

How Effective Are Interventions With Caregivers? An Updated Meta-Analysis

Silvia Sörensen, PhD,¹ Martin Pinquart, Dr habil,² and Paul Duberstein, PhD¹

Purpose: The purpose of this study was to determine the effectiveness of interventions for family caregivers of older adults. **Design and Methods:** Meta-analysis was used to synthesize the effects of 78 caregiver intervention studies for six outcome variables and six types of interventions. **Results:** The combined interventions produced a significant improvement of 0.14 to 0.41 standard deviation units, on average, for caregiver burden, depression, subjective well-being, perceived caregiver satisfaction, ability/knowledge, and care receiver symptoms. Intervention effects were larger for increasing caregivers' ability/knowledge than for caregiver burden and depression. Psychoeducational and psychotherapeutic interventions showed the most consistent short-term effects on all outcome measures. Intervention effects for dementia caregivers were smaller than those for other groups. The number of sessions, the setting, care receiver age, caregiver age, gender, type of caregiver-care receiver relationship (spouse vs adult child), initial burden, and study characteristics moderated the observed effects. **Implications:** Caregiver interventions are effective, but some interventions have primarily domain-specific effects rather than global effects. The differences between intervention types and moderators suggest ways of optimizing interventions.

Key Words: Caregiving, Treatment, Older adults, Meta-analysis, Elderly, Dementia

Family caregivers of elderly persons with physical ailments and/or dementing illnesses often experience high levels of stress (Vitaliano, Russo, Young, Becker, & Maiuro, 1991), which can lead to a lowered sense of well-being (Rose-Rego, Strauss, & Smyth, 1998), feelings of being burdened (Dunkin & Anderson-Hanley, 1998), depression (Bodnar & Kiecolt-Glaser,

1994; Rose-Rego et al., 1998), compromised physical health (Loomis & Booth, 1995; Rose-Rego et al., 1998), and even premature mortality (Schulz & Beach, 1999). Although some caregivers derive benefits from caregiving (Kramer, 1997), many are nonetheless in need of psychosocial and instrumental support. In this article, we report the findings of a meta-analysis examining the effects that psychoeducational, supportive, respite-based, psychotherapy, care receiver-focused, and multicomponent interventions have on caregivers.

Early studies of the effects of interventions relied on the clinical impressions of group leaders or satisfaction surveys of small, select samples of caregivers (see Toseland & Rossiter, 1989, for review). These interventions were, not surprisingly, judged to be effective. However, more recent studies using standard measures of change in emotional distress were less conclusive (for reviews, see Bourgeois, Schultz, & Burgio, 1996; Callahan, 1989; Cooke, McNally, Mulligan, Harrison, & Newman, 2001; Kennet, Burgio, & Schulz, 2000; Pusey & Richards, 2001).

In response to Callahan's (1989) provocative suggestion that many interventions fail to produce desirable effects and the ensuing flurry of studies in the early 1990s, Knight, Lutzky, and Macofsky-Urban (1993) published a meta-analysis of studies on the effectiveness of caregiver intervention programs, focusing on caregiver distress. They observed that interventions had small to moderate effects but that results of individual studies were often inconsistent with each other, and many showed minimal or no effects. Callahan's critique of caregiver interventions was thus diminished but not invalidated.

In explaining the inconsistencies in intervention effectiveness, Knight and colleagues (1993; see also George & Gwyther, 1986; Zarit, 1994) discussed three major limitations of the existing research. The first is the failure to examine multiple outcome variables. Some outcome measures may be more sensitive to change than others (George & Gwyther, 1986). For example, measures of caregiver burden are often less modifiable than measures of well-being. Examining the effect of an intervention only on burden may underestimate its effectiveness.

The second major issue is the lack of attention to differences between types of interventions. Because

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Address correspondence to Silvia Sörensen, PhD, Geriatrics and Neuropsychiatry, Department of Psychiatry, University of Rochester Medical Center, 300 Crittenden Blvd., Rochester, NY 14642-8409. E-mail: silvia_sorensen@urmc.rochester.edu

¹Geriatrics and Neuropsychiatry, Department of Psychiatry, University of Rochester Medical Center, NY.

²Department of Developmental Psychology, Friedrich Schiller University, Jena, Germany.

interventions vary in their style of administration and content, some outcomes may be more responsive to certain types of interventions. For example, assuming that specific types of interventions yield specific effects, one might expect psychoeducational interventions to have a stronger effect on knowledge about the care receiver's condition or knowledge about effective ways to cope with stress, but not necessarily on burden. However, if it is assumed that the effects of interventions are nonspecific, then the effect of psychoeducational interventions on knowledge and burden may be roughly equivalent.

The third issue involves the need to identify moderators of intervention effectiveness, including the influence of (a) the intensity of interventions (individual or group, number of sessions), (b) the extent to which participants adhere to the intervention (regularity of attendance and dropout), (c) the type of relationship between caregiver and care recipient (spouses, adult children), (d) random assignment, and (e) reliability and validity of the outcome measures.

Since the publication of Knight and associates' (1993) meta-analysis, the findings of new intervention studies have been reported. Many have used methodologically sophisticated designs and provided more complete descriptions of subjects, procedures, and outcomes than have earlier studies. The purpose of the present study was, therefore, to present an updated and expanded meta-analysis in which we estimate the effectiveness of interventions for caregivers and examine potential moderators.

The difference between efficacy and effectiveness has been highlighted in clinical and epidemiological research (Fletcher, Fletcher, & Wagner, 1996). *Efficacy* refers to whether treatment has the desired effect under ideal conditions of implementation. In efficacy studies, participants are restricted to those who will adhere completely to the treatment as presented. In contrast, *effectiveness* is established by offering a program and allowing participants to accept or reject it as they would in a real-world implementation. Thus, it focuses more on generalizability than on internal validity. Because in meta-analysis treatment conditions cannot be controlled retrospectively and because most of the studies in this area have examined effectiveness, not efficacy, the results of this study bear on the effectiveness of interventions with caregivers.

Intervention Outcomes

Intervention studies have used a number of different outcome measures. Knight and colleagues (1993) distinguished two major categories: caregiver burden and dysphoria. However, there are a number of other outcome criteria that have not been investigated in a meta-analytic study. The availability of a large number of studies with diverse outcomes enables us to examine several effects of caregiver interventions in addition to those on depression and burden. These effects are subjective well-being, uplifts of caregiving, ability/knowledge, and symptoms of care receivers.

We also test whether effect sizes are dependent on the measurement used for these outcomes.

Types of Interventions

Caregiver interventions can be divided into two major groups: (a) those aimed at reducing the objective amount of care provided by caregivers (respite, interventions to enhance the competence of the care receiver) and (b) those aimed at improving the caregiver's well-being and coping skills (e.g., psychoeducational interventions, support groups). Knight and associates (1993) suggested that a one-size-fits-all approach to assisting caregivers may not be useful because caregivers have vastly different needs. The data we have compiled allow us to conduct separate analyses to examine the effectiveness of six distinct types of caregiver intervention: psychoeducational interventions, supportive interventions, respite/adult day care, psychotherapy, interventions to improve care receiver competence, and multicomponent interventions. Classification into these types was based on the dominant approach used, as described in the original empirical article. When several approaches appeared to have equal weight, the intervention was classified as multicomponent.

Psychoeducational Interventions (38 Studies).—Psychoeducational interventions involve a structured program geared toward providing information about the care receiver's disease process and about resources and services and training caregivers to respond effectively to disease-related problems, such as memory and behavior problems in dementia patients or depression and anger in cancer patients (e.g., Chiverton & Caine, 1989; Schultz, Smyrniotis, Schultz, & Grbich, 1994; Ostwald, Hepburn, Caron, Burns, & Mantell, 1999). Intervention formats usually include lectures, group discussions, and written materials and are always led by a trained leader. Support may be part of a psychoeducational group, but it is secondary to the educational content.

