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Research Article

Stressors, Positive and Negative Caregiving Appraisals, and Caregiver Psychological Well-Being: The Moderating Role of Stages of Dementia

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Caregiving is a process affected by both caregiver and care recipients and contains both positive and negative experiences. However, there is a lack of theories that capture the impact of the progression of dementia on family caregiving. This study proposed and examined a dementia caregiver process two-factor (DCPT) model. Specifically, we explored (a) the relationship between the severity of caregiving stressors and caregiver psychological well-being, along with the mediating role of positive aspects of caregiving (PAC) and caregiving burden, and (b) the moderating role of stages of dementia. Data were obtained from a two-wave longitudinal data collected from 328 adult–child dementia caregivers in Hong Kong. Multiple group analysis was used to examine the proposed hypotheses. Results show that PAC and burden both significantly mediated the relationship between care recipients' neuropsychiatric symptoms (NPS) and caregiver depressive symptoms and life satisfaction. Stages of dementia significantly moderated the relationship between PAC and caregiver depressive symptoms, with PAC associated with lesser depressive symptoms only among caregivers of those with middle- or late-stage dementia. In sum, the dementia caregiver process two-factor model proposed in this study was supported by our empirical data. This theory and the study results underscore the importance of both PAC and burden and capture the specificity of the caregiving process in different dementia stages. Findings in this study suggest the need to develop tailored interventions that can better accommodate caregivers with diverse characteristics and adapt to the entire disease trajectory.

1. Introduction

The world's population is aging. Dementia, a common syndrome and main cause of death and disability, now affects approximately 50 million older adults in the world, and the population of older adults living with dementia is expected to continuously increase [1]. Dementia is highly overwhelming, not only for older adults but also for their family caregivers who have taken the main responsibility of providing caregiving activities. Due to the influence of factors such as dementia-related neuropsychiatric symptoms (NPS), dementia caregivers have been found to have higher risks of negative outcomes than caregivers of older adults with other conditions [2, 3]. Under such circumstances, it is of great importance to care for dementia caregivers better, and one indispensable way is to promote their psychological well-being.

Previous studies into caregiver psychological well-being were mainly guided by stress and coping models [4, 5]. Despite their theoretical contributions, these frameworks tend to view caregiving as a primarily stressful process, in which positive aspects of caregiving (PAC) were neglected [6]. Moreover, given that dementia is progressive, caregiving process may also vary as the disease progresses. Though previous studies have verified that elements of the caregiving process change across the disease trajectory [7, 8], little evidence has been generated regarding variations in the relationships among these elements (i.e., stressors, appraisals, and outcomes), and there is still a lack of theoretical models to guide research into the impact of disease progression on the caregiving process.

Therefore, in this study, we proposed and examined a new theoretical framework. Specifically, we aimed to examine (a) the relationship between the severity of caregiving stressors and caregiver psychological well-being and the mediating role of PAC and caregiving burden, and (b) the moderating role of stages of dementia. Moreover, previous studies primarily derived their conclusions from the general population, generating inconsistent results due to the heterogeneity of subgroups [3, 9]. For instance, the perceived caregiving experience varies according to the kinship between caregivers and care recipients (e.g., spousal caregivers versus adult–child caregivers) due to different social roles, lifestyle, motivation, and social networks [10–14], which would lead to different caregiving processes [10]. Therefore, given that the proportion of adult–child caregivers may increase in the future with the increasing proportion of the oldest older adults (i.e., aged 85 years or above) [15], this study focused on adult–child caregivers to better understand their caregiving process and inform future social work practice and social policies. In addition, longitudinal studies are insufficient; hence, this study used two-wave longitudinal data collected from Hong Kong for its analysis.

2. Dementia Caregiver Process Two-Factor (DCPT) Model

A DCPT model was proposed in this study (Figure 1). This model is based on the two-factor model [10], which depicts caregiving as a process consisting of sequentially interrelated stressful situations, including stressors, positive and negative appraisals, and outcomes. We further integrated stress and coping theories [5], and Gallagher-Thompson et al.'s [7] model on the trajectory of dementia caregiving, both of which provided fundamentals for the moderating role of dementia stage. Specifically, the stress and coping theories underscore that the stress, appraisals, and coping process vary across different situational contexts [5]. Therefore, for the caregiving process proposed by the two-factor model, how the stressors would affect appraisals and how appraisals might influence the outcome would be influenced by specific contexts, further enhancing the two-factor model by embedding it in a contextualized model. Furthermore, dementia stages can be a meaningful context for family caregivers of people living with dementia. According to Gallagher-Thompson et al.'s [7] model, components of the caregiving process change across different dementia stages, thereby specifying dementia stage as a contextual factor in dementia caregiving. As a result, dementia stage has the potential to influence the associations among the elements of the caregiving process, though they solely focused on the variation of each caregiving element through different dementia stages in this model.

In summary, the aforementioned theories tended to separately examine the varying associations among and the changing trend of the caregiving elements, overlooking the time-varying associations among these elements. Therefore, the DCPT model proposed by this study aims to enhance theoretical base to understand and explain the dementia family caregiving process by proposing a contextualized (e.g., dementia stage as a context) model that incorporate disease progression into the current caregiving process model (i.e., two-factor model). Specifically, in line with Gallagher-Thompson et al.'s [7] model, we view dementia stage as a contextual factor. Furthermore, we integrate dementia stage into the stress and coping model, suggesting that as a contextual factor, it can affect the associations among caregiving elements. Therefore, the DCPT model suggests that the mechanism linking caregiving stressors, positive and negative appraisals, and outcomes is moderated by care recipients' dementia stage. By empirically examining this model and applying the results to practice, we can achieve deeper insight into the caregiving process and guide the design of tailored interventions for family caregivers.

