

Substantial Changes in Mastery Perceptions of Dementia Caregivers With the Placement of a Care Recipient

Frank J. Infurna,^{1,2,3} Denis Gerstorf,^{1,2,3} and Steven H. Zarit¹

¹Department of Human Development and Family Studies, The Pennsylvania State University, University Park, USA.

²German Socio-Economic Panel Study, German Institute for Economic Research (DIW Berlin), Berlin, Germany.

³Institute for Psychology, Humboldt University, Berlin, Germany.

Objectives. The current study examined how a key component of caregiving stress processes, global mastery perceptions, changes with placing the care recipient in a nursing home or institution. We also explored the role of primary stressors in accounting for mastery changes with placement and whether characteristics of the caregiver and care recipient moderate reactions to placement.

Method. We applied multiphase growth curve models to prospective longitudinal data from 271 caregivers in the Caregiver Stress and Coping Study who experienced placement of their care recipient.

Results. Using a time-to/from-placement metric, we found that caregivers typically experienced declines in mastery preceding placement, followed by a significant increase within 1 year after placement and further increases thereafter. Corresponding changes in primary stressors (role overload) mediated the placement-related increase in mastery. Caregivers who reported more depressive symptoms and activities of daily living/instrumental activities of daily living dependencies of the care recipient were more likely to experience larger placement-related increases in mastery perceptions.

Discussion. Our findings suggest that placement alters psychological resources of caregivers and this effect is driven by corresponding changes in primary stressors. Findings also underscore the importance of examining change processes across salient life events and transitions.

Key Words: Caregiver stress and coping study—Caregiving—Caring for Dementia-related conditions—Placement—Stress process.

MAJOR life events and transitions often trigger developmental change in various domains of functioning (Baltes & Nesselroade, 1979; Diener, Lucas, & Schollen, 2006; Gerstorf et al., 2010; Ram, Gerstorf, Fauth, Zarit, & Malmberg, 2010). In line with prevailing models of stress and of control, transitions in caregiving such as caregiving onset, placement of the care recipient, or bereavement can be expected to initiate profound changes in psychological resources (Heckhausen & Schulz, 1995; Lachman, 2006; Pearlin, Menaghan, Lieberman, & Mullan, 1981; Skinner, 1995). In this study, we focus on global perceptions of mastery as a key psychological resource in the stress process and examine how mastery changes with placing a care recipient into a nursing home or similar institution. Placement has been identified as an important event that can have tremendous effects on the caregiver (Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995). In our report, we use longitudinal data from the Caregiver Stress and Coping Study (CSCS) to track how changes in mastery of caregivers unfold prior to, within 1 year of, and in the years following placement of a care recipient suffering from dementia into a nursing home or similar institution. We will also explore whether and how primary stressors (role overload) mediate reaction to placement and examine the moderating role of caregiver and care recipient characteristics in reaction to placement.

Global Sense of Mastery and Caregiving

Psychological resources such as global sense of mastery enable individuals to have control over life circumstances and strive for goal attainment (Pearlin & Schooler, 1978). For caregivers, global beliefs of mastery protect against the adverse effects of caregiving strains on well-being and physical health (Aneshensel, Botticello, & Yamamoto-Mitani, 2004; Harmell, Chattillion, Roepke, & Mausbach, 2011; Roepke et al., 2008). It is likely that those mastery perceptions themselves are profoundly shaped by experiences that accompany the caregiving process. The chronic stress and daily disturbances involved in caregiving may deplete one's adaptive capacity and resources. More specifically, caregiving often confronts caregivers with conditions, experiences, and persistent role strains that erode global sense of mastery and in turn result in poor adaptation such as depressive symptoms and compromised health (Monin & Schulz, 2009). For example, caregivers are often confronted with frequent and numerous problem behaviors, such as restlessness or agitation that constrain and undermine caregivers' ability to pursue behaviors directed at the attainment of desired outcomes (Aneshensel et al., 1995). In line with those arguments, mastery has been observed to decline for long-term caregivers (Skaff, Pearlin, & Mullan, 1996).

Little is known, however, about whether and how mastery changes during important transitions in caregiving. Placement can be expected to alter the challenges associated with caregiving because caregivers are no longer the primary persons taking care of their loved ones, which can lead to significant changes in both psychological resources such as mastery and consequent effects on well-being and physical health. A first possible scenario is that placement will operate as a relief to caregivers, resulting in improved mastery. Placement may then be perceived as a relief from everyday challenges associated with caregiving and thus result in a restoration of a caregiver's sense of control over the events in his/her own life. A contrasting scenario is that placement will not alter change trajectories in mastery. New stressors may emerge such as scheduling visits, feelings of guilt, or financial strains that further deplete one's resources, and caregivers may feel less control over what happens to their relative compared with when they provided all of the care (Whitlatch, Schur, Noelker, Ejaz, & Looman, 2001; Zarit & Whitlatch, 1992). Empirical evidence so far is relatively scarce. Initial evidence exists to suggest that mastery remains relatively unchanged after placement of one's care recipient (Gaugler, Pot, & Zarit, 2007; Skaff et al., 1996).

Role Overload as a Proxy for Challenges Associated With Caregiving

Several lines of inquiry highlight how mastery may change with the experience of caregiving and transitions in caregiving. To begin with, the accumulation of primary care-related stressors such as role overload often constrains and seriously undermines perceptions of control. In particular, role overload refers to role demands, fatigue, and experiences of being overwhelmed by caregiving-related tasks and responsibilities (Pearlin, Mullan, Semple, & Skaff, 1990). Chronic stressors and daily disturbances that arise directly from patient care (e.g., help with dressing) often lead to increases in role overload over time (Gaugler, Davey, Pearlin, & Zarit, 2000; Sugihara, Sugisawa, Nakatani, & Hougham, 2004). During caregiving, increasing role overload can be especially taxing on mastery because taking on the role of a primary caregiver for a loved one typically relinquishes caregivers' ability to be the primary driver of their own life circumstances. For example, dementia caregivers are often faced with stressors and events that interfere with and constrain one's own lifestyle (Bookwala & Schulz, 1998; Gignac & Gottlieb, 1996). Such impediments challenge the fulfillment of motivational strivings and goal implementation strategies that are essential for attainment of desired outcomes (see Heckhausen, Wrosch, & Schulz, 2010). The transition to placement often results in declines in role overload (Gaugler et al., 2007; Gaugler, Mittelman, Hepburn, & Newcomer, 2009; Mausbach et al., 2007a), illustrating that placement acts as a partial relief to caregivers. Changes

(declines) in role overload with placement may result in parallel changes (increases) in mastery, thereby providing relief to caregivers' psychological resources.

The Moderating Role of Caregiver and Care Recipient Characteristics

Embedded within the seminal stress process model (Pearlin et al., 1981, 1990) is that caregiver and care recipient characteristics moderate caregiving-related resources and outcomes. People bring to the caregiving career their own abilities and resources that they can draw upon when dealing with caregiving challenges. For example, caregivers who are older and/or women are more likely to report lower self-efficacy (Pinquart & Sörensen, 2003). Minority group differences in mastery may arise through differences in advance planning and preparation for future care (e.g., Sörensen & Pinquart, 2000, 2001) as well as long-term care decision making and health service utilization. For example, African American caregivers are typically less likely to use formal services and place their loved one in a nursing home or similar institution, probably because they often report greater filial responsibility, collectivism, and lack of accessibility to formal services (Aranda & Knight, 1997; Cox, 1999; Knight & Sayegh, 2010). As a consequence, African American caregivers may be more likely to be resilient to caregiving strains (Aranda & Knight, 1997; Pinquart & Sörensen, 2005). In a similar vein, depressive symptoms and mastery are often closely intertwined. For example, caregivers who report high levels of depressive symptoms may be constrained in their perceptions of and ability to ascertain control over life circumstances (Schulz, O'Brien, Bookwala, Fleissner, 1995). In turn, a strong sense of mastery is protective against increases in depressive symptoms (Kaplan & Boss, 2004; Steffen, McKibbin, Zeiss, Gallagher-Thompson, & Bandura, 2002). Finally, the social embedding of the caregiver can also be expected to be relevant (for discussion, see Knight & Sayegh, 2010). For example, more emotional support and lower family tensions have been linked to experiencing increases in mastery post placement (Skaff et al., 1996).