Supportive Interventions (7 Studies).—This category subsumes both professionally led and peer-led unstructured support groups focused on building rapport among participants and creating a space in which to discuss problems, successes, and feelings regarding caregiving (e.g., Gonyea & Silverstein, 1991; Scharlach, 1987 [Condition B]; Toseland, Rossiter, & Labrecque, 1989 [self-help group]). Rather than using the principles of group therapy to explore deeper psychological conflicts or confront participants with problematic behaviors, support groups help the participants recognize that others have similar problems, and they provide an opportunity for participants to exchange ideas and strategies for coping with their shared difficulties. Support groups rely strongly on group members to provide mutual emotional support and to share concrete information on the nature of the care receiver's needs, how to manage problem behaviors, and where to obtain services. In

contrast to psychoeducational programs, these interventions are rarely standardized or manualized, education is not their primary focus, and publications rarely provide much detail on the exact content or procedure (e.g., Gonyea & Silverstein, 1991). Of the seven supportive interventions, one was peer led (Toseland et al., 1989 [self-help group only]) and the rest had professional leaders.

Respite/Adult Day Care (13 Studies).—Respite care is either in-home or site-specific supervision, assistance with activities of daily living, or skilled nursing care designed to give the caregiver time off. It does not imply that activities or programs are offered to the care recipient (e.g., Burdz, Easton, & Bond, 1988). Adult day care programs provide a combination of respite and activity programs. The interventions often engage the care receiver away from home and offer stimulating programs tailored toward the patient population's specific needs (e.g., Guttman, 1991; Zarit, Stephens, Townsend, & Greene, 1998).

Psychotherapy (10 Studies).—This type of intervention involves a therapeutic relationship between the caregiver and a trained professional. Most psychotherapeutic interventions with caregivers follow a cognitive-behavioral approach ($N = 9$), where therapists may teach self-monitoring, challenge negative thoughts and assumptions that maintain the caregiver's problematic behavior; help caregivers develop problem-solving abilities by focusing on time management, overload, and emotional reactivity management; and help the caregiver reengage in pleasant activities and positive experiences (e.g., Goldberg & Wool, 1985; Lovett & Gallagher, 1988).

Interventions to Improve Care Receiver Competence (6 Studies).—These interventions include memory clinics for patients with dementia and activity therapy programs designed to improve affect and everyday competence (LoGiudice et al., 1999; Zarit, Zarit, & Reever, 1982). We included studies that report caregiver outcomes, even if they were otherwise focused on the patient.

Multicomponent Interventions (12 Studies).—Interventions in this group included various combinations of educational interventions, support, psychotherapy, and respite (e.g., Montgomery & Borgatta, 1989).

Miscellaneous.—Three studies could not be coded into one of the above categories because, although they offered more than one intervention component, there was evidence that some participants did not use or were not exposed to more than one component (e.g., Newcomer, Yordi, DuNah, Fox, & Wilkinson, 1999; Weuve, Boulton, & Morishita, 2000).

Moderators of Caregiver Intervention Effectiveness

Three groups of moderators of the effectiveness of caregiver interventions are analyzed here: (a) characteristics

Table 1. Moderators of Intervention Effects and Their Coding

Variable	Coding
Characteristics of the Intervention	
No. sessions	Continuous: 1–108; z standardized for analysis
Group vs individual or mixed	1 = group, 0 = other
Individual vs group or mixed	1 = individual, 0 = other
Dropout rate	Continuous (0%–64%)
Characteristics of the Caregiving Situation	
Care receiver diagnosis	1 = dementia, 0 = other
Caregiver age	Continuous (47–74 years)
% female caregivers	Continuous (40–100%)
Relationship to care receiver	
% adult children	Continuous (0%–100%)
% are spouses	Continuous (0%–100%)
Subjective burden at pretest	Continuous ZCBI score (14.3–55.7)
No. of hours/week spent caregiving	Continuous (9.9–122)
No. of years spent caregiving	Continuous (0.3–6.7)
Characteristics of the Study	
Random assignment to treatment and control	1 = random, 0 = nonrandom/no information
Year of publication	Continuous (1982–2001)

Note: ZCBI = Zarit Caregiver Burden Inventory.

of the intervention, (b) characteristics of the caregiving situation, and (c) characteristics of the study. The moderators and their coding are described in Table 1.

First, characteristics of the intervention—for example, whether the intervention is conducted with individuals or in a group setting—and also how many sessions the treatment involves may have an impact on its effectiveness (Toseland, Rossiter, Peak, & Smith, 1990; Whitlatch, Zarit, & von Eye, 1991; Zarit, Anthony, & Boutselis, 1987). Treatment effectiveness may also be inflated or mitigated by participant dropout from the intervention group or from the waiting list.

Second, the nature of the caregiving situation and the caregiver population are important considerations. For example, caregivers for dementia patients have higher stress levels than other caregivers (Clipp & George, 1993; Coen, Swanwick, O'Boyle, & Coakley, 1997), suggesting that responses to interventions may also differ. Spouse caregivers have been shown to suffer more from providing care than adult children (Barber & Pasley, 1994; Tennstedt, McKinlay, & Sullivan, 1988), thus suggesting that they may differ in their needs and in how they benefit from interventions.

Third, characteristics of the study, including the design, may also moderate the findings of intervention studies. For example, nonrandom assignment of participants to intervention and nonintervention groups may lead the more distressed caregivers to self-select into the intervention groups. This may undermine attempts to unequivocally document the intervention's effectiveness. Another study characteristic that may moderate

findings is when the study was published: Investigators who have implemented studies more recently have had access to more information about the validity of measures and potential pitfalls in caregiver intervention.

In sum, in this article we report the effectiveness of caregiver interventions in three major steps: (a) the averaged effect of all types of interventions on six outcome measures (caregiver burden, depression, subjective well-being, uplifts, ability/knowledge, and care receiver symptoms), (b) the effects of six types of interventions (psychoeducation, supportive interventions, psychotherapy respite/daycare, care receiver training, and multicomponent), and (c) the extent to which intervention effects are moderated by characteristics of the intervention, of the caregiving situation, and of the study. The coding of the variables is displayed in Table 1.

Methods

Literature Search

A comprehensive sample of the available studies that investigate the effects of interventions with caregivers to older adults on caregiver outcomes was identified from the geriatric, gerontological, and clinical literature by searching electronic databases (Psycinfo, Medline, Psyn dex; search terms: *caregiver* or *carer* or *caregiving*, *intervention* or *support* or *training*, and *elderly* or *old age*) and using the ancestry method. In addition, suggestions from reviewers were included. Criteria for inclusion of the studies in the meta-analysis were the following:

1. The care recipients had a mean or median age of ≥ 60 years.
2. An intervention condition was compared with an untreated control condition. Comparisons of several treatments (e.g., Steffen, Futterman, & Gallagher-Thompson, 1998) were not included because (a) the goal of the meta-analysis was to test whether greater improvements were found in caregivers who received treatment compared with caregivers who received no specific intervention; (b) if two interventions were compared, there would be no theoretical reason to label one as the experimental condition and the other as the control condition; and (c) comparing change in an intervention condition to change in a control condition that is also an intervention underestimates intervention effects when both interventions show some desired effects.
3. At least one of the following outcomes was reported: caregiver burden, depression, other measures of psychological well-being (e.g., life satisfaction, morale, self-esteem, happiness), uplifts of caregiving, caregivers' knowledge and/or coping abilities, and care receivers' symptoms.
4. Statistics could be converted into effect sizes (means, F or t values, correlations).
5. Studies were written in German, English, French, or Russian.
6. Studies were published in peer-reviewed journals.

The 78 eligible studies are listed in the References and marked with an asterisk. Fifteen additional studies had to be excluded because they provided insufficient information to calculate effect sizes, 32 were excluded because they did not include a no-treatment control group or did not provide comparative data on the no-treatment group, and 14 were excluded because they were not published in peer-reviewed journals (see Appendix, Note 1). Most studies were in English (76); two German studies were included as well. The majority of articles were from *The Gerontologist* (12), the *Journal of the American Geriatrics Society* (6), *Psychology and Aging* (4), the *Journal of Gerontology* (3), *International Journal of Geriatric Psychiatry* (3), and *Nursing Research* (3). The studies were coded by two doctoral-level raters who had specialized training in gerontology. In addition, one rater had special training in behavior therapy and practical experience leading caregiver support and psychoeducational groups. The average observed agreement between the raters (Cohen's κ) was .91. Inconsistencies between the raters were resolved by discussion.

