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The caregiving dyad: Do caregivers' appraisals of caregiving matter for care recipients' health?

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ABSTRACT

Caregiving experiences matter for caregivers' own wellbeing, but few studies link caregivers' burden and benefit perceptions with recipient outcomes. Following the stress process model, I prospectively explore how caregivers' experiences shape recipients' mental health. I match US National Health and Aging Trends Study and National Study of Caregivers, employing logistic regression on 781 older adult-informal caregiver dyads. I examine how caregivers' appraisals shape recipients' subsequent depression and anxiety, with caregiver mental health and recipient unmet care need as key covariates. Recipients receiving care from caregivers reporting predominantly benefits are less likely to become depressed than counterparts receiving care from persons reporting predominantly burden. Recipients receiving care from persons reporting benefits even alongside low or moderate burden are also less likely to become anxious. Recipient unmet care need, but not caregiver mental health, is associated with recipient mental health. Improving caregiver conditions may have benefits for both dyad members.

1. Background

Informal caregiving is integral to the US long-term care system. For more than two-thirds of older adults, family caregivers are their only source of assistance (Doty, Mahoney, & Sciegaj, 2010), but caring for older adults can be difficult (AARP, 2015). For many, caregiving to family members or friends is physically, psychologically, and financially draining, and results in experiencing burden (Zarit, Todd, & Zarit, 1986). Simultaneously, caregiving can generate benefits as a positive emotional and practical experience (Kramer, 1997). Caregivers report developing new skills and close relationships with recipients, feeling companionship, fulfillment, and personal growth (Andren & Elmstahl, 2005; Netto, Goh, & Yap, 2009).

Caregiving experiences are therefore multi-faceted, including negative (burden) and positive appraisals (benefits). Research focuses predominantly on how caregivers' appraisals shape their own wellbeing, and the implications of burden and benefits perceptions for caregivers are well-established (Pinquart and Sorensen, 2003). However, few studies explicitly acknowledge that caregiving relationships are by definition dyadic, and little is known about whether consequences of caregivers' perceived burden and benefit extend beyond the individual and have implications for recipients' health (Roberto, Blieszner, & Allen, 2006). Studies that do examine caregiver appraisals

and recipient outcomes consider caregiving experiences narrowly, examining its facets—burden and benefits—in isolation (Ejem, Drentea, & Clay, 2014; McClendon & Smyth, 2015). A dyadic approach and reports obtained from both caregivers and recipients avoid confounding due to one informant's underlying affect, and can improve our understanding of caregiving as an interpersonal process with implications for both dyad members.

Studies examining associations between particular caregiver characteristics and recipient outcomes offer initial support for the assertion that caregivers' experiences and recipients' health are linked. Caregiver well-being is associated with better quality care, recipient adjustment, and successful transitions to facility living. For example, caregiver-reported quality of life (QOL) is associated with recipient-reported QOL. When caregivers experience anxiety, depression, or stress, recipients are more likely to report poor self-efficacy, treatment adherence, and symptom monitoring (Buck, Mogle, Riegel, McMillan, & Bakitas, 2015; Ejem et al., 2014). Older adults whose caregivers report burden are also more likely to be institutionalized (McClendon & Smyth, 2015; Spillman & Long, 2009). Conversely, positive caregiver-recipient interactions, caregiver commitment, and better caregiver health are associated with recipients' delayed facility placement (Wright, 1994). Recipients in dyads with close relationships adjust to nursing homes better and experience slower cognitive decline (Burgener & Twigg,
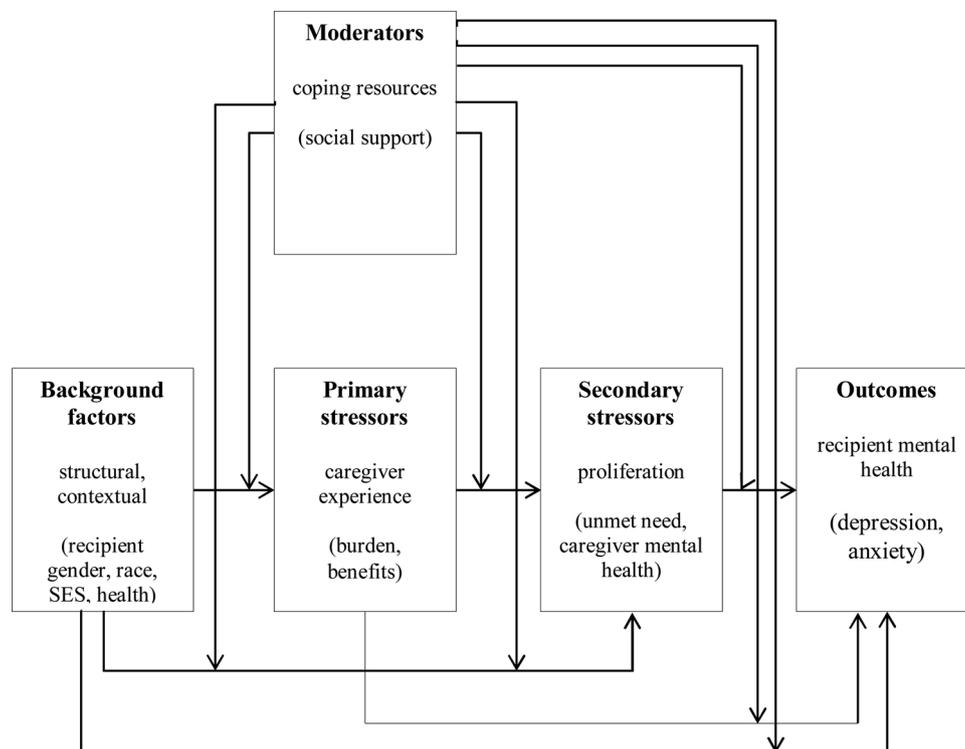
Fig. 1. Caregivers' experiences and recipient mental health conceptual model.

2002; Norton et al., 2009). When caregivers are confident in recipients' capabilities, recipients are more likely to experience activities of daily life (ADL) improvements (Li & McLaughlin, 2012).