It is also conceivable that factors associated with the caregiving process such as care recipient characteristics shape whether and how mastery changes with the placement of the care recipient. For example, aiding a care recipient with everyday activities of daily living (ADL) may undermine the mastery perceptions of the care provider (Skaff et al., 1996). Caregivers may perceive their care recipients' frailty and inability to eat or dress without help as a window into his or her own (distant) future and so demoralize the general sense of mastery (Monin & Schulz, 2009). Similarly, being confronted with more problem behaviors such as irritability and being kept up at night may also constrain and limit caregivers' beliefs regarding exercising control over the situation (Li, Seltzer, & Greenberg, 1999).

The Present Study

Our objectives are (a) to examine how caregivers' global perceptions of mastery change with the placement of their care recipient in a nursing home or similar institution, (b) to explore whether role overload mediates those placement effects, and (c) to explore how caregiver and care recipient characteristics moderate reactions to placement. We focus on dementia caregivers because challenges associated with providing care for a loved one with dementia and observing their physical and mental deterioration are often particularly taxing (Aneshensel et al., 1995; Schulz & Martire, 2004). Dementia caregivers are confronted with daily challenges and hassles such as no longer being recognized by their loved one, helping their care recipient with everyday activities of daily living (e.g., to eat, bath, and get out of bed), and dealing with the care recipients' cognitive difficulties (e.g., understanding simple instructions). As a result, cumulative demands and experiences of caregiving may be a constant reminder of how little caregivers can do to affect the course of their own life circumstances, which may be especially detrimental to perceptions of mastery.

To address these research questions, we used longitudinal data from the CSCS that assessed caregivers yearly for 5 years. The longitudinal and prospective nature of the CSCS allows examining how mastery changes in relation to placement. Previous work using the CSCS (Aneshensel et al., 1995; Pearlin et al., 1990) has either focused solely on post placement change or (group) mean-level differences in mastery (Gaugler et al., 2007; Skaff et al., 1996). We extend previous research by applying a comprehensive approach to examining change processes in mastery as they unfold prior to, within 1 year of, and in the years following placement. Based on extant research, we expect that mastery declines leading up to placement, increases with placement, and is relatively stable in the years following placement. For the mediation, we hypothesize that the reduction in accumulated caregiving stressors with placement (operationally defined by role overload) account for placement-related increase in mastery. In a final exploratory step, we targeted whether caregiver-related resources (caregiver characteristics) and care recipient characteristics moderate placement-related changes in mastery.

METHOD

Participants and Procedure

The CSCS is a six-wave longitudinal study of caregivers of individuals with progressive dementia (for details, see Aneshensel et al., 1995; Pearlin et al., 1990). Potential respondents were identified through local Alzheimer's Association chapters in the San Francisco and greater Los Angeles areas and through the Family Caregiver Alliance in the San Francisco Area.

Caregivers were recruited over the telephone to determine interest in participation. Respondents met the following

eligibility criteria: (a) The care recipient had a confirmed physician diagnosis of Alzheimer's disease or another progressive dementia; (b) the caregiver was the spouse or adult child (including daughters- and sons-in-law) of an elderly relative suffering from dementia; and (c) the participant was the primary caregiver (or the family member who provided the most help) of a relative living in the community at the time of initial screening.

The sample consisted of 555 caregivers at Time 1 who were assessed yearly over the course of 5 years (six measurement occasions) across a wide range of topics concerning their caregiving career. With our interest in examining placement-related changes in mastery, we focused on the 271 participants (70% women, 88% attained at least high school education, and 84% or $n = 227$ were white, 11% or $n = 29$ African American, 3% or $n = 9$ Hispanic, 1% or $n = 4$ Asian, and 1% or $n = 2$ other) who placed their care recipient in a nursing home or other institution during the course of the study. To quantify selectivity effects, we compared those 271 participants with the Time 1 sample of 284 participants who did not experience placement. Analyses revealed that participants who experienced placement did not differ in age at Time 1, gender, education, role overload at Time 1, and mastery at Time 1 (all p 's $>.10$), suggesting that our participants are comparable to the study population from which they were drawn.

MEASURES

Outcome.—*Global sense of mastery* was assessed at each wave using seven items from Pearlin and Schooler's (1978) Mastery scale that measures global feelings of control (e.g., "I can do just about anything I really set my mind to do."). Participants rated the extent to which they felt their life was under their control using a 4-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*). A mean index was created with higher scores indicating more mastery (baseline $\alpha = 0.75$).

Mediator.—*Role overload* represents caregivers' subjective evaluation of care-related stressors, tasks, and responsibilities and was measured at each wave using three items assessing feelings of emotional exhaustion and fatigue due to informal care provision (e.g., "You have more things to do than you can handle."); Pearlin et al., 1990). Participants rated each item using a 4-point Likert scale (1 = *not at all* to 4 = *completely*). A mean index was created with higher scores indicating more role overload (baseline $\alpha = 0.78$) and was included in our analyses as a time-varying predictor to examine whether corresponding changes in role overload mediated changes in mastery. To facilitate interpretation of relative changes, we standardized mastery and role overload to the T metric ($M = 50$, $SD = 10$) with the Time 1 sample ($N = 555$) serving as the reference.

Table 1. Means, Standard Deviations, and Intercorrelations Among Caregiver and Care Recipient Characteristics

Moderators	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
Caregiver characteristics													
1. Age (30–88)	63.29	13.12	—										
2. Gender (0 = men)	0.70	0.46	-.31*	—									
3. Education (0–3)	1.80	1.02	-.08	-.09	—								
4. Ethnicity (1 = white)	0.84	0.37	.08	.02	.12*	—							
5. Years of caregiving (1.25–12.5)	4.66	2.34	.01	-.10	.13*	.002	—						
6. Emotional support (2–4)	3.30	0.47	-.12*	.06	.04	.18*	-.11	—					
7. Family tension (1–4)	1.86	0.71	-.33*	.15*	.03	-.01	-.03	-.09	—				
8. Depressive symptoms (1–4)	1.89	0.71	-.06	.24*	-.18*	-.08	-.14*	-.18*	.30*	—			
Care recipient characteristics													
9. Cognitive difficulties (0–4)	2.47	0.78	.07	-.08	.06	.01	.20*	.04	-.10	-.09	—		
10. ADL/IADL dependencies (1–4)	2.67	0.74	.22*	-.11	-.18*	-.04	-.07	-.08	-.02	.08	.33*	—	
11. Problem behaviors (1–3.64)	2.01	0.61	-.03	.17*	-.10	-.10	-.14*	-.07	.12	.28*	-.13*	.29*	—

Note. *N* = 271. Education was divided into four categories: 0 = less than high school (*n* = 33); 1 = high school graduate/vocational training (*n* = 74); 2 = some college (*n* = 78); 3 = college degree and more (*n* = 86). Ethnicity was divided into two categories: 0 = African American, Hispanic, Asian, and other (*n* = 43); 1 = white (*n* = 228). Years of caregiving refers to caregiving years at the assessment period immediately prior to placement. ADL/IADL = activities of daily living/instrumental activities of daily living. **p* < .05.

Moderators.—Table 1 shows descriptive statistics for caregiver and care recipient characteristics assumed to moderate placement-related mastery changes. With an interest in the resources caregivers could draw from and the constraints they were confronted with, we used data for each candidate moderator from the wave immediately preceding the placement. Socio-demographic factors included were age, gender, education, ethnicity (non-white vs. white), and years of caregiving. *Emotional support* was measured with a seven-item scale assessing the amount of connection caregivers felt toward their family and friends using a 4-point Likert scale (e.g., “*You have someone that you feel you can trust.*”; 1 = *strongly disagree* to 4 = *strongly agree*; baseline α = 0.81). *Family tension* was measured using three items assessing the degree to which family members get along with one another using a 4-point Likert scale (e.g., “*There is tension in our family.*”; 1 = *not at all like your family* to 4 = *very much like your family*; baseline α = 0.72). *Depressive symptoms* were assessed using a seven-item scale from the Hopkins Symptoms Checklist (e.g., “*In the past week, on how many days did you feel caught or trapped.*”; see Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), which asked how often symptoms occurred in the past week using a 4-point Likert scale (0 = *no days* to 3 = *5 or more days*; baseline α = 0.86). Mean indices were created for each caregiver characteristic with higher scores indexing more emotional support, family tension, and depressive symptoms.