Outcome Measures

We used six main outcome variables. Of the 78 studies, 57 reported effects for caregiver burden; 40, for depression; 23, for other self-rated measures of subjective well-being; 3, for uplifts of caregiving; 33, for knowledge and coping abilities; and 31, care receiver symptoms as well as caregiver outcomes.

Caregiver burden was assessed using the Zarit Burden Scale (Zarit, Reever, & Bach-Peterson, 1980; 21 studies), Montgomery and Borgatta's Burden Scale (1989; 8 studies) and other scales (29 studies).

Self-rated depression was most often measured with the Centers for Epidemiologic Studies–Depression Scale (Radloff, 1977; 8 studies), the Beck Depression Inventory (Beck & Steer, 1987; 8 studies), the Depression Subscale of the Brief Symptom Inventory (Derogatis & Melisaratos, 1983; 7 studies), the Geriatric Depression Scale (Yesavage et al., 1983; 5 studies), and other measures (13 studies).

Subjective well-being was assessed with a broad variety of measures, including the Affect Balance Scale (Bradburn, 1969; 6 studies), Life Satisfaction Scales (e.g., Neugarten, Havighurst, & Tobin, 1961; 4 studies), the Philadelphia Geriatric Center Morale Scale (Lawton, 1975; 4 studies), the Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988; 3 studies), the Profile of Mood States (McNair, Lorr, & Droppleman, 1971; 2 studies), and other scales (8 studies).

Uplifts were measured as sources of satisfaction from caregiving or satisfaction with caregiving (three studies).

Ability and knowledge dealt with the necessary tools to cope competently with the caregiver role. It was most often assessed by questionnaires on knowledge about the care receiver's illness and available services (16 studies), coping abilities (10 studies), and self-efficacy

specifically in dealing with caregiving tasks (11 studies). (Self-efficacy was included here rather than under well-being because it was specific to care-related abilities.)

Care receiver outcomes were assessed by the Memory and Behavior Problem Checklist (Teri et al., 1992; 17 studies), deficits in functional abilities (activities of daily living [ADL], instrumental ADL [IADL]; e.g., RPI Home Care Classification Project, 1986; 8 studies), and others (9 studies).

Statistical Integration of Research Findings

We performed calculations for the meta-analysis in five steps mainly by using procedures outlined by Hedges and Olkin (1985).

1. Effect sizes were computed for each study as the difference in the posttreatment measure between the experimental and control groups divided by the pooled standard deviation (Glass, McGaw, & Smith, 1981; Hedges, 1981). Effect sizes were also derived from *t* values, *F* values, exact *p* values, and alpha levels. The effect size estimates were adjusted for bias due to differences in pretests between the experimental and control groups on the basis of Mullen (1989) and for bias owing to overestimation of the population effect size (common for small samples), based on Hedges (1981). Confidence intervals that include 95% of the effects were computed for each effect size.
2. Weighted mean effect sizes were computed.
3. The significance of the mean effect size was tested by dividing the mean effect size by the estimation of the standard deviation. Differences between two conditions were interpreted as significant when the 95% intervals did not overlap (Hedges & Olkin, 1985).
4. The homogeneity of effect sizes was computed by use of the homogeneity statistic *Q*, which is distributed approximately as chi-square with *k* - 1 degrees of freedom, where *k* is the number of effect sizes.
5. To test the influence of moderator variables simultaneously, weighted multiple linear regression analyses were used, following the approach outlined by Hedges (1994). The significance test from the weighted regressions was corrected because the standard errors for the regression coefficients are incorrect by a factor of the square root of the residual mean square. The effects of potential moderator variables were estimated in a multivariate analysis only if data on the moderator variable were available for 80% of the studies; otherwise, univariate weighted linear regression analyses were computed.

Results

Descriptive Characteristics of the Studies

For intervention characteristics, the number of sessions ranged from 1 to 180 with a median of 8 ses-

sions. Follow-ups were conducted in 22% of cases after an average of 7 months (*SD* = 5.1 months). Group treatments were examined in 59% of the studies; 22% used individual treatments, 18% combined group and individual treatments, and 1% gave no information whether group or individual treatments were used. The average dropout rate across all studies was 19.6%. Dropout was highest for day care/respite interventions (35.9%) and for training of the care receiver (33.3%) and lowest for psychotherapy (11.7%). Dropout for psychoeducational interventions was 16.1%, 12.5% for supportive interventions, and 25.8% for multicomponent interventions.

The number of participants in the experimental (intervention) condition ranged from 4 to 2,268 (*M* = 24). Mean age of the caregivers was 62.3 years (*SD* = 3.7). The percentage of female caregivers varied between 40% and 100%, with a mean of 69%. Most of the caregivers (77%) coresided with the care receiver, 40% were adult children, 50% were spouses; the remaining 9% were siblings, nieces, nephews, grandchildren, and friends; 79% of the respondents were married, and 39% were employed. The median income of the caregivers was \$17,000. Only 14% reported their ethnicity as non-White; 78% had more than 12 years of education (high school). The caregivers had been providing care for an average of 4.0 years, and they provided 30 hours/week of care. For care receivers, the mean age was 77.3 years (*SD* = 2.9); 64% were female. More than half (61%) of the studies focused only on care for dementia patients; most of the other studies were conducted with heterogeneous samples, including seniors with physical disabilities or mental illness, stroke patients, and cancer patients. Many of the heterogeneous samples also included dementia patients, but not exclusively. Twenty-one were published before 1990. Sixty of the studies were conducted in North America, 11 in Europe, and 7 in Australia.

Effectiveness of Intervention on Different Outcomes

As shown in Table 2, all caregiver interventions taken together produced a significant improvement of between 0.14 and 0.41 standard deviation units in the level of caregiver burden, depressive mood, subjective well-being, perceived caregiving satisfaction, ability/knowledge, and care receiver symptoms. The effects for the immediate pre-post tests on burden, depression, subjective well-being, ability/knowledge, and symptoms of the care receiver were significant (*p* < .01), whereas the effect on uplifts of caregiving was only significant at the *p* < .10 level. Immediate post-test effects were significantly larger for ability/knowledge than for caregiver burden, depression, uplifts of caregiving, and symptoms of the care receiver. In addition, effects on subjective well-being were stronger than effects on burden and depression. For the follow-up, only the effects on caregiver burden, depression, subjective well-being, and ability/knowledge were significant. Follow-up effects for ability/knowledge were larger than for burden and depression; no

Table 2. Intervention Effects on Caregivers' Burden, Depression, Subjective Well-Being, Uplifts, Abilities/Knowledge, and Symptoms of Care Recipients

Variable	No. of Effects	No. of Participants	Mean Effect Size <i>g</i>	95% Confidence Interval	<i>t</i>	Homogeneity
Immediate effects (pre-post)						
Burden	75	5,187	-.15	-0.19, -0.11	-7.62***	151.96***
Depression	53	4,146	-.14	-0.18, -0.09	-6.20***	172.92***
Subjective well-being	28	950	.37	0.28, 0.46	7.85***	76.93***
Uplifts	7	499	.15	-0.02, 0.31	1.71 ⁺	12.86*
Ability/knowledge	48	1,672	.41	0.33, 0.48	10.63***	98.53***
Symptoms of care recipient	41	1,503	-.20	-0.28, -0.13	-5.11***	59.24
Pretest—follow-up						
Burden	18	1,672	-.12	-0.19, -0.05	-3.51***	37.79**
Depression	12	1,693	-.15	-0.22, -0.09	-4.40***	10.75
Subjective well-being	5	321	.23	0.08, 0.38	2.09*	25.06***
Ability/knowledge	6	159	.46	0.22, 0.70	3.87***	6.38
Symptoms of care recipient	8	291	-.09	-0.26, 0.08	-1.08	18.36**

Notes: *t* = test of significance of the mean. Homogeneity: Significant effects indicate heterogeneity of the effect sizes. Heterogeneous effects indicate that the effect sizes between studies vary and that there are likely to be moderators. Effect sizes for uplifts were not included for the follow-up because there was only one study in this category.