These studies examine associations between certain caregiver characteristics and recipient wellbeing, but suffer from three limitations. First, prior research frequently uses measures obtained from one reporter, introducing potential bias due to underlying informant affect or viewpoint (Bradford et al., 2013). Burdened caregivers may give negatively biased reports about recipients' well-being. Dyadic data with caregivers' and recipients' self-reports avoids this bias. Second, past studies do not evaluate how caregivers' experiences comprehensively shape recipients' wellbeing and health in particular. They focus on caregivers' burden, discounting co-existence and different positive and negative appraisal levels caregivers may experience (Lawton, Moss, Kleban, Glicksman, & Rovine, 1991).

Additionally, most studies examining caregiver experiences and recipient outcomes are cross-sectional, and cannot establish causal ordering—whether caregivers contribute to negative recipient outcomes, or whether recipient health conditions increase caregiver burden (Ejem et al., 2014; Shega, Hougham, Stocking, Cox-Hayley, & Sachs, 2016). Most research also relies on convenience or clinical samples of recipients with one disease group, or on caregivers of older persons with particular impairments (Iecovich, 2011, 2015; Norton et al., 2009). These samples do not represent population experiences. For example, although research frequently examines dementia caregiving, only 9% of older individuals' caregivers cite it as primary reason their recipients need care; many older adults have comorbidities or receive care for other conditions (AARP, 2015). Small samples also preclude researchers from distinguishing between caregiver groups, such as between family and nonrelatives (Robison, Fortinsky, Kleppinger, Shugrue, & Porter, 2009).

I use longitudinal National Health and Aging Trends Study (NHATS) data and link it with its companion study, the National Study of Caregivers (NSOC), to address these gaps and evaluate how caregivers' self-reported burdens and benefits matter or recipients' self-reported mental health. Dyadic data allow me to avoid single-reporter bias and

capture how recipient-reported mental health responds to caregiver-reported experiences, rather than confounding them due one informant's underlying affect. I assess how caregivers' burden and benefit appraisals shape recipients' depression and anxiety using a sample of adults aged 65+ receiving care from a nationally representative informal caregiver group. I use a population-derived caregiving experience typology accounting for both negative and positive appraisals developed in prior work (Pristavec, 2018), and I focus on care recipients broadly, rather than on a clinically select sample. Arguing that the stress of caregivers' negative appraisals (burden) may spill over to recipients when unaccompanied by positive appraisals (benefits), I use baseline caregiver burden and benefit reports to predict recipient mental health three years later. Prospective data allows me to ascertain causal ordering and examine associations between caregiving experiences and recipient health that develop over time (Krause & Shaw, 2002). Stress process models posit that health outcomes develop with continuous and cumulative exposure to stressors, and using two data waves avoids capturing the effects of only the initial stress of becoming a caregiver.

I address two research questions. First, I ask whether and how caregivers' experiences are prospectively associated with recipients' mental health (depression and anxiety). Relatedly, I explore how caregivers' burden versus benefit perceptions shape recipients' mental health. Second, I examine whether potential secondary stressors (caregiver mental health and recipient unmet need) related to caregiving experiences are associated with recipients' mental health, and whether associations persist after adjusting for relevant contextual factors.

1.1. Conceptual framework

I employ the stress process model to guide analyses and examine how caregivers' experiences and recipients' health are related (Pearlin, 2010). In the model, primary stressors (caregiver experiences) shape recipient outcomes (mental health) directly, and/or through secondary stressors developed with stress proliferation (caregiver mental health,

recipient unmet need). Further, the model posits that outcomes depend on structural and contextual background (demographic, socio-economic), and that coping resources (social support) moderate stress processes. The resulting framework suggests that daily stress (or absence thereof) of interacting with caregivers experiencing caregiving as more burdensome than beneficial may worsen recipient mental health (Fig. 1). I discuss framework elements below.

1.1.1. Primary stressors: caregiver experiences

Caregivers' experiences are potential stressors shaping recipient mental health. Primary and chronic stressors represent negative experiences recurring due to structured arrangements in individuals' lives (Pearlin, 1989: 245). Through stress contagion within role sets, "stressors one person faces can become sources of stress for her/his interacting partners" (Pearlin, 2010: 212). Receiving help from caregivers perceiving high burden and/or few benefits may be stressful for recipients, and such stress may worsen recipients' health. Stressed caregivers may interact negatively with recipients, voicing criticism, discouragement, or providing recipients poor emotional support. Such exchanges may degrade recipients' sense of confidence, control, or engender sadness and worry (Moos, Brennan, Schutte, & Moos, 2006). Conversely, interactions with caregivers perceiving their activities as more beneficial may be more positive. Positive interactions are associated with older adults reporting fewer depression symptoms and benefit both partners' psychological wellbeing in couples (Robles, Slatcher, Trombello, & McGinn, 2014).

I use an informal caregiving experience typology integrating burden and benefit appraisal developed in prior work to operationalize caregivers' experience types and examine how they shape recipient health (Pristavec, 2018). Using latent class analysis on NHATS and NSOC data and a nationally-representative sample of older adults' informal caregivers yields five distinguishable experience subtypes. Each is unique in reported benefit and burden presence/absence, type, and intensity. In two types (labeled "Intensive Caregivers" and "Balanced Caregivers"), burdens and benefits co-occur. Intensive Caregivers report high burden and moderate benefits across emotional, interpersonal, physical, and social domains. Compared to others, their perceived burden is highest, but benefits are comparable to those reporting little to no burden. Balanced Caregivers report moderate burden—with absent social burden—coexisting with high benefits, also at levels comparable to caregivers without burden. In the third type ("Dissatisfied Caregivers"), caregivers report only burden, at levels comparable to Intensive or Balanced Caregivers. Finally, in two types ("Relationship Caregivers" and "Satisfied Caregivers"), caregivers predominantly experience benefits. Relationship Caregivers experience interpersonal benefits with low interpersonal burden; Satisfied Caregivers indicate no burden, with reported benefits higher than in any other group. The typology allows me to characterize caregivers' experiences with burden and benefit appraisals simultaneously, and reflects nationally representative experience types.

1.1.2. Secondary stressors: recipient unmet need and caregiver mental health

Encounters with burdened caregivers may also engender secondary stressors for recipients (Pearlin, 1989). Secondary stressors develop over time from primary stressors through stress proliferation. Caregivers' appraisals may give rise to two stressors potentially shaping recipients' mental health: recipient unmet care need and caregiver mental health.

