the Midlife Development in the United States survey), this nonresponse may possibly bias results. It is difficult to discern the direction or degree of bias due to this nonresponse, but studies that attempt to replicate the results described herein are warranted.

Conclusions

A life course perspective suggests that important experiences in individuals' lives may have substantially different effects depending on the timing of these experiences. However, a stress process perspective suggests that social resources condition effects of stressful experiences. This research demonstrates that a synthesis of both perspectives is useful for understanding how limitations in ADLs influence changes in psychological distress in late life. Limitations are related to changes in psychological distress differently depending on the timing of these limitations, but only if there is a sense that one is immersed within a supportive social network. Without this perceived social support, ADL limitations tend to be associated with increases in distress regardless of timing. Clearly, then, an important area for future research is to examine how timing and social support intersect to shape the consequences of additional stressors experienced in late life.

Funding

A National Institute on Aging Grant Award AG17461 (Leonard I. Pearlin, principal investigator) supported this work.

Acknowledgments

We greatly thank Carol S. Aneshensel for her comments on a previous draft of this article. Author contributions: A.B. and D.S. planned the study together. A.B. performed the majority of writing, literature review, and data analysis, with substantial contributions to all three aspects of the process from D.S.

Correspondence

Address correspondence to Alex Bierman, BS, MA, PhD, Department of Sociology, University of Calgary, Calgary, Alberta, Canada T2N 1N4. Email: aebierma@ucalgary.ca.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage Publications.

Albert, S. M. (2004). *Public health and aging: An introduction to maximizing function and well-being*. New York: Springer Publishing.

Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology*, *112*, 545–557.

Antonovsky, A. (1979). *Health, stress, and coping: New perspectives on mental and physical well-being*. San Francisco: Jossey-Bass.

Bolger, N., Zuckerman, A., & Kessler, R. C. (2000). Invisible support and adjustment to stress. *Journal of Personality and Social Psychology*, *79*, 953–961.

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Hoboken, NJ: John Wiley & Sons.

Boyle, P. A., Buchman, A. S., Wilson, R. S., Bienias, J. L., & Bennett, D. A. (2007). Physical activity is associated with incident disability in community-based older persons. *Journal of the American Geriatrics Society*, *55*, 195–201.

Brown, T. H., & Warner, D. F. (2008). Divergent pathways? Racial/ethnic differences in older women's labor force withdrawal. *Journal of Gerontology: Social Sciences*, *63B*, S122–S134.

Calsyn, R. J., & Winter, J. P. (2001). Predicting four types of service needs in older adults. *Evaluation and Program Planning*, *24*, 157–166.

Choi, N. G., Burr, J. A., Mutchler, J. E., & Caro, F. G. (2007). Formal and informal volunteer activity and spousal caregiving among older adults. *Research on Aging*, *29*, 99–124.

Collins, L. M., Schafer, J. L., & Kam, C. M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods*, *6*, 330–351.

Derogatis, L. R., Lipman, R., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom inventory. *Behavioral Science*, *19*, 1–15.

Dyer, C. B., Goodwin, J. S., Pickens-Pace, S., Burnett, J., & Kelly, P. A. (2007). Self-neglect among the elderly: A model based on more than 500 patients seen by a geriatric medicine team. *American Journal of Public Health*, *97*, 1671–1676.

Elder, G. H., Jr. (1998). The life course as developmental theory. *Child Development*, *69*, 1–12.

Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer Academic/Plenum.

Enders, C. K. (2006). Analyzing structural equation models with missing data. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 225–254). Greenwich, CT: Information Age Publishing.

Femia, E. E., Zarit, S. H., & Johansson, B. (2001). The disablement process in very late life: A study of the oldest-old in Sweden. *Journal of Gerontology: Psychological Sciences*, *56B*, P12–P23.

Gayman, M. D., Turner, R. J., & Cui, M. (2008). Physical limitations and depressive symptoms: Exploring the nature of the association. *Journal of Gerontology: Social Sciences*, *63B*, S219–S228.

Giele, J., & Elder, G. H. (1998). Life course research: Development of a field. In J. Giele & G. H. Elder (Eds.), *Methods of life course research: Qualitative and quantitative approaches* (pp. 5–27). Thousand Oaks, CA: Sage.

Guilley, E., & d'Epinay, C. J. L. (2008). Social status and mortality with activity of daily living disability in later life. *Journal of Gerontology: Social Sciences*, *63B*, S192–S196.

Heckhausen, J., Dixon, R. A., & Baltes, P. B. (1989). Gains and losses in development throughout adulthood as perceived by different adult age groups. *Developmental Psychology*, *25*, 109–121.

Himes, C. L. (2000). Obesity, disease, and functional limitation in later life. *Demography*, *37*, 73–82.

Jang, Y., Borenstein, A. R., Chiriboga, D. A., & Mortimer, J. A. (2005). Depressive symptoms among African American and White older adults. *Journal of Gerontology: Psychological Sciences*, *60B*, P313–P319.

Jang, Y., Haley, W. E., Small, B. J., & Mortimer, J. A. (2002). The role of mastery and social resources in the associations between disability and depression in later life. *The Gerontologist*, *42*, 807–813.

Jang, Y., Poon, L. W., & Martin, P. (2004). Individual differences in the effect of disease and disability on depressive symptoms: The role of age and subjective health. *International Journal of Aging & Human Development*, *59*, 125–137.