2.1. Caregiving Stressors, Appraisals, and Caregivers' Psychological Well-Being. According to Figure 1, the DCPT model incorporated three basic elements, namely, stressors, caregiving appraisals, and outcomes, which followed the construct of the two-factor model [10]. Specifically, stressors are difficulties directly rooted in the care recipient's symptoms and related demands, which reflect the objective dimension of caregiving [4, 10]. Caregiving appraisals, instead, are related to the subjective evaluation in terms of caregiving, including both positive and negative sides. Stressors affect caregiving appraisals through multiple pathways. On one hand, stressors cause distress among caregivers, create conflicts between caregiving and caregivers' personal needs, and present challenges in addressing caregiving issues, all of which contribute to negative appraisals, which is typically characterized as caregiving burden [4, 10]. On the other hand, positive appraisals, often refer to PAC, arise from fulfilling caregiving responsibilities and encompass experiences such as enhancing self-competence and strengthening relationships between caregivers and care recipients. However, these positive aspects may diminish in the face of increased stressors due to difficulties in meeting overwhelming responsibilities [10, 16]. These positive and negative appraisals subsequently affect caregiving outcomes by altering people's emotions and behaviors [4, 10]. Specifically, positive appraisals typically serve as protective factors for outcomes, whereas negative appraisals lead to negative effects.

In the present study, to examine the DCPT model, we utilize care recipients' NPS as the proxy of stressor in the caregiving process [17]. NPS refers to behavioral and psychological symptoms among people living with dementia, including symptoms like euphoria, depression, agitation, and sleep impairment. These symptoms are regarded as primary stressors in dementia caregiving [17]. Moreover, caregivers' psychological well-being, a major concern of

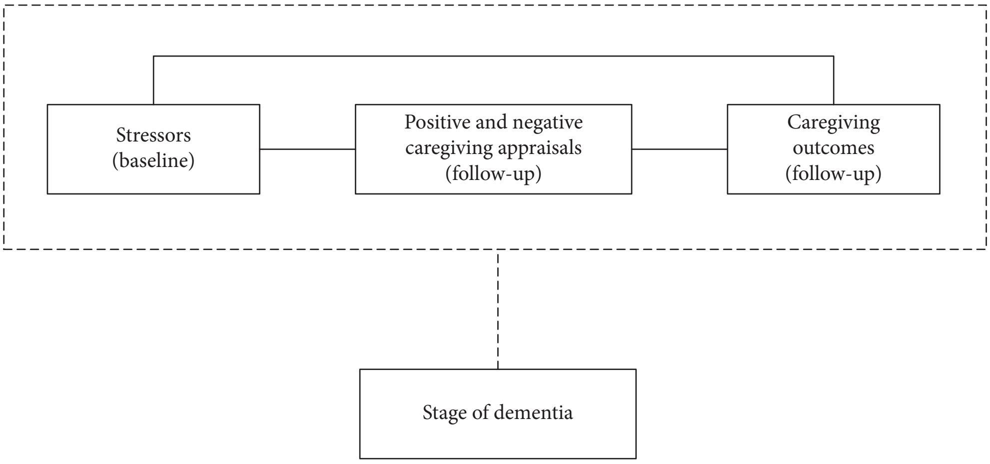

Figure 1: Theoretical framework: dementia caregiver process two-factor (DCPT) model.

caregivers and nowadays caregiving research, is regarded as the outcome in this study [18–20]. Specifically, psychological well-being is a multidimensional concept. Although no consistent definition of psychological well-being has been generated, one widely adopted approach was to conceptualize it into affective evaluation (e.g., positive and negative affect) and cognitive perception (e.g., life satisfaction) of individual's life [21, 22]. Therefore, depressive symptoms and life satisfaction, two widely used indicators of psychological well-being among research into family caregiving [10, 23, 24], were incorporated in this study as key aspects of psychological well-being. Specifically, depressive symptoms are individuals' negative affect and perceptions of themselves and their lives, which reflect the affective dimension of psychological well-being [10, 21]. Furthermore, life satisfaction, which captures individuals' overall assessment of meaning and purpose in their life, is an important element of psychological well-being as aforementioned and represents the cognitive aspects of psychological well-being [21–23].

Though consensus has not been reached yet, evidence generated from previous studies has partially supported the above mechanism. Specifically, while NPS have been found to affect caregiving burden negatively in both cross-sectional and longitudinal studies [25, 26], findings regarding the relationship between NPS and PAC are mixed, with previous cross-sectional studies noting a significantly negative or nonsignificant relationship [3, 9]. Regarding the two-factor pathway, including impacts of the two mediators (i.e., PAC and burden), studies have also generated inconsistent results. While some scholars suggested that PAC might be more related to positive outcomes (i.e., life satisfaction) and burden might have a stronger relationship with negative outcomes (i.e., depressive symptoms) [10, 16, 27], studies have also found that both appraisals affect the two aspects of caregivers' psychological well-being [18, 19, 28, 29].

These discordances might be due to heterogeneities among subgroups of caregivers and different social contexts. For instance, previous studies suggested that NPS might have a lesser effect on burden among adult–child caregivers compared to spousal caregivers [11, 30]. Regarding the associations between NPS and PAC, the negative cross-sectional relationship between them seemed to be stronger rather than nonsignificant when focusing solely on adult–child caregivers [10, 14]. Regarding the aforementioned hypothesis of distinct pathways of PAC and burden while it was supported by empirical evidence generated from spousal caregivers, a dominant role of caregiving burden was found among adult–child caregivers [10]. Moreover, caregiving is a culturally sensitive process [31], and adult–child caregivers in China may perceive and benefit from higher levels of PAC because they are driven by filial piety, thus regarding caregiving for their parents as their obligation and honor [32, 33].