Recipient unmet care need. Caregivers experiencing burden may feel overwhelmed and have fewer psychological, temporal, or physical resources to address recipients' needs. In severe cases, they may not consider recipients' wishes, exclude them from decisions, become neglectful, or otherwise enact their stress. Burdened caregivers may thus compromise care quality; accordingly, recipients may report unmet ADL and instrumental ADL (IADL) care need (Beach & Schulz, 2017).

Unmet ADL and IADL needs are distinct recipient QOL indicators associated with health declines (Tennstedt, McKinlay, & Kasten, 1994). Conversely, caregivers perceiving benefits may interact more positively with recipients and be better equipped to assist recipients and meet their needs.

Caregiver mental health. Caregivers are likely to develop poor mental health; they may experience depression or anxiety symptoms, negative mood, or resigned behavior (Pinquart and Sorensen, 2003), and recipients may respond to caregivers' mental health issues with fear, worry, sadness, or helplessness. Cross-partner effect studies in marital relationships suggest partners' experiences and mental health are associated (Butterworth & Rodgers, 2006; Townsend, Miller, & Guo, 2001). Affective concordance with the caregiver may thus shape recipient mental health (Goodman & Shippy, 2002).

1.1.3. Stress-buffering factors

The model further suggests that high perceived social support buffers from stress. Lower perceived support and contact frequency are associated with older adults' poor mental health (Vink, Aartsen, & Schoevers, 2008). Receiving support may give recipients sense of control, dignity, and self-worth, and emotional or instrumental resources from family and friends may mitigate stressful interactions and exchanges with caregivers. Married and cohabiting older adults may have partners as confidantes providing validation, and report better psychological wellbeing despite stress (Wright & Brown, 2017). Emotional support through confidantes and social networks may protect against poor mental health (Fiori, Antonucci, & Cortina, 2006). Instrumental support beyond primary caregiver may also benefit recipients and offset stressful experiences with main caregiver (Gur-Yaish, Zisberg, Sinoff, & Shadmi, 2013).

1.1.4. Confounders in caregivers' experiences and recipient mental health

The conceptual model suggests that stress processes unfold against background and structural factors associated with caregivers' experiences and recipient mental health. Recipient characteristics may affect stress responses, and gender, race, age, socioeconomic status (SES), and health all shape older adults' anxiety and depression likelihood (Schoevers, Beekman, Deeg, Jonker, & van Tilburg, 2003; Vink et al., 2008). Caregiver characteristics like gender, SES, relationship to recipient, and caregiving duration may also in part explain relationships between caregivers' experiences and secondary stressors (Pinquart & Sorensen, 2003).

1.1.5. Mental health outcomes

Close relationship dyad studies show one's psychological wellbeing and mental health depend on unique stressors and stress partners experience (Butterworth & Rodgers, 2006; Townsend et al., 2001); I evaluate how caregiver experiences shape recipient depression and anxiety, the two most common old age mental health conditions (Schoevers et al., 2003; Vink et al., 2008). Anxiety describes a "tendency to attend to, experience, and report negative emotions such as fears, worries, and anxiety across many situations," which can be trait-like or state-like in response to a stressful event (Gidron, 2013; McCrae & Costa, 1995). Depressed mood, which includes sadness and helplessness, may similarly be trait-like or a temporary response to particular situation or event stressors (Chen, Huang, & Chen, 2014; Haugan, Innstrand, & Moksnes, 2013).

Recipient depression and anxiety may respond in different ways to stressors proliferating from caregivers' experiences. Caregiver appraisals may more strongly predict state-like depression or anxiety over time; conversely, caregiver appraisals may not affect recipient mental health conditions if these more trait-like and stable characteristics less dependent on context.

2. Data and methods

2.1. Data

To examine how caregiver experiences shape recipient health, I link two large scale nationally representative surveys, NHATS and its supplement NSOC, and perform secondary data analyses. I applied for and obtained written permission to use anonymized publicly available and anonymized sensitive data. Data cannot be freely shared but are obtainable from NHATS following the same authorization procedure, and are permitted to be used for analyses and publication provided that no records are individually identified and that no n < 5 cells are produced. The following analyses satisfy these criteria. No primary data were collected.

I obtain recipient reports from 2011 and 2013 NHATS. NHATS is nationally representative and monitors social implications of aging. It collects information on a stratified three-stage sample of Medicare recipients over age 65 living in residential care or communities; 96% of U.S. older adults are Medicare enrollees. NHATS oversamples black older adults and those 85 + . The baseline response rate was 71%. Although further waves of NHATS waves are available, high deceased respondent numbers and possible primary caregiver changes limit the analyses to initial waves.

During the survey, NHATS sample persons could identify up to five helpers from whom they received assistance with self-care, mobility, or household activities. These individuals were eligible for NSOC, a NHATS companion study of informal caregivers (i.e. individuals not associated with formal care systems). NSOC interviews were conducted with 2007 (59.7% response rate) of 1369 NHATS sample persons. To obtain caregivers' reports and link information about both caregiving dyad members, I match each NHATS older adult with their 2011 NSOC primary caregiver as described below.

2.2. Analytic sample

The analytic sample are dyads consisting of NHATS sample person matched to their primary caregiver. 1369 NHATS older adults identified at least one informal caregiver; 38.4% older persons identified more than one (up to 5). In cases of multiple caregivers, the primary caregiver was selected and refers to the individual providing the highest number of hours of assistance to older adult in the month prior to NSOC interview.

Of the 1369 NHATS participants matched with primary caregivers in NSOC Wave 1 (W1), 155 (11.3%) died and 380 (27.8%) attrited by Wave 3 (W3). Attrition analysisusing chi-square tests and multinomial logistic regression predicting attrition and death odds suggests no unexpected demographic differences between the analytic sample and those attrited. Those deceased differ from final sample on factors commonly associated with old-age mortality, including advanced age, poor health, and being black (not shown).

Of remaining 834 older persons with caregivers in W3, 27 dyads (3.2%) had missing data on at least one analytic variable. Because of low missing data, I use listwise deletion for cases without information on factors included in final models. The analytic sample thus includes 781 older adult-primary caregiver pairs. Although no sample individuals lived in nursing facilities at baseline, some (4.0%) moved into nursing care between waves.

Table 1 shows unweighted sample descriptives.

