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Internal resources among informal caregivers: trajectories and associations with well-being

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Abstract

Purpose The experiences, skills, and internal resources that informal caregivers bring into their role may play a critical part in their mental health and well-being. This study examined how caregiver internal resources changed over a 10 year period, and how this was related to caregivers' well-being.

Methods Data are from the Midlife in the United States (MIDUS) study, a national sample of adults, at two time points: 1995–1996 (T1) and 2004–2006 (T2). We identified subjects who reported being a caregiver at T2 and starting care after T1 (mean age = 56; 65% female). We examined internal resources: sense of control (personal mastery); primary and secondary control strategies (persistence in goal striving, positive reappraisal, and lowering expectations); and social support seeking, and psychological and subjective well-being. We evaluated how internal resources changed over time, and how these trajectories were associated with well-being at T2 using multivariable linear regressions.

Results Most caregivers had stable levels of internal resources (between 4 and 13% showed an increase or decrease). Caregivers with increasing or high-stable levels of personal mastery had significantly better well-being scores on 6 out of 8 subscales compared with low-

stable levels [effect sizes (ES) between 0.39 and 0.79]. Increasing persistence was associated with better personal growth and environmental mastery (ES = 0.96 and 0.91), and increasing and high-stable positive reappraisals were associated with better affect (ES = 0.63 and 0.48) compared with low-stable levels. Lowering aspirations and support seeking were not associated with well-being outcomes.

Conclusions Practices or interventions that support or improve internal resources could potentially improve caregiver well-being.

Introduction

Informal caregiving (providing unpaid support to a family member or a friend with an illness or a disability) has both positive and negative consequences for caregivers. While many caregivers find benefits in the experience, such as a sense of purpose [1, 2], many also report feeling stressed or burdened by their role [3]. Moreover, some caregivers experience serious problems like depression [4].

The *internal resources* that caregivers bring into their role—experiences, strengths, personality characteristics, coping skills, social background, and other psychological resources that support individuals' resilience or coping—may play a critical role in how caregiving influences emotional health, psychological well-being, or life satisfaction. Internal resources and related concepts (e.g., "intrapersonal resources" [5], "psychological capital" [6], and "resilience resources" [7]) are defined diversely in the literature, but often encompass personality characteristics

such as self-esteem and optimism, as well as skills such as self-efficacy or perceived control [5, 8]. One general definition refers to "characteristics which are internal…When present, these characteristics result in better coping" [9].

Theory and limited empirical research support the notion that caregivers with certain internal resources may be more resilient. Theories of stress process and caregiving suggest that antecedent factors such as the caregiver's characteristics, caregiving history, or family network play an important role in the development of caregiver stress and subsequent outcomes [10]. In particular, Goode's longitudinal adaptation of the stress process model [11] suggests that changes in caregivers' mental and physical health are influenced by their initial psychological resources, changes in stressors, and changes in psychological resources. Furthermore, psychological homeostasis theory [5] suggests that psychological resources play a critical role in the maintenance of well-being during stress (such as caregiving). Research among caregivers of patients with dementia has shown the fundamental role of psychosocial resources (including appraisals, coping, social support, and dispositional resilience) as predictors of stable caregiver mental health and resilience outcomes over time [11, 12]. Little research, however, has addressed how such attributes may change after the onset of caregiving, and how this may be related to caregiver outcomes. In a recent longitudinal study, Hajek and Konig [13] reported that self-efficacy moderated the adverse impact of informal caregiving on subjective well-being, in particular mental health. Other internal resources may too be associated with caregiver well-being outcomes.

In order to better understand the role that internal resources play in caregiver well-being, this study sought to (1) evaluate how caregivers' internal resources change over time, from prior to the commencement of caregiver to during or shortly after the caregiving role; and (2) determine how these internal resource trajectories are associated with caregiver well-being over time. In particular, we examined both psychological (eudaimonic) and subjective (hedonic) well-being [14, 15], embracing the World Health Organization's definition of health as not merely the absence of disease and the biopsychosocial impact of well-being on other physical and mental health outcomes [16, 17]. The findings stand to improve our general understanding of the caregiving experience, and highlight novel targets for intervention to support caregiver well-being and mitigate the adverse impacts of caregiver stress and burden.

Methods

This study was a secondary analysis of data collected as part of Mid-life in the United States (MIDUS) study [18]. In brief, MIDUS is a national study of health and aging that follows a cohort of adults within the age range of 25–74 at baseline. The baseline sample was selected via national RDD (random digit dialing), with oversampling from five metropolitan areas in the US. In addition, siblings of individuals from the RDD sample and a national RDD sample of twin pairs were included. Non-institutionalized, English-speaking adults in the contiguous United States were eligible. Data collection consisted of a phone interview and self-administered questionnaires. Baseline response rates were 70% for the phone survey and 87% for the self-administered questionnaire for the RDD sample; 64 and 81%, respectively, for the sibling sample, and 60 and 92%, respectively, for the twin sample [19]. The overall longitudinal response rate was 75% [19]. We used data from waves one (1995–1996; "Time 1") and two (2004–2005; "Time 2"). Additional information about MIDUS is available at http://midus.wisc.edu/.