⁺*p* < .10; **p* < .05; ***p* < .01; ****p* < .001.

other significant differences in magnitude of effects were found.

Effectiveness of Different Forms of Intervention

We computed average effects for the different types of interventions for each class of outcome variable. As shown in Table 3, psychoeducational interventions and psychotherapy had a significant effect on all outcome variables. Multicomponent interventions had significant effects on caregiver burden, well-being, and ability/knowledge but not on depression and care receiver symptoms. Respite/daycare interventions were also effective for three outcomes: caregiver burden, caregiver depression, and caregiver well-being. In addition, supportive interventions reduced caregiver burden and increased ability/knowledge but had no effect on the other outcome variables. Furthermore, training care recipients was effective in increasing caregivers' subjective well-being and reducing care receivers' symptoms, but the effects on caregiver burden, depression, and ability/knowledge were not statistically significant. Miscellaneous interventions showed no significant effects on any outcome.

Next we calculated whether the effect sizes varied across treatments, within each outcome, by looking at the overlap of the 95% intervals. These comparisons should be interpreted with caution, given the nonrandom selection of treatment modalities. Few differences within outcomes were observed. For caregiver burden, the effect of multicomponent interventions was significantly larger than those of psychoeducation, respite/daycare, training of the care receiver, and miscellaneous interventions (Table 3). In addition, the effect of miscellaneous interventions on caregiver burden was significantly smaller than those of other interventions, except psychoeducation. Similarly, the effect of miscellaneous interventions on de-

pression was smaller than the effects of other interventions. Multicomponent interventions had larger effects on subjective well-being than on respite/daycare. There were no other significant differences between intervention types for depression, subjective well-being, ability/knowledge, and care receiver symptoms.

Influences of Moderator Variables

To answer our third research question, we tested for moderator variables. We conducted a weighted multiple regression analysis (Table 4) with the moderator variables as predictors and the mean effect size (*g*) on five of the outcomes as dependent variables (see Appendix, Note 2).

For several of the moderators, information was missing for more than 20% of the studies. For these studies, we calculated univariate weighted linear regression models (Table 5). For organizational purposes, we report the results by topic, alternately referring to Table 4 and Table 5.

Intervention Characteristics.—As shown in Table 4, intervention characteristics were strongly related to the effect sizes found. Interventions conducted in a group setting yielded smaller effects for improvement in caregiver burden and well-being than did individual or mixed interventions. However, with regard to the reduction of care receiver symptoms, group interventions had larger effects. That is, group interventions were less effective at improving burden and well-being but more effective at reducing care receiver symptoms than were nongroup interventions.

Because interventions in groups were compared against a combination of individual and group interventions, the preceding analysis does not allow a direct comparison of group and individual interven-

Table 3. Effects of Different Types of Intervention on Caregiver and Care Receiver Outcomes (Pre-Post)

Intervention	No. of Effects	No. of Participants	Mean Effect Size <i>g</i>	95% Confidence Interval	<i>t</i>	Homogeneity
Effects on caregiver burden						
Psychoeducation	33	1,215	-.12	-0.21, -0.03	-2.73**	51.37*
Supportive interventions	5	134	-.35	-0.59, -0.11	-2.89**	5.22
Psychotherapy	11	305	-.31	-0.47, -0.15	-3.77***	8.09
Respite/daycare	11	682	-.30	-0.40, -0.20	-5.53***	17.50
Training of care recipient	6	110	-.08	-0.36, 0.19	-0.60	4.98
Multicomponent	7	446	-.62	-0.78, -0.46	-7.73***	20.16**
Miscellaneous	2	2,295	-.01	-0.07, 0.05	-0.34	0.15
Effects on caregiver depression						
Psychoeducation	21	776	-.43	-0.53, -0.32	-7.80***	60.21***
Supportive interventions	5	127	-.09	-0.33, 0.15	-0.73	8.72
Psychotherapy	12	334	-.29	-0.44, -0.14	-3.70***	25.47**
Respite/daycare	5	380	-.23	-0.36, -0.10	-3.42***	6.57
Training of care recipient	4	56	-.27	-0.67, 0.13	-1.31	8.25*
Multicomponent	5	200	-.11	-0.31, 0.09	-1.08	16.20**
Miscellaneous	1	2,268	-.02	-0.08, 0.04	-0.53	—
Effects on caregiver well-being						
Psychoeducation	10	320	.50	0.31, 0.68	5.43***	40.62***
Supportive interventions	2	158	.17	-0.18, 0.53	0.98	0.02
Psychotherapy	5	106	.37	0.11, 0.63	2.79**	12.95**
Respite/daycare	7	369	.20	0.06, 0.34	2.80**	8.06
Training of care recipient	1	21	.74	0.06, 1.42	2.19*	—
Multicomponent	3	76	.75	0.43, 1.08	4.61***	4.35
Effects on caregivers' ability/knowledge						
Psychoeducation	28	817	.53	0.42, 0.63	9.98***	47.17*
Supportive interventions	6	432	.29	0.13, 0.45	3.47***	9.77*
Psychotherapy	7	221	.42	0.23, 0.61	4.38***	2.50
Respite/daycare	2	79	-.23	-0.65, 0.19	-1.07	8.87**
Training of care recipient	2	44	-.16	-0.59, 0.27	-0.72	5.41*
Multicomponent	3	50	.86	0.42, 1.31	3.95***	5.37
Effects on care recipients' symptoms						
Psychoeducation	18	841	-.24	-0.35, -0.13	-4.33***	15.12
Supportive interventions	2	63	-.17	-0.52, 0.18	-0.98	0.48
Psychotherapy	8	240	-.19	-0.38, -0.00	-2.01*	13.55
Respite/daycare	4	162	-.11	-0.34, 0.12	-0.95	9.66*
Training of care recipient	5	79	-.51	-0.84, -0.18	-3.03**	4.60
Multicomponent	3	91	.14	-0.16, 0.44	0.92	11.46**
Miscellaneous	1	27	.04	-0.53, 0.61	0.14	—

Notes: *t* = test of significance of the mean. Homogeneity: Significant effects indicate heterogeneity of the effect sizes. There were no studies on the effects of miscellaneous interventions on caregiver well-being and ability/knowledge. Dashes indicate that it was impossible to calculate a homogeneity coefficient because only one study was available for that category.

p* < .05; *p* < .01; ****p* < .001.

tions. Thus, we created an additional “setting” variable (1 = interventions in an individual setting, 0 = others) that allowed us to compare the effectiveness of individual versus group or combined interventions in another multiple regression. For the individual interventions, improvements of caregiver burden ($B = .13, \beta = .15, p < .001$), depression ($B = .08, \beta = .07, p < .001$), and well-being ($B = .32, \beta = .28, p < .001$) were greater than for nonindividual interventions. Effect sizes for individual interventions did not differ from other interventions with regard to ability/knowledge and symptoms of the care receiver. Because participants were not randomly assigned to an individual treatment or a group treatment, these results should be treated with caution.

To ascertain that the moderator effect for individual versus group intervention was not merely due to

selection effects related to differences in the initial levels of objective burden (number of hours and years they provided care) and subjective burden (mean level of Zarit Caregiver Burden Inventory [ZCBI]), we compared the two groups with regard to these variables. No significant differences were found between caregivers who received individual treatments and those who received group treatments for number of caregiving hours ($M_{ind} = 46.58, SD = 42.40, N = 216$, vs $M_{group} = 50.67, SD = 14.88, N = 168$) and the levels of ZCBI at pretest ($M_{ind} = 46.93, SD = 3.80, N = 73$, vs $M_{group} = 43.94, SD = 6.88, N = 320$).