2.3. Measures

2.3.1. Dependent variables: recipient mental health, W3

Recipient depression indicates recipient-reported likely depression (Patient Health Questionnaire-2 [PHQ-2]), and recipient anxiety indicates recipient-reported likely anxiety (Generalized Anxiety Disorder Scale [GAD-2]). PHQ-2 and GAD-2 are validated two-item screeners

Table 1
Unweighted sample descriptives (N = 781).

	% / mean(sd)
CR mental health (W3)	
Depression (= 1)	27.18
Anxiety (= 1)	21.16
Primary stressor (W1)	
CG experience type	
Intensive CG	11.52
Balanced CG	20.61
Dissatisfied CG (reference)	9.22
Relationship CG	21.25
Satisfied CG	37.39
Secondary stressors (W1)	
CG depression (= 1)	10.82
CG anxiety (= 1)	14.01
CR unmet ADL need (= 1)	30.35
CR unmet IADL need (= 1)	25.86
CR contextual factors (W1)	
Female (= 1)	70.93
Race	
White (reference)	59.67
Black	31.63
Other	8.71
Age	
Young old (65–74; reference)	25.48
Old old (75–84)	40.85
Oldest old (85 +)	33.67
Education	
< High school (reference)	37.79
High school	25.96
Some college	22.75
College +	13.50
Homeowner (= 1)	55.13
Receives assistance (= 1)	24.20
# ADL disabilities (0–6)	2.99 (1.75)
Good self-rated health (= 1)	22.05
Depression W1 (= 1)	26.76
Anxiety W1 (= 1)	22.69
CR social support	
Married/partnered (= 1)	38.92
# children (0–13)	3.40 (2.34)
No confidante (= 1)	4.23
Other helpers (= 1)	38.41
CG control variables	
Female (= 1)	67.48
Education	
< High school (reference)	14.21
High school	26.23
Some college	34.75
College +	24.81
Relationship	
Spouse (reference)	27.91
Adult child	50.83
Other	21.25
Long-term (= 1)	53.42
Hours	
< 25 (reference)	27.66
25–80 hours/month	34.31
84–744 hours/month	38.03

Notes: CG = caregiver. CR = care recipient.
W1 = Wave 1. W3 = Wave 3.

reflecting DSM-V diagnostic criteria. PHQ-2 asks whether respondents had little interest or pleasure in doing things; or felt down, depressed, or hopeless, over past month. GAD-2 asks whether respondents felt nervous, anxious, or on edge; or felt unable to stop or control worrying over past month.

Original item response categories (not at all, several days, more than half the days, and nearly every day) are scored 0–3, with total score range 0–6 (Lowe et al., 2010). Scores ≥3 are cutoffs for depression or anxiety. I recode variables accordingly to indicate whether respondents meet depression criteria (= 1) or anxiety criteria (= 1) versus not (= 0). I control for lagged dependent variables using these

indicators measured at W1.

2.3.2. Primary stressors (caregivers' experiences), W1

Caregiver experience type is a categorical variable based on care-givers' reports about perceived burdens and benefits. Based on item response patterns, I use most likely class membership to assign care-givers to one of five categories developed in prior latent class analyses (Pristavec, 2018): 1) Intensive Caregiver (reporting high caregiving burden and moderate benefits across all emotional, interpersonal, physical, and social domains); 2) Balanced Caregiver (moderate burden with social burden absence, and high benefits); 3) Dissatisfied Caregiver (reference category; reporting burden only); 4) Relationship Caregiver (low interpersonal burden only, and interpersonal benefits); or 5) Satisfied Caregiver (benefits only). Measurement model reconstruction confirms the existence of the same nationally representative latent classes in the present analytic sample (Tables 4 and 5 in the online Appendix show high similarity in item response probabilities for the study sample and a nationally representative sample of caregivers to US older adults using the same model, confirming the suitability of using the LCA solution).[2]

2.3.3. Secondary stressors (caregiver mental health, recipient unmet need), W1

Caregiver mental health. Caregiver depression and anxiety indicate caregiver-reported depression and anxiety symptoms, measured as de-scribed for recipients. Measures are correlated at 0.32; I include them in models separately.

Recipient unmet care need. Unmet ADL need indicates recipient-reported inability in past month to perform any basic ADL (eating, bathing, toileting, dressing, moving around inside, getting out of bed) because there was no one there to help (= 1) versus otherwise (= 0). Unmet IADL similarly indicates recipient-reported inability to perform any IADL (doing laundry, getting groceries, moving around outside, cooking, banking, taking medicines) (= 1). Unmet ADL and IADL need appear at different disability stages and have different predictors (Tennstedt et al., 1994); I include measures separately.

2.3.4. Moderators (social support), W1

Recipient marital status indicates recipient self-reports being mar-ried/partnered (= 1). Recipient number of children indicates recipient-reported living biological/adopted children number. No confidante indicates recipient reports having "no one to talk to" (= 1). Other helpers indicates recipient reports receiving assistance from helpers other than primary caregiver (= 1).

2.3.5. Structural and contextual/Confounding factors, W1

Recipient factors. Gender indicates recipient female self-identifica-tion (= 1); age indicates recipient self-reports "young old" (65–74 years old), "old old" (75–84 years old), or "oldest old" (85 years or older); race indicates self-identification as non-Hispanic white (re-ference), non-Hispanic Black, or other; education indicates self-reported highest education as < high school (reference), high school or equivalent, some college or technical school, or college degree+; homeownership indicates self-reported homeownership (= 1); social assistance indicates self-reported social assistance receipt (food stamps, other types of food assistance, or gas and electricity assistance) (= 1); ADL disabilities indicates self-reported ADL disability number (eating,

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[2] As opposed to variable interactions, the latent class-derived typology re-flects underlying groupings of caregiving experiences in the population of US informal caregivers; variable interactions project hypothetical combinations of burden and benefits and are not indicative of the population experience. Further, latent classes are better able to account for both the level and types of burden and benefits that caregivers experience, a task that would be complex and require multiple comparisons in the case of interactions.

bathing, toileting, dressing, moving around inside, and getting out of bed); self-rated health indicates self-reported very good/excellent health (= 1); baseline depression and anxiety are adjusted as described under Secondary Stressors.

