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Maureen Wilson-Genderson
Rowan University

Rachel A Pruchno
Rowan University

Francine P Cartwright
Rowan University

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Effects of Caregiver Burden and Satisfaction on Affect of Older End Stage Renal Disease Patients and their Spouses

Maureen Wilson-Genderson, Ph.D., **Rachel A. Pruchno, Ph.D.***, and **Francine P. Cartwright, B.S.**
New Jersey Institute of Successful Aging, University of Medicine & Dentistry of New Jersey – School of Osteopathic Medicine.

Abstract

Analyses examine the extent to which a two-factor model of affect explains how the burdens and satisfactions experienced by caregivers influence their own well-being and that of the spouses for whom they provide care. Using data from 315 older patients with End Stage Renal Disease and their spouses, we extend tests of Lawton et al.'s (1991) two-factor model both longitudinally and dyadically. Multilevel modeling analyses partially support the two-factor model. Consistent with the model, mean caregiver burden has a stronger effect on both caregiver and patient negative affect than does mean caregiver satisfaction. Contrary to the model, mean caregiver satisfaction has an effect on caregiver positive affect that is similar to that of mean caregiver burden, and it has no effect on patient positive affect. Time-varying effects of caregiver burden are consistent with the two-factor model for caregiver but not patient negative affect. Time-varying effects of caregiver satisfaction are not consistent with the two-factor model for either patients or caregivers. Results highlight the powerful role of caregiver burden for both caregivers and patients and suggest important new directions for conducting health-related research with late-life marital dyads.

Keywords

two-factor model; negative affect; positive affect; late-life marriages; multi-level models; dyads

The two-factor model proposed by Lawton, Moss, Kleban, Glicksman, and Rovine (1991) has dominated the caregiving literature for over 20 years. While the model stimulated significant research, it, like most of the caregiving literature, stems from a paradigm in which the care recipient's behavior is viewed as a potential stressor and the caregiver's well-being is viewed as outcome. However, as Lyons, Zarit, Sayer, and Whitlatch (2002) point out, the caregiving relationship is made up of two people, both of whom influence and are influenced by the other. Using data from couples in which one partner has been diagnosed with End Stage Renal Disease (ESRD) and is on dialysis, we examine the ways that mean and changing levels of caregiver burden and satisfaction influence the positive and negative affect of both members of the marital dyad, extending the two-factor model both longitudinally and dyadically.

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* Correspondence concerning this article should be addressed to: Rachel Pruchno, Ph.D., New Jersey Institute for Successful Aging, University of Medicine & Dentistry of New Jersey, 42 E. Laurel Rd., Suite 2300, Stratford, New Jersey 08084. Phone: 856-566-6822 Fax: 856-566-6874 pruchnra@umdnj.edu.

There is no doubt that the caregiver role is stressful. It is associated with increased levels of depressive symptoms (Baille, Norbeck, & Barnes, 1988; Dura, Haywood-Niler & Kiecolt-Glaser, 1990; Schulz, O'Brien, Bookwala, & Fleissner, 1995; Schulz, Visintainer, & Williamson, 1990) and impoverished physical health (Schulz et al., 1990; 1995; Schulz et al., 1997). Spouses, when available, are the main source of primary care for partners with chronic illness and disability (Booth & Johnson, 1994; Cantor, 1983). Because the marital relationship is one characterized by interdependence and reciprocity, with each spouses' reactions, responses, attitudes, and emotional states influencing the other, it is especially important to simultaneously examine the effects that caregiving has on the well-being of both patient and caregiver. Moreover, a growing body of research documenting the associations between the psychological well-being of marital partners (Bookwala & Schulz, 1996; Butterworth & Rodgers, 2006; Coyne et al., 1987; Feng & Baker, 1994; Meyler, Stimpson, & Peek, 2007; Peek, Stimpson, Townsend, & Markides, 2006; Schimmack & Lucas, 2007; Siegel, Bradley, Gallo, & Kasl, 2004; Tower & Kasl, 1995, 1996a, 1996b; Townsend, Miller, & Guo, 2001) raises questions about the ways in which characteristics of one spouse influence the positive and negative affect of the other.

The model proposed by Lawton et al. (1991) suggests that providing care to a person with a chronic illness has mixed valence for the caregiver. On the one hand, because it is an activity that an individual is committed to, it is positively affirming. On the other, it is a stressor that competes with other demands and has the potential to exhaust a caregiver's resources. Consistent with the partial independence of positive and negative affect, Lawton et al. (1991) proposed that providing care to a spouse with a chronic disease would increase both caregiver satisfaction and caregiver burden. Moreover, they posited that caregiver satisfaction would be associated with positive affect but be less effective in mitigating negative affect. Conversely, caregiver burden would increase negative affect to a greater extent than it would diminish positive affect.

There are inconsistencies in the literature regarding support for the two-factor model. Empirical work by Lawton et al. (1991) found support for the two-factor model in a sample of spouses providing care to an Alzheimer's patient, with caregiver satisfaction predicting positive affect and caregiver burden predicting depressive symptoms. In their sample of adult children who were providing care to a parent with Alzheimer's disease, however, they found that while there was a significant relationship between caregiver burden and depressive symptoms, the hypothesized path from caregiver satisfaction to positive affect was not significant. Instead, caregiver burden had both a negative relationship with positive affect as well as the predicted positive association with depressive symptoms. Pruchno, Peters, and Burant (1995) found that the two-factor model held for the husbands of primary caregivers, but not for the caregivers themselves or for teenagers living in multigenerational households. For the caregivers, burden decreased positive affect and increased depressive symptoms, while caregiver satisfaction was not related to positive affect. For the teenagers, caregiver burden predicted depressive symptoms but caregiver satisfaction was not related to positive affect. Rapp and Chao (2000) found that the strains (caregiver burden) and gains (caregiver satisfaction) experienced by caregivers of Alzheimer's patients living in the community predicted negative affect, but neither predicted positive affect. Finally, in a sample of grandmothers raising grandchildren, Pruchno and McKenney (2002) found support for the two-factor model, as caregiver satisfaction predicted positive affect and caregiver burden predicted negative affect. In addition, they found that caregiver burden had a significant negative effect on positive affect.