Identification of caregivers

In the second wave of MIDUS, subjects were asked "During the last 12 months have you, yourself, given personal care for a period of one month or more to a family member or friend because of a physical or mental condition, illness, or disability?" Subjects who responded affirmatively and indicated that the caregiving began after 1996 (Time 1) were included in this study.

Of the 4959 MIDUS II participants who responded to this item, 629 (12.7%) reported caregiving in the past 12 months. Of these, 117 were missing data on the outcome variables and 145 missing data on one or more other key variables, resulting in a final complete-case sample of 367 caregivers. Caregivers who were dropped due to missing data were younger; more likely to be non-white or have unreported race; and less likely to be college graduates; and had more chronic conditions at Time 2. They did not differ on other sociodemographic or caregiving factors.

Key variables

Dependent variables

Subjective well-being. As in Persoskie et al. [20], subjective well-being (SWB) was assessed in terms of (1) affect and (2) life satisfaction [21]. Specifically, participants reported their frequency of experiencing six positive (e.g., feeling cheerful) and six negative (e.g., feeling nervous) affective states during the past 30 days [5-point Likert scale: ranging from none of the time (1) to all the time (5)]. Negative items were reverse coded, and the mean of all the 12 items was used as a composite score, as has been used previously (e.g., ref [20]). Cronbach's alphas in the MIDUS sample at Time 1 [22] and Time 2 [23],

respectively, were 0.87 and 0.85 for negative affect; and 0.91 and 0.90 for positive affect. Overall life satisfaction was assessed using participants' reports of their quality of life in five domains: work, health, their relationship with their spouse or partner, their relationship with their children, and life overall [10-point scale ranging from worst possible (1) to best possible (10)]. This evaluation is consistent with the definition of life satisfaction offered by Luhman et al.: "evaluation of life overall…as well as of specific life domains (e.g., job satisfaction or marital satisfaction)" [21]. The items for relationship with spouse/partner and relationship with children were averaged to create single "relationships" item, and this was then averaged with the remaining three items to create an overall score. For participants with missing items (e.g., no spouse or partner), the overall score was created using the remaining items. This composite measure was calculated by MIDUS researchers [24] and has been used successfully as an assessment of overall life satisfaction in studies using MIDUS data (e.g., ref [20]). Cronbach's alpha in the MIDUS sample was 0.67 at both timepoints [22, 23].

Psychological well-being. Psychological well-being (PWB) was measured using Ryff's Psychological Well-Being Scale [25]. This well-validated scale consists of six (3-item) subscales: positive relations with others, self-acceptance, autonomy, personal growth, environmental mastery, and purpose in life. Respondents indicated how much they agreed or disagreed with each item [7-point Likert scale ranging from strongly agree (1) to strongly disagree (7)]. Negative items were reverse-coded, and summed scores were created for all scales. Higher scores reflect more positive appraisals. Cronbach's alphas in the MIDUS sample, respectively, were 0.58, 0.59, 0.48, 0.55, 0.52, and 0.36 at Time 1 [22]; and 0.63, 0.66, 0.45, 0.54, 0.54, and 0.29 at Time 2 [23].

Independent variables (internal resources)

We evaluated five factors capturing an individual's internal resources: sense of control (personal mastery), primary and secondary control strategies (persistence in goal setting, positive reappraisal, and lowering aspirations), and social support seeking. These resources were selected to align with our theoretical conceptualization of internal resources described above and were included in both the baseline and follow-up MIDUS questionnaires. *Personal mastery* (i.e., one's sense of efficacy or effectiveness in carrying out goals) [26] was measured using four items assessing subjects' sense of control. All items were measured on a 7-point Likert scale [from strongly agree (1) to strongly agree (7)]. Scale scores were calculated as the mean across each set of items for those who had valid values for at least half of the items. Higher scores indicated higher standing

in each dimension. Cronbach's alphas in the MIDUS sample were 0.70 at Time 1 [22] and 0.73 at Time 2 [23]. *Persistence in goal striving* (primary control; five items), *positive reappraisals* (secondary control; four items), and *lowering aspirations* (secondary; five items) were measured by asking participants how often they used various primary and secondary control strategies (e.g., "When I encounter problems, I don't give up until I solve them"). All items were measured on a 4-point Likert scale [ranging from a lot (1) to not at all (4)]. Scale scores were calculated as the mean across each set of items for those who had valid values for at least half of the items. Higher scores indicated higher standing in each dimension; Cronbach's alphas were 0.77, 0.78, and 0.63 at Time 1 [22] and 0.78, 0.78, and 0.61 at Time 2 [23] respectively. *Social support seeking* was measured using two items ["I don't like to ask others for help unless I have to" and "Asking others for help comes naturally to me" (reverse coded)] each scored on a 4-point Likert scale [ranging from a lot (1) to not at all (4)]. The scale score (mean) was calculated for those with data for at least one item [27]. Higher scores indicate greater support seeking; Cronbach's alphas in the MIDUS sample were 0.68 at Time 1 [22] and 0.62 at Time 2 [23].