Caregiver factors. Gender indicates self-identification as female (= 1); education indicates self-reported highest education as < high school (reference), high school or equivalent, some college or technical school, or college degree+; relationship indicates self-reported being recipient's spouse (reference; factor was included in analyses given low correlation with recipient marital status at 0.29 and no indication of model instability in sensitivity analyses), adult child, or other; long-term caregiver indicates self-reported assisting recipient five years or more (= 1); hours caregiving to recipient in past month indicates self-reported spending < 20 hours (reference), 21–63 hours, or 64 hours or more assisting. Cut-off points are based on response distribution ter-ciles.

2.4. Methods

I examine caregiver experience associations with recipient mental health using binary logistic regression. I first estimate unadjusted as-sociations between caregiver experience types (W1) and recipient de-pression/anxiety separately (W3) in Model 1. I then include variable blocks to examine whether associations persist after entering relevant covariates. I adjust baseline models for secondary stressors (Model 2), contextual/structural factors including the lagged dependent variable (Model 3), social support (Model 4), and controls (Model 5).

I tested primary/secondary stressors and social support interaction terms, as conceptual model suggests social support moderates stress processes (results not shown). No interaction terms were significant, and are omitted from models. Multicollinearity did not pose a problem for the present analysis, with no variance inflation factor for covariates in the models exceeding 2. In models shown, the link test of the logistic regression equation predicting care recipient depression and anxiety was not significant, suggesting no specification error. The Homer-Lemeshow goodness-of-fit test did not suggest model fit issues. Lowess graphs indicated that the log odds of each outcome are linearly asso-ciated with the covariates in the model. The classification table in-dicated that the model correctly classified the majority of the sample (75% of all cases in predicting depression, and 81% of all cases in predicting anxiety). For both outcomes, the analytic sample did not contain any cases exhibiting high leverage.

Tables 2 and 3 show results predicting W3 recipient depression and anxiety. Tables display odds ratios and robust standard errors on vari-ables in each model.

3. Results

3.1. Caregivers' experiences and recipient anxiety

Older adults with caregivers reporting benefits, even alongside burden (unless burden is very high), are less likely to experience an-xiety. In unadjusted Model 1 (Table 2), older persons receiving W1 assistance from Balanced, Relationship, and Satisfied Caregivers (re-porting benefits or benefits alongside low/moderate burden) have lower W3 anxiety odds than counterparts receiving assistance from Dissatisfied Caregivers (burden only). Associations persist after in-cluding secondary stressors, contextual factors with lagged dependent variable, support, and control variables. In fully-adjusted model (Model 5), compared to older adults receiving assistance from Dissatisfied Caregivers, those receiving W1 assistance from Balanced Caregivers (moderate burden and high benefits) had 63% lower W3 anxiety odds (or = 0.37, p < 0.01). Those receiving care from Relationship Care-givers (interpersonal burden and benefits), had 66% lower anxiety odds (or = 0.34, p < 0.01), and those receiving care from Satisfied Care-givers (benefits only) had 67% lower anxiety odds (or = 0.33,

Table 2
Logistic regression results predicting W3 recipient anxiety with W1 factors.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Baseline		+ Secondary stressors		+ Contextual factors		+ Social support		+ Control variables	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
CG experience type										
Intensive caregivers	0.85	0.28	0.68	0.24	0.50	0.19	0.50	0.19	0.46	0.19
Balanced caregivers	0.48 *	0.15	0.45 *	0.15	0.39 **	0.13	0.39 **	0.13	0.37 **	0.12
Dissatisfied caregivers (reference)										
Relationship caregivers	0.24 ***	0.08	0.28 ***	0.10	0.30 ***	0.11	0.30 ***	0.11	0.34 **	0.12
Satisfied caregivers	0.37 ***	0.11	0.42 **	0.13	0.34 ***	0.11	0.34 ***	0.11	0.33 ***	0.11
Secondary stressors										
CG depression (= 1)			1.33	0.37	1.22	0.35	1.22	0.35	1.16	0.34
CG anxiety (= 1)			1.26	0.34	1.15	0.32	1.15	0.33	1.15	0.33
CR unmet ADL need (= 1)			1.74 **	0.37	1.30	0.31	1.30	0.32	1.33	0.33
CR unmet IADL need (= 1)			1.40	0.32	1.19	0.29	1.20	0.29	1.20	0.30
CR contextual factors										
Female (= 1)					1.43	0.33	1.47	0.37	1.47	0.41
Race (ref = white)										
Back					1.05	0.25	1.05	0.26	0.98	0.25
Other					1.35	0.46	1.34	0.46	1.28	0.45
Age (ref = young old (65–74))										
Od old (75–84)					1.03	0.26	1.03	0.27	0.99	0.27
Oldest old (85+)					1.00	0.29	1.01	0.31	1.00	0.32
Education (ref = < HS)										
High school					0.77	0.19	0.76	0.19	0.78	0.21
Some college					0.50 *	0.15	0.50 *	0.15	0.56	0.17
College or higher					0.69	0.24	0.69	0.25	0.81	0.30
Homeowner (= 1)					0.87	0.18	0.87	0.18	0.84	0.18
Receives assistance (= 1)					1.38	0.32	1.39	0.32	1.32	0.31
#ADL disabilities					1.06	0.07	1.06	0.07	1.05	0.07
Anxiety W1 (= 1)					3.36 ***	0.72	3.36 ***	0.71	3.28 ***	0.71
Good SR health (= 1)					1.01	0.27	1.01	0.27	1.00	0.27
CR social support										
Married (= 1)							1.03	0.26	1.17	0.38
Other helpers (= 1)							0.94	0.19	0.92	0.19
#children							1.01	0.04	1.00	0.04
No confidante (= 1)							0.80	0.42	0.74	0.41
CG controls										
Female (= 1)									1.12	0.27
Education (ref = < HS)										
High school									0.85	0.28
Some college									0.85	0.27
College or higher									0.60	0.22
Relationship (ref = spouse)										
Adult child									1.38	0.55
Other									1.20	0.56
Long-term caregiver (= 1)									1.11	0.23
Hours (ref = < 25 h/month)										
25-80 hours/month									1.23	0.33
84-744 hours/month									1.45	0.41
McFadden's R^2	0.03		0.06		0.13		0.13		0.14	
Wald χ^2 (df)	25.92	(4)	43.51(8)		87.28(21)		87.79(25)		95.25(34)	
Pseudo log-likelihood	− 374.11		− 364.90		− 336.83		− 336.62		− 334.10	

Note: *p < 0.05,**p < 0.01,***p < 0.001. N = 753. CR = care recipient. CG = caregiver. # = number. ADL = abilities of daily living. IADL = instrumental abilities of daily living.

p < 0.001) relative to those receiving assistance from Dissatisfied Caregivers. Older persons receiving care from Intensive Caregivers (high burden and moderate benefits) and Dissatisfied Caregivers (burden only) did not differ in anxiety likelihood. In sum, older adults whose caregivers report any W1 benefits are less likely to experience W3 anxiety, unless their caregivers also report very high burden.