The overwhelming majority of research testing the two-factor model has relied on cross-sectional designs, thereby limiting the extent to which causality can be understood. Early longitudinal studies focusing on average experiences of caregivers concluded that burden, depressive symptoms, and satisfaction scores tended to remain stable over time (Suitor &

Pillemer, 1994; Townsend, Noelker, Deimling, & Bass, 1989; Zarit, Todd, & Zarit, 1986). However, hints that the well-being of caregivers is not static come from intervention studies (Fauth, Zarit, Femia, Hofer, & Stephens, 2006; Gitlin et al., 2003; Mittelman, Roth, Haley, & Zarit, 2004). Further evidence that the well-being of caregivers fluctuates derives from studies using latent growth curve modeling to examine individual variability in the trajectories of depressive symptoms and burden experienced by caregivers on both a daily (Koerner & Kenyon, 2007) and more long-term basis (Danhauer et al., 2004; Fauth et al., 2006; Gaugler, Davey, Pearlin, & Zarit, 2000; Roth, Haley, Owen, Clay, & Goode, 2001; Sugihara, Sugisawa, Nakatani, & Hougham, 2004). Our data, including positive and negative affect as well as caregiver burden and satisfaction from spouses at three points in time, are unique, providing the opportunity to model the ways in which changes in caregiver burden and satisfaction affect the well-being of caregivers over time.

Although studies simultaneously examining the well-being of spouses and patients are rare, there is evidence that the well-being of a person coping with a chronic illness and his/her spouse are linked (Coyne & Smith, 1991; Daneker, Kimmel, Ranich, & Peterson, 2001; Druley, Stephens, Martire, Ennis, & Wojno, 2003; Goodman & Shippy, 2002; Stephens, Martire, Cremeans-Smith, Druley, & Wojno, 2006). To date, however, little attention has been paid to the mechanisms responsible for this similarity. Given the salience of the caregiver role, we would expect that the caregiving satisfactions and burdens experienced by the caregiver should affect not only the well-being of the caregiver, but also that of the patient. Extending the two-factor model both longitudinally and dyadically, we predict that:

1. Mean caregiver burden will have a greater effect on the caregiver's negative affect than will mean caregiver satisfaction.
2. Mean caregiver burden will have a greater effect on the patient's negative affect than will mean caregiver satisfaction.
3. Mean caregiver satisfaction will have a greater effect on the caregiver's positive affect than will mean caregiver burden.
4. Mean caregiver satisfaction will have a stronger effect on the patient's positive affect than will mean caregiver burden.

Although scant research has examined the effects that changing levels of burden and satisfaction have on affect, we expect that changing (time-varying) levels of caregiver burden and satisfaction will follow the principles of the two-factor model.

We examine these relationships in the context of ESRD because this chronic illness, affecting over 400,000 people in the United States (U.S. Renal Data System, 2008), presents significant challenges for both patients and spouses. Patients with ESRD suffer permanent kidney failure and must rely on hemodialysis, an invasive but life-sustaining treatment that removes waste materials from the blood. Hemodialysis is typically administered 3-4 times a week, with each session lasting 3-5 hours. Patients face end-of-life decisions on a daily basis as failure to continue hemodialysis results in death within days. In addition to the demanding schedule of hemodialysis, patients and their spouses may be faced with unpredictable health crises, including severe electrolyte disturbances as toxic levels of waste products normally eliminated by the kidneys accumulate.

As we examine the ways in which the two-factor model predicts the well-being of both patients and caregivers, we control for the effects of variables known to be related to the affect of caregivers. Based on this literature, we posit that higher negative affect and lower positive affect will be evidenced when respondents are female (Ford, Goode, Barrett, Harrell, & Haley, 1997; Navaie-Waliser, Spriggs, & Feldman, 2002; Strawbridge, Wallhagen & Shema, 2007; Yee & Schulz, 2000), when the patient has been on dialysis for shorter periods of time (Kimmel, Cukor, Cohen, & Peterson, 2007); when couples are White as opposed to Black (Haley et al., 1996; Skarupski et al., 2005; Steuve, Vine, & Struening, 1997), older (Fiske, Gatz, & Pedersen, 2003), married for longer periods of time (Proulx, Helms, & Buehler, 2007); and when patients and spouses have more health conditions (Mills, 2001).

Methods

Sample

The OPTIONS study (Opinions and Preferences for Treatment In Older Nephrology patients and Spouses) was designed to increase understanding of the preferences for end-of-life treatment within the contexts of both the marital dyad and the course of chronic disease. Participants were recruited through advertisements in newspapers and newsletters, referral from staff at hemodialysis centers, and a one-time mailing to a random sample of beneficiaries receiving financial assistance for hemodialysis treatment from the Centers for Medicare and Medicaid Services. Preliminary analyses revealed that participants found through various recruitment strategies did not significantly differ on any of the focal variables in the current research. More detailed information regarding recruitment is reported in Feild, Pruchno, Bewley, Lemay, and Levinsky (2006). Data for the analyses reported here were collected between May, 2001, and June, 2006.

Inclusion criteria stipulated that patients be at least 55 years old, on hemodialysis for ESRD with a cumulative treatment length of at least six months, and currently married or partnered and cohabiting for at least five years. Study eligibility required that both patients and their spouses agree to participate, be English-speaking, and be free of cognitive, hearing, and speech impairments that would preclude their ability to answer questions on the phone. Status with respect to these characteristics was based on evaluation of both spouses during a telephone screening session. Cognitive status was determined using the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). More than 50% incorrect responses (5 or more errors) rendered a person ineligible. Hearing and speech abilities were considered adequate if the screener was able to successfully complete the screening process. Similar screens for cognitive, hearing, and speech abilities were used prior to conducting each follow-up interview.

A total of 1,474 couples responded to our recruitment efforts. Among the 432 couples who were eligible to participate, 117 elected not to participate, with most indicating lack of interest as reason for this decision. The remaining 315 couples enrolled in the study.

The average age for patients and spouses who joined the study was 69.8 and 67.9 years, respectively. The average length of time that the patient had been undergoing hemodialysis was 70.8 months (SD = 65.4; range 6 months to 34.8 years). Patients and spouses had been married for a mean of 41.2 years (SD = 13.2; ranging from 2 years to 64 years). The patients were predominantly men (73%). The highest level of education completed by the patients ranged from 3 years to postgraduate study (M = 14.2, SD = 3.2); the highest level of education completed by the spouses also ranged from 3 years to post graduate study (M = 13.7, SD = 2.6). The majority of both patients (85.1%) and spouses (85.1%) were White; 10.8% of patients and 10.5% of spouses were Black; 4.1% of patients and 3.5% of spouses indicated that they were of other or mixed races. The spouses who participated in the study were actively involved in the patient's care. Patients reported that their spouses helped them with an average of 4.5 (SD = 1.8) out of eight IADL tasks. Medicare, a federally funded program, paid for 80% of hemodialysis treatments, with individuals responsible for a 20% coinsurance.

Each patient and caregiving spouse completed an initial interview (Wave 1), and each was subsequently contacted for telephone interviews 12 months (Wave 2) and 24 months (Wave 3) following the initial interview. This assessment schedule was driven by the larger goals of the OPTIONS study, and yielded an ideal design for purposes of the analyses that follow. The one-year time frame is long enough to enable change to unfold, yet brief enough to capture the experiences of couples coping with a chronic condition. Figure 1 provides details regarding participation of patients and caregivers in interviews subsequent to Wave 1. A total of 204 couples completed the Wave 2 interview; 145 couples completed the Wave 3 interview. Table 1 contrasts characteristics of patients and caregivers who completed the final interview with those who did not.