Care recipient characteristics were also considered as potential moderators of placement-related mastery changes and included caregiver reports about the cognitive difficulties, ADL/instrumental activities of daily living (IADL) dependencies, and problem behaviors of the care recipient at the wave prior to placement. *Cognitive difficulty* was measured by asking the caregiver how difficult is it for the care recipient to perform seven tasks, including understanding simple instructions and speaking sentences using a

5-point Likert scale (0 = *not at all difficult* to 4 = *cannot do at all*; see Pearlin et al., 1990; baseline α = 0.86). *ADL/IADL dependencies* were measured by asking the caregiver how much does the care recipient depend on the caregiver for 15 everyday tasks ranging from bathing/showering to getting in/out of bed using a 4-point Likert scale (1 = *not at all* to 4 = *completely*; see Gaugler et al., 2004; baseline α = 0.91). *Problem behaviors* were measured by asking the caregiver on how many days in the past week he or she personally had to deal with 14 problem behaviors, including becoming restless or agitated and keeping you up at night using a 4-point Likert scale (1 = *no days* to 4 = *5 or more days*; see Pearlin et al., 1990; baseline α = 0.78). Mean indices were created for each care recipient characteristic with higher scores indexing more dependent or reliant behavior.

Time metric of time-to/from-placement.—During each wave, caregivers were asked to update their caregiving status (i.e., continuing care, placement, or bereavement). Caregivers who reported caring for their relative at home in the previous wave but whose relative was now institutionalized (placement) were selected. We then realigned these selected caregivers’ mastery assessments in relation to the wave placement occurred. Realigning caregivers’ mastery in relation to placement allowed for tracking changes prior to, within 1 year of, and in the years following placement. We also did this same procedure for role overload to allow examining whether corresponding changes in role overload accounted for changes in mastery. Table 2 shows the descriptive statistics for mastery and role overload prior to (waves -5 to -1), immediately following (wave 0), and in the years following placement (waves 1–4). The descriptive statistics indicate that mastery declines prior to placement, followed by an increase within 1 year of placement and gradual increases thereafter. Conversely, the descriptive statistics indicate that role overload increases prior to placement, followed by a

Table 2. Descriptive Statistics for Global Sense of Mastery and Role Overload Over time-to/from-Placement of Care Recipient

Time-to/from-placement (months)			Global sense of mastery				Role overload					
Wave	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	Skew	Kurtosis	<i>n</i>	<i>M</i>	<i>SD</i>	Skew	Kurtosis
-5	-56.33	2.35	9	52.15	7.45	0.74	-0.07	9	47.27	8.55	1.19	1.15
-4	-44.97	1.90	35	50.55	9.20	0.48	-0.05	35	48.39	10.83	0.02	-1.44
-3	-33.48	1.61	80	49.52	8.27	0.58	0.21	80	48.07	10.07	0.21	-1.10
-2	-22.03	1.34	142	49.06	9.88	0.10	0.59	142	50.33	9.86	-0.03	-1.16
-1	-11.15	1.16	271	49.46	9.99	0.17	0.17	271	51.10	9.94	-0.16	-1.08
0	0	0	269	50.36	9.55	0.30	-0.01	269	44.35	9.24	0.49	-0.84
1	11.01	1.21	245	50.29	9.68	0.36	0.06	245	43.76	9.00	0.65	-0.43
2	22.80	1.32	209	51.27	9.40	0.16	-0.01	209	43.58	8.69	0.65	-0.40
3	34.17	1.66	159	52.56	9.62	0.39	-0.19	159	43.93	9.06	0.63	-0.59
4	45.25	1.66	104	53.15	9.63	0.48	-0.07	104	44.46	8.37	0.53	-0.31

Note. $N = 271$. Wave refers to the assessment or interview in relation to placement. Scores for global sense of mastery and role overload were standardized to a T metric ($M = 50$, $SD = 10$) using the baseline ($N = 555$) sample. Number of observations = 1,523.

substantial decline within 1 year of placement, and stability thereafter. For both mastery and role overload, we observed slight positive skewness, suggesting scores are distributed at the lower end of the scale, whereas for role overload there was slight negative kurtosis, suggesting a flat distribution (as opposed to normal distribution). We also note that for our analyses, time-to/from-placement was modeled over months and not rounded to year to provide more exact data regarding interview assessment than assuming everyone was assessed exactly 1 year apart. We note that caregivers may have also experienced bereavement during the course of the study in the years following placement. In follow-up analyses, we also explored the role of bereavement. Results obtained did not differ between caregivers who additionally experienced bereavement and those who did not.

Statistical Procedures

Our first task was to establish a model of placement-related within-person changes in mastery that captures between-person differences in the multiple phases of change (see Fauth, Gerstorf, Ram, & Malmberg, 2012; Ram & Grimm, 2007). To do so, we operationally defined two constructs: time-to/from-placement and reaction. Time-to/from-placement refers to the implied linear rate of change in mastery leading up to placement. Reaction was measured via a time-varying dummy-coded variable. *Reaction* indexes the effect of placement on caregivers' mastery and was coded as 0 for all waves prior to placement (waves -5 to -1) and 1 for the wave immediately following placement and all waves thereafter (waves 0-4). The multiphase growth curve model was specified as

$$y_{it} = \beta_{0i} + \beta_{1i} (\text{time-to/from-placement}_{it}) + \beta_{2i} (\text{reaction}_{it}) + \beta_{3i} (\text{time-to/from-placement}_{it} \times \text{reaction}_{it}) + e_{it} \quad (1)$$

where person i 's level of mastery at time t , y_{it} , is a function of an individual-specific intercept parameter that represents levels prior to placement, β_{0i} ; an individual-specific slope parameter, β_{1i} , that captures rates of linear change prior to

placement; an individual-specific reaction parameter, β_{2i} , that represents the effect of placement on caregivers' mastery; and an individual-specific interaction between linear rate of change and reaction, β_{3i} , that indexes whether rates of change in mastery differed prior to and post placement; and residual error, e_{it} .

Following standard multilevel or latent growth modeling procedures (e.g., McArdle & Nesselroade, 2003; Ram & Grimm, 2007; Singer & Willett, 2003), individual-specific intercepts and slopes (β s from the Level 1 model given in Equation 1) were modeled as the Level 2 model where between-person differences were estimated (i.e., variance parameters) for level (β_{0i}), linear change (β_{1i}), and reaction (β_{2i}) and are assumed to be normally distributed, correlated with each other, and uncorrelated with the residual errors, e_{it} . Role overload and moderators were added into the model at the within-person (Level 1) and between-person levels (Level 2), respectively. Specifically, role overload was added at Level 1 to assess whether corresponding changes in role overload mediated changes in mastery (for discussion, see Preacher, Zyphur, & Zhang, 2010; Sliwinski & Mogle, 2008). Additionally, we included a between-person, mean-level component of role overload at Level 2 to assess whether between-person differences in role overload moderated reaction to placement. Caregiver and care recipient characteristics were added at Level 2 as moderators of reaction to placement (β_{2i}). All moderators were grand mean centered, and role overload was centered using each caregivers overall role overload score (within-person level). The expanded model that included moderators took the form (Model 2 in Table 4)

$$\begin{aligned} \beta_{0i} &= \gamma_{00} + \gamma_{01} (\text{role overload of caregiver}_i) + \dots \\ &\quad + \gamma_{012} (\text{problem behaviors of care recipient}_i) + u_{0i}, \\ \beta_{1i} &= \gamma_{10} + u_{1i}, \\ \beta_{2i} &= \gamma_{20} + \gamma_{21} (\text{role overload of caregiver}_i) + \dots \\ &\quad + \gamma_{212} (\text{problem behaviors of care recipient}_i) + u_{2i}, \\ \beta_{3i} &= \gamma_{30}, \text{ and} \\ \beta_{4i} &= \gamma_{40} + \gamma_{41} (\text{role overload of caregiver}_i) + u_{3i} \quad (2) \end{aligned}$$

We note that the relatively small number of measurement occasions for this kind of multiphase model restricted our ability

to thoroughly examine between-person difference questions. Because of our focus on predictors of level differences in mastery prior to placement and moderators of reaction to placement, we did not include moderators to examine between-person differences in time-to/from-placement (β_{1i}) and did not estimate the variance component for postplacement change (β_{3i}). In sum, we preferred robustness of the models for testing our research questions in the context of data constraints (for discussion, see Gerstorf, Lövdén, Röcke, Smith, & Lindenberger, 2007; Ghisletta & Lindenberger, 2005).