Internal resources were measured at baseline and follow-up. Following Ryff 2015 [16], we then categorized subjects into trajectory subgroups: increasing, decreasing, high-stable, mid-stable, or low-stable by cross-tabulating quartiles for each scale at both baseline and follow-up. Figure 1 provides a visual depiction of how subjects were categorized. Social support seeking was coded slightly differently due to a floor effect: scores ≤1.5 (the median value) were considered "low," and all other scores were considered "high," and trajectories were categorized accordingly with the "mid-stable" category removed.

Covariates

Sociodemographic characteristics included age (years), gender, race (white vs non-white/unreported race), and educational level (high school graduate or less, some college, or college graduate). In addition, subjects reported on
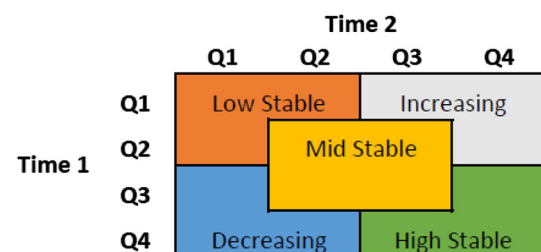
Fig. 1 Categorization of trajectories from Times 1 to 2. Q1–Q4 refer to quartiles of each variable, from the lowest to the highest

a number of caregiving characteristics including their relationship to the care recipient (care recipient is spouse, child, parent/in-law, or other); care recipient gender; whether they were still providing care at the time of the survey; whether they reside with the care recipient (co-resident: yes vs no/some of the time); number of caregiving tasks they performed (bathing, dressing, eating or going to the bathroom; getting around inside the house or going outside; shopping, cooking, housework or laundry; managing money, making phone calls, or taking medications; range 0–4), duration for which they had been caring for the care recipient (weeks), and hours per week of care. Personality characteristics (neuroticism, extraversion, openness to experience, conscientiousness, agreeableness, and agency measured at T1 using subjects' responses about how well 30 self-descriptive adjectives described them [27]; Cronbach's alphas on subscales ranging from 0.58 to 0.80 in the MIDUS RDD sample) were also included as covariates, as suggested by Ferrer-i-Carbonell and Frijters [28].

Statistical approach

Descriptive statistics were used to assess the sample (percentages; mean/standard deviation; histograms). Multicollinearity was evaluated among the trajectory variables using Cramer's V scores from χ^2 tests, and among the continuous internal resource and well-being variables using Pearson's correlation. There was no collinearity among the internal resources (Cramer's V ranged from 0.09 to 0.31), among the well-being variables (r ranged from 0.23 to 0.61), or between the continuous internal resources variables and the well-being variables (r ranged from 0.01 to 0.45). The core multivariable linear regression models regressed each PWB and SWB outcome on the sociodemographic and caregiving-related covariates, and the six personality traits [28]; the models used robust standard errors. Each internal resource was then added to these core models, to make up a final total of 40 regressions. We also tested including caregiver chronic health conditions as a control variable; as this did not impact the results, this variable was not included in the presented models. To assess the possibility of regression to the mean, dependent variables were examined with scatter plots of change score (T2 minus T1) by T1 score. If possible regression to the mean was observed (i.e., if subjects with particularly low scores at T1 were more likely to have an increase, and subjects with particularly high scores were more likely to have a decrease between T1 and T2), the subject's baseline value less the sample mean at baseline was included in the regression [29]. Effect sizes (ES) were evaluated using Cohen's d [30]. Given the large number of tests (40 models X 4 contrasts in each model), a Bonferroni correction was

applied ($p \leq 0.0003$) when interpreting the p values in the final regressions.

Sensitivity analyses

In order to assess whether unobserved heterogeneity may have impacted our results [28], fixed-effects models were also run regressing the difference scores (T2 minus T1) for the dependent variables on the difference scores for the independent variables, controlling for age and caregiving characteristics. P-values were interpreted after a Bonferroni correction ($p < 0.00125$).

Results

Table 1 depicts the sociodemographic and caregiving characteristics of the informal caregivers. On average, caregivers were 56 years of age. The majority were female (65%), white (92%), and had at least some college education (70%). Almost half of them were caring for a parent or parent-in-law (46%) and lived with the care recipient (44%). On average, caregivers provided more than 20 h of care per week, and had been providing care for nearly half a year.

Most caregivers reported stable internal resources from the pre-caregiving time point to 10 years later (Fig. 2). PWB and SWB were also largely stable over time (Table 2; Supplemental Figure 1): for example, only 8% reported a decline in life satisfaction and 6% reported a decline in affect, while almost 8% reported an increase in both SWB outcomes. The largest proportion reporting a decline was seen for autonomy (13%); while the largest group reporting an increase was for personal growth (10%).