Procedures and Measures

All data were obtained from structured individual interviews conducted by telephone, approximately one hour in length, with structured questions about treatment preferences, physical and mental health, and demographics. Measures were presented in the same order to all respondents. In order to protect their confidentiality, patients and caregivers were interviewed separately by different interviewers, and participants were asked to refrain from sharing their responses with their spouses. Whenever possible the interviewer who conducted the Wave 1 interview re-contacted and completed subsequent interviews with each respondent. All interviewers were women. The mean time lapse between individual patient and caregiver interviews (when both members of a couple were interviewed) was 6.8 days (SD = 21.6) at Wave 1, 11.7 days (SD = 19.4) at Wave 2, and 9.0 days (SD = 20.5) at Wave 3. Preliminary analyses indicated that this time lapse did not affect the pattern of study findings.

Positive and negative affect were measured using the scales developed by Lawton et al. (1992). These scales are brief and clinically sensitive, and capture the densest portions of the circumplex model using easily understood affect terms (Meyer & Shack, 1989; Russell, 1980). The Philadelphia Geriatric Center (PGC) positive and PGC negative scales use adjectives that were consensually validated as markers for two quadrants (positive affect-pleasant and negative affect-unpleasant) of the circumplex by Diener and Emmons (1984) and Watson, Clark, and Tellegen (1988). The adjectives used were chosen to include those most frequently appearing in longer affect checklists (Diener & Emmons, 1984; Russell, 1980; Watson et al., 1988). Lawton et al. (1992) found that the two scales showed a reproducible pattern across samples of young, middle-aged, and elderly respondents. Subsequent studies that used the measures report adequate reliability and validity (Lawton, Parmelee, Katz, & Nesselroade, 1996; Sliwinski, Smyth, Hofer, & Stawski, 2006), suggesting their usefulness among community-dwelling residents.

Each of the scales includes five items (PGC positive: “happy,” “warm-hearted,” “interested,” “content,” and “energetic;” PGC negative: “sad,” “annoyed,” “worried,” “irritated,” and “depressed”). Respondents indicated how often in the past week they experienced each emotion using a 5-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = frequently, 5 = very frequently). The PGC positive and PGC negative scales were each created by summing scores. As such, higher scores reflected both more positive and more negative affect.

Caregiver burden and satisfaction were assessed using the measures developed by Lawton, Kleban, Moss, Rovine, and Glicksman, (1989). Extensive information regarding scale development has been reported (Lawton et al., 1989). The measures have adequate internal consistency and test-retest reliability, and the scales have been used in several caregiving studies (Lawton et al., 1991; Pruchno, Burant, & Peters, 1994; Pruchno & McKenney, 2002). Caregiver burden was measured with nine items requiring that caregivers report on negative feelings (e.g., trapped, don't have enough time to yourself, social life has suffered, tired) resulting from the patient's illness that they have experienced during the previous month. As such, it is an index of the emotional costs associated with having a spouse with a chronic disability. Caregiver satisfaction was assessed with the six-item scale developed by Lawton et al. (1989). Caregivers were asked to report on positive feelings (e.g., satisfaction from helping patient, responsibility gives self-esteem a boost, helping patient provides meaning to your life) they have had in the previous month. As such, it is a measure of the emotional benefits associated with helping a spouse who has a chronic disability. Both scales used an identical 5-point Likert response scale (1 = never, 2 = rarely, 3 = sometimes, 4 = quite frequently, 5 = nearly always). Scales were developed by summing responses for each dimension, with higher scores indicating both more caregiver burden and more caregiver satisfaction.

Patient gender was coded as “0” for males, “1” for females. Time on dialysis was measured in months (M = 70.8, SD = 65.3). Race was coded as “1” for Black and “0” for White. Length of time married was measured in years (Mean = 41.2, SD = 13.2). Patients and caregivers were asked about whether they had the following chronic conditions: arthritis, breathing problems, heart trouble, hardening of the arteries, stomach ulcer, cancer, Parkinson's disease, diabetes, hypertension, stroke, circulation trouble, liver problems, serious vision problems, serious hearing problems, and bladder problems. Sums representing the number of conditions experienced by patients (M = 4.9, SD = 2.3) and by caregivers (M = 3.1, SD = 2.1) at Wave 1 were created.

Data Analysis Procedures

As the hypotheses present questions necessitating the examination of cross-partner effects (burden and satisfaction experienced by the caregiver will affect both the caregiver and the patient), the data were analyzed using the multivariate two-level model for longitudinal data (Lyons & Sayer, 2005; Lyons, Sayer, Archbold, Hornbrook, & Stewart, 2007; Raudenbush, Brennan, & Barnett, 1995). This model enables the simultaneous estimation of the unique effects for each dyad member as well as cross-partner effects while controlling for interdependencies in the data. Failing to adequately model inter-spouse effects may lead to misleading or incomplete understanding of the experience of negative and positive affect in these couples (Davey, Fincham, Beach, & Brody, 2001).

Separate models using identical procedures were tested for negative and positive affect. In the baseline model, patient and caregiver affect were conceptualized as functions of initial affect status and linear change in affect over time. To test Hypotheses 1 and 2, time-varying (Level 1) and mean (Level 2) caregiver burden and satisfaction were examined simultaneously for associations with the negative affect of each dyad member. To test Hypotheses 3 and 4, these same predictors were examined in relationship to positive affect. Additional Level 2 predictors (gender, race, age, length of time on ESRD treatment, length of time married, number of own health conditions [last 4 variables all grand-mean centered]) were assessed for significant effects. The models were estimated using full information maximum likelihood (FIML) with HLM 6.04 (Raudenbush, Bryk, & Congdon, 2004) and all available data from all patients and caregivers.

Model comparisons were assessed using the deviance statistic, which compares the log-likelihood statistics (likelihood of observing the current sample data) for the competing models. The deviance is distributed asymptotically as χ^2 with degrees of freedom equal to the difference in number of parameters estimated in the competing models (Singer & Willett, 2003, p. 116). The deviance statistics presented for the linear model reflect a comparison with the means-only model.