Though the associations among elements have been established except for existing inconsistencies, few studies have examined the comprehensive mediation mechanism linking NPS to caregivers' psychological well-being. Moreover, existing studies tended to portray the caregiving process as totally burdensome and solely studied the mediating role of caregiving burden in this process [34]. The DCPT model, instead, aims to portray the entire caregiving process by testing the mediating roles of appraisals in the association between NPS and caregivers' psychological well-being, with simultaneous emphasis on both caregiving burden and PAC.

Despite the preliminary results, there is also a dearth of empirical evidence from longitudinal studies. Under these circumstances, the present study adopted a panel study design to test the relationships among NPS, caregiving appraisals, and caregiver psychological well-being among adult–child caregivers in Hong Kong.

2.2. Moderating Role of Dementia Stage. Apart from the three basic elements mentioned above, dementia stage is included as a moderator that can modify the relationships in the caregiving process, which may also partially explain the inconsistencies among previous studies. According to stress and coping theories, the caregiving process is embedded in specific contexts, which will affect the whole caregiving process, including individual's reactions to stressors and how a certain appraisal may affect outcomes [5]. Moreover, from a time perspective, components of the caregiving process change across the caregiving trajectory, constituting a context for dementia caregiving [7]. Therefore, dementia stage could be considered as a context-specific factor, which can be further integrated as a moderator in the DCPT model. In other words, instead of solely examining the changing trend of each element in the caregiving process, this model proposes that the internal relationships among caregiving also vary across the dementia trajectory.

While stressors might be correlated with dementia stage, different levels and types of stressors will emerge and predominate along the disease trajectory of dementia [7, 17, 35, 36]. Therefore, the association between stressors and dementia stage may not be linear; instead, specific symptoms emerge in each stage, distinguishing these two concepts in nature. In support of this view, previous theories and studies suggested that the needs and experiences of both care recipients and caregivers vary across the dementia trajectory, calling for distinct intervention strategies to fit the different stages of dementia caregiving [7, 37–40]. However, they mainly focused on the time-varying trend of each element of the caregiving process, overlooking the varying associations among the caregiving elements (i.e., stressors, appraisals, and outcomes) across dementia stages.

As there are different symptoms and demands at different stages, and caregivers adapt to their caregiving roles gradually, stressors may have varying impacts on caregivers' appraisals within different stages [36]. For instance, though care recipients' NPS have been established to influence caregivers universally [17], the extent and direction of the impacts might vary. In studies that exclusively involved caregivers of older adults with mild- or early-stage dementia, caregiving stressors such as behavioral problems (i.e., a component of NPS) were not significantly associated with caregiving burden [41, 42], which might be because that caregivers may feel less overwhelmed due to the relatively mild stressors at the early stage of dementia. Conversely, caregivers of older adults in the middle- and late-stages of dementia may face greater burden from stressors, yet they may also find the caregiving process rewarding as they become more proficient in handling caregiving tasks or as some challenging symptoms decline due to the care recipients' diminished mobility [35, 38, 43]. Though distinctions have been found in studies using different samples, no direct comparisons have been conducted among different stages of dementia, particularly considering PAC and mediation pathways from caregiving stressors to outcomes.

Meanwhile, caregiving appraisals can play different roles across the disease trajectory as their impacts are dependent on contexts [5, 44]. For example, while positive appraisals are typically protective factors for caregiving outcomes, this effect may be particularly salient in face of severe and uncontrollable situation (e.g., terminal stage of disease) [44]. This is because that during stages where conditions are controllable, positive appraisals may lead to satisfaction with the current situation without developing effective coping and management strategies for stressors, which might potentially accelerate the situation being worse [44, 45]. However, in uncontrollable situations, individuals tend to rely more on positive appraisals because it seems to be the only factor they can control to maintain their well-being [5, 45]. Despite this, this relationship has not yet been tested in the caregiving context. Furthermore, to our best knowledge, no study has directly examined the moderation effect of dementia stage on the association between caregiving burden and caregivers' psychological well-being.

Therefore, evidence is needed to better capture the caregiving process across the progression of dementia, and the DCPT model was developed to guide research in this unexplored area.

2.3. Hypotheses. Based on the DCPT model and previous literature, we hypothesize that PAC and caregiving burden play significant mediating roles in the associations between care recipients' NPS and caregivers' psychological well-being. Specifically, care recipients' NPS negatively affects caregivers' psychological well-being by decreasing PAC and increasing caregiving burden. Furthermore, care recipients' stage of dementia moderates the associations among care recipients' NPS, PAC, burden, and caregivers' psychological well-being. Particularly, based on previous evidence, we hypothesize that dementia stage significantly moderates the association between PAC and caregivers' psychological well-being, and the protective effect of PAC on psychological well-being can be magnified if caregivers take care of care recipients with middle- and late-stage of dementia. Moreover, though no direct and consistent empirical evidence has been generated regarding the moderating role of dementia stage on other pathways (i.e., associations of care recipients' NPS with caregiving burden and PAC and that between caregiving burden and caregivers' psychological well-being), the moderating effect of dementia stage might exist according to theories. Therefore, this study will examine the moderating effect of dementia stage on associations among care recipients' NPS, caregiving appraisals (i.e., PAC and burden), and caregivers' psychological well-being.

3. Materials and Methods

3.1. Data. Data were obtained from a two-wave longitudinal survey involving adult–child caregivers of older adults with dementia in Hong Kong SAR, China. Hong Kong is currently facing severe population aging, with 20.5% of its population aged 65 years or older [46]. Among these older adults living in Hong Kong, 7.2% have dementia [47], triggering great caregiving demands.