Multivariable analyses indicated that increasing or high-stable levels of internal resources were strong predictors of PWB and SWB at Time 2 (Table 3; Supplemental Figure 2). For *personal mastery*, increasing and/or high-stable levels were associated with 6 out of 8 well-being outcomes (positive relationships with others; self-acceptance; autonomy; personal growth; environmental mastery; affect) compared with low-stable levels. The effect sizes were moderate to large, ranging from 0.39 to 0.79. For *persistence*, increasing persistence was associated with better personal growth and environmental mastery (ES = 0.96 and 0.91) compared with low-stable levels. For *positive reappraisal*, mid-stable positive reappraisal was associated with better relationships with others (ES = 0.54) compared with low-stable levels. Increasing and high-stable levels of positive reappraisal were also associated with better affect (ES = 0.63 and 0.48) compared with low-stable levels. *Lowering aspirations* and

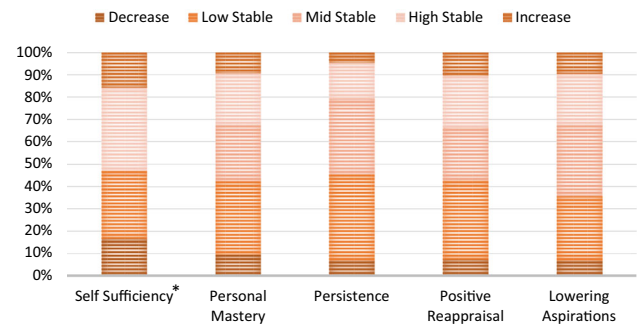**Table 1** Characteristics of caregivers in the MIDUS

	Current caregiver[a] n = 367 Mean (SD) or %
Sociodemographics	
Age	56.19 (11.13)
Gender	
Male	34.6
Female	65.4
Race	
White	91.6
Non-white/unreported	8.5
Education	
High school grad or less	30.25
Some college	27.79
College graduate	41.96
Caregiving Characteristics	
Relationship to CR	
Spouse	16.89
Child	8.17
Parent/in-law	46.32
Other	28.61
CR Gender	
Male	38.96
Female	61.04
Still giving care	
Yes	53.68
No	46.32
Cores ident status	
Yes	44.14
No/some of the time	55.86
Caregiving tasks	
0–1	17.71
2	25.61
3	23.98
4	32.7
Duration (weeks)	24.9 (19.7)
Hours/week	22.9 (25.7)

[a] Reporting caregiving at Time 2 (2004–2005) that began after 1996

Fig. 2 Internal resource trajectories among family caregivers. The *bars* indicate the proportion of caregivers who experienced decreasing, low-stable, mid-stable, high-stable, or increasing levels of five internal resources. Data are from the Midlife in the US Survey (MIDUS). *Asterisks* no mid-stable category due to floor effect

life satisfaction: ES for a one-point increasing in personal mastery ranging from 0.14 to 0.25). An increase in *persistence* was associated with an increase in 3 well-being subscales (self-acceptance, autonomy, and environmental mastery: ES ranging from 0.37 to 0.39). An increase in *positive reappraisal* was associated with 5 well-being subscales (autonomy, personal growth, environmental mastery, affect, and life satisfaction: ES ranging from 0.32 to 0.44). Changes in *lowering aspirations* and *support seeking* were not associated with changes in well-being.

Discussion

Using a national dataset, this study assessed how internal resources (personal mastery; control strategies; and social support seeking) changed over time for informal caregivers, and how such trajectories were associated with psychological and subjective well-being. While most caregivers showed stable internal resources over time, those with increasing and/or high stable levels of personal mastery had better well-being (6 out of 8 subscales) than those with consistently low levels. Those with increasing levels of persistence also had better well-being on two subscales (personal growth and mastery), and those with increasing or high-stable levels of positive reappraisal had better affect, compared to those with low-stable levels. This suggests that approaches for increasing or sustaining high levels of internal psychological resources throughout the course of (or even before) informal caregiving may be valuable tools for improving mental and emotional health outcomes of caregivers.

Research suggests that certain internal psychological resources play a critical role in buffering the negative effects of stress and life challenges, promoting resilience

social support seeking were not significantly associated with PWB or SWB outcomes after Bonferroni corrections.