The Level 1 substantive model is:

$$\text{Y}tp = (\text{patient})\left[\beta_{1p} + \beta_{2p}\left(\text{TIME}_{\ tp}\right) + \beta_{3p}\left(\text{Caregiver Burden}_{\ tp} - \text{Mean Caregiver Burden}_{\ .p}\right) + \beta_{4p}\left(\text{Caregiver Satisfaction}_{\ tp} - \text{Mean Caregiver Satisfaction}_{\ .p}\right)\right] + (\text{caregiver})\left[\beta_{5p} + \beta_{6p}\left(\text{TIME}_{\ tp}\right) + \beta_{7p}\left(\text{Caregiver Burden}_{\ tp} - \text{Mean Caregiver Burden}_{\ .p}\right) + \beta_{8p}\left(\text{Caregiver Satisfaction}_{\ tp} - \text{Mean Caregiver Satisfaction}_{\ .p}\right)\right] + r_{\ tp} \tag{Eq. 1}$$

where Y*tp* is the affect score (separate analyses focus on positive and negative affect), Y (t = 1, …k outcome responses per dyad and time of measurement) for dyad p; $\beta_{1\text{p}}$ and β_{5p} represent the intercepts and $\beta_{2\text{p}}$ and $\beta_{6\text{p}}$ represent the TIME effect (linear slopes) for the patient and caregiver affect respectively. The indicator variable (patient) had a value of "1" if the outcome response was obtained from a patient and "0" if it was obtained from a caregiver (the opposite is true for the (caregiver) indicator variable). Within-person centering (Raudenbush et al., 1995; Singer & Willett, 2003) was used such that the time-varying predictors (cargiver burden and satisfaction) were decomposed into time-varying and time-invariant (mean) effects on affect. The time invariant relationship is the degree to which mean caregiver burden and satisfaction averaged over time (3 measurement points grand-mean centered) are related to mean affect (modeled at Level 2). The time-varying relationship represents the extent to which changes in caregiver burden and satisfaction are associated with affect. The values represented by $\beta_{3\text{p}}$, and $\beta_{7\text{p}}$ in the Level 1 model are deviations between the caregiver's burden score at each point of measurement and mean burden score. The values represented by $\beta_{4\text{p}}$, and $\beta_{8\text{p}}$ are deviations between the caregiver's satisfaction score at each point of measurement and mean satisfaction score. The effect of fluctuations in caregiver burden on the patient's ($\beta_{3\text{p}}$) and the caregiver's affect ($\beta_{7\text{p}}$), and the effect of fluctuations in caregiver satisfaction on the patient's ($\beta_{4\text{p}}$) and the caregiver's ($\beta_{8\text{p}}$) affect, were modeled simultaneously.

The Level 2 substantive model is:

$$\beta_{1\text{p}} = \gamma_{10} + \gamma_{11}(\text{Mean Caregiver Burden})_p + \gamma_{12}(\text{Mean Caregiver Satisfaction})_p + \text{u}_{1p} \tag{Eq. 2}$$

$$\beta_{2\text{p}} = \gamma_{20} + \text{u}_{2p} \tag{Eq. 3}$$

$$\beta_{3\text{p}} = \gamma_{30} \tag{Eq. 4}$$

$$\beta_{4\text{p}} = \gamma_{40} \tag{Eq. 5}$$

$$\beta_{5\text{p}} = \gamma_{50} + \gamma_{51}(\text{Mean Caregiver Burden})_p + \gamma_{52}(\text{Mean Caregiver Satisfaction})_p + \text{u}_{5p} \tag{Eq. 6}$$

$$\beta_{6\text{p}} = \gamma_{60} + \text{u}_{6p} \tag{Eq. 7}$$

$$\beta_{7p}=\gamma_{70} \qquad \text{(Eq. 8)}$$

$$\beta_{8p}=\gamma_{80} \qquad \text{(Eq. 9)}$$

The between-dyad model provided estimates of the population averages for the intercept (γ_{10}) and change over time (linear) (γ_{20}) in affect for the patient and for the intercept (γ_{50}), and change over time (linear) (γ_{60}) in affect for the caregiver. Mean caregiver burden and mean caregiver satisfaction are included at Level 2 as time-invariant predictors of affect for each study member. γ_{11} (patient) and γ_{51} (caregiver) represent the effect of mean caregiver burden on each participant's own level of mean affect. γ_{12} (patient) and γ_{52} (caregiver) represent the effect of mean caregiver satisfaction on each participant's own level of mean affect. β_{3p} and β_{7p} represent the fluctuations in burden scores; thus γ_{30} and γ_{70} capture the average time-varying effect of caregiver burden across dyads. β_{4p} and β_{8p} represent the fluctuations in caregiver satisfaction scores, and γ_{40} and γ_{80} capture the average time-varying effect of caregiver satisfaction across dyads. The random effects (u_{1p}, u_{2p}, u_{5p}, u_{6p}) represent the deviation of each member from the average intercept and change over time (linear) effect for affect for patient and caregivers, respectively. Significant variability in these parameters indicates that there is variability around the ‘average’ experience that might be explained via the introduction of additional predictors.

There are no random effects associated with γ_{30}, γ_{40}, γ_{70} or with γ_{80}, which are specified as fixed parameters (Lyons et. al., 2007; Singer & Willett, 2003). Random effects for the time-varying covariates were not included after considering whether the additional parameters were necessary and estimable using the available data (Singer & Willet, 2003, p. 169). We hypothesized a systematic relationship between negative and positive affect and between caregiver burden and satisfaction; however, we did not a priori have a reason to expect residual random variation in these components. In addition, the limits of the present data set (only 3 waves of data) would make boundary constraints likely and reliable detection of inter-dyad fluctuations suspect.

While HLM is able to handle missing data, a model analyzed with missing data will only render interpretable estimates if the data are missing at random or missing completely at random. Given that most of our sample attrition was not likely random, but rather associated with death of the patient, we tested the assumption of ignorability of missingness using the pattern-mixture approach for non-ignorable data following procedures described by Atkins (2005), Little (1995), and Hedeker and Gibbons (1997). Dummy variables representing the most heavily represented patterns of missingness (patient died after Wave 1, patient withdrew after Wave 1, caregiver withdrew after Wave 1, patient died after Wave 2, patient withdrew after Wave 2, caregiver withdrew after Wave 2), as well as interactions between the dummy variables and the predictors, were created. All models were individually tested with and without these dummy variables, and the fixed effects for the dummy variables were examined for both patients and caregivers.

Results

Descriptive statistics for PGC positive, PGC negative, caregiver burden and satisfaction measures are presented in Table 2. Bivariate correlations amongst these variables are presented in Table 3.

Caregiver Burden, Caregiver Satisfaction, and Negative Affect

Results from the multilevel modeling analyses predicting negative affect (Hypotheses 1 and 2) are reported in Table 4. The baseline (linear) model revealed evidence of statistically significant increases in negative affect over two years for caregivers. Although not statistically significant, the negative affect of patients also increased over time. Race of the patient and the caregiver had significant, negative associations with own negative affect, as Black participants had lower negative affect scores than Whites. For caregivers, gender and number of own health conditions were associated with own negative affect. Female caregivers had higher negative affect scores than male caregivers. Caregivers with more health conditions had higher negative affect scores than caregivers with fewer health conditions.