To analyze for the moderating effect of the length of interventions, we first *z*-standardized the number of sessions within each type of intervention. This transformation was performed because the number of

Table 4. Influence of Moderator Variables on Positive Intervention Effects (Weighted Multiple Linear Regression)

Variable	Improvement of Burden		Improvement of Depression		Increase of Well-Being		Increase of Ability/Knowledge		Improvement of Symptoms of Care Receivers	
	B	β	B	β	B	β	B	β	B	β
Group intervention (1 = yes, 0 = no)	-.171***	-.26	-.005	-.04	-.339***	-.29	-.004	-.01	.112***	.14
No. of sessions	-.118***	-.14	.006***	.12	-.048	-.06	.014	.03	.044***	.13
Caregiver diagnosis (1 = dementia, 0 = other or heterogeneous sample)	-.063***	-.10	-.256***	-.29	-.295***	-.33	-.209***	-.25	-.003	-.01
Caregiver age (sample mean)	.009***	.12	-.000	-.00	.024***	.32	.011***	.15	.029***	.37
Female caregivers, %	.013***	.59	-.001	-.04	.003	.06	.007***	.20	.003*	.10
Randomization (1 = yes, 0 = no)	.006	.01	-.279***	-.35	-.403***	-.45	-.126***	-.15	-.406***	-.50
Year of publication	-.005***	-.09	-.001	-.01	.007	.07	-.005	-.06	.005*	.07
Constant	9.29***		2.01		-15.46		10.24***		10.74*	
R ²	.26		.24		.28		.15		.27	

*p < .05; ***p < .001.

sessions varied systematically between the interventions, so that this variable would have been confounded with the effects of the type of intervention. The longer the intervention, the larger the effects for improving caregiver depression, but the smaller the effects for improving caregivers' ability/knowledge (Table 4).

As shown in Table 5, for intervention programs with higher dropout rates, caregiver burden, depression, and care receiver symptoms were reduced more effectively, but ability/knowledge increased less in response to the intervention than for programs with lower dropout rates.

Characteristics of the Caregiving Situation.—Using a regression model, we compared studies in which all care receivers were suffering from dementia to those in which only a subset were dementia patients or in which there were no dementia patients. Table 4 shows that interventions were less effective at improving caregiver burden, depression, subjective well-being,

and ability/knowledge when all care receivers had dementia than when care receivers did not have dementia or when the sample was mixed. Surprisingly, there was no association of patient diagnosis with the effect sizes for changes in care receiver symptoms. Note that because only seven studies specifically excluded caregivers of elders with dementia, we were not able to test whether interventions with these groups had a stronger effect than those that exclusively focused on dementia caregivers or on mixed groups of caregivers. In contrast to care receivers' diagnoses, their age was positively associated with intervention effectiveness for improvement of burden, depression, and subjective well-being (Table 5).

Caregiver characteristics were less consistently associated with intervention effectiveness. The effects of interventions varied with the percentage of adult child versus spouse caregivers: The larger the proportion of adult children participating in the intervention, the greater were the improvements for burden, depression, subjective well-being, and ability/knowledge, but

Table 5. Influence of Moderator Variables on Positive Intervention Effects (Univariate Multiple Linear Regression)

Variable	Improvement of Burden		Improvement of Depression		Increase of Well-Being		Increase of Ability/Knowledge		Improvement of Symptoms of Care Receivers	
	B	β	B	β	B	β	B	β	B	β
Dropout rate	.007***	.35	.002**	.10	.001	.09	-.007***	-.23	.023***	.52
Care receiver age (sample mean)	.013***	.11	.008**	.06	.024***	.31	-.005	-.05	.005	.06
Care providers who are adult children, %	.002***	.17	.004***	.22	.003***	.22	.003***	.24	-.003***	-.25
Care providers who are spouses, %	-.002***	-.15	-.003***	-.18	-.004***	-.31	-.003***	-.27	.002***	.23
Hours/week spent caregiving	-.008***	-.78	-.007***	-.60	-.016***	-.98	.015***	.83	-.008	-1.00
No. of years spent caregiving	-.013	-.05	-.041**	-.13	.090***	.35	.053***	.25	.054**	.19
Level of subjective burden at pretest (ZCBI; Zarit et al., 1980)	.004***	.35	.010***	.56	.009***	.81	-.002***	-.28	-.007*	-.14

Note: ZCBI = Zarit Caregiver Burden Inventory.
*p < .05; **p < .01; ***p < .001.

the smaller the improvements of care receiver symptoms. Similarly, smaller improvements for burden, depression, subjective well-being, and ability/knowledge, but greater improvements for care receiver symptoms, were found in studies with a higher percentage of spousal caregivers. Also, interventions with older caregivers yielded larger improvements of burden, subjective well-being, ability/knowledge, and care receiver symptoms than those with younger caregivers; no effects were found for depression (Table 4). As shown in Table 4, for studies with a higher percentage of female caregivers, the reduction in burden, the increase of ability/knowledge, and the improvement of care receiver symptoms was more pronounced than for studies with a higher proportion of male caregivers. However, no gender differences were found for changes in depression and subjective well-being.

Furthermore, we found that the effects of interventions varied by the levels of objective and subjective burden at the time of first measurement. With regard to objective burden, in studies where caregivers provided support for more hours, we found less improvement for burden, depression, and subjective well-being, but greater improvements for ability/knowledge. In addition, in studies where caregivers had been providing care over a longer period, a greater increase in well-being and ability/knowledge and a greater improvement of care receivers' symptoms but a smaller decrease in depression were observed. Greater subjective burden (as indicated by Zarit and colleagues', 1980, burden interview) at pretest was associated with greater improvements during intervention for caregiver burden, depression, and well-being, but smaller improvements of ability/knowledge and symptoms of the care receiver (Table 5).

Study Characteristics.—The measurement of outcome variables was a concern in this study. We com-

pared, first, the different measures of caregiver burden. Studies using Zarit and colleagues' (1980) ZCBI had lower effect sizes ($g = -.04$, confidence interval [CI] $-.09, .01$) than those using other measures ($g = -.29$, CI $-.34, -.24$). Interventions using the Geriatric Depression Scale showed lower effect sizes ($g = -.03$, CI $-.09, .02$) than studies using the Beck Depression Inventory ($g = -.43$, CI $-.60, -.26$). However, the intervention effects on other self-ratings on subjective well-being, ability/knowledge, and care receiver's symptoms did not vary by the method of assessing these variables. We also looked at whether earlier studies may have shown larger effects than later studies. This was the case for caregiver burden but not for other outcomes. In fact, for improvement of care receiver symptoms, later studies had larger effects.

Whether treatment and control group were randomly assigned significantly predicted the size of the effects for four out of five outcome variables. Depression, subjective well-being, ability/knowledge, and care receiver symptoms showed less improvement in randomized studies. For this reason, we also computed average effect sizes for each outcome measure and for each intervention type only for randomized studies. As shown in Table 6, we found significant short-term effects of interventions for caregiver burden, depression, ability/knowledge, and symptoms of the care receiver, and, at the $p < .10$ level, for subjective well-being. Significant effects at follow-up were found for depression and ability/knowledge and, at the $p < .10$ level, for caregiver burden.

The comparison of different types of interventions using only randomized studies revealed that psychotherapy was effective with regard to all outcome measures. Psychoeducational interventions had significant effects for all but two outcomes (well-being and care receiver symptoms; Table 7). Multicomponent in-

Table 6. Intervention Effects on Caregiver Burden, Depression, Subjective Well-Being, Uplifts, Abilities/Knowledge, and Symptoms of Care Recipients: Randomized Studies Only

Variable	No. of Effects	No. of Participants	Mean Effect Size g	95% Confidence Interval	t	Homogeneity
Immediate effects (Pre-Post)						
Burden	45	3,699	-.12	-0.16, -0.07	-4.87***	82.79***
Depression	40	3,320	-.06	-0.11, -0.01	-2.52*	111.44***
Subjective well-being	14	386	.14	-0.01, 0.28	1.86+	32.93**
Uplifts	4	83	.03	-0.27, 0.32	0.17	0.74
Ability/knowledge	34	922	.37	0.27, 0.46	7.55***	68.95***
Symptoms of care recipient	34	1,098	-.12	-0.20, -0.03	-2.61**	36.31
Pretest—follow-up						
Burden	11	1,267	-.07	-0.15, 0.01	-1.74+	17.97
Depression	8	1,258	-.14	-0.22, -0.06	-3.46***	8.27
Subjective well-being	1	96	-.11	-0.39, 0.17	-0.76	—
Ability/knowledge	5	140	.37	0.12, 0.62	2.90**	2.26
Symptoms of care recipient	8	291	-.09	-0.26, 0.08	-1.08	18.36*

Notes: t = test of significance of the mean. Homogeneity: Significant effects indicate heterogeneity of the effect sizes. Heterogeneous effects indicate that the effect sizes between studies vary and that there are likely to be moderators. Effect sizes for uplifts were not included for the follow-up because there was only one study in this category. Also, because there was only one study for subjective well-being follow-up, no homogeneity coefficient could be calculated.