All models were estimated using SAS (PROC MIXED; see Littell, Milliken, Stroup, Wolfinger, & Schabenberger, 2006), with incomplete data accommodated under missing at random assumptions at the within- and between-person levels (Little & Rubin, 1987).

RESULTS

Global Sense of Mastery and Caregiving

The intraclass correlation for mastery was .62, suggesting that between-person differences accounted for the majority of the total variance (62%), but there was also substantial within-person variability over time (38%). Results in Table 3 show that the typical change in mastery was characterized by significant declines leading up to placement ($\gamma_{10} = -0.06$ T units per month or -0.72 T units per year), followed by sizeable increases within 1 year of placement ($\gamma_{20} = 1.87$ T units). Compared with prior to placement, changes in mastery differed postplacement, and caregivers, on average, experienced increases ($\gamma_{10} + \gamma_{30} = -0.06 + 0.10 = 0.04$ T units per month or 0.48 T units per year). The time-to-placement (linear rate of change), reaction, and postplacement change parameters conjointly accounted for 18% of the within-person variance in mastery.

We note that those 18% variance explained in within-person variation of mastery are larger than the <1% and 13% explained that follow-up analyses revealed for chronological age and time in study. We also examined whether errors and random effects followed the normality assumptions. We observed that the random errors and intercept were normally distributed, but for both the time-to-placement and reaction parameters, there was slight positive skew (time-to-placement: 0.22, reaction: 0.13) and positive kurtosis (time-to-placement: 1.40, reaction: 1.04). Moreover, the reaction variance parameter was reliably different from zero ($\sigma^2_{u2} = 26.95$), indicating that there was heterogeneity in caregivers' reaction to placement.

Role Overload as a Proxy for Challenges Associated with Caregiving

In the next step, we included role overload into our model and examined whether corresponding changes in role overload mediated mastery changes. Results from Table 4 (Model 1) indicate that the inclusion of role overload altered

Table 3. Fixed and Random Effects for Global Sense of Mastery to/from Placement of Care Recipient

	Global sense of mastery	
	Estimate	SE
Fixed effects		
Intercept, γ_{00}	48.47*	0.79
Time-to-placement, γ_{10}	-0.06*	0.03
Reaction, γ_{20}	1.87*	0.72
Postplacement change, γ_{30}	0.10*	0.03
Random effects		
Variance intercept, σ^2_{u0}	69.71*	9.10
Variance time-to-placement, σ^2_{u1}	0.01*	0.004
Variance reaction, σ^2_{u2}	26.95*	8.39
Covariance, σ_{u0u1}	0.16	0.14
Covariance, σ_{u0u2}	-17.13*	7.24
Covariance, σ_{u1u2}	-0.23	0.15
Residual, σ^2_{e1}	28.97*	1.50
Pseudo R ² for inclusion of time-to-placement, reaction, and after placement change parameters	.179	
-2 LL	10,320	

Note. N = 271. Number of observations = 1,523. Intercept was centered at time or wave of placement. Fixed effects parameters for time-to-placement and postplacement change refer to global sense of mastery change for each one month of time that has passed. Variance term for postplacement change was not estimated because of scarce data. Pseudo R² refers to reduction in residual variance from random intercept only model (35.28–28.97/35.28). SE = standard error.

* $p < .05$.

the structure of our findings. Two findings are particularly noteworthy. First, the reaction parameter is no longer reliably different from zero ($\gamma_{20} = 0.79, p > .05$), suggesting that parallel changes (declines) in role overload with placement mediated the significant boost in mastery. We corroborated this finding by using Preacher and colleagues (2010) multilevel structural equation modeling mediation approach (i.e., Example 1 in Preacher et al., 2010; 1-1-1 design). More specifically, in a follow-up analysis, we analyzed our data within a multilevel structural equation modeling framework within MPlus (Muthén & Muthén, 1998–2007), which applies a formal test to corroborate that role overload indeed mediated changes in mastery with placement (reaction) and to quantify that the indirect effect of role overload was reliably different from zero. The parameter estimate for the indirect effect of placement (reaction) onto mastery changes through role overload was reliably different from zero (indirect effect = 0.73, SE = 0.25, $p < .05$), suggesting that corresponding changes in role overload mediated mastery changes with placement. We also found that the time-to-placement parameter is no longer reliably different from zero ($\gamma_{10} = -0.05, p > .05$), suggesting that mastery changes during caregiving were considerably shaped by role overload. Second, the within-person role overload parameter was reliably different from zero and negative ($\gamma_{40} = -0.10, p < .05$), suggesting that on assessments when participants reported more role overload, they correspondingly reported lower mastery and vice versa. Figure 1 shows the model-implied change in role overload and mastery

Table 4. Fixed and Random Effects for Global Sense of Mastery to/from Placement of Care Recipient: The Effect of Role Overload and Moderators

	Model 1		Model 2	
	Estimate	SE	Estimate	SE
Fixed effects				
Intercept, γ_{00}	49.28*	0.78	49.72*	1.02
Caregiver characteristics				
Role overload of caregiver, γ_{01}	-0.40*	0.07	-0.17*	0.07
Age of caregiver, γ_{02}			-0.16*	0.04
Gender of caregiver, γ_{03}			-0.73	1.05
Education of caregiver, γ_{04}			0.76	0.45
Ethnicity of caregiver, γ_{05}			-1.62	1.21
Years of caregiving, γ_{06}			-0.19	0.20
Emotional support, γ_{07}			3.75*	0.99
Family tension, γ_{08}			-1.19	0.73
Depressive symptoms, γ_{09}			-4.67*	0.72
Care recipient characteristics				
Cognitive difficulties of care recipient, γ_{010}			0.82	0.62
ADL/IADL dependencies of care recipient, γ_{011}			-0.91	0.69
Problem behaviors of care recipient, γ_{012}			0.29	0.81
Time-to-placement, γ_{10}	-0.05	0.03	-0.05	0.03
Reaction, γ_{20}	0.79	0.74	0.07	0.95
Caregiver characteristics				
Role overload of caregiver, γ_{21}	0.11*	0.06	-0.01	0.06
Age of caregiver, γ_{22}			-0.01	0.03
Gender of caregiver, γ_{23}			1.33	0.91
Education of caregiver, γ_{24}			0.07	0.39
Ethnicity of caregiver, γ_{25}			1.26	1.06
Years of caregiving, γ_{26}			0.13	0.17
Emotional support, γ_{27}			-1.46	0.86
Family tension, γ_{28}			-0.46	0.63
Depressive symptoms, γ_{29}			1.63*	0.62
Care recipient characteristics				
Cognitive difficulties of care recipient, γ_{210}			-0.31	0.54
ADL/IADL dependencies of care recipient, γ_{211}			1.49*	0.60
Problem behaviors of care recipient, γ_{212}			1.15	0.71
After placement change, γ_{30}	0.09*	0.03	0.09*	0.03
Within-person change in role overload, γ_{40}	-0.10*	0.03	-0.08*	0.03
Within-person role overload \times between-person role overload, γ_{41}	-0.002	0.005	-0.004	0.005
Random effects				
Variance intercept, σ_{u0}^2	59.52*	8.47	36.86*	6.53
Proportion of variance intercept attributable to caregiver and care recipient characteristics			38.10%	
Variance time-to-placement, σ_{u1}^2	0.01*	0.004	0.01*	0.004
Variance reaction, σ_{u2}^2	25.47*	9.11	18.83*	8.59
Proportion of variance reaction attributable to caregiver and care recipient characteristics			26.10%	
Variance within-person role overload, σ_{u3}^2	0.05*	0.02	0.05*	0.01
Covariance, σ_{u0u1}	0.18	0.14	0.17	0.13
Covariance, σ_{u0u2}	-12.60	7.31	-5.12	6.31
Covariance, σ_{u0u3}	-0.18	0.27	-0.28	0.23
Covariance, σ_{u1u2}	-0.28	0.15	-0.26	0.15
Covariance, σ_{u1u3}	-0.006	0.01	-0.01	0.01
Covariance, σ_{u2u3}	0.42	0.27	0.39	0.26
Residual, σ_{e1}^2	26.80*	1.46	26.85*	1.45
Pseudo R^2 due to inclusion of role overload	.075			
Goodness-of-fit				
-2 LL	10,250		10,129	

Note. $N = 271$. Number of observations = 1,523. Pseudo R^2 indicates the amount of within-person variation in global sense of mastery that role overload accounted for (28.97–26.80/28.97). Model 1 = adding role overload to the within-person model at Level 1. Model 2 = adding a total of 11 individual difference characteristics to the between-person model at Level 2. ADL/IADL = activities of daily living/instrumental activities of daily living; SE = standard error.