Sensitivity analyses

When we ran the analyses using fixed effects models (Table 4), an increase in *personal mastery* was associated with an increase in 6 out of the 8 well-being subscales (positive relationships with others, self-acceptance, autonomy, personal growth, environmental mastery, and

Table 2 Distribution of psychological and subjective well-being among caregivers in the MIDUS

	Current Caregiver[a] n = 367 Mean (SD)
Psychological (eudaimonic) Well-Being	
Positive relationship to others	
T1	16.57 (3.88)
T2	17.29 (3.83)
Self acceptance	
T1	16.54 (3.48)
T2	16.36 (3.89)
Autonomy	
T1	16.34 (3.31)
T2	16.68 (3.17)
Personal growth	
T1	18.15 (3.07)
T2	17.46 (3.28)
Environmental mastery	
T1	16.19 (3.57)
T2	16.63 (3.36)
Purpose in life	
T1	16.75 (3.46)
T2	16.27 (3.35)
Subjective (hedonic) well-being	
Life satisfaction	
T1	7.72 (1.23)
T2	7.74 (1.25)
Affect	
T1	3.86 (0.64)
T2	3.90 (0.58)

T1 Time 1 (1995–1996), *T2* Time 2 (2004–2005)

[a] In past 12 months, reported at T2

[5, 31]. For example, the ability to productively engage with goals—including persistence in goal striving as well as adjustment or disengagement with goals that are unattainable or not aligned with personal values—is associated with better psychological outcomes [32–35]. Self-efficacy has also been found to moderate the association between caregiving and poor mental health [13]. Our findings provide evidence that caregivers who experience increases in these resources, as well as those who have high levels both before and during caregiving, may have better well-being outcomes over time.

It is particularly interesting to note that most caregivers did not report changes in internal resources from the time point of pre-caregiving. Furthermore, the fact that both increasing levels and high-stable levels of some internal resources were associated with some well-being scores suggests that where caregivers end up in their levels of

internal resources may be more important than where they start. The start of caregiving, therefore, may be a window of opportunity for helping caregivers to acknowledge, utilize, and/or bolster their internal psychological resources. The stability of internal resources over time, however, suggests that sustainable changes in these factors do not often occur spontaneously, but rather likely require intentional effort. Mindfulness-based interventions, in particular, may increase positive reappraisal [36–38] and/or sense of control [39] and may plausibly bolster other internal resources as well.

Caregivers respond to their roles in a variety of ways. One qualitative study of caregivers of seniors with chronic conditions identified both barriers and facilitators of resilience, with caregivers' sense of control, mastery, and support (or lack thereof) playing a role in both categories [40]. Importantly, many caregivers report positive changes or growth due to caregiving, even while reporting high levels of burden [1–3]. Helping caregivers to bolster their internal resources, or leverage their existing strengths, may improve resilience or benefit finding, or otherwise mitigate some of the potentially deleterious effects of caregiving stress.

Despite the well-researched connection between social support and emotional outcomes for informal caregivers, this study did not find that a willingness to seek out social support was associated with well-being outcomes. This was contrary to our expectations. Caregivers may experience a desire to be (or appear) strong and self-sufficient, balancing the effects of a willingness to seek out help and support; although we theorized that such stoicism would be deleterious to caregivers, it may in some cases facilitate self-management [41]. It is also possible that the measure used in this study did not adequately capture the construct of interest. Indeed, the hypothesis driving this concept would naturally be moderated by the receipt of actual and useful social support (i.e., caregivers who are inclined to seek out social support—rather than attempting to undertake everything on their own—would potentially have better outcomes precisely because they would be more likely to receive help and support); we could not fully investigate those effects here. Future research may consider pursuing this question more fully.

Importantly, targeting internal resources may be an effective way to improve well-being [42, 43]. For example, a review of strengths interventions concluded that they "demonstrate small but consistent well-being effects" [44]. Internal resources and strengths, however, have not been well-studied among informal caregivers despite theoretic support for their importance, particularly in a longitudinal context. Future research will be needed to determine whether helping caregivers bolster and best utilize their existing strengths, skills, and other internal resources can

Table 3 Multivariable regressions of the associations between internal resources and well-being among informal caregivers

	Psychological (eudaimonic) well-being									
	Positive relationships with others					Self-acceptance				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Internal resources										
Personal mastery					0.41					0.39
Low stable (reference)										
Decreasing	0.33	0.66	0.09	0.6155		−0.57	0.67	−0.15	0.3926	
Increasing	3.03*	0.53	0.79	<0.0001		2.67*	0.62	0.69	<0.0001	
Mid stable	1.44	0.42	0.38	0.0008		1.66*	0.42	0.43	0.0001	
High stable	1.37	0.47	0.36	0.0037		2.18*	0.51	0.56	<0.0001	
Persistence					0.37					0.33
Low stable (reference)										
Decreasing	0.00	0.85	0.00	0.9978		−0.53	0.76	−0.14	0.4856	
Increasing	1.85	0.75	0.48	0.0141		2.44	0.76	0.63	0.0015	
Mid stable	0.75	0.42	0.20	0.0731		0.40	0.46	0.10	0.3795	
High stable	0.91	0.54	0.24	0.0926		−0.01	0.66	0.00	0.9883	
Positive reappraisal					0.39					0.34
Low stable (reference)										
Decreasing	0.26	0.65	0.07	0.6920		−0.68	0.71	−0.18	0.3354	
Increasing	1.50	0.63	0.39	0.0175		1.64	0.56	0.42	0.0037	
Mid stable	2.07*	0.45	0.54	<0.0001		1.26	0.49	0.32	0.0114	
High stable	1.30	0.55	0.34	0.0175		1.30	0.54	0.33	0.0175	
Lower aspirations					0.37					0.31
Low stable (reference)										
Decreasing	−0.03	0.64	−0.01	0.9610		−0.55	0.73	−0.14	0.4534	
Increasing	−1.61	0.67	−0.42	0.0170		−0.74	0.62	−0.19	0.2333	
Mid stable	−0.33	0.39	−0.09	0.3965		−0.52	0.46	−0.13	0.2675	
High stable	−1.24	0.45	−0.32	0.0059		−0.29	0.50	−0.07	0.5639	
Seeking social support[a]					0.37					0.32
Low stable (reference)										
Decreasing	0.30	0.50	0.08	0.5499		0.18	0.52	0.05	0.7331	
Increasing	0.68	0.49	0.18	0.1708		0.95	0.48	0.24	0.0475	
High stable	0.97	0.39	0.25	0.0144		0.81	0.44	0.21	0.0662	