+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 7. Effects of Different Types of Interventions on Caregiver and Care Receiver Outcomes (Pre-Post):Randomized Studies Only

Intervention	No. of Effects	No. of Participants	Mean Effect Size <i>g</i>	95% Confidence Interval	<i>t</i>	Homogeneity
Effects on caregiver burden						
Psychoeducation	21	582	-.12	-0.24, -0.01	-2.04*	26.50
Supportive interventions	4	121	-.35	-0.60, -0.10	-2.78**	5.21
Psychotherapy	8	240	-.22	-0.41, -0.03	-2.31*	1.96
Respite/daycare	1	16	.34	-0.36, 1.04	0.96	—
Training of care recipient	5	79	-.13	-0.46, 0.20	-0.77	4.77
Multicomponent	4	366	-.65	-0.84, -0.46	-7.03***	19.00***
Miscellaneous	2	2,295	-.01	-0.07, 0.05	-0.34	0.15
Effects on caregiver depression						
Psychoeducation	15	370	-.23	-0.38, -0.08	-2.99**	46.80***
Supportive interventions	5	127	-.09	-0.33, 0.16	-0.69	10.82*
Psychotherapy	9	271	-.27	-0.45, -0.09	-3.02**	24.89**
Respite/daycare	2	38	-.29	-0.74, 0.16	-1.26	0.12
Training of care recipient	4	56	-.27	-0.67, 0.13	-1.31	8.25*
Multicomponent	4	190	-.02	-0.22, 0.18	-0.19	4.95
Miscellaneous	1	2,268	-.02	-0.08, 0.04	-0.53	—
Effects on caregiver well-being						
Psychoeducation	3	66	-.25	-0.63, 0.14	-1.35	3.57
Supportive interventions	2	58	.17	-0.18, 0.52	0.95	0.02
Psychotherapy	2	43	.52	0.08, 0.96	2.34*	0.02
Respite/daycare	4	156	.06	-0.16, 0.28	0.53	3.34
Training care recipient	1	21	.74	0.06, 1.42	2.19*	—
Multicomponent	2	42	.78	0.27, 1.29	3.09**	4.35
Effects on caregivers' ability/knowledge						
Psychoeducation	19	523	.37	0.24, 0.51	5.47***	26.71
Supportive interventions	5	131	.54	0.30, 0.78	4.43***	6.04
Psychotherapy	4	158	.38	0.14, 0.61	3.10***	0.98
Respite/daycare	1	16	-1.36	-2.14, -0.58	-3.78***	—
Training of care recipient	2	44	-.16	-0.59, 0.27	-0.72	5.41*
Multicomponent	3	50	.86	0.42, 1.31	3.95***	5.37
Effects on care recipients' symptoms						
Psychoeducation	15	508	-.09	-0.22, 0.03	-1.44	7.02
Supportive interventions	2	63	-.17	-0.52, 0.18	-0.95	0.48
Psychotherapy	7	228	-.19	-0.38, -0.00	-1.96*	13.50
Respite/daycare	2	112	.12	-0.14, 0.39	0.92	0.68
Training of care recipient	5	79	-.51	-0.84, -0.18	-3.03**	4.60
Multicomponent	2	81	-.02	-0.34, 0.30	-0.12	1.18
Miscellaneous	1	27	.04	-0.53, 0.61	0.14	—

Notes: *t* = test of significance of the mean. Homogeneity: Significant effects indicate heterogeneity of the effect sizes. Dashes indicate that it was impossible to calculate a homogeneity coefficient because there was only one study available for that category.

p* < .05; *p* < .01; ****p* < .001.

interventions were effective in improving caregiver burden, well-being, and ability/knowledge. Also, training of the care receiver improved caregivers' subjective well-being and care receiver symptoms. However, supportive interventions were effective only for improving caregiver burden and ability/knowledge. Furthermore, only one significant effect was found for respite/daycare: Caregiver ability/knowledge, surprisingly, actually decreased in the experimental condition. However, because this effect was based on only one small study, this might reflect an outlier rather than a valid result.

Discussion

The purpose of this meta-analysis was to provide an updated estimate of the overall effectiveness of caregiver interventions. The study examined new out-

come variables and types of interventions that had not been included in prior meta-analyses. It also tested the effect of moderator variables on the impact of interventions. Consistent with Knight and colleagues (1993), we found that interventions with caregivers were, on average, of small to moderate effect size (on average, 0.14 to 0.41 standard deviation units) for all six outcome variables. Among different types of treatments, psychotherapeutic and psychoeducational interventions showed the most consistent effects on all outcome variables. The effect sizes varied by intervention characteristics, aspects of the caregiving situation, the initial level of objective and subjective burden, and general study characteristics. In the following, we discuss how our study compares with other meta-analyses of caregiver interventions, explain differences in the effects of particular interventions, and consider the implications of our findings for future research.

Comparison of Outcome Variables

When considering the whole sample, all outcome variables in this study were affected by at least one intervention. However, in the present study, the average effect sizes for depressive symptoms and burden were smaller ($g_s = -.15$ and $-.14$, respectively) than the effects found by Knight and associates (1993) for individual interventions ($d_s = .58$ and $.41$, respectively; see Appendix, Note 3). The differences are likely due to the fact that a larger variety of individual interventions was included in the present study and that some studies with small average effect sizes have been published recently. The analyses for types of intervention suggest that some interventions have effects on specific outcome variables (training of the care receiver, supportive interventions, respite care), whereas others are broader in their effects. In the breakdown, effect sizes comparable to Knight and associates' are found for the impact of multicomponent interventions ($g = -.62$) on burden and for psychoeducational interventions ($g = -.43$) on depression. Consistent with George and Gwyther's (1986) suggestion that some outcome measures may be more sensitive to change than others, we found stronger effects of interventions on caregivers' ability/knowledge than on burden, depression, uplifts of caregiving, and care receiver symptoms. This may be due, first, to the fact that a large number of studies focused on psychoeducational interventions that aim to increase caregivers' ability and knowledge. Second, smaller effects of interventions on caregiver burden and care receiver symptoms than on ability/knowledge are not surprising because even the best interventions can reduce the impact of the care receiver's illness, but they do not eliminate the problem (Zarit & Leitsch, 2001).

The most consistent positive effects of caregiver interventions were found for psychotherapy and psychoeducational interventions, which produced improvements across practically all outcome domains. Multicomponent interventions and respite/daycare were effective for three of the outcomes, and supportive interventions were effective for two. All of these interventions address salient caregiving stressors: being overburdened with the physical and temporal demands of care, feeling isolated, having difficulties managing and responding to the care recipient's behavior, and dealing with one's own negative emotions (e.g., Kosberg & Cairl, 1986). Multicomponent interventions may have had a large effect on caregiver burden ($g = -.57$) because they consist of multiple techniques and target multiple outcome domains. They are thus most able to address a variety of caregiver needs (e.g., Mittelman et al., 1995). However, the effect of multicomponent interventions on caregiver depression and care receiver symptoms was not significant—presumably because only a small number of studies were available in this category. Training of the care receiver had a specific effect primarily on care receiver symptoms and almost no effect on the caregiver. Thus, a combination of interventions directly targeted to the caregiver is recommended to reduce caregiver burden and depression.