In this survey, data were collected between October 2019 and August 2021. Using purposeful sampling, respondents were recruited from social services' organizations that provide services to people living with dementia and their caregivers based on the following inclusion criteria: (a) born between 1946 and 1980, (b) able to speak Cantonese, (c) taken care of their care recipients for no less than 8 h per week in the past 3 months, and (d) not challenged by other stressful life events (e.g., loss of significant family members or friends, diagnosed with life-threatening diseases, and unemployed) [48]. Ethical approval was obtained from the Human Research Ethics Committee, The University of Hong

Kong (reference number: EA1802010) and the Institutional Review Board of The University of Hong Kong/Hospital Authority Hong Kong West Cluster (reference number: UW 19-779).

Regarding the data collection process, before the baseline survey, potential respondents were referred to the research team by staff members in these organizations. Subsequently, trained assistants from the research team obtained written informed consent from the respondents and invited them to participate in the survey. Twelve months after the baseline survey, we sent invitations to previous respondents to invite them to participate in a follow-up survey.

After collecting the data, we excluded respondents who did not reply to both waves of the survey ($n = 239$) or whose care recipients lived in hospitals or institutions at baseline ($n = 37$). The final analytic sample included 382 caregivers. Furthermore, sensitivity analyses including t-test and chi-square test were conducted to examine the baseline distinctions between those who remained in the sample and those lost follow-up. Results indicated that no significant differences exist except for care recipients' NPS ($t(592) = -2.602$, $p < 0.01$), caregiver gender ($\chi^2(1) = 6.352$, $p < 0.05$), and data collection time (i.e., before or during the COVID-19 pandemic; $\chi^2(1) = 7.019$, $p < 0.01$). Specifically, caregivers who dropped were more likely to be males, caring for people with lower levels of NPS, and were interviewed during the COVID-19 pandemic. Moreover, a second sensitivity analysis was conducted using baseline data to construct a mediation model incorporating those who dropped or remained in the sample, and the results turned out to be robust.

3.2. Measurements

3.2.1. Dependent Variables. The dependent variable in this study was caregivers' psychological well-being, including both depressive symptoms and life satisfaction. The nine-item Patient Health Questionnaire, a validated scale, was used to measure depressive symptoms [49]. Respondents were asked about the frequency (0 = *not at all* to 3 = *nearly every day*) of being bothered by certain problems (e.g., little interest or pleasure in doing things, poor appetite or overeating, feeling tired or having little energy) during the last 2 weeks. The total score ranged from 0 to 27, with a higher score indicating severer depressive symptoms (Cronbach's $\alpha = 0.91$).

Life satisfaction was measured by the Satisfaction With Life Scale [50]. Measured on a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*), this scale contains five items that aim to measure caregivers' global life satisfaction (e.g., "In most ways, my life is close to my ideal" and "The conditions of my life are excellent"). We summed the scores for all items (range: 5–35), and the higher the total score, the higher the level of life satisfaction as perceived by caregivers (Cronbach's $\alpha = 0.91$).

3.2.2. Independent Variable. Caregiving stressor, operationalized by care recipients' NPS during the baseline survey, was the independent variable in the present study. It was measured by the Neuropsychiatric Inventory Questionnaire [51], a four-point Likert scale with 12 items regarding the severity of symptoms a care recipient experienced during the month prior to the baseline survey (e.g., aberrant motor behavior, irritability, delusion, and depression). The total score of this scale ranges from 0 to 36, with higher scores indicating severer NPS (Cronbach's $\alpha = 0.87$).

3.2.3. Mediators. Mediators in this study were PAC and burden, referring to positive and negative appraisals, respectively. These two variables were obtained from the follow-up survey. PAC was quantified by the Chinese version of the PAC scale [52], which includes 11 items covering both domains of self-affirmation (e.g., feel more useful and feel good about self) and life enrichment (e.g., appreciate life more and strengthened relationship). A total score was generated (range: 11–55). The higher the score, the higher the PAC as perceived by caregivers (Cronbach's $\alpha = 0.93$).

Burden was measured by the summed score of a four-item version of Zarit Burden Inventory [53]. A five-point Likert scale (1 = *never* to 5 = *nearly always*) was used to measure, for example, whether caregiving had left respondents with not enough time for themselves. A total score, ranging from 4 to 20, was generated, with a higher score indicating a higher level of burden (Cronbach's $\alpha = 0.81$).

3.2.4. Moderator. In this study, stage of dementia was employed as a moderator. During the follow-up survey, respondents were asked to identify the dementia stage of their care recipients, divided into early (e.g., loss of recent memory and reduced ability to think), middle (e.g., emotional instability, easy to get angry, wandering, and need assistance with activities of daily living), and late (e.g., cannot recognize family members, difficulty speaking and understanding, loss of bladder and bowel control, and loss of independence). For the convenience of analysis, stages were further dichotomized into early-stage and middle- or later-stage dementia.