* $p < .05$.

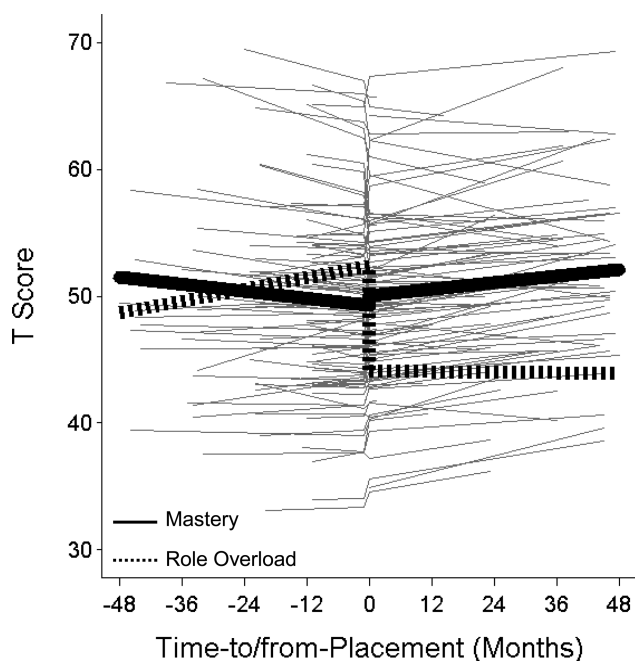


Figure 1. Graphical illustration of how changes in global sense of mastery and role overload correspond with one another in relation to placement. Model-implied mean longitudinal change trajectories are shown from Model 1 in Table 4 for mastery and role overload in relation to placement. Mastery declined prior to placement, but the transition of placement altered the caregiver's trajectory of change with an increase in mastery within 1 year of placement, followed by a gradual increase (solid black line). Role overload increased in the years leading up to placement, precipitously dropped within 1 year of placement and was stable in the years thereafter (dotted black line). Prior to placement, higher role overload was related to lower mastery, and postplacement the picture was reversed, with individuals experiencing less role overload and higher mastery. To illustrate, predicted scores are shown for a subsample of 100 participants.

from Model 1 in Table 4. Declines in role overload (dotted black line) with placement are accompanied by increases in mastery (solid black line). Prior to placement, higher role overload was related to lower mastery and, postplacement, the picture was reversed, with individuals experiencing less role overload and higher mastery. Additionally, the main effect ($\gamma_{01} = -0.40, p < .05$) and moderation with reaction ($\gamma_{21} = 0.11, p < .05$) parameters for the between-person component of role overload were reliably different from zero. This between-person level finding suggests that people who report more role overload than their caregiver peers also reported lower mastery prior to placement and experienced larger placement-related increases in mastery than other caregivers. The inclusion of role overload accounted for an additional 7% of within-person variation in mastery above and beyond the time-to-placement (linear rate of change), reaction, and postplacement parameters.

The Moderating Role of Caregiver and Care Recipient Characteristics

In a final set of analyses, we included caregiver and care recipient characteristics into the model and examined whether these factors moderated reaction to placement.

Results of this model are presented in Table 4 (Model 2). We first note that the within-person effect of role overload remains significant with the inclusion of the moderators, but the between-person component no longer moderates reaction to placement. Findings also revealed that caregivers who were younger and reported higher levels of emotional support, less family tension, less role overload, and fewer depressive symptoms were each more likely to report higher mastery prior to placement. Most pertinent to our research question, our results show that caregivers reporting more depressive symptoms and ADL/IADL dependencies of the care recipient experienced larger increases in mastery within 1 year of placement. Socio-demographic factors, emotional support, family tension, and caregiver characteristics, including cognitive difficulties and problem behaviors, did not moderate reaction to placement. The moderators accounted for a total of 38% and 26% of the variance in level and reaction parameters, respectively.

DISCUSSION

The objective in this study was to examine how global mastery perceptions as a key component of caregiving stress processes are shaped and influenced by placement of a care recipient in a nursing home or similar institution. Applying multiphase growth curve models to longitudinal data of a sample of caregivers who experienced placement, we observed that changes in mastery with placement were characterized by a multiphase pattern, that role overload mediated this change, and that caregiver and care recipient characteristics moderated reaction to placement. Prior to placement, caregivers typically experienced a decrease of mastery. On average, the transition of placement resulted in a significant uptake (approximately $0.20 SD$) in mastery, followed by gradual increases thereafter. This finding is consistent with previous work demonstrating that placement of the care recipient provides caregivers release from cumulative chronic stress associated with caregiving (Gaugler et al., 2007; Mausbach et al., 2007a), thus allowing caregivers to feel more in control of their everyday life. This hypothesis was supported by the finding that reductions in role overload (i.e., the subjective evaluation of one's caregiving-related tasks and responsibilities) mediated the significant boost in mastery within 1 year of placement. Our findings extend previous research by providing support for conceptual models of stress and control, suggesting that mastery is a malleable construct that is shaped by the contexts people are confronted with and the experiences people have (Infurna, Gerstorf, Ram, Schupp, & Wagner, 2011a; Pearlin, 2010; Skinner, 1995). Our approach provides impetus for future work examining how a given domain of functioning changes in relation to transitions in caregiving.

Global Sense of Mastery and Caregiving

We found that caregivers' global sense of mastery followed a multiphase pattern when examined prospectively

in relation to placement. First, caregivers typically experienced declines or an erosion of mastery prior to placement. Caregivers are frequently confronted with challenges such as preparing meals or constantly monitoring their loved one, which can constrain their ability to strive to attain goals, feel competent, and ascertain control over life circumstances (Mullan, 1992). Second, within 1 year of placement, caregivers typically reported significant increases in mastery. The experience of placing a care recipient in an institution or nursing home appears to operate as a relief, probably allowing individuals to once again concentrate on their own tasks and desired outcomes. Caregivers are no longer constrained by the daily challenges of caregiving for a loved one at home and are likely to have fewer external factors constraining their ability to exercise control. Lastly, postplacement, caregivers experienced a shift in mastery that was characterized by gradual increases. Increases in mastery postplacement may be due to caregivers no longer being the primary person providing direct care, resulting in continued feelings of competence and expected contingencies for one's own pursuits.

We note that the methodological approach that was applied to prospective longitudinal data was critical in identifying these patterns of change. Previous research focusing on mean-level differences comparing mastery pre- and immediately postplacement or using data from the postplacement period only found that mastery remained relatively stable (Gaugler et al., 2007; Skaff et al., 1996). By centering longitudinal trajectories of mastery along placement (as opposed to time in study or chronological age), we were able to observe significant patterns of decline and growth around a critical transition in caregiving. Empirical research suggests that mastery typically remains relatively stable across adulthood and shows minor declines in old age (Lachman, Rosnick, & Röcke, 2009; Mirowsky & Ross, 2007; Specht et al., in press). Our results qualify those reports by demonstrating that alignment along placement revealed a more efficient description of the data than chronological age or time in study, allowing insights into how mastery may systematically change along different stages in the caregiving process.

Role Overload as a Proxy for Challenges Associated With Caregiving

To examine whether the conditions and challenges associated with caregiving influenced change processes in mastery, we included role overload into our analyses as a time-varying predictor. The inclusion of role overload altered the structure of our findings; the reaction parameter was no longer significant, suggesting that corresponding changes in role overload accounted for changes in mastery within 1 year of placement (role overload r with time-to-placement and reaction, $-.31$ and $.42$, respectively). During caregiving, primary stressors that arise from taking care of someone with

dementia (e.g., help with everyday activities or problematic behaviors) contribute to corresponding erosion of one's psychological resources. Placement changes the caregiving context from the overwhelming nature of daily demands and challenges associated with caregiving to a sense of relief characterized by fewer perceived external constraints. Caregivers are likely to experience an increasing awareness that future desired goals and outcomes will (once again) be dependent on one's own actions and choices, not so much on the care recipient as it has been in the past. Lastly, our results illustrate that mastery is malleable in that mastery develops out of certain kinds of experiences (e.g., life events and transitions) and is affected by contextual factors (e.g., primary stressors of caregiving; Pearlin, Nguyen, Schieman, & Milkie, 2007). The context (here primary care-related stressors) shapes one's belief system, which in turn has consequences for well-being and health (Infurna, Gerstorf, & Zarit, 2011b; Mausbach et al., 2007b; Wrosch, Amir, & Miller, 2011). We observed in our natural experiment of tracking change before and after a major transition that the trajectory of mastery shifted to be more positive within 1 year of and in the years following placement (for discussion on various other contexts shaping control, see Heckhausen & Schulz, 1995; Skinner, 1995).