3.1.1. Secondary stressors

Caregiver experience types maintain significant associations with recipient anxiety after including secondary stressors in models (Models 2–5). Recipient unmet ADL need is associated with subsequent anxiety when first entered (Model 2), but including contextual factors explains away the association (Model 4). Baseline recipient unmet need and caregiver mental health are thus not associated with subsequent

recipient anxiety after adjustment (Model 5).

3.1.2. Other predictors

Recipient education and baseline anxiety are initially associated with subsequent anxiety (Model 3). Controls explain associations with recipient education, but prior mental health remains predictive of anxiety three years later (Model 5). Compared to recipients without W1 anxiety, those with W1 anxiety have 228% higher W3 anxiety odds (or = 3.28, p < 0.001). No other secondary stressors, contextual, support, or control factors are associated with W3 recipient anxiety.

3.2. Caregivers' experiences and recipient depression

Only older persons with caregivers reporting benefits and no burden

Table 3
Logistic regression results predicting W3 recipient depression with W1 factors.

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
| | Baseline | | + Secondary stressors | | + Contextual factors | | + Social support | | + Control variables | |
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
CG experience type										
Intensive caregivers	1.60	0.53	1.30	0.45	1.34	0.48	1.33	0.48	1.26	0.47
Balanced caregivers	0.74	0.23	0.69	0.22	0.71	0.23	0.71	0.23	0.69	0.22
Dissatisfied caregivers (reference)										
Relationship caregivers	0.61	0.19	0.70	0.23	0.82	0.27	0.82	0.27	0.83	0.28
Satisfied caregivers	0.53 *	0.15	0.57	0.17	0.55	0.17	0.56	0.17	0.53 *	0.17
Secondary stressors										
CG depression (= 1)			1.23	0.33	1.09	0.30	1.08	0.30	1.05	0.30
CG anxiety (= 1)			1.01	0.27	0.95	0.28	0.93	0.27	0.97	0.29
CR unmet ADL need (= 1)			1.94 ***	0.37	1.68 *	0.36	1.67 *	0.36	1.69 *	0.37
CR unmet IADL need (= 1)			1.54 *	0.31	1.37	0.29	1.37	0.29	1.43	0.30
CR contextual factors										
Female (= 1)					1.23	0.26	1.27	0.29	1.18	0.28
Race (ref = white)										
Black					0.84	0.18	0.85	0.20	0.84	0.20
Other race					1.37	0.42	1.38	0.43	1.31	0.42
Age (ref = young old (65–74))										
Old old (75–84)					0.89	0.20	0.90	0.21	0.83	0.20
Oldest old (85 +)					0.88	0.22	0.87	0.22	0.83	0.22
Education (ref = < HS)										
High school					0.92	0.21	0.91	0.21	0.93	0.22
Some college					0.51 **	0.13	0.50 **	0.13	0.52 *	0.14
College +					0.56	0.18	0.55	0.18	0.54	0.19
Owns home (= 1)					0.98	0.18	0.99	0.19	0.99	0.19
Receives assistance (= 1)					1.32	0.28	1.35	0.29	1.30	0.28
# ADL disabilities					1.03	0.06	1.04	0.06	1.03	0.06
Depression W1 (= 1)					2.06 ***	0.41	2.13 ***	0.43	2.07 ***	0.42
CR good SR health (= 1)					0.92	0.21	0.91	0.21	0.95	0.23
CR social support										
Married/partnered (= 1)							1.01	0.25	1.23	0.38
Other helpers (= 1)							0.81	0.16	0.79	0.16
# children							1.00	0.04	1.00	0.04
No confidante (= 1)							0.47	0.22	0.44	0.21
CG control variables										
Female (= 1)									0.89	0.18
Education (ref = < HS)										
High school									0.88	0.25
Some college									0.65	0.19
College +									0.90	0.30
Relationship (ref = spouse)										
Adult child									1.54	0.55
Other									1.28	0.53
Long-term caregiver (= 1)									0.95	0.17
Hours (ref = < 25 h/month)										
25-80 hours/month									1.11	0.27
84-744 hours/month									1.25	0.32
McFadden's R^2	0.02		0.05		0.09		0.10		0.10	
Wald χ^2 (df)	20.86	(4)	47.05	(8)	75.55(21)		78.98	(25)	85.13	(34)
Pseudo log-likelihood	−431.58		−418.09		−399.85		−397.95		−395.19	

Note: *p < 0.05,**p < 0.01,***p < 0.001. N = 753. CR = care recipient. CG = caregiver. # = number. ADL = abilities of daily living. IADL = instrumental abilities of daily living.

are less likely than counterparts with burdened caregivers to subsequently experience depression. In unadjusted Model 1 (Table 3), recipients receiving W1 assistance from Satisfied Caregivers (reporting benefits only) have lower W3 depression odds, relative to counterparts receiving assistance from Dissatisfied Caregivers (burden only). Coefficient size and significance remain stable following covariate additions, with significant effects final model (Model 5). In fully-adjusted model (Model 5), recipients with W1 Satisfied Caregivers (benefits only) at had 47% lower W3 depression odds (or = 0.53, p < 0.05) than recipients with Dissatisfied Caregivers. Those receiving care from caregivers perceiving benefits, but also reporting any burden, do not differ in depression from counterparts receiving care from caregivers reporting burden only. In sum, only older adults whose caregivers report perceiving W1 benefits but no burden are less likely than persons

receiving care from burdened caregivers to experience W3 depression.

3.2.1. Secondary stressors

Entering secondary stressors in models weakens caregiver experiences and recipient depression associations (Model 2). Recipient unmet ADL and IADL need, but not caregiver mental health, are initially associated with subsequent recipient depression (Model 2). Entering contextual factors explains unmet IADL need and recipient depression association, but association with ADL need persists (Model 3). In full model (Model 5), compared to recipients not reporting unmet baseline ADL need, recipients reporting ADL need have 41% higher W3 depression odds (or = 1.69, p < 0.05). Thus, unmet ADL need exacts significant effects on recipient depression.