3.2.5. Covariates. Covariates in the present study were obtained from the baseline survey, including caregivers' age, gender (1 = *female* and 0 = *male*), educational attainment (1 = *college degree or beyond* and 0 = *high school or below*), relationship with care recipient (1 = *son or daughter* and 0 = *son-in-law or daughter-in-law*), marital status (1 = *married or living with a partner* and 0 = *other*), working status (1 = *full- or part-time job* and 0 = *no job*), having religious beliefs (1 = *yes* and 0 = *no*), coresidence with care recipient (1 = *yes* and 0 = *no*), and caregiving time per week, caregiving length, and status as primary caregiver (1 = *yes* and 0 = *no*). As for care recipients' characteristics, this study assessed their age, gender (1 = *female* and 0 = *male*), activities of daily living, and instrumental activities of daily living. Specifically, activities of daily living were measured using

Katz Activities of Daily Living Scale [54], which consists of six items measuring individuals' independence in performing tasks such as dressing, bathing, and eating (1 = *independence* and 0 = *dependence*). A total score was generated, with higher score indicating higher levels of independence. The eight-item Lawton's Instrumental Activities of Daily Living Scale is used for assessing care recipients' independence in instrumental activities of daily living (e.g., managing money, taking medications, and shopping; 1 = *independence* and 0 = *dependence*) [55]. The higher the total score is, the better the independence level is. Furthermore, because some respondents were recruited and engaged in the baseline survey during the COVID-19 pandemic outbreak, a covariate was generated to control the potential impact of the external environment (1 = *data collected during COVID-19* and 0 = *data collected before COVID-19*).

3.3. Data Analysis. Structural equation modeling was used to examine the proposed hypotheses. Mediation analysis was conducted to examine the mediating role of PAC and burden. Specifically, we initially constructed a regression model to examine the total effect from NPS to caregiver psychological well-being after adjusting for covariates. Then, PAC and burden were introduced and a mediation model was built. We performed bootstrapping with 1,000 replications, with a 95% confidence interval not containing zero indicating significant mediating effects [56]. In addition, the baseline values of mediators and dependent variables were controlled.

Multiple group analysis was used to examine the moderating effect of the stage of dementia [57]. As previously elaborated, caregivers were treated as two distinct groups, based on care recipients with early-stage versus middle- or late-stage dementia. To make comparisons between each group, we first built an unconstrained model, where all path coefficients were freely estimated across groups. Subsequently, we constrained the paths of the mediation model to be equal across groups. During this process, chi-square differences were calculated to identify whether the model fit decreased significantly. In other words, if there was a significant chi-square difference between the freely estimated model and the model with one particular path constrained, it would indicate that dementia stage might have a potential moderating effect on that path. Based on these findings, we conducted a final analysis in which only significant paths were allowed to vary across groups. A Wald test was carried out, and a significant result indicated significant differences between groups.

Model fit was measured by a chi-square value, comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Specifically, a nonsignificant chi-square value, values above 0.90 for CFI and TLI, and values below 0.08 for RMSEA and SRMR were considered to indicate satisfactory model fit [58, 59]. Much of the analysis was conducted in Mplus 8.7 [57].

4. Results

4.1. Sample Characteristics. Descriptive statistics are shown in Table 1. No missing values were present in the variables included. Approximately, half of the caregivers engaged in the baseline study during the COVID-19 pandemic. Their mean age was about 55 years (SD = 6.80). Most were the daughter of their care recipient (75.39%) and the primary caregivers (72.51%), and the majority was caring for their mother (81.94%). Those who were married or living with a partner, had achieved an educational level of high school or below, had a full- or part-time job, had no religious beliefs, and coresided with the care recipient constituted the majority in this study sample. The caregivers had provided dementia care for an average of 4.77 years (SD = 4.05), and each week, they spent 48.24 h (SD = 40.12) on caregiving on average.

Regarding psychological well-being, the score for depressive symptoms was relatively low (M = 6.01 and SD = 5.62). According to the commonly adopted cutoff point [49], most respondents (76.18%) had minimal or mild depressive symptoms. The level of life satisfaction was at a moderate level, with an average score of 19.97 (SD = 6.37). Respondents in this study perceived a relatively high level of PAC and a lower level of burden, with total scores of 36.08 (SD = 7.43) and 11.65 (SD = 3.25), respectively. In terms of the severity of NPS, the mean score was 11.92 (SD = 7.21), indicating generally mild NPS. In addition, around 64% of care recipients were at the middle or late stage of dementia in the follow-up survey.

4.2. Mediating Role of PAC and Burden. By building a regression model controlling for covariates and baseline values of dependent variables, the total effects of severity of NPS were examined. The regression model indicated satisfactory model fit: $\chi^2(1) = 0.000$, $p = 0.996$, RMSEA = 0.000, CFI = 1.000, TLI = 1.088, and SRMR = 0.000. The results showed that severer NPS significantly increased the level of depressive symptoms and decreased life satisfaction among caregivers (depression: $b = 0.093$, SE = 0.033, and $p < 0.01$; life satisfaction: $b = -0.099$, SE = 0.037, and $p < 0.01$).

After introducing PAC and caregiver burden to the regression model, we further uncovered indirect effects through these two variables, alongside direct effects. The model fit indexes suggested that the model fit the data well: $\chi^2(11) = 15.306$, $p = 0.169$, RMSEA = 0.032, CFI = 0.996, TLI = 0.969, and SRMR = 0.022). Both PAC and burden were significantly affected by the severity of NPS. With severer NPS among care recipients, caregivers experienced an increase in burden and a decrease in PAC (burden: $b = 0.055$, SE = 0.021, and $p < 0.01$; PAC: $b = -0.139$, SE = 0.044, and $p < 0.01$). In addition, both PAC and burden were significantly associated with depressive symptoms (PAC: $b = -0.160$, SE = 0.041, and $p < 0.001$; burden: $b = 0.675$, SE = 0.083, and $p < 0.001$) and life satisfaction (PAC: $b = 0.352$, SE = 0.042, and $p < 0.001$; burden: $b = -0.567$, SE = 0.090, and $p < 0.001$). In addition, after controlling for the impact of mediators, the direct effects from NPS to both

Table 1: Descriptive statistics ($N = 382$).