The substantive model adding both caregiver burden and satisfaction yielded a significant improvement in fit, χ^2 (8) = 256.9, $p < .001$, over the baseline model. Mean caregiver burden was significantly associated with both patient and caregiver negative affect. The time-varying component of caregiver burden was significantly associated with caregiver negative affect; time-varying caregiver burden was not associated with patient negative affect. Neither mean nor time-varying caregiver satisfaction had a significant effect on patient or caregiver negative affect. Gender of the patient and spouse had significant associations with negative affect, with female patients and caregivers having higher negative affect scores than males. For caregivers, race was associated with negative affect, as Black caregivers had lower negative affect scores than White caregivers.

Results of the pattern mixture analyses for the negative affect models did not alter the significance of mean burden, mean satisfaction, or the time-varying effects of burden and satisfaction for the patient and the caregiver. The slope of the caregiver negative affect was diminished in the substantive model when we controlled for patients lost to follow up after Wave 2 (caregiver negative affect slope = .22, $p < .06$), caregivers lost to follow up after Wave 1 (caregiver negative affect slope =.23, $p < .06$), or caregivers lost to follow up after Wave 2 (caregiver negative affect slope =.19, $p <.10$). There were no other differences in the model interpretation resulting from the pattern mixture analyses.

Caregiver Burden, Caregiver Satisfaction, and Positive Affect

Identical procedures were followed in order to determine the appropriate baseline model for positive affect (means-only model was compared to a model including the effect of time [linear]). The model including the effect of time yielded a better fit than did the means-only model, χ^2 (27) = 18.4, $p < .05$, hence it was adopted as the baseline model.

Results of the multi-level modeling analyses predicting positive affect (Hypotheses 3 and 4) are reported in Table 5. The baseline (linear) model testing the associations between patient and caregiver positive affect and caregiver burden and satisfaction revealed evidence of a statistically significant decrease in positive affect over two years for both patients and caregivers. Health conditions of both patients and caregivers were significantly associated with positive affect, with poorer health associated with lower positive affect. Black caregivers had higher levels of positive affect None of the other Level 2 covariates had a significant association with positive affect.

The substantive model adding caregiver burden and satisfaction provided an improvement in fit, χ^2 (8) = 271.3, $p < .001$, over the baseline model. Mean caregiver satisfaction was significantly associated with caregiver positive affect but not with patient positive affect. The time-varying effect of satisfaction did not have an association with either patient or caregiver positive affect. Mean caregiver burden had a significant, negative association with both patient and caregiver positive affect. The time-varying component of caregiver burden was significantly associated with caregiver positive affect but not with patient positive affect. Number of patient health conditions and number of caregiver health conditions were associated with the participants' own positive affect (higher number of health conditions, lower positive affect). The race effect seen in the baseline model became non-significant, but a gender effect emerged, such that female caregivers had higher positive affect. None of the other covariates were significant.

The relative importance of mean caregiver burden and mean caregiver satisfaction for predicting caregiver positive affect was tested by re-estimating the model, excluding mean caregiver burden and mean caregiver satisfaction resulting in a Deviance (SD) of 6515.42 (33). Separate models adding mean caregiver burden and mean caregiver satisfaction were estimated to examine the improvement in fit relative to the model including neither. The model with mean caregiver burden added resulted in a Deviance (SD) of 6442.72 (34), $\chi^2(1) = 72.70$, $p < .001$ This model had a similar fit to the model with mean caregiver satisfaction added, which yielded a Deviance (SD) of 6432.20 (34), $\chi^2(1) = 83.21$, $p < .001$, indicating that mean caregiver burden and mean caregiver satisfaction had similar effects on caregiver positive affect.

Results of the pattern mixture analyses for the positive affect models did not alter the significance of mean burden, mean satisfaction and the time-varying effects of burden and satisfaction on positive affect for the patient or caregiver. The influence of health conditions of patients on own positive affect became non-significant when we controlled for patients lost to follow up after Wave 1 (patient health conditions = 0.02, $p > .80$) or Wave 2 (patient health conditions −.008, $p > .90$). The effect of patient health conditions on patient positive affect was likewise reduced to non-significance when we controlled for the loss of caregivers to follow up after Wave 1 (−.01, $p > .80$) or after Wave 2 (−.01, $p > .90$). There was an attenuation of the significant reduction in caregiver positive affect when we controlled for caregivers lost to follow up after Wave 1 (−.19, $p < .10$) or Wave 2 interviews (−.14, $p > .20$). There were no other differences in model interpretation resulting from the pattern mixture analyses.

Discussion

Results from these analyses extend our understanding of Lawton et al.'s (1991) two-factor model both longitudinally and dyadically. Our findings provide partial support for the model and also highlight the powerful influence that caregiver burden has on both patient and caregiver affect.

Consistent with Lawton's two-factor model and our Hypotheses 1 and 2, mean levels of caregiver burden are more strongly associated with negative affect experienced by both patients and caregivers than are mean levels of caregiver satisfaction. While the magnitude of the association between mean caregiver burden and negative affect experienced by patients is smaller than that for caregivers, the pattern of these associations is similar. Our findings regarding the relationships between mean levels of caregiver satisfaction and positive affect, however, are not consistent with the Lawton model. Although we find that mean caregiver satisfaction predicts the positive affect of caregivers, the effects that mean caregiver burden have on positive affect are similar to those of caregiver satisfaction (contrary to Hypothesis 3). Moreover, contrary to Hypothesis 4, it is mean caregiver burden rather than mean caregiver satisfaction that best predicts patient positive affect.

The lack of support for a relationship between caregiver satisfaction and patient and caregiver's positive affect is consistent with findings from other caregiving studies (Lawton et al., 1991; Pruchno et al., 1995; Rapp & Chao, 2000). Together these studies suggest a need to look beyond caregiving satisfaction in order to better understand positive affect. There is some evidence suggesting that positive affect is more strongly affected by characteristics such as the frequency and quality of social ties (Clark & Watson, 1988; Watson, Clark, McIntyre, & Hamaker, 1992). As such, a productive avenue for future research would be a closer examination of the relationship between measures of social engagement and positive affect. Similarly, the consistent finding that extraversion is moderately correlated with positive affect (Diener & Lucas, 1999; Lucas & Fujita, 2000) suggests both that positive affect may be stable over time and that information about personality traits may provide a better lens through which to understand it.