	Psychological (eudaimonic) well-being									
	Autonomy					Personal growth				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Internal resources										
Personal mastery					0.28					0.33
Low stable (reference)										
Decreasing	−0.27	0.51	−0.08	0.6016		0.26	0.58	0.08	0.6527	
Increasing	2.50*	0.56	0.79	<0.0001		2.11*	0.52	0.64	<0.0001	
Mid Stable	0.64	0.35	0.20	0.0697		1.20	0.39	0.37	0.0022	
High Stable	1.31	0.42	0.41	0.0022		2.03*	0.44	0.62	<0.0001	
Persistence					0.25					0.32
Low stable (reference)										
Decreasing	0.61	0.65	0.19	0.3510		0.54	0.77	0.16	0.4870	
Increasing	2.54	0.86	0.80	0.0035		3.14*	0.58	0.96	<0.0001	
Mid stable	1.04	0.36	0.33	0.0041		1.36	0.38	0.41	0.0004	
High stable	1.33	0.50	0.42	0.0086		1.86	0.52	0.57	0.0004	

Table 3 continued

	Psychological (eudaimonic) well-being									
	Autonomy					Personal growth				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Positive reappraisal					0.26					0.32
Low stable										
Decreasing	−1.32	0.45	−0.42	0.0038		−1.17	0.63	−0.36	0.0619	
Increasing	0.74	0.54	0.23	0.1740		1.25	0.43	0.38	0.0036	
Mid stable	1.12	0.41	0.35	0.0061		0.95	0.43	0.29	0.0280	
High stable	0.72	0.50	0.23	0.1479		1.68	0.48	0.51	0.0006	
Lower aspirations					0.25				0.0341	0.28
Low stable (reference)										
Decreasing	0.87	0.63	0.28	0.1643		−1.21	0.78	−0.37	0.1188	
Increasing	−0.77	0.50	−0.24	0.1236		−1.35	0.54	−0.41	0.0124	
Mid stable	−0.85	0.39	−0.27	0.0310		−0.63	0.40	−0.19	0.1171	
High stable	−1.10	0.42	−0.35	0.0094		−1.15	0.44	−0.35	0.0092	
Seeking social support[a]					0.23					0.27
Low stable (reference)										
Decreasing	−0.26	0.43	−0.08	0.5447		0.57	0.42	0.17	0.1783	
Increasing	−0.10	0.42	−0.03	0.8138		0.47	0.43	0.14	0.2783	
High Stable	−0.82	0.36	−0.26	0.0242		0.14	0.38	0.04	0.7178	

	Psychological (Eudaimonic) well-being									
	Environmental mastery					Purpose				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Internal resources										
Personal mastery					0.39					0.25
Low stable (reference)										
Decreasing	0.71	0.61	0.21	0.2445		0.04	0.64	0.01	0.9480	
Increasing	2.58*	0.49	0.77	<0.0001		1.66	0.53	0.50	0.0019	
Mid stable	1.41*	0.39	0.42	0.0003		0.81	0.40	0.24	0.0422	
High stable	2.40*	0.42	0.71	<0.0001		0.47	0.46	0.14	0.3138	
Persistence					0.35					0.25
Low stable (reference)										
Decreasing	−0.38	0.85	−0.11	0.6555		−0.42	0.69	−0.12	0.5478	
Increasing	3.05*	0.51	0.91	<0.0001		1.32	0.59	0.40	0.0257	
Mid stable	0.79	0.37	0.24	0.0319		0.75	0.40	0.23	0.0587	
High stable	1.11	0.53	0.33	0.0378		0.88	0.51	0.26	0.0819	
Positive reappraisal					0.33					0.23
Low stable (reference)										
Decreasing	−0.60	0.66	−0.18	0.3654		0.01	0.65	0.00	0.9851	
Increasing	1.05	0.47	0.31	0.0257		0.44	0.53	0.13	0.4070	
Mid stable	0.97	0.43	0.29	0.0253		0.19	0.49	0.06	0.6971	
High stable	0.79	0.48	0.24	0.1022		0.17	0.50	0.05	0.7361	
Lower aspirations					0.32					0.27
Low stable (reference)										
Decreasing	0.06	0.70	0.02	0.9364		0.26	0.51	0.08	0.6093	
Increasing	−0.90	0.56	−0.27	0.1071		−0.89	0.51	−0.26	0.0834	
Mid stable	−0.56	0.38	−0.17	0.1460		−1.37	0.41	−0.41	0.0009	
High stable	−0.90	0.43	−0.27	0.0380		−1.45	0.48	−0.43	0.0030	
Seeking social support[a]					0.32					0.24