	Percent (%)	Mean (SD)	Min	Max
Dependent variables				
Depressive symptoms		6.01 (5.62)	0	25
Life satisfaction		19.97 (6.37)	5	34
Independent variable				
Severity of NPS		11.92 (7.21)	0	35
Mediators				
PAC		36.08 (7.43)	14	55
Burden		11.65 (3.25)	4	20
Moderator				
Dementia stage				
Early stage	35.86			
Middle or late stage	64.14			
Control variables				
Caregiver				
Age		55.28 (6.80)	40	70
Gender				
Male	18.59			
Female	81.41			
Relationship				
Son or daughter	91.62			
Son-in-law or daughter-in-law	8.38			
Marital status				
Married or living with a partner	52.09			
Other marital status	47.91			
Education				
High school or below	51.05			
College degree or beyond	48.95			
Working status				
Full- or part-time job	54.19			
No job	45.81			
Have religious beliefs	48.69			
Primary caregiver	72.51			
Coreside with care recipient	58.12			
Caregiving time per week (h)		48.24 (40.12)	8	168
Caregiving length (years)		4.77 (4.05)	0	26.5
Care recipient				
Age		85.25 (5.93)	67	101
Gender				
Male	18.06			
Female	81.94			
Activities of daily living		4.19 (2.05)	0	6
Instrumental activities of daily living		1.73 (2.06)	0	8
Data collected during COVID-19	53.40			

Abbreviations: NPS, neuropsychiatric symptoms; PAC, positive aspects of caregiving.

depressive symptoms ($b = 0.013$, $\mathrm{SE} = 0.032$, and $p = 0.681$) and life satisfaction ($b = -0.008$, $\mathrm{SE} = 0.035$, and $p = 0.830$) became nonsignificant, indicating a full mediation model. The standardized parameters for the paths are displayed in Figure 2.

Regarding the mediation effect, the results show that both PAC and burden significantly mediated the relationship between the severity of care recipients' NPS and caregivers' psychological well-being. Severer NPS was associated with decreased perceived PAC and exacerbated burden among caregivers, thus related to more depressive symptoms and a lower level of life satisfaction (PAC: depressive symptoms: $b = 0.022$, and 95% CI [0.007, 0.041]; life satisfaction: $b = -0.049$, and 95% CI [−0.082, −0.018]; burden: depressive symptoms: $b = 0.037$, and 95% CI [0.010, 0.070]; life satisfaction: $b = -0.031$, and 95% CI [−0.061, −0.009]). A summary of total effects, total indirect effects, single indirect effects, and direct effects is shown in Table 2.

Finally, depressive symptoms and life satisfaction were negatively correlated ($b = -3.326$, $\mathrm{SE} = 0.836$, and $p < 0.001$). The covariance between PAC and burden was significant, suggesting that higher levels of PAC were related to lower levels of burden ($b = -2.772$, $\mathrm{SE} = 0.833$, and $p < 0.01$).

4.3. Moderating Effect of Dementia Stage.

By including dementia stage as a moderator, we further examined whether dementia stage modified the paths in the mediation model.

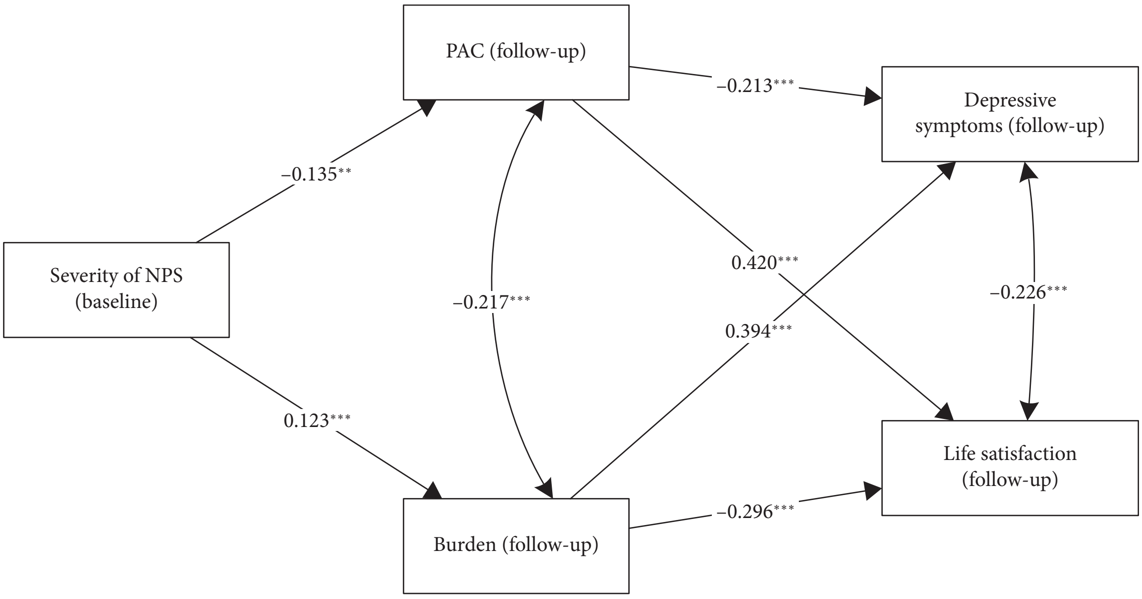

Figure 2: Paths from severity of NPS to psychological well-being (standardized parameters). *Notes*. (1) $\chi^2(11) = 15.306$, $p = 0.169$, RMSEA = 0.032, CFI = 0.996, TLI = 0.969, and SRMR = 0.022; (2) NPS, neuropsychiatric symptoms; PAC, positive aspects of caregiving. Significance levels: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

Table 2: Total effect, direct effect, and indirect effect ($N = 382$).