3.2.2. Other predictors

Recipients with more education may less likely experience depression than counterparts with less education, and those reporting W1 depression are likely to experience W3 depression in full model (Model 5). Older persons with some college education have 48% lower W3 depression odds (or = 0.52, p < 0.05) compared to recipients with less than high school. Compared to older adults without W1 depression, those with W1 depression have 107% higher W3 depression odds (or = 2.07, p < 0.001). No other secondary stressors, contextual, support, or control factors are associated with W3 recipient depression.

4. Discussion

I examine how informal caregivers' benefit and burden appraisal is prospectively associated with recipients' mental health. I find caregivers' experiences matter for recipients' depression and anxiety in distinct ways, indicating that improving caregiving conditions may benefit both dyad members. Specifically, I find robust associations between caregivers' baseline burden and benefit reports and recipients' depression and anxiety three year later. Recipients whose caregivers report benefits, even alongside low to moderate burden, are less likely to subsequently experience anxiety; older adults whose caregivers report benefits without any burden are also less likely to experience depression. Associations persist after accounting for covariates, including recipients' baseline health. Additionally, recipient unmet ADL need as secondary stressor predicts subsequent recipient depression.

Analyses yielded five main findings. First, caregivers' baseline appraisals are associated with both subsequent recipient depression and anxiety but in different ways. Second, older persons whose caregivers report high benefits and high burden do not differ in outcomes from counterparts whose caregivers report only high burden. Third, recipients' unmet ADL but not IADL need prospectively shapes their mental health. Fourth, caregiver mental health is not associated with subsequent recipient mental health. Finally, contextual factors explain recipient mental health better than social factors.

4.1. Caregiver experiences shape recipient mental health

I find caregivers' baseline reports of both beneficial and ambivalent experiences are associated with better subsequent recipient mental health. Older adults are less likely to experience anxiety when receiving care from either caregivers reporting only benefits, or from caregivers reporting benefits alongside low to moderate burden, compared to those receiving care from persons reporting only burden. In contrast, only older adults receiving assistance from caregivers perceiving caregiving as beneficial with no burden are less likely to experience depression; those with caregivers reporting benefits alongside any burden do not differ from counterparts with caregivers reporting exclusively burden. Interactions with a burdened caregiver, regardless of whether caregivers also perceive benefits, may be stressful for recipients; findings thus suggest that frequent interpersonal stressors may matter more for depression than anxiety (Moos et al., 2006). They may be more likely to engender sadness and helplessness, more characteristic of depression than anxiety (Haugan et al., 2013).

This finding is in line with the expectation that more state-like mental health conditions may respond more to caregiver appraisals than trait-like conditions. The GAD-2 instrument measuring recipient anxiety used here that asks about nervousness, being on edge, and worrying, better captures state than trait anxiety. State anxiety refers to more transient negative emotional responses, like fear, worry, and uncertainty, and these feelings may be responses to daily stressors and caregiver interactions (Vink et al., 2008). Relatedly, depression may be more likely inherited than anxiety and thus be a more stable characteristic less responsive to context. Depression likelihood also increases with age, and positive caregiver experiences may not sufficiently mitigate this risk (Sutin et al., 2013). Further, despite the PHQ-2

capturing state-like depression, using a diagnostic cutoff may better describe a longer-term condition.

Caregiver experiences thus shape both recipient depression and anxiety, and results suggest that when not possible to reduce caregivers' burden, interventions may instead focus on increasing perceived/objective benefits. Recipients are less likely to experience anxiety when caregivers perceive benefits, even if caregivers also report low to moderate burden. Such interventions may foster caregiver resilience and facilitate developing coping skills like positive reframing. To decrease recipient depression likelihood, findings suggest it may be most important to reduce caregivers' perceived or objective burden. Access to support services, nursing care training, assistance from paid caregivers, and respite care availability may help alleviate burden (Hunt & Reinhard, 2015).

4.2. High benefits may not counterbalance caregivers' high burden

Older adults whose caregivers report high benefits alongside high burden do not differ in depression or anxiety risk from counterparts whose caregivers report high burden without benefits. This suggests caregivers reporting highest burden levels may be at a threshold beyond which positive appraisals no longer counter-balance burden spillover, or provide benefits for recipient mental health.

Caregivers reporting high burden are likely providing intensive care beyond factors controlled in analyses. Despite benefits perceptions, they are themselves at risk of developing poor mental health and engaging in elder neglect or abuse (Beach et al., 2005). Their actions and interactions with recipients may be poorer quality, and older adults respond more poorly than younger individuals to negative interpersonal interactions, taking longer to recuperate emotionally (Birditt, 2014). Poor social interactions may also be more salient for recipients than positive ones. Thus, despite caregivers' high positive appraisals, the consequences of high burden may have stronger or more lasting impacts on older persons' well-being.

Caregivers reporting highest burden levels may therefore be the ones most needing assistance. Respite care and adult day care centers may reduce objective/perceived burden for intensive caregivers (Hunt & Reinhard, 2015). Beyond benefits for caregivers, findings suggest providing such support to caregivers may also have implications for recipients' QOL.

4.3. Recipient unmet ADL but not IADL need shapes their mental health

Among secondary stressors, I find unmet ADL but not IADL need shapes older adults' depression. Although I cannot directly ascertain care quality provided, caregivers experiencing high burden are at risk of elder neglect, including omitting or poorly performing tasks related to recipients' personal care, feeding, or other ADL (Reay & Browne, 2001). I do not conduct mediation analyses in this paper due to data constraints, but findings may suggest caregivers' experiences affect recipient mental health through care quality, pending future research. Caregivers reporting high burden may give lower quality or inadequate care, reflected in recipients reporting unmet ADL need and poorer mental health.