The Moderating Role of Caregiver and Care Recipient Characteristics

We also examined whether characteristics of the caregiver and care recipient moderated placement-related mastery changes. Caregivers who reported more emotional support and less family tension reported higher mastery prior to placement, which is in line with previous studies suggesting that one's social network and integration contributes to and enlarges one's ability to exercise control (Gerstorf, Röcke, & Lachman, 2011; Infurna et al., 2011a; Krause, 1987). Caregivers reporting more depressive symptoms were more likely to report lower mastery but experienced a larger increase in mastery with placement. Well-being constitutes an important source of mastery (Infurna et al., 2011a; McAvay, Seeman, & Rodin, 1996) and depressive symptoms that may arise through daily challenges associated with caregiving may affect one's feelings of mastery and ability to attain desired outcomes. Finally, ADL/IADL dependencies were observed to be the only care recipient characteristics that revealed reliable associations with mastery. Caregivers who help with more everyday activities such as dressing have further restrictions on their feelings of mastery; placement is experienced as a larger relief compared with caregivers who do not have to deal with as many everyday hassles.

We also note that sociodemographic factors, cognitive difficulties, and problem behaviors of the care recipient did not moderate reaction to placement. Our findings are in contrast to previous research that has shown these resources to be critical in shaping caregivers' functioning across a variety of domains

(Pearlin et al., 1990). It may be that when examined in the context of other resources such as social support and mental health, these factors do not play as large of a role as previously thought. Furthermore, future research should examine the role of long-term care planning in moderating dementia caregivers' global sense of mastery (and other domains) changes in relation to placement. For example, having made advanced directives to be placed in a nursing home if needed may serve as a buffering factor against mastery declines among caregivers because they can anticipate future institutionalization in case caregiving burdens become more and more overwhelming. We also note that there may be between-person differences in the decision for placement such that caregivers suffering from one form of depressive symptoms or another may be at particular risk of not making the decision to place the care recipient into an institution when it is appropriate/needed (Steffen, Gant, & Gallagher-Thompson, 2008). In sum, integrating the care recipients' plans for future care promises to help us better understand how key domains of functioning in the care provider may (or may not) change in relation to caregiving transitions.

Caregiving Implications

Our findings bear implications for designing effective caregiving interventions, for example, by informing the focus and timing of those interventions. First, we showed that caregivers' global sense of mastery may systematically change, depending on the level of subjective stress they experience, the number of ADL/IADL dependencies, and the social resources available to them. This malleability suggests that it may be useful to address mastery in services or interventions for caregivers. Would services such as adult day care, which provide partial relief of role overload by giving caregivers predictable time away from care (Gaugler et al., 2003; Zarit, Stephens, Townsend, & Greene, 1998) also reduce the erosion of mastery? Likewise, would family interventions that increase social support and reduce conflict (e.g., Mittelman, Roth, Haley, & Zarit, 2004) provide a buffer against decline in mastery? By focusing on the potential for intervention to have an effect on maintenance or enhancement of global sense of mastery, it may be possible to sustain the psychological resources and means for protection against mental and physical health declines due to caregiving strains. As a final note, we do not advocate that nursing home placement is the only strategy for addressing low levels of mastery in caregivers. Our findings can be a basis for future research centered on caregivers' adult day service utilization. More specifically, future studies can assess whether mastery fluctuates across days where adult day service is or is not utilized. Previous research has already shown that caregivers typically experience fewer exposures to stressors and lower stressor appraisals on days when adult day services were used (Zarit et al., 2011), and based on our findings, we would expect that mastery would be higher on adult day service days.

Our discussion of caregiving implications needs to be interpreted within the context of possible subgroup differences in placement-related mastery change. In particular, our statistical models assumed that participants form a homogeneous sample that all follow the same scenario. However, the fixed effects from our models may not apply to all caregivers, which were qualified by the random-effects parameters being reliably different from zero. One approach would be to use growth mixture models (Grimm & Ram, 2009; Ram & Grimm, 2009) to examine whether subgroups of participants exist who experience different placement-related change (see also Aneshensel et al., 2004). We speculate that some subgroups of caregivers exist who report low levels of mastery both prior to and postplacement (i.e., placement does not alter mastery trajectory), whereas others experience mastery decreases with placement, and a third group is resilient and maintains high mastery throughout their caregiving career (for discussion on subgroups of change following transitions and life events, see Bonanno, 2004; Bonanno, Westphal, & Mancini, 2011). In a similar vein, drawing from empirical evidence (Aranda & Knight, 1997; Pinquart & Sörensen, 2005), we would expect that African American caregivers would be less likely to experience mastery declines prior to placement and stronger increases with reaction to placement. We note, however, that a sample of less than 300 participants is very sparse to thoroughly estimate these highly complex models and so reliably distinguish subgroups.

Limitations and Outlook

We note several limitations of our study. First, care recipient characteristics were self-reports of the caregiver. Depending on the length of caregiving, caregivers may be sensitized to problem behaviors of their care recipient, leading to underreporting the help they provide. Second, our sample is not nationally representative of caregivers and is fairly homogeneous (84% white), therefore limiting generalization of our findings to the larger population of dementia caregivers. Third, although we did not find evidence for a moderating effect of ethnicity, we caution against drawing strong conclusions because sample size for the minority groups was very small and we had to ignore differences between minority groups (e.g., Hispanic American vs. Asian Americans). It is possible that the pathways into and the consequences of caregiving found in our study may not generalize to other population segments such as minority groups. Fourth, although our study included 271 participants who provided some ~1,500 observations for global sense of mastery, we were faced with limitations in statistical power. For example, we were only able to estimate and test between-person differences in some phases (i.e., intercept, time-to/from-placement, and reaction) and not in others. Finally, our study only targeted caregiver reports as the outcome. It would be additionally insightful to assess how

care recipients experienced the transition of placement and how much those experiences affect the persons who provided care earlier on.

In closing, our study highlights the importance of examining how caregivers' psychological resources change in relation to care recipient placement and how primary stressors associated with caregiving shape these processes. Our study adds to reports examining the important role that mastery plays in caregiving (Aneshensel et al., 1995; Gaugler et al., 2007; Harmell et al., 2011; Schulz, Belle, Czaja, Stevens, & Zhang, 2004) and provides insight into how this pivotal component of caregiving changes in relation to placement. We take our results to provide impetus for prospectively examining how key components of caregiving change in relation to transitions and for examining whether similar processes of changes in mastery and other key components, such as role overload may occur when care recipients receive interventions or use services such as adult day care (Zarit et al., 1998, 2011). Whether these transitions affect the subjective experience of stress and resources such as mastery may be more effectively examined within the larger trajectory of the caregiver's experiences.

FUNDING

Frank J. Infurna and Denis Gerstorf gratefully acknowledge the support provided by the National Institute on Aging (NIA) R21-AG032379 and R21-AG033109. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies.

ACKNOWLEDGMENTS

We thank Nilam Ram for his invaluable methodological advice. Special thanks to Laura C. Klein and Martin J. Sliwinski for comments and feedback on earlier drafts of this manuscript.

CORRESPONDENCE

Correspondence should be addressed to Frank J. Infurna, PhD, Humboldt University Berlin, Institute of Psychology, Unter den Linden 6, 10099, Berlin, Germany. E-mail: frank.j.infurna@hu-berlin.de.