Paths	***b***	***β***	**(95% CI)**
DV: depressive symptoms			
Total effect	0.073	0.095	(0.000, 0.139)
Direct effect	0.013	0.017	(−0.053, 0.075)
Indirect effect			
Total indirect	0.060	0.078	(0.025, 0.099)
Severity of NPS ⟶ PAC ⟶ depressive symptoms	0.022	0.029	(0.007, 0.041)
Severity of NPS ⟶ burden ⟶ depressive symptoms	0.037	0.049	(0.010, 0.070)
DV: life satisfaction			
Total effect	−0.088	−0.102	(−0.160, −0.010)
Direct effect	−0.008	−0.009	(−0.073, 0.059)
Indirect effect			
Total indirect	−0.080	−0.093	(−0.126, −0.037)
Severity of NPS ⟶ PAC ⟶ life satisfaction	−0.049	−0.057	(−0.082, −0.018)
Severity of NPS ⟶ burden ⟶ life satisfaction	−0.031	−0.037	(−0.061, −0.009)

Note: $\chi^2(11) = 15.306$, $p = 0.169$, RMSEA = .032, CFI = 0.996, TLI = 0.969, and SRMR = 0.022.
Abbreviations: NPS, neuropsychiatric symptoms; PAC, positive aspects of caregiving.

In the first step, we allowed the parameters in each group to be freely estimated, yielding a satisfactory model fit: $\chi^2(20) = 22.108$, $p = 0.335$, RMSEA = 0.023, CFI = 0.998, TLI = 0.982, and SRMR = 0.013. Second, each path was constrained equal across groups sequentially. However, the results show that the model fit significantly worsened only when the path from PAC to depressive symptoms was constrained as equal: χ^2 difference = 3.891, df = 1, and $p < 0.05$.

Therefore, we established a final multiple group path model by constraining all other paths to be equal across groups and only allowing the path from PAC to depressive symptoms to vary (Figure 3). The model fit was adequate: $\chi^2(94) = 99.941$, $p = 0.318$, RMSEA = 0.018, CFI = 0.994, TLI = 0.989, and SRMR = 0.033. The results suggest that PAC only had a significant association with depressive symptoms among caregivers whose care recipients were in the middle or late stage of dementia (early stage: $b = -0.055$, SE = 0.035, and $p = 0.118$; middle or late stage: $b = -0.157$, SE = 0.040, and $p < 0.001$). The moderation effects were statistically significant based on a Wald test: $\chi^2(1) = 4.102$, and $p < 0.05$.

5. Discussion

In this study, we proposed a DCPT model and it was supported by empirical findings as presented in the current study. Based on a panel study design with adult–child caregivers of parents with dementia, the DCPT model was empirically confirmed. In particular, care recipients' NPS exacerbated caregivers' psychological well-being by simultaneously decreasing PAC and increasing caregiving burden. Moreover, although PAC was associated with enhanced life satisfaction among caregivers at all stages, it only was related

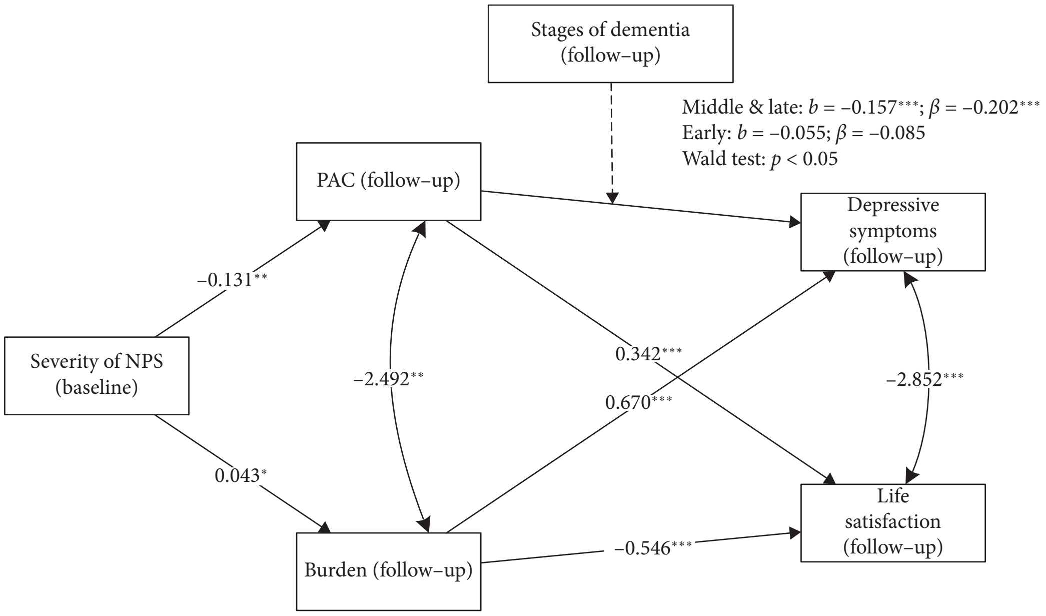

Figure 3: Moderating effect of stages of dementia (unstandardized parameters). *Notes*. (1) $\chi^2(94) = 99.941$, $p = 0.318$, RMSEA = 0.018, CFI = 0.994, TLI = 0.989, and SRMR = 0.033; (2) NPS, neuropsychiatric symptoms; PAC, positive aspects of caregiving. Significance levels: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

to decreased depressive symptoms for those whose care recipients were in the middle or late stages of dementia. To our knowledge, the present study represents the first attempt to propose and examine a theoretical framework that integrates the impact of disease progression on the caregiving process and includes both positive and negative sides of caregiving (i.e., PAC and burden). The results of this study not only contributed theoretical insights and extended the present understanding of family caregiving but also offered valuable guidance for developing tailored intervention strategies that can better accommodate caregivers with diverse characteristics and adapt to the disease trajectory.