Table 3 continued

	Psychological (Eudaimonic) well-being									
	Environmental mastery					Purpose				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Low stable (reference)										
Decreasing	−0.01	0.45	0.00	0.9799		0.31	0.48	0.09	0.5253	
Increasing	0.43	0.39	0.13	0.2715		−0.28	0.44	−0.08	0.5235	
High stable	0.70	0.36	0.21	0.0545		0.21	0.38	0.06	0.5744	

	Subjective (hedonic) well-being									
	Affect					Life satisfaction				
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Internal resources										
Personal mastery					0.42					0.38
Low stable (reference)										
Decreasing	0.09	0.09	0.16	0.3309		−0.07	0.19	−0.06	0.7104	
Increasing	0.32	0.09	0.54	0.0007		0.60	0.21	0.48	0.0054	
Mid stable	0.21	0.06	0.37	0.0009		0.23	0.14	0.18	0.1008	
High stable	0.39*	0.07	0.67	<0.0001		0.54	0.17	0.43	0.0021	
Persistence					0.37					0.38
Low stable (reference)										
Decreasing	0.07	0.12	0.12	0.5623		−0.27	0.25	−0.22	0.2806	
Increasing	0.32	0.10	0.55	0.0021		0.92	0.29	0.73	0.0014	
Mid stable	0.13	0.06	0.22	0.0285		0.16	0.14	0.12	0.2740	
High stable	0.21	0.08	0.36	0.0076		0.16	0.19	0.13	0.3784	
Positive reappraisal					0.41					0.37
Low stable (reference)										
Decreasing	−0.01	0.11	−0.01	0.9406		−0.11	0.23	−0.09	0.6205	
Increasing	0.37*	0.08	0.63	<0.0001		0.49	0.20	0.39	0.0145	
Mid stable	0.21	0.07	0.36	0.0036		0.31	0.17	0.25	0.0680	
High stable	0.28*	0.07	0.48	0.0001		0.14	0.18	0.12	0.4227	
Lower aspirations					0.36					0.36
Low stable (reference)										
Decreasing	0.10	0.09	0.17	0.2694		0.00	0.23	0.00	0.9946	
Increasing	−0.01	0.09	−0.02	0.9215		0.02	0.19	0.01	0.9235	
Mid stable	−0.10	0.07	−0.17	0.1337		−0.20	0.14	−0.16	0.1584	
High stable	−0.05	0.07	−0.09	0.4376		−0.28	0.15	−0.22	0.0718	
Seeking social support[a]					0.37					0.36
Low stable (reference)										
Decreasing	−0.02	0.08	−0.03	0.8150		−0.03	0.17	−0.03	0.8468	
Increasing	0.01	0.07	0.02	0.8884		0.10	0.14	0.08	0.5060	
High stable	0.12	0.06	0.21	0.0428		0.33	0.13	0.26	0.0097	

Models control for: age, gender, race, education, relationship to the care recipient, care recipient gender, current caregiving status, co-resident status, number of caregiving tasks, duration of caregiving(weeks), number of hours of care per week, time 1 value of outcome less the sample mean at time 1, and personality traits

SE standard error, ES effect size (Cohen's d)

* Statistically different from low-stable after Bonferroni correction ($p \leq 0.0003$)

[a] Self-sufficiency coded without "mid-stable" category due to ceiling effect

Table 4 Associations between internal resources and well-being among informal caregivers, fixed effects models

| | Psychological (eudaimonic) well-being | | | | | | | | | |
| | Positive relationships with others | | | | | Self-acceptance | | | | |
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Personal mastery	0.60*	0.17	0.16	0.0003	0.04	0.77*	0.17	0.20	<0.0001	0.08
Persistence	0.98	0.39	0.26	0.0129	0.03	1.35*	0.39	0.35	0.0006	0.06
Positive reappraisal	0.60	0.33	0.16	0.0664	0.03	0.91	0.32	0.23	0.0048	0.05
Lowering aspirations	−0.55	0.33	−0.14	0.0908	0.02	−0.52	0.33	−0.13	0.1173	0.04
Support seeking	0.43	0.23	0.11	0.0653	0.03	0.43	0.24	0.11	0.0694	0.04