I do not find this association between unmet IADL need and recipient mental health. Unmet IADL need is more common among older adults than unmet ADL need, but IADL need does not include intimate tasks like ADL. IADL needs are instrumental rather than essential, and often not required daily. Unmet ADL need, like bathing and toileting, is likely more detrimental to older persons' mental health than unmet need for non-immediate, non-essential help. However, both factors may reduce older adults' QOL (Tennstedt et al., 1994). Nationally representative data shows over 40% care recipients report one or more unmet needs in a given month, and over 30% report adverse consequences (Beach & Schulz, 2017; Freedman & Spillman, 2014). Future research should examine reasons behind unmet need to establish

whether it is due to burden or other factors, suggesting how to intervene. With unmet ADL need, rather than only due to overwhelming burden, gender dynamics in performing intimate tasks for non-marital caregiving dyads may partly explain unmet need. Information on sense of control is only available for a subset of NHATS participants, but implied loss of control for recipients in adult child-parent dyads could similarly engender unmet need (Tennstedt et al., 1994).

4.4. Caregiver mental health is not associated with recipient mental health

Caregiver mental health is not directly associated with recipient depression and anxiety in models. This suggests emotional contagion may not operate between caregivers' experiences and recipient mental health, unexpected given research suggesting couples experience emotional contagion and show mental health concordance (Goodman & Shippy, 2002). However, different processes may operate among peers in marital and romantic relationships than in caregiving. The latter relation may be less egalitarian, with caregivers and recipients power-imbalanced; further, caregivers and recipients may be less likely than couples, typically coresident, to share environmental context. Differential stressor exposure may partly explain absent emotional contagion.

Although caregiver mental health is not directly associated with recipient mental health here, the finding should be interpreted cautiously. Due to NSOC timing, I measured caregiver mental health concurrently with caregivers' experiences; thus, I was unable consider poor caregiver mental health as caregiving consequence. However, one-third informal caregivers experience depression, with burden preceding depressive symptoms, and depressed caregivers are at risk of elder neglect (Beach et al., 2005). Similarly to depression, caregiver anxiety has been linked to potentially harmful behaviors (Reay & Browne, 2001) Although I could not measure care quality directly, I find evidence of unmet care need. Unmet need is a potential elder neglect outcome (Beach & Schulz, 2017). Future research with caregiver mental health data over time and harmful behavior indicators may evaluate pathways from caregivers' to recipients' mental health.

4.5. Contextual factors explain recipient mental health better than social factors

I find background and contextual factors explain older adults' mental health better than social support. Among background factors, as expected and consistent with prior studies, older persons with higher education are less likely to experience depression than lower-educated peers (Beattie, Pachana, & Franklin, 2010). Recipients reporting baseline depression or anxiety are also more likely to subsequently experience the respective condition, aligned with research indicating past mental illness predicts old age mental health (Berkman, Berkman, & Kasl, 1986; Vink et al., 2008).

Besides contextual factors, stress process models suggest receiving social support moderates stressor and old age outcomes associations. However, social support was not associated with recipients' mental health or contributed to explaining variation beyond contextual factors. This is contrary to research showing social and emotional support shape older adults' wellbeing (Vink et al., 2008). It is possible that as adults age, they become more selective in social relationships, but remain equally content with their QOL despite smaller social networks (Fiori et al., 2006). Extensive social supports may be less relevant for older adults' mental health if they have fewer but close relationships. Alternatively, older adults' caregivers may be integral to recipients' social support system; caregivers' stress levels may impede support provision, or engender other family network tensions detrimental rather than beneficial for older adults' wellbeing (Amirkhanyan & Wolf, 2003).

4.6. Limitations

This study is the first using dyadic data to examine how caregivers'

conceptually and statistically distinct experiences of perceived burden and benefit prospectively affect their recipients' mental health. However, it has several limitations.

First, I consider moderators narrowly. Social support measures should be considered proxies and are likely not sufficiently comprehensive to detect associations with older adults' mental health. Besides social support, psychological resilience may moderate stress processes. Sense of control, subjective age, and affect measures are only available for some NHATS respondents, and were not included in analyses. Studies using data from future or pooled NHATS and NSOC can better evaluate other coping resources focal to stress processes.

Second, although NHATS provides multiple data waves, NSOC provides two (2011, 2015) with little overlap. I control for caregiving duration, but was unable to include other information about caregivers' experiences over time, precluding mediation analyses. Subsequent NSOC waves consistently tracking caregivers will make possible analyses using longitudinal caregiver data and examining secondary stressors as potential pathways to recipient outcomes.

Third, I only consider two recipient outcomes. Caregiver experiences may matter for older adults' other mental health outcomes, like drinking or suicidal ideation. Additionally, stress introduces physiological strain. Cardiovascular and immune systems are potential pathways through which caregiving interactions may be linked to recipients' physical health (Kiecolt-Glaser, 1999). Studies using Medicare-linked NHATS data or biomarkers may explore additional outcomes.

Finally, I am unable to deduce reason for caregiving. Although NSOC asks caregivers about assistance type and frequency, it does not ask about reasons for assuming caregiving. Caregiving reasons may offer a global assistance description or additional information about recipients' overall health. They may also indicate whether caregivers assumed the role voluntarily versus by necessity, which could shape experiences, mental health, and care quality. Thus, researchers should consider incorporating such indices in analyses when available.

5. Conclusion

I used longitudinal, dyadic data, and a nationally representative caregiving experience typology to show older persons who receive assistance from caregivers perceiving only benefits are less likely than older adults receiving care from caregivers reporting only burden to subsequently experience depression; and that those receiving assistance from either caregivers perceiving only benefits, or benefits alongside low to moderate burden, are less likely to experience anxiety. Importantly, effects persist net of contextual factors.

Caregivers' experiences thus have implications for recipients' mental health beyond the care provision itself, and as numbers older persons requiring assistance continue to grow, US long-term care systems will increasingly rely on informal caregivers (Federal Interagency Forum on Aging-Related Statistics, 2004). Caregiving trajectories are typically long, progressing from sporadic help to personal and end-of-life care, and increasingly more older adults wishing to continue residing outside facilities will share frequent and long-term interactions with caregivers. Old age depression and anxiety are associated with other adverse outcomes and excess annual healthcare costs (Vasiliadis et al., 2013); it is crucial to better understand how caregivers' perceptions and experiences shape older adults' mental health, along with changes as they adapt to their roles (or become increasingly overwhelmed) over time.

Results demonstrate caregiving has interpersonal dimensions and is situated within older adults' larger networks, and it is therefore important for researchers and practitioners to consider caregiving as a dyadic process. Caregiving dynamics and their mental health outcomes may have implications for interactions and assistance demands among extended family relationships and support systems.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.archger.2019.01.020.

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