These analyses are some of the first to distinguish the enduring or mean aspects of caregiver burden and satisfaction from those that are more transitory or time-varying. Typically, analyses have measured caregiver burden and satisfaction at a single point in time and then used this indicator to predict simultaneous and successive outcomes. This approach is problematic because it is not clear whether what is being measured is an enduring personal characteristic or a more fleeting feature. While the effects of enduring burden may reflect a tendency for both spouses to respond to similar environmental and/or sociodemographic factors, and not necessarily to the changing emotional conditions of one another, it is also possible that the burden of chronic illness is responsible for the observed similarity of affect within marital dyads. Consistent with the two-factor model, we find that time-varying burden affects caregiver negative affect. It did not, however, affect patient's negative affect. While neither time-varying caregiver satisfaction nor caregiver burden affected patient's positive affect, time-varying caregiver burden had a negative effect on caregiver's positive affect.

A more compelling argument regarding the explanatory role of time-varying burden could have been made had we found a consistent time-varying effect for burden on both patient and caregiver well-being. However, the long-term nature of the health condition with which these couples were coping and the point in time at which we studied them may have made time-varying effects of burden difficult to identify. Future research that identifies couples at the onset of ESRD or following a critical incident may be more likely to capture and model the time-varying component of burden and satisfaction. Our data indicate that for caregivers, in addition to the enduring effects of burden, there are also time-varying effects on both negative and positive affect. These fluctuations in burden over time, experienced by at least some caregivers, have important implications for their positive and negative affect. Caregivers who experience variability in burden over time experience greater negative affect and poorer positive affect. The time-varying effects of burden have not received enough attention in the literature, yet our data suggest that strategies that can reduce this burden over time have the potential both to increase positive affect and reduce negative affect experienced by caregivers.

In these analyses, one's own health conditions had consistent effects on the negative affect of both patients and caregivers. Once we controlled for patients lost to follow-up, the previously significant effects of health conditions on positive affect reduced to non-significance. While the comorbidity of mental and physical heath problems is well-documented (Gatchel, 2004; Gureje, Simon, & Von Korff, 2001; Katon, Sullivan, & Walker, 2001; Watson & Pennebaker, 1989), their persistent effects in this sample of chronically ill older couples is noteworthy.

Although our analyses make the distinction between “patients,” who were people diagnosed with ESRD, and “caregivers,” who did not have ESRD, it should not be assumed that the spouses were disease-free or even that they were healthier than the persons with ESRD. In fact, as shown in our data, caregivers too had been diagnosed with multiple chronic conditions. In dyadic research focused on couples in late-life, it is important to be mindful of the realities of late-life health. Given that 82% of Medicare beneficiaries have one or more chronic conditions (Wolff, Starfied, & Anderson, 2002), it is more likely that older couples will be involved in reciprocal helping relationships as they face the exigencies of multiple chronic conditions, than that one person will be “patient” and the other “caregiver.”

Recognition of the likelihood that many late-life couples must cope simultaneously with their own chronic illnesses as well as with those of their partner suggests new research questions, including “How do the burdens and satisfactions perceived by the husband (or wife) affect those of his wife (her husband)?” and “how do the exigencies of various chronic illnesses play out on a day-to-day basis for the couple?” These questions call for research designs that gather and analyze data from both members of the dyad. We have embraced this perspective not only in the analyses described here, but also in analyses examining the relationship between self-rated health and depressive symptoms experienced by both patients and spouses (Pruchno, Wilson-Genderson, & Cartwright, 2009) and an analysis of the relationship between marital quality and depressive symptoms (Pruchno, Wilson-Genderson, & Cartwright, in press). Future research building on these findings will provide important insights into ways to enhance the well-being of both members of the marital dyad.

The other covariates examined in these models had small, inconsistent effects on patient and caregiver affect. It is possible that gender effects were confounded with patient/caregiver status since the overwhelming majority of patients were male. Race effects may have been diminished by the relatively small number of Black respondents. The effects of the time-contingent variables (age, length of time married, time on ESRD treatment) that were examined may already have been substantial at baseline, hence their effects masked. Future research modifying inclusion and exclusion criteria will help mitigate these potential problems.

While these results are intriguing, we suggest several cautions regarding the generalizability of our findings. Our sample was primarily white and comprised of spouses in long-term marriages. As such, it is not clear that the dynamics characterizing this sample would generalize either to a more ethnically diverse sample or to one with less marital longevity. Because the couples we studied had been coping with the stresses of ESRD and hemodialysis for an extended period of time when the study began, we are unable to capture change in burdens and satisfaction between the time ESRD was diagnosed and hemodialysis was initiated. Future research addressing the influence of burdens and satisfactions on affect during the transition from wellness to illness is important. Further, our study included patients with one chronic condition, ESRD. While it is interesting to speculate about whether findings could be generalized to other health conditions, such as cancer or dementia, it is not clear whether our findings would apply to patients with other chronic health conditions and their caregiving spouses. In addition, although our measures of positive and negative affect were reliable and valid, it would be important to replicate our findings using other established measures of positive and negative affect, such as the PANAS (Watson et al., 1988). It is also important to acknowledge that all data were self-reported by patients and caregivers. As such they represent the subjective realities of dyad members, with the potential for bias due to shared method variance resulting from these reporter effects. Moreover, lack of information in the dataset regarding medication regimens followed by patients and caregivers must be acknowledged.

Despite the limitations of this study, these analyses extend knowledge about the two-factor model of affect both longitudinally and dyadically. They highlight the importance of including both patient and spouse perspectives in order to understand late-life marital relationships. Finally, the findings have important implications for intervention, as they suggest that interventions targeted toward reducing the influence of burden on both patients and spouses may be more effective than those targeting only one member of the dyad.

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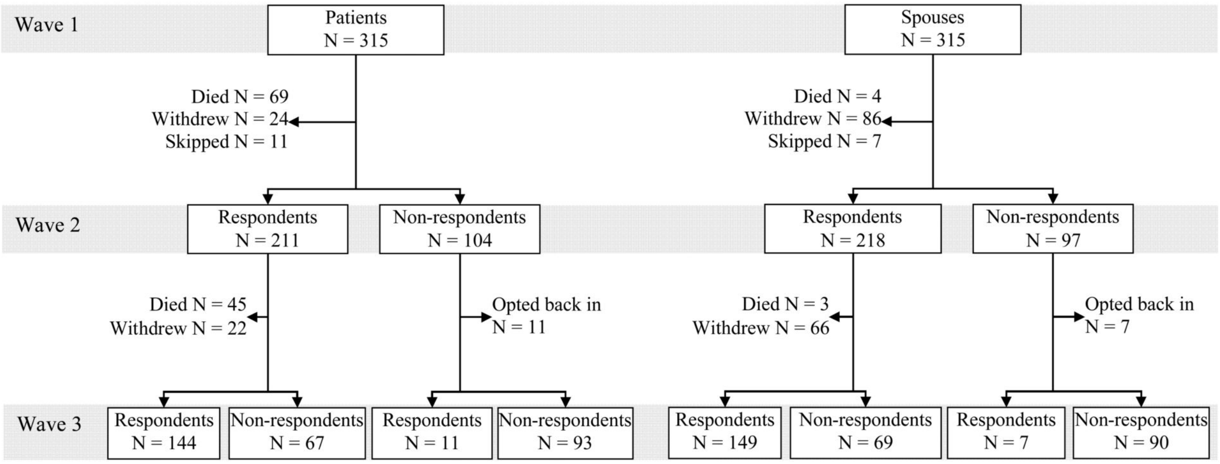