| | Psychological (eudaimonic) well-being | | | | | | | | | |
| | Autonomy | | | | | Personal Growth | | | | |
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Personal mastery	0.80	0.16*	0.25	<0.0001	0.06	0.88*	0.14	0.27	<0.0001	0.08
Persistence	1.31	0.37*	0.41	0.0005	0.04	1.01	0.33	0.31	0.0021	0.04
Positive reappraisal	1.01	0.31*	0.32	0.0010	0.04	1.37*	0.27	0.42	<0.0001	0.06
Lowering aspirations	−0.66	0.31	−0.21	0.0367	0.02	−0.55	0.27	−0.17	0.0445	0.02
Support seeking	0.24	0.23	0.08	0.2909	0.02	0.28	0.20	0.09	0.1462	0.02

| | Psychological (eudaimonic) well-being | | | | | | | | | |
| | Environmental mastery | | | | | Purpose | | | | |
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Personal mastery	0.96*	0.16	0.29	<0.0001	0.09	0.27	0.17	0.08	0.1081	0.04
Persistence	1.50*	0.38	0.45	<0.0001	0.05	0.73	0.39	0.22	0.0582	0.04
Positive reappraisal	1.47*	0.31	0.44	<0.0001	0.07	0.44	0.32	0.13	0.1698	0.04
Lowering aspirations	−0.87	0.31	−0.26	0.0059	0.04	−0.11	0.32	−0.03	0.7372	0.03
Support seeking	0.32	0.23	0.10	0.1617	0.03	0.21	0.23	0.06	0.3541	0.03

| | Subjective (hedonic) well-being | | | | | | | | | |
| | Affect | | | | | Life satisfaction | | | | |
	Beta	SE	ES	p value	R^2	Beta	SE	ES	p value	R^2
Personal mastery	0.08	0.02	0.14	0.0013	0.05	0.29*	0.05	0.24	<0.0001	0.10
Persistence	0.13	0.06	0.22	0.0212	0.02	0.33	0.13	0.27	0.0087	0.05
Positive reappraisal	0.19*	0.05	0.33	<0.0001	0.06	0.47*	0.10	0.38	<0.0001	0.08
Lowering aspirations	−0.11	0.05	−0.20	0.0125	0.04	−0.17	0.11	−0.13	0.1117	0.04
Support seeking	0.02	0.03	0.04	0.4912	0.03	0.09	0.08	0.07	0.2377	0.04

Fixed effects regression controls for time-invariant heterogeneity; Models also controlled for age (years, T2−T1), relationship to the care recipient, care recipient gender, current caregiving status, co-resident status, number of caregiving tasks, duration of caregiving (weeks), and number of hours of care per week

* Statistically significant association after Bonferroni correction ($p < 0.00125$)

have a tangible impact on family outcomes. This information will be particularly relevant for clinical psychologists and other mental health professionals working with family caregivers, who may have the opportunity to work with caregivers on maintaining or enhancing their internal resources. In addition, the care recipient's clinical care team may have an important role in supporting caregivers:

one recent study indicated that providing caregivers with needed training on medical tasks, for example, has been shown to improve caregivers' confidence [45], and may also positively impact self-efficacy, personal mastery, or other internal resources.

This study should be interpreted in the context of several potential limitations. First, informal caregivers were

identified by self-report, and included all adults who reported being a caregiver in the past 12 months. Although this study was longitudinal, the findings are based on two time points approximately ten years apart, and no intervening measurements of internal resources or well-being outcomes were available. Response rates were good at both baseline and follow-up, but subjects with the greatest burden or the lowest levels of internal resources or well-being may have chosen not to participate, potentially contributing to selection bias. We conducted a complete case analysis, and subjects dropped due to missing data may represent a particularly vulnerable subset of caregivers. The sample size is also a limitation, especially in light of the multiple exploratory tests. We applied a Bonferroni correction in order to reduce the possibility of Type I error (i.e., false positive findings); however, the small sample size and resultant limitations to statistical power leave open the possibility of Type II error (i.e., false negative findings). A post hoc power analysis revealed that we had 80% power to detect small-medium effect sizes ($f^2 = 0.05$); nevertheless, nonsignificant findings should be interpreted with caution, and all findings should be replicated in other, larger samples. We also include a lagged term in the models to control for the possibility of regression to the mean [29]. However, this could result in Nickell-Bias [46] and should be interpreted accordingly; models using the lagged term produced more conservative results (i.e., estimates closer to the null and larger p values) than those without the lagged term. Finally, we were not able to account for some potentially relevant factors such as perceived stress and care recipient health condition. Nevertheless, this study provides novel evidence of how individuals change after informal caregiving begins, and how such changes are associated with well-being outcomes.

In conclusion, this study provides evidence that greater (and increasing) psychological resources, particularly personal mastery, may be associated with better well-being outcomes among informal caregivers. Informal caregivers may therefore be a prime target for testing, dissemination, and implementation of existing interventions targeting psychological resources. Future observational research should confirm these findings, and randomized controlled trials should test whether existing or adapted interventions or trainings improve positive or prevent/mitigate negative caregiver outcomes, as well as assess the acceptability, feasibility, and sustainability of such approaches. Further targeted observational research should seek to understand how other elements of positive psychology may be related to better caregiver outcomes.

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