Jefferson, A. L., Barakat, L. P., Giovannetti, T., Paul, R. H., & Glosser, G. (2006). Object perception impairments predict instrumental activities of daily living dependence in Alzheimer's disease. *Journal of Clinical and Experimental Neuropsychology*, *28*, 884–897.

Jefferson, A. L., Cahn-Weiner, D., Boyle, P., Paul, R. H., Moser, D., Gordon, N., & Cohen, R. A. (2006). Cognitive predictors of

functional decline in vascular dementia. *International Journal of Geriatric Psychiatry*, *21*, 752–754.

Kelley-Moore, J. A., & Ferraro, K. F. (2001). Functional limitations and religious service attendance in later life: Barrier and/or benefit mechanism? *Journal of Gerontology: Social Sciences*, *56B*, S365–S373.

Kelley-Moore, J. A., & Ferraro, K. F. (2005). A 3-D model of health decline: Disease, disability, and depression among Black and White older adults. *Journal of Health and Social Behavior*, *46*, 376–391.

Kelley-Moore, J. A., Schumacher, J. G., Kahana, E., & Kahana, B. (2006). When do older adults become "disabled"? Social and health antecedents of perceived disability in a panel study of the oldest old. *Journal of Health and Social Behavior*, *47*, 126–141.

Kennedy, G. J., Kelman, H. R., & Thomas, C. (1990). The emergence of depressive symptoms in late life: The importance of declining health and increasing disability. *Journal of Community Health*, *15*, 93–104.

Krause, N. (2005). Exploring age differences in the stress-buffering function of social support. *Psychology and Aging*, *20*, 714–717.

Kurland, B. F., Gill, T. M., Patrick, D. L., Larson, E. B., & Phelan, E. A. (2006). Longitudinal change in positive affect in community-dwelling older persons. *Journal of the American Geriatrics Society*, *54*, 1846–1853.

Laz, C. (1998). Act your age. *Sociological Forum*, *13*, 85–113.

Ormel, J., Rijsdijk, F. V., Sullivan, M., Sonderen, E. V., & Kempen, G. (2002). Temporal and reciprocal relationship between IADL/ADL disability and depressive symptoms in late life. *Journal of Gerontology: Psychological Sciences*, *57B*, P338–P347.

Pearlin, L. I. (1999). The stress process revisited: Reflections on concepts and their interrelationships. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the sociology of mental health* (pp. 395–415). New York: Plenum.

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, *46*, 205–219.

Pearlin, L. I., & Skaff, M. M. (1996). Stress and the life course: A paradigmatic alliance. *The Gerontologist*, *36*, 239–247.

Pinquart, M. (2001). Correlates of subjective health in older adults: A meta-analysis. *Psychology and Aging*, *16*, 414–426.

Prince, M. J., Harwood, R. H., Thomas, A., & Mann, A. H. (1998). A prospective population-based cohort study of the effects of disablement and social milieu on the onset and maintenance of late-life depression: The Gospel OAK Project VII. *Psychological Medicine*, *28*, 337–350.

Ross, C. E., & Mirowsky, J. (2006). Sex differences in the effect of education on depression: Resource multiplication or resource substitution? *Social Science & Medicine*, *63*, 1400–1413.

Rozario, P. A., & Derienzis, D. (2009). 'So forget how old I am!' Examining age identities in the face of chronic conditions. *Sociology of Health and Illness*, *31*, 540–553.

Schieman, S. (2005). Residential stability and the social impact of neighborhood disadvantage: A study of gender- and race-contingent effects. *Social Forces*, *83*, 1031–1064.

Schieman, S., Pearlin, L. I., & Meersman, S. C. (2006). Neighborhood disadvantage and anger among older adults: Social comparisons as effect modifiers. *Journal of Health and Social Behavior*, *47*, 156–172.

Schieman, S., & Plickert, G. (2007). Functional limitations and changes in levels of depression among older adults: A multiple-hierarchy stratification perspective. *Journal of Gerontology: Social Sciences*, *62B*, S36–S42.

Schieman, S., & Turner, H. A. (1998). Age, disability, and the sense of mastery. *Journal of Health and Social Behavior*, *39*, 169–186.

Schnittker, J. (2005). Chronic illness and depressive symptoms in late life. *Social Science & Medicine*, *60*, 13–23.

Thoits, P. A. (1995). Stress, coping and social support processes: Where are we? What next? *Journal of Health and Social Behavior*, *35*, 53–79.

Turner, R. J., & Turner, J. B. (1999). Social integration and support. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the sociology of mental health* (pp. 301–319). New York: Plenum.

Tyler, K. A., & Hoyt, D. R. (2000). The effects of an acute stressor on depressive symptoms among older adults: The moderating effects of social support and age. *Research on Aging*, *22*, 143–164.

van Solinge, H., & Henkens, K. (2007). Involuntary retirement: The role of restrictive circumstances, timing, and social embeddedness. *Journal of Gerontology: Psychological Sciences and Social Sciences*, *62B*, S295–S303.

Wethington, E., & Kessler, R. C. (1986). Perceived support, received support, and adjustment to stressful life events. *Journal of Health and Social Behavior*, *27*, 78–89.

Wothke, W. (2000). Longitudinal and multigroup modeling with missing data. In T. D. Little, K. U. Schnabel & J. Baumert (Eds.), *Modeling longitudinal and multilevel data: Practical issues, applied approaches and specific examples* (pp. 219–240). Mahwah, NJ: Lawrence Erlbaum.

Yang, Y. (2006). How does functional disability affect depressive symptoms in late life? The role of perceived social support and psychological resources. *Journal of Health and Social Behavior*, *47*, 355–372.