Figure 1.
Sample disposition

Table 1

Wave 1 Contrasts of Couples Who Completed the Final Interview, the Bereaved, and the Voluntarily Withdrawn (ANOVA)

	Completed Mean (SD) (N=145)	**Patient Died Mean (SD) (N=114)**	**Withdrew Mean (SD) (N=56)**	**F**
Patient age	68.9 (8.3)	70.9 (8.2)	70.0 (7.4)	1.84 (2, 312)
Caregiver age	66.9 (9.2)	69.2 (8.4)	68.0 (9.4)	2.27 (2, 312)
Patient education	14.4 (3.0)	14.4 (3.2)	13.2 (3.4)	3.77* (2, 311)
Caregiver education	13.7 (2.5)	14.0 (2.7)	13.2 (2.8)	1.93 (2, 310)
Years married	40.3 (13.6)	42.6 (12.0)	40.8 (14.8)	1.03 (2, 312)
Household Income	$43,964 (26,912)	$45,297 (24,283)	$40,773 (28,104)	0.46 (2, 261)
Time on hemodialysis (months)	71.9 (70.1)	69.0 (60.7)	71.5 (62.5)	0.07 (2, 309)
Patient health condition count	4.5 (2.2)	5.4 (2.4)	4.8 (2.4)	5.19** (2, 312)
Caregiver health condition count	3.3 (2.1)	2.7 (1.8)	3.5 (2.5)	3.64* (2, 312)
Patient positive affect	18.7 (3.4)	17.7 (3.4)	18.6 (2.8)	3.68* (2, 311)
Spouse positive affect	18.9 (3.1)	19.5 (2.9)	19.4 (3.3)	1.31 (2, 312)
Patient negative affect	10.4 (3.3)	11.0 (3.4)	10.9 (3.1)	1.25 (2, 310)
Spouse negative affect	11.7 (3.4)	11.4 (3.5)	11.1 (3.9)	0.53 (2, 312)
Caregiver burden	17.0 (6.6)	18.7 (7.1)	16.1 (6.3)	3.30* (2, 312)
Caregiver satisfaction	23.7 (4.7)	23.1 (4.7)	24.4 (5.2)	1.33 (2, 310)
	Completed (%)	Patient Died (%)	Withdrew (%)	X^2 (df=2)
Patient gender (% female)	.24	.25	.38	3.88
Race (% Black)	.08	.09	.21	8.02*

Note:

The denominator for degrees of freedom varies somewhat due to missing data.

* p<.05,

** p<.01,

*** p<.001;

Table 2

Patient and Caregiver Positive and Negative Affect, Caregiver Burden and Satisfaction (N, Mean, Standard Deviation, Range and Cronbach's Alpha)

	Baseline	1 Year	2 Years
Patient Negative Affect			
N	313	210	154
M (SD)	10.7 (3.3)	10.5 (3.4)	10.9 (3.2)
Range	5-23	5-22	5-21
Cronbach's alpha	.79	.82	.79
Patient Positive Affect			
N	314	210	154
M (SD)	18.3 (3.3)	18.6 (3.2)	18.1 (3.6)
Range	6-25	8-25	6-25
Cronbach's alpha	.76	.79	.82
Caregiver Negative Affect			
N	315	217	156
M (SD)	11.5 (3.5)	11.9 (3.5)	11.9 (3.3)
Range	5-24	5-25	5-20
Cronbach's alpha	.83	.81	.79
Caregiver Positive Affect			
N	315	217	156
M (SD)	19.2 (3.1)	18.9 (3.2)	18.6 (3.0)
Range	10-25	5-25	9-25
Cronbach's alpha	.86	.85	.87
Caregiver Burden			
N	315	217	154
M (SD)	17.4 (6.6)	17.9 (7.0)	17.6 (4.9)
Range	9-38	9-39	9-37
Cronbach's alpha	.89	.89	.91
Caregiver Satisfaction			
N	313	217	154
M (SD)	23.6 (4.8)	23.0 (5.0)	22.9 (4.9)
Range	8-30	6-31	10-30
Cronbach's alpha	.85	.85	.84

Note: The sample size varies primarily due to a patient or spouse not completing an interview at a given time point.

Table 3

Bivariate Pearson Correlations among Patient and Caregiver Depressive Symptoms, Positive Affect, Burden, and Satisfaction for Wave 1-Wave 3

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1 Patient Negative Affect 1	1.00																	
2 Caregiver Negative Affect 1	0.21	1.00																
3 Burden 1	0.24	0.54	1.00															
4 Satisfaction 1	−0.14	−0.23	−0.33	1.00														
5 Patient Positive Affect 1	−0.43	−0.29	−0.31	0.16	1.00													
6 Caregiver Positive Affect 1	−0.09	−0.49	−0.33	0.36	0.18	1.00												
7 Patient Negative Affect 2	0.54	0.18	0.13	−0.01	−0.31	−0.09	1.00											
8 Caregiver Negative Affect 2	0.25	0.62	0.59	−0.29	−0.30	−0.34	0.15	1.00										
9 Burden 2	0.21	0.46	0.73	−0.37	−0.35	−0.29	0.15	0.56	1.00									
10 Satisfaction 2	−0.13	−0.22	−0.26	0.75	0.17	0.33	0.01	−0.22	−0.37	1.00								
11 Patient Positive Affect 2	−0.34	−0.23	−0.30	0.14	0.57	0.10	−0.45	−0.20	−0.25	0.17	1.00							
12 Caregiver Positive Affect 2	−0.14	−0.35	−0.35	0.40	0.17	0.58	−0.06	−0.45	−0.44	0.40	0.25	1.00						
13 Patient Negative Affect 3	0.58	0.24	0.26	−0.13	−0.28	−0.19	0.53	0.30	0.22	−0.13	−0.43	−0.21	1.00					
14 Caregiver Negative Affect 3	0.27	0.52	0.52	−0.27	−0.35	−0.24	0.22	0.67	0.48	−0.28	−0.31	−0. 34	0.34	1.00				
15 Burden 3	0.31	0.48	0.73	−0.32	−0.33	−0.31	0.24	0.54	0.74	−0.35	−0.31	−0.44	0.27	0.57	1.00			
16 Satisfaction 3	−0.16	−0.21	−0.31	0.74	0.15	0.33	0.00	−0.32	−0.35	0.74	0.14	0.40	−0.18	−0.35	−0.42	1.00		
17 Patient Positive Affect 3	−0.36	−0.28	−0.23	0.20	0.52	0.29	−0.21	−0.27	−0.23	0.15	0.54	0.30	−0.41	−0.29	−0.29	0.26	1.00	
18 Caregiver Positive Affect 3	−0.16	−0.29	−0.36	0.45	0.23	0.52	−0.07	−0.43	−0.40	0.45	0.21	0.56	−0.28	−0.53	−0.47	0.52	0.28	1.00

Note: Listwise deletion used; At Wave 1, $|0.09| \le r \le |0.14|$, $p < .05$; $|0.14| < r < |0.18|$, $p < .01$; $r \ge |0.18|$,$p < .001$.