REFERENCES

- Aneshensel, C. S., Botticello, A. L., & Yamamoto-Mitani, N. (2004). When caregiving ends: The course of depressive symptoms after bereavement. *Journal of health and social behavior, 45*, 422–440. doi:10.1177/002214650404500405
- Aneshensel, C. S., Pearlin, L. I., Mullan, J. T., Zarit, S. H., & Whitlatch, C. J. (1995). *Profiles in caregiving: The unexpected career*. San Diego, CA: Academic Press. doi:10.1016/B978-012059540-2/50011-9
- Aranda, M. P., & Knight, B. G. (1997). The influence of ethnicity and culture on the caregiver stress and coping process: A sociocultural review and analysis. *The Gerontologist, 37*, 342–354. doi:10.1093/geront/37.3.342
- Baltes, P. B. & Nesselroade, J. R. (1979). History and rationale of longitudinal research. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 1–39). New York, NY: Academic Press.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*, 20–28. doi:10.1037/0003-066X.59.1.20
- Bonanno, G. A., Westphal, M., & Mancini, A. D. (2011). Resilience to loss and potential trauma. *Annual Review of Clinical Psychology, 7*, 511–535. doi:10.1146/annurev-clinpsy-032210-104526
- Bookwala, J., & Schulz, R. (1998). The role of neuroticism and mastery in spouse caregivers' assessment of and response to a contextual stressor. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 53B*, P155–P164. doi:10.1093/geronb/53B.3.P155
- Cox, C. (1999). Service needs and use: A further look at the experiences of African American and White caregivers seeking Alzheimer's assistance. *American Journal of Alzheimer's Disease, 14*, 93–101. doi:10.1177/153331759901400202
- Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom inventory. *Behavioral Science, 19*, 1–15. doi:10.1002/bs.3830190102
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist, 61*, 305–314. doi:10.1037/0003-066X.61.4.305
- Fauth, E. B., Gerstorf, D., Ram, N., & Malmberg, B. (2012). Changes in depressive symptoms in the context of disablement processes: The role of demographic characteristics and social support. *Journal of Gerontology, Series B: Psychological Sciences, 67*, 167–177. doi:10.1093/geronb/gbr078
- Gaugler, J. E., Anderson, K. A., Zarit, S. H., & Pearlin, L. I. (2004). Family involvement in nursing homes: Effects on stress and well-being. *Aging & Mental Health, 8*, 65–75.
- Gaugler, J. E., Davey, A., Pearlin, L. I., & Zarit, S. H. (2000). Modeling caregiver adaptation over time: The longitudinal impact of behavior problems. *Psychology and Aging, 15*, 437–450. doi:10.1037/0882-7974.15.3.437
- Gaugler, J. E., Jarrott, S. E., Zarit, S. H., Stephens, M.-A. P., Townsend, A. L., & Greene, R. (2003). Respite for dementia caregivers: The effects of adult day service use on caregiving hours and care demands. *International Psychogeriatrics, 15*, 37–58. doi:10.1002/gps.772
- Gaugler, J. E., Mittelman, M. S., Hepburn, K., & Newcomer, R. (2009). Predictors of change in caregiver burden and depressive symptoms following nursing home admission. *Psychology and Aging, 24*, 385–396. doi:10.1037/a0016052
- Gaugler, J. E., Pot, A. M., & Zarit, S. H. (2007). Long-term adaptation to institutionalization in dementia caregivers. *The Gerontologist, 47*, 730–740. doi:10.1093/geront/47.6.730
- Gerstorf, D., Lövdén, M., Röcke, C., Smith, J., & Lindenberger, U. (2007). Well-being affects changes in perceptual speed in advanced old age: Longitudinal evidence for a dynamic link. *Developmental Psychology, 43*, 705–718. doi:10.1037/0012-1649.43.3.705
- Gerstorf, D., Ram, N., Mayraz, G., Hidajat, M., Lindenberger, U., Wagner, G. G., & Schupp, J. (2010). Late-life decline in well-being across adulthood in Germany, the United Kingdom, and the United States: Something is seriously wrong at the end of life. *Psychology and Aging, 25*, 477–485. doi:10.1037/a0017543
- Gerstorf, D., Röcke, C., & Lachman, M. E. (2011). Antecedent-consequent relations of perceived control to health and social support: Longitudinal evidence for between-domain associations across adulthood. *Journals of Gerontology, Series B: Psychological Sciences, 66B*, 61–71. doi:10.1093/geronb/gbq077
- Ghisletta, P., & Lindenberger, U. (2005). Exploring structural dynamics within and between sensory and intellectual functioning in old and very old age: Longitudinal evidence from the Berlin Aging Study. *Intelligence, 33*, 555–587. doi:10.1016/j.intell.2005.07.002
- Gignac, M. A. M., & Gottlieb, B. H. (1996). Caregivers' appraisals of efficacy in coping with dementia. *Psychology and Aging, 11*, 214–225. doi:10.1037/0882-7974.11.2.214
- Grimm, K. J., & Ram, N. (2009). A second-order growth mixture model for developmental research. *Research in Human Development, 6*, 121–143. doi:10.1080/15427600902911221
- Harmell, A. L., Chattillion, E. A., Roepke, S. K., & Mausbach, B. T. (2011). A review of the psychobiology of dementia caregiving: A focus on resilience factors. *Current Psychiatry Reports, 13*, 219–224. doi:10.1007/s11920-011-0187-1
- Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review, 102*, 284–304. doi:10.1037/0033-295X.102.2.284

- Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review*, *117*, 32–60. doi:10.1037/a0017668
- Infurna, F. J., Gerstorf, D., Ram, N., Schupp, J., & Wagner, G. G. (2011a). Long-term antecedents and outcomes of perceived control. *Psychology and Aging*, *26*, 559–575. doi:10.1037/a0022890
- Infurna, F. J., Gerstorf, D., & Zarit, S. H. (2011b). Examining dynamic links between perceived control and health: Longitudinal evidence for differential effects in midlife and old age. *Developmental Psychology*, *47*, 9–18. doi:10.1037/a0021022
- Kaplan, L., & Boss, P. (2004). Depressive symptoms among spousal caregivers of institutionalized mates with Alzheimer's: Boundary ambiguity and mastery as predictors. *Family Process*, *38*, 85–103. doi:10.1111/j.1545-5300.1999.00085.x
- Knight, B. G., & Sayegh, P. (2010). Cultural values and caregiving: The updated sociocultural stress and coping model. *Journal of Gerontology: Psychological Sciences*, *65B*, 5–13. doi:10.1093/geronb/gbp096
- Krause, N. (1987). Understanding the stress process: Linking social support with locus of control beliefs. *Journal of Gerontology*, *42*, 589–593. doi:10.1093/geronj/42.6.589
- Lachman, M. E. (2006). Perceived control over aging-related declines: Adaptive beliefs and behaviors. *Current Directions in Psychological Science*, *15*, 282–286. doi:10.1111/j.1467-8721.2006.00453.x
- Lachman, M. E., Rosnick, C. B., & Röcke, C. (2009). The rise and fall of control beliefs and life satisfaction in adulthood: Trajectories of stability and change over ten years. In H. B. Bosworth & C. Hertzog (Eds.), *Aging and cognition: Research methodologies and empirical advances. Decade of behavior (2000–2010)* (pp. 143–160). Washington, DC: American Psychological Association. doi:10.1037/11882-007
- Li, L. W., Seltzer, M. M., & Greenberg, J. S. (1999). Change in depressive symptoms among daughter caregivers: An 18-month longitudinal study. *Psychology and Aging*, *14*, 206–219. doi:10.1037//0882-7974.14.2.206
- Littell, R. C., Miliken, G. A., Stroup, W. W., Wolfinger, R. D., & Schabenberger, O. (2006). *SAS for mixed models* (2nd ed.). Cary, NC: SAS Institute.
- Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York: Wiley.
- Mausbach, B. T., Aschbacher, K., Patterson, T. L., von Känel, R., Dimsdale, J. E., Mills, P. J., ... Grant, I. (2007a). Effects of placement and bereavement on psychological well-being and cardiovascular risk in Alzheimer's caregivers: A longitudinal analysis. *Journal of Psychosomatic Research*, *62*, 439–445. doi:10.1016/j.jpsychores.2006.10.011
- Mausbach, B. T., Patterson, T. L., von Känel, R., Mills, P. J., Dimsdale, J. E., Ancoli-Israel, S., & Grant, I. (2007b). The attenuating effect of personal mastery on the relations between stress and Alzheimer caregiver health: A five-year longitudinal analysis. *Aging & Mental Health*, *11*, 637–644. doi:10.1080/13607860701787043
- McArdle, J. J., & Nesselroade, J. R. (2003). Growth curve analysis in contemporary psychological research. In J. Shinka & W. Velicer (Eds.), *Comprehensive handbook of psychology: Research methods in psychology* (Vol. 2, pp. 447–480). Hoboken, NJ: Wiley.
- McAvay, G. J., Seeman, T. E., & Rodin, J. (1996). A longitudinal study of change in domain-specific self-efficacy among older adults. *Journal of Gerontology: Psychological Sciences*, *51*, P243–P253. doi:10.1093/geronb/51B.5.P243
- Mirowsky, J., & Ross, C. E. (2007). Life course trajectories of perceived control and their relationship to education. *American Journal of Sociology*, *112*, 1139–1382. doi:10.1086/511800
- Mittelman, M. S., Roth, D. L., Haley, W. E., & Zarit, S. H. (2004). Effects of a caregiver intervention on negative caregiver appraisals of behavior problems in patients with Alzheimer's Disease: Results of a randomized trial. *Journal of Gerontology: Psychological Sciences*, *59B*, P27–P34. doi:10.1093/geronb/59.1.P27
- Monin, J. K., & Schulz, R. (2009). Interpersonal effects of suffering in older adult caregiving relationships. *Psychology and Aging*, *24*, 681–695. doi:10.1037/a0016355
- Mullan, J. T. (1992). The bereaved caregiver: A prospective study of changes in well-being. *The Gerontologist*, *32*, 673–683. doi:10.1093/geront/32.5.673
- Muthén, L. K., & Muthén, B. O. (1998–2007). *Mplus user's guide* (5th ed.). Los Angeles, CA: Muthén & Muthén.
- Pearlin, L. I. (2010). The lifecourse and the stress process: Some conceptual comparisons. *Journal of Gerontology, Series B: Psychological and Social Sciences*, *65B*, 207–215. doi:10.1093/geronb/gbp106
- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior*, *22*, 337–356. doi:10.2307/2136676
- Pearlin, L. I., Mullan, J. T., Semple, S. J., & Skaff, M. M. (1990). Caregiving and the stress process: An overview of concepts and their measures. *The Gerontologist*, *30*, 583–584. doi:10.1093/geront/30.5.583
- Pearlin, L. I., Nguyen, K. B., Schieman, S., & Milkie, M. A. (2007). The life-course origins of mastery among older people. *Journal of Health and Social Behavior*, *48*, 164–179. doi:10.1177/002214650704800205
- Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior*, *19*, 2–21. doi:10.2307/2136319
- Pinquart, M., & Sörensen, S. (2003). Associations of stressors and uplifts of caregiving with caregiver burden and depressive mood: A meta-analysis. *Journals of Gerontology Series B: Psychological Sciences*, *58B*, P112–P128. doi:10.1093/geronb/58.2.P112
- Pinquart, M., & Sörensen, S. (2005). Ethnic differences in stressors, resources, and psychological outcomes of family caregiving: A meta-analysis. *The Gerontologist*, *45*, 90–106. doi:10.1093/geront/45.1.90
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, *15*, 209–233. doi:10.1037/a0020141
- Ram, N., Gerstorf, D., Fauth, B., Zarit, S. H., & Malmberg, B. (2010). Aging, disablement, and dying: Using time-as-process and time-as-resources metrics to chart late-life change. *Research in Human Development*, *7*, 27–44. doi:10.1080/15427600903578151
- Ram, N., & Grimm, K. (2007). Using simple and complex growth models to articulate developmental change: Matching theory to method. *International Journal of Behavioral Development*, *31*, 303–316. doi:10.1177/0165025407077751
- Ram, N., & Grimm, K. J. (2009). Growth mixture modeling: A method for identifying differences in longitudinal change among unobserved groups. *International Journal of Behavioral Development*, *33*, 565–576. doi:10.1177/0165025409343765
- Roepke, S. K., Mausbach, B. T., Aschbacher, K., Ziegler, M. G., Dimsdale, J. E., Mills, P. J., ... Grant, I. (2008). Personal mastery is associated with reduced sympathetic arousal in stressed Alzheimer caregivers. *American Journal of Geriatric Psychiatry*, *16*, 310–317. doi:10.1097/JGP.0b013e3181662a80
- Schulz, R., Belle, S. H., Czaja, S. J., Stevens, A., & Zhang, S. (2004). Long-term care placement of dementia patients and caregiver health and well-being. *Journal of the American Medical Association*, *292*, 961–967. doi:10.1001/jama.292.8.961
- Schulz, R., & Martire, L. M. (2004). Family caregiving of persons with dementia: Prevalence, health effects, and support strategies. *American Journal of Geriatrics Psychiatry*, *12*, 240–249. doi:10.1176/appi.ajgp.12.3.240
- Schulz, R., O'Brien, A. T., Bookwala, J., & Fleissner, K. (1995). Psychiatric and physical morbidity effects of dementia caregiving: Prevalence, correlates, and causes. *The Gerontologist*, *35*, 771–791. doi:10.1093/geront/35.6.771
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press. doi:10.1093/acprof:oso/9780195152968.003.0010

- Skaff, M. M., Pearlin, L. I., & Mullan, J. T. (1996). Transitions in the caregiving career: Effects on sense of mastery. *Psychology and Aging, 11*, 247–257. doi:10.1037/0882-7974.11.2.247
- Skinner, E. A. (1995). *Perceived control, motivation, and coping*. Thousand Oaks, CA: Sage.
- Sliwinski, M. J., & Mogle, J. (2008). Time-based and process-based approaches to analysis of longitudinal data. In S. M. Hofer & D. F. Alwin (Eds.), *Handbook on cognitive aging: Interdisciplinary perspectives* (pp. 477–491). Thousand Oaks, CA: Sage. doi:10.4135/9781412976589.n28
- Sörensen, S., & Pinquart, M. (2001). Developing a measure of older adults' preparation for future care needs. *International Journal of Aging and Human Development, 53*, 137–165. doi:10.2190/1R0D-30TC-F4K1-F0DW
- Sörensen, S., & Pinquart, M. (2000). Preparation for future care needs by West and East German older adults. *Journal of Gerontology: Social Sciences, 55B*, S357–S367. doi:10.1023/A:1006778627518
- Specht, J., Egloff, B., & Schmukle, S. C. (in press). Everything under control? The effects of age, gender, and education on trajectories of perceived control in a nationally representative German sample. *Developmental Psychology*. doi: 10.1037/a0028243
- Steffen, A. M., Gant, J. R., & Gallagher-Thompson (2008). Reducing psychosocial distress in family caregivers. In D. Gallagher-Thompson, A. M. Steffen, & L. W. Thompson (Eds.), *Handbook of behavioral and cognitive therapies with older adults* (pp. 102–117). New York, NY: Springer. doi:10.1007/978-0-387-72007-4_7
- Steffen, A. M., McKibbin, C., Zeiss, A. M., Gallagher-Thompson, D., & Bandura, A. (2002). The revised scale for caregiving self-efficacy: Reliability and validity studies. *Journals of Gerontology: Psychological Sciences, 57*, 74–86. doi:10.1093/geronb/57.1.P74
- Sugihara, Y., Sugisawa, H., Nakatani, Y., & Hougham, G. W. (2004). Longitudinal changes in the well-being of Japanese caregivers. Variations across kin relationships. *Journals of Gerontology Series B: Psychological Sciences, 59B*, P177–P184. doi:10.1093/geronb/59.4.P177
- Whitlatch, C. J., Schur, D., Noelker, L. S., Ejaz, F. K., & Looman, W. J. (2001). The stress process of family caregiving in institutional settings. *The Gerontologist, 41*, 462–473. doi:10.1093/geront/41.4.462
- Wrosch, C., Amir, E., & Miller, G. E. (2011). Goal adjustment capacities, coping, and subjective well-being: The sample case of caregiving for a family member with mental illness. *Journal of personality and social psychology, 100*, 934–946. doi:10.1037/a0022873
- Zarit, S. H., Kim, K., Femia, E. E., Almeida, D. M., Savla, J., & Molenaar, P. C. (2011). Effects of adult day care on daily stress of caregivers: A within-person approach. *The journals of gerontology. Series B, Psychological sciences and social sciences, 66*, 538–546. doi:10.1093/geronb/gbr030
- Zarit, S. H., Stephens, M. A., Townsend, A., & Greene, R. (1998). Stress reduction for family caregivers: Effects of adult day care use. *The journals of gerontology. Series B, Psychological sciences and social sciences, 53*, S267–S277. doi:10.1093/geronb/53B.5.S267
- Zarit, S. H., & Whitlatch, C. J. (1992). Institutional placement: Phases of the transition. *The Gerontologist, 32*, 665–672. doi:10.1093/geront/32.5.665