The present study confirmed the two-factor pathways. Using longitudinal data, we confirmed that care recipients' NPS negatively affected adult–child caregivers' appraisals (i.e., decreased PAC and increased burden). Though previous cross-sectional studies suggested that NPS was less related to caregiving burden among adult–child caregivers [11, 30], this study provided longitudinal evidence that NPS remains a crucial predictor of caregiving burden. Our study also provided further evidence for the longitudinal relationship between NPS and PAC (i.e., PAC is negatively affected by NPS among adult–child caregivers), which previous cross-sectional studies partially identified [10, 14]. However, unlike a previous study that suggested the dominant role of caregiving burden among adult–child caregivers [10], this study used a panel design and found that PAC also played a crucial role. One potential explanation for this discrepancy could be cultural differences. Previous research in Western countries has generally reported a relatively low level of PAC among adult–child caregivers, which might limit its protective effect [14]. However, as previously discussed, PAC may be more salient in Chinese contexts due to cultural values. Adult children might believe that it is their obligation to care for their parents and thus might voluntarily and willingly provide care, rather than feeling coerced [32, 33]. Consequently, they might experience a higher level of PAC, which could protect against declines in psychological well-being.

The impact of disease progression on caregiving proposed by the DCPT model was also supported in this study. The path from PAC to depressive symptoms was found to be significantly moderated by dementia stage. More specifically, among caregivers of care recipients in the early stage of dementia, PAC only contributed to increased life satisfaction. However, among those caring for individuals in the middle or late stages of dementia, PAC could also protect caregivers from depressive symptoms. This finding expands the conclusions drawn by previous studies in the field of family caregiving, verifying that positive appraisals might play a more important role in contexts of severer dementia that is less controllable [44]. The nonsignificant moderating effects on other paths suggest the stability of relationships among all stages of dementia, further highlighting the importance of developing corresponding and tailored interventions across the disease trajectory.

The results from our study provide practical implications for social work practice and social policies. First, care recipients' NPS were a profound predictor of caregivers' appraisals and psychological well-being. Because some components of NPS are not irreversible, it is of great importance to provide relevant prevention and intervention support to mitigate care recipients' NPS [17]. Second, the present study's results underscore the importance of both PAC and burden. Interventions should adopt a more comprehensive perspective, seeking to enhance PAC and decrease burden simultaneously. Third, tailored interventions and policies need to be developed that adapt to the disease trajectory. For instance, when care recipients have entered a more advanced dementia stage, strategies such as benefit finding that can enhance caregivers' PAC should be emphasized more in early stages of dementia [60]. Due to discrepancies among subgroups of caregivers, targeted interventions and population-specific policies (e.g., that reduce work–family conflict and enhance work–family enrichment) also need to be established. Finally, although this study developed the DCPT model for caregivers of older adults living with dementia, this model provides valuable insights for research and practice in other related areas (e.g., caregivers of people with other chronic conditions). Specifically, the DCPT model is primarily based on the two-factor model, which has been successfully applied to different caregivers [61, 62]. Furthermore, although the moderating role of dementia stage is specified to dementia caregivers, the dynamic perspective adopted by this theoretical framework has potential to be applied to research into other caregivers given that many diseases are also progressive and may result in different disease stages. Therefore, future studies are warranted to examine this theoretical model in other subgroups of family caregivers.

Despite these contributions and implications, the present study has some limitations. Even though we used two-wave longitudinal data, causal inference was only partially achieved. More follow-up surveys need to be conducted to confirm the causal relationships in this pathway model. Furthermore, we differentiated the caregiving process by dementia stage using multiple group analysis. With this approach, we compared the experience of caregiver–care recipient dyads in different stages at one time, rather than following the process of each dyad throughout the caregiving trajectory. Based on initial evidence provided by this study, quantitative or qualitative studies should adopt a person-centered approach and follow the whole process of caregiving, further deepening our knowledge of the caregiving process. In addition, this study adopted a self-report approach to measure dementia stage, which might cause information inaccuracy. Therefore, we recommend future studies to use objective measures (e.g., medical records) or scales to further examine the moderating role of dementia stage in the caregiving process. Finally, in the present study, we focused on adult–child caregivers of older adults with dementia in Hong Kong only, which limits the empirical generalizability of the study finding.

6. Conclusions

This study proposed and examined the DCPT model that integrated dementia stage to the two-factor caregiving process in adult–child caregivers in Hong Kong SAR, China. Results from this study confirm that caregiving burden and PAC played significant mediating roles in the associations of care recipients' NPS with caregivers' depressive symptoms and life satisfaction. Furthermore, dementia stage was found to significantly moderate the association between PAC and caregivers' depressive symptoms. Specifically, PAC showed a significant association with depressive symptoms only among caregivers of individuals with middle- or late-stage of dementia. This study highlights the importance of managing care recipients' NPS, enhancing PAC, and alleviating caregiving burden in promoting caregivers' psychological well-being. To achieve this, tailored interventions should be developed to address specific needs at different stages of the disease trajectory.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author on request. The data are not publicly available due to privacy or ethical restrictions.

Ethics Statement

Ethical approval was obtained from the Human Research Ethics Committee, The University of Hong Kong (reference number: EA1802010), and the Institutional Review Board of The University of Hong Kong/Hospital Authority Hong Kong West Cluster (reference number: UW 19-779).

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Vivian W. Q. Lou contributed to study design, supervision, data analysis, and paper writing and revision. Yuqi Yan contributed to data analysis, original draft preparation and writing, and revision. Nan Lu contributed to study design, data analysis, and paper writing and revision.

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