At Wave 2, $|0.14| \le r \le |0.16|$, $p < .05$; $|0.16| < r < |0.22|$, $p < .01$; $r \ge |0.22|$,$p < .001$. At Wave 3, $|0.16| \le r \le |0.21|$, $p < .05$; $|0.21| < r < |0.26|$, $p < .01$; $r \ge |0.26|$,$p < .001$.

Table 4

Multi-level Models Predicting Negative Affect Experienced by Patients and Caregivers

	Baseline (Linear) Model				Substantive Model including Burden and Satisfaction			
	Patient		Caregiver		Patient		Caregiver	
	Parameter estimate (SE)	95% CI	Parameter estimate (SE)	95% CI	Parameter estimate (SE)	95% CI	Parameter estimate (SE)	95% CI
Fixed Effects								
Intercept	10.70 (.21)***	10.3, 11.1	12.12 (.23)***	11.6, 12.6	9.52 (1.19)***	7.14, 11.90	7.82 (.97)***	5.88, 9.76
Time	0.21 (.11)	−.02, .43	0.24 (.12)*	.00, .48	0.15 (.12)	−.090, .39	0.28 (.12)*	.04, .52
Mean Burden					0.10 (.03)***	.05, .16	0.28 (.02)***	.24,.52
Mean Satisfaction					−0.03 (.03)	−.11, .04	−0.04 (.03)	−.10, .02
Time Varying Burden					0.04 (.04)	−.04, .08	0.08 (.03)*	.02, .14
Time Varying Satisfaction					−0.04 (.05)	−.14, .06	0.05 (.05)	−.05, .15
Covariates								
Race (Black)	−1.13 (.55)*	.03, 2.23	−2.44 (.52)***	−3.4, −1.4	−0.64 (.55)	−1.74, .46	−1.33 (.44)**	−2.21, −.45
Gender	0.49 (.39)	−.29, .77	1.4 (.36)***	2.1, .69	0.80 (.39)*	.02, 1.58	0.68 (.31)*	.06, 1.30
Own health conditions	0.003 (.08)	−.16, .16	0.17 (.08)***	.01, .33	−.01 (.08)	−.26, .15	0.12 (.06)	0.0, .24
Random Effects								
Residual	4.50 (.33)				4.43 (.33)			
Intercept	6.94 (.93)***		6.88 (.93)***		6.37 (.88)***		3.92 (.70)***	
Time	0.15 (.32)		0.52 (.35)*		0.17 (.33)		0.61 (.35)*	
Estimated parameters	27				35			
Deviance statistic	6748.83				6491.90			
Model Comparison χ^2(df)	13.01 (9)				256.93 (8)***			

Deviance statistics presented for the baseline model are based on comparison with the means only model (data not shown); deviance statistics presented for the substantive model are based on comparison with the baseline model. Models run with covariates included: age, length of time married, gender, race (black), time on hemodialysis, number of health conditions; data shown for significant effects only.

95% CI = 95% Confidence Interval. FIML, HLM 6.04.

[*] $p < .05$,

[**] $p < .01$,

[***] $p < .001$.

Table 5

Multi-level Models Predicting Positive Affect of Patients and Caregivers

	Baseline (Linear) Model				Substantive Model including Burden and Satisfaction			
	Patient		Caregiver		Patient		Caregiver	
	Parameter estimate (SE)	**95% CI**	**Parameter estimate (SE)**	**95% CI**	**Parameter estimate (SE)**	**95% CI**	**Parameter estimate (SE)**	**95% CI**
Fixed Effects								
Intercept	18.30 (.21)**	17.9, 18.7	19.30 (.20)***	18.9, 19.7	18.40 (.20)***	18.0, 18.6	19.5 (.17)***	19.3, 19.8
Time	−0.27 (.13)*	−.02, .52	−0.28 (.09)**	−.46, −.10	−0.19 (.13)	−.45, .07	−0.23 (.11)*	−.45, −.01
Mean Burden					−0.12 (.03)***	−.18, −.06	−0.14 (.02)***	−.18, −.10
Mean Satisfaction					0.06 (.04)	−.02, .14	0.22 (.03)***	.19, .28
Time Varying Burden					−0.02 (.04)	−.10, .06	−0.10 (.03)**	−.16, −.04
Time Varying Satisfaction					.09 (.04)	.01, .17	0.08 (.04)	0.0, .16
Covariates								
Own health conditions	−.36 (.08)***	−.52, −.20	−0.16 (.08)*	−.32, 0.0	−0.32 (.07)***	−.46, −.18	−0.14 (.07)*	−.28, 0.0
Race (black)	0.91 (.55)	−.19, 2.01	1.23 (.49)*	.25, 2.21	0.31 (.52)	−.73, 1.35	0.47 (.41)	.035, 1.29
Gender (female)	−0.12 (.38)	−.88, .64	−0.52 (.35)	−1.22, .18	−0.38 (.36)	−1.10, .34	1.23 (.28)***	.67, 1.79
Random Effects								
Residual	4.51 (.33)				4.30 (.32)			
Intercept	6.40 (.83)***		4.76 (.76)***		4.88 (.80)***		3.11(.63)***	
Time	0.70 (.37)**		0.04 (.30)		.73 (.38)***		0.07 (.30)	
Estimated parameters	27				35			
Deviance statistic	6660.74				6389.48			
Model Comparison χ^2(df)	18.41 (19)*				271.26 (8)***			

Deviance statistics presented for the baseline model are based on comparison with the means only model (data not shown); deviance statistics presented for the substantive model are based on comparison with the baseline model. Models run with covariates included: age, length of time married, sex, race (black), time on hemodialysis and number of health conditions; data shown for significant effects only.

95% CI = 95% Confidence Interval. FIML, HLM

[*] $p < .05$,

[**] $p < .01$,

[***] $p < .001$.