One surprising finding was that one intervention that targeted caregivers exclusively (psychotherapy) also had a positive impact on care receiver symptoms. Psychotherapy may have taught the care receiver specific techniques to respond more effectively to care receivers' problem behaviors and emotional struggles (Teri, 1999). However, the effect may also be due to the fact that care receiver symptoms in many studies were measured by caregiver reports and were thus subject to a halo effect.

It should be noted here that comparing different types of interventions with each other in a meta-analytic context can be inherently problematic because respondents in each study may nonrandomly elect to participate in particular types of interventions or intervention studies. As covarying baseline variables is not possible in the comparative analysis, the factors that may contribute to selective participation cannot be controlled. In addition, inclusion of specific interventions in particular categories is at times difficult because the interventions may not be described in sufficient detail, and there is no agreed-on taxonomy for classifying intervention types (Schulz, 2001). Finally, the effectiveness of an intervention depends, to some degree, on the dropout rate. Because the different types of interventions did not have identical dropout rates, some reached fewer individuals (e.g., day-care/respite and care receiver interventions) and may therefore be considered less effective, regardless of their effect sizes. Thus, analyses comparing different interventions, while informative about the outcomes that these interventions affect, should not be construed as an exclusive evaluation of the overall quality of these intervention types.

Influence of Moderator Variables

Intervention Characteristics.—Our finding that group interventions are less effective at improving caregiver burden and well-being than individual and mixed interventions (i.e., combinations of group and individual programs) replicates earlier findings (Knight et al., 1993; Whitlatch et al., 1991). Our reanalysis comparing individual versus group and mixed interventions confirms this finding. It is also consistent with Pinquart and Sörensen's (2001) meta-analysis of the effectiveness of therapeutic interventions with older adults in general.

The smaller effect of group interventions on caregiver burden and well-being in the present study may be related to three methodological issues: First, the type of intervention may be confounded with the group versus individual format. That is, psychoeducational interventions are mostly done in groups, whereas psychotherapy is often done in an individual setting. However, psychoeducational interventions and supportive interventions, which are usually carried out in groups, did not significantly differ from psychotherapeutic interventions in their effects on caregiver burden and well-being. In fact, the only intervention type that was significantly different from others for burden was the multicomponent interven-

tion, and only miscellaneous interventions were significantly different from other interventions in their effects on caregiver well-being. Because multicomponent and miscellaneous interventions usually combine individual interventions and group interventions, they are unlikely to have biased the comparison of interventions in groups with interventions in the individual setting.

Second, it is also possible that among the group approaches that were included, the less effective interventions of the early years dominated over later, more sophisticated programs. However, because we controlled for year of publication, the smaller effects of group interventions on burden and well-being cannot be explained by the fact that early studies were less effective than later studies. Finally, the results may have been influenced by a selection bias, because participants were not randomly assigned to individual treatment or group treatment. However, we found no significant differences in the levels of initial objective and subjective burden between the participants of the individual condition and those of the group condition. Although other differences between participants in the individual and group conditions may still have contributed to our results, a comparison to specific caregiver intervention studies that randomly assigned participants to group and individual conditions (e.g., Whitlatch et al., 1991) or that approached a true experimental design (e.g., Toseland et al., 1990) also shows that individual caregiver interventions look slightly more effective than group interventions in reducing depression and improving well-being. Thus it is relatively unlikely that our finding is an artifact of selection. The observed differences between individual and group interventions on depression and well-being may, rather, indicate that individual interventions are somewhat more effective at adapting the topics and methods of the intervention to individuals' specific caregiving concerns.

However, we found that interventions in groups are *more* effective than individual treatments with regard to improving care receiver symptoms. The group setting may promote the exchange of experiences and techniques in how to influence the care recipient's behavior, thus enabling mutual learning. In addition, previous studies have shown that interventions in groups have the added advantage of building up supportive social networks (Toseland & Rossiter, 1989). Owing to the lack of sufficient data for different forms of intervention, social support outcomes were not a focus of the present meta-analysis. Thus, whether individual interventions or group interventions are of advantage depends on the selection of outcome measures.

The length of an intervention appears to be important in alleviating caregiver depression and care receiver symptoms. Change in other variables was unaffected by the length of the intervention. Caregivers may benefit more from longer interventions with regard to depression because of the supportive aspects of prolonged contact with a group or a professional. Care receivers may benefit more from longer interven-

tions because it takes more time for caregivers to learn, place their trust in, and subsequently implement new response patterns that can effect change in care receivers' behavior and because multiple approaches are often needed to change care receivers' symptoms (Ostwald et al., 1999).

Aspects of the Caregiving Situation.—The analyses of the caregiving situation suggest that care receiver characteristics are strongly related to intervention effectiveness. Because many of the diseases and disabilities leading to the need for care are progressive in nature, the caregivers of older care recipients are likely to encounter more stressors and limitations in their activities (Coen, Swanwick, O'Boyle, & Coakley, 1997). They are thus more likely to benefit from an intervention that either frees up their time or provides them with emotional support. However, for four of the five dependent variables, interventions with caregivers of dementia patients are less successful than for other caregivers. This effect is probably underestimated in our study because even among studies that do not explicitly focus on dementia, there are often care receivers suffering from this disease. Dementia caregivers cope with unpredictable stressors, such as problem behaviors and personality changes. Because these may be more difficult to cope with and less modifiable than the stressors common to pure physical care (Birkel & Jones, 1989), it may be more difficult to effect change through intervention with this population.

The findings regarding care receiver age and diagnosis are consistent with results regarding initial objective caregiver burden. The impact of objective burden (measured by number of care hours per week and number of years providing care) on effect sizes of interventions varies with the outcome variable that is investigated. Greater objective burden at pretest is associated with greater increases in knowledge and greater improvements of care receiver symptoms. However, greater objective burden is also related to less improvement of subjective burden and depression. Presumably, if levels of caregiving are relatively high and cannot be reduced, as might be the case for dementia caregivers, then burden and depression are less amenable to change as well. In contrast, a larger time commitment to caregiving may also preclude independent information gathering, such as about the care receiver's disease or available community services, and an intervention that provides this information may substantially increase knowledge for those who are more burdened. Surprisingly, this is even the case for individuals with a longer history of caregiving, even though one might expect them to have gathered much knowledge about caregiving from experience.

In contrast to objective burden, greater initial subjective burden is related to larger intervention effects for burden, depression, and well-being, probably because most interventions are geared toward reducing subjective burden, as measured by the ZCBI and other burden measures. Also, for those with already low levels of burden, interventions are less likely to

produce improvements because of floor effects. However, caregivers with high subjective distress reported less improvement in ability/knowledge and care receiver symptoms, which may indicate that they were faced with severe care receiver symptoms that were not easily modifiable.

With regard to caregiver characteristics, spouse caregivers benefit less from interventions than do adult children. Adult children probably derive greater advantages from caregiver interventions because they are often less prepared for the strains of caregiving than spouses. Spouses are more likely to have already cared for their parents and have developed coping strategies or gathered information about community services and supports from their previous experience. The crucial information that interventions provide is more novel to adult children and, therefore, more effective at reducing their burden. Moreover, adult children often have several additional social roles (e.g., nuclear family responsibilities and work), which may lead to greater role strain (Reid & Hardy, 1999; Stephens, Franks, & Townsend, 1994). Learning to cope with role strain may be a particularly useful aspect of caregiver interventions.

Higher proportions of women in the sample are related to a more positive caregiver response to interventions with regard to burden, ability/knowledge, and care receiver symptoms. This effect may be related to higher levels of initial psychological distress in female than in male caregivers (Miller & Cafasso, 1992).

Study Characteristics.—Studies where caregivers were assigned randomly to the intervention or control group reported smaller improvements for depression, well-being, ability/knowledge, and care receiver symptoms when randomization was evaluated as a predictor of effect size. Random assignment does not guarantee that control groups remain pure “placebo” groups (Zarit et al., 1987); greater use of alternative services by those on a wait-list may lead to smaller intervention effects. In addition, individuals with lower subjective well-being and higher motivation are more likely to self-select into the intervention condition in nonrandom studies and are thus more likely to benefit from the intervention (Gonyea & Silverstein, 1991), although selection factors may vary for different studies (Knight et al., 1993).

When analyzing only the randomized studies, we found positive short-term intervention effects for five out of six outcome variables and positive intervention effects at follow-up for three out of five outcome variables. However, because only one and four studies, respectively, were available for the short-term effects on caregiver uplifts and long-term effects on caregiver well-being, these nonsignificant effects must be interpreted with caution. The positive effects of psychotherapy and psychoeducational interventions and, in part, of supportive and multicomponent interventions were replicated. However, no positive effects of respite/daycare remained when only randomized studies were analyzed. Only a small number of ran-

domized respite/daycare interventions were available, thus reducing the chance of finding significant effects. Also, caregivers seeking respite and being randomly assigned to the control condition may be very highly motivated to seek alternative support, thus reducing the difference to observed change in the experimental condition (Zarit, 1994). Unfortunately, we were not able to rule out this explanation empirically. A third explanation may be that the positive effects of day-care/respite in the full sample are based primarily on sources of bias in the nonrandomized studies (e.g., influences of social desirability). Although there is no direct evidence for this in the analyzed publications, this explanation also cannot be completely ruled out.

Higher dropout rates are associated with greater reductions in burden, depression, and care receiver symptoms, but smaller improvements of caregivers' ability/knowledge. Individuals who do not benefit from the intervention are more likely to discontinue participation. In studies with high dropout rates, above average effects on burden and depression may be based on the highly motivated “stayers.” Psychoeducational interventions, which were very effective at increasing knowledge and abilities, had low dropout rates, on average. This may explain the increase in knowledge in studies with low dropout rates.

A further study characteristic is the year of publication. In our study, more recent publication was related to smaller improvements for burden but larger improvements of care receiver symptoms than earlier publication. Callahan's (1989) and others' criticism of the intervention literature may have initiated a trend toward more careful studies with control groups, higher quality outcome measures, and a greater likelihood for null results to be published. In addition, recent advances in methods for teaching caregivers how to respond more effectively to care receivers' memory and behavioral problems may have improved the effects of interventions on care receiver symptoms in more recent studies (e.g., Ostwald et al., 1999).

Limitations

The first limitation is that we were not able to disaggregate the multiple dimensions of the burden measures in this study, as has been suggested by George and Gwyther (1986), primarily because burden is still reported as one score in most intervention studies. However, we were able to separate subjective and objective burden in our moderator analysis, which contributed to a more differentiated picture. Second, many studies had missing data for relevant variables (e.g., dropout rate), making it impossible to do multivariate analyses for these variables. Similarly, some of the outcome variables were addressed in very few studies. For example, no separate analyses for types of interventions or subgroups could be performed for uplifts because of the small number of studies in this category. Third, delivery characteristics (group or length) and intervention type are sometimes confounded. Thus, although we used multivariate meth-

ods of analysis when possible, it was impossible to specify the source of some of our effects. Fourth, although we analyzed for follow-up outcomes across all interventions, we were not able to disaggregate proximal and distal outcomes for specific types of interventions. Future research is needed to assess which interventions provide caregivers with coping strategies that facilitate long-term relief versus provide only short-term solutions (Schulz, 2001). Fifth, it was not possible in this study to control for the timing of interventions, that is, to see whether interventions that focus on family members in the early and middle stages of a progressive disease are more effective than those that focus on late-stage caregivers (Zarit & Leitsch, 2001). Sixth, in a meta-analysis it is not possible to control for the selection effects that may have led individuals to enroll in particular types of interventions. As suggested by one reviewer, the best way to determine whether one type of intervention is more effective than another is to design a randomized direct comparison. As there are relatively few such studies, future research should embrace this approach. In addition, further research is needed on how the individual's motivation to participate in specific forms of intervention influences effect sizes. Seventh, meta-analysis allows the researcher to control only some of the possible moderators that can affect an intervention's effectiveness. For example, we were unable to control for the effect of therapists' or group leaders' level of training. Eighth, the majority of studies reviewed here are studies of the interventions' effectiveness and not its efficacy. Thus, this meta-analytic method allows only an assessment of effectiveness. Finally, meta-analysis is often criticized for using primarily published studies, which tend to have higher effect sizes and are less likely to have null results (because null results are less likely to be published: file-drawer problem; Rosenthal, 1991). Our analyses (see Appendix, Note 1) suggest that it is highly unlikely that we have overestimated our effects due to the file drawer problem, as unpublished studies had higher effect sizes than published studies.

Conclusions and Recommendations

Interventions are, on average, successful in alleviating burden and depression, increasing general subjective well-being, and increasing caregiving ability/knowledge. The majority of these effects persist after an average of 7 months postintervention. Providing psychoeducational interventions, psychotherapy, and a combination of several of these interventions, as is done in multicomponent approaches, is most effective for improving caregiver well-being in the short term. Although the lack of random assignment limits our conclusions, the results suggest that some interventions have broad, nonspecific effects across a range of outcomes (psychotherapy, psychoeducational interventions, multicomponent interventions), whereas others have more specific effects on targeted outcomes (care receiver training, supportive interventions).

Clinicians and interventionists should decide in ad-

vance whether specific targeted outcomes or general improvement of well-being is the goal of their intervention because each of these goals may require a different set of intervention techniques, implementation strategies, and attention to different potential moderators. For example, based on our findings, we recommend that the length of the intervention be matched to the goal of the program. Interventions of 7–9 sessions (the average across all interventions reviewed here except respite/daycare) should be adequate to increase ability/knowledge, but may be too limited to improve depression.

Spousal caregivers benefit less from existing interventions than adult children. This may be due to a ceiling effect because they have more knowledge of and experience with the caregiving process. In this case, interventions might focus more on trying to influence the affective aspects of caregiving. Also, spousal caregivers, due to their advanced age, often have more risk factors for distress, such as shrinking social networks, lower income, and health problems (Barber & Pasley, 1994; Montgomery & Borgatta, 1989) and may need assistance with building supportive social networks, access to low-cost respite care, and taking care of their own health. Further research is necessary to understand which factors are most responsible for spouses' smaller benefit from interventions so that interventions can take these factors into account.

Dementia caregivers also benefited less from the interventions than did caregivers of older adults without dementia and mixed samples. More efforts are needed to increase the effectiveness of interventions with dementia caregivers, for example, by combining respite/daycare with training to increase caregivers' abilities to cope with care receiver behavior problems. New initiatives of this kind are likely to be found in large, multicenter studies, such as the Resources for Enhancing Alzheimer's Caregiver Health project (REACH; Schulz & Ory, 1999).

Individual interventions were more effective at improving caregiver well-being whereas interventions in groups were more effective at improving care receiver symptoms. Other studies have shown that group interventions are effective ways to build supportive networks. Thus, we recommend that choosing an intervention setting should depend on the main goals of the intervention. If the intervention aims to improve caregiver affect, build supportive networks, and alleviate care receiver symptoms, then a combination of individual and group intervention may be the best choice.

The data also suggest that more well-controlled randomized intervention studies are needed to study the effects of respite/daycare as well as the long-term or delayed effects of interventions with caregivers.

In sum, our findings suggest that it is both justifiable and recommended to implement interventions while maintaining realistic expectations with regard to outcomes. Objective caregiver burden can be reduced to some degree, but it is rarely possible to eliminate it completely. The present comparison of differ-

ent intervention types and analysis of moderators of effectiveness provides an important foundation on which to develop more effective interventions.

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Appendix

Notes

1. In an additional analysis, we checked whether unpublished studies would show different effect sizes than published studies. Surprisingly, we found larger effects for unpublished studies (e.g., doctoral dissertations) than for published studies. This may indicate that doctoral students are more motivated and have more time to plan and conduct a well-designed intervention study. However, we cannot rule out an alternative explanation, that unpublished studies that have not been subjected to peer scrutiny are, in some cases, more likely to contain biased, manipulated, or erroneous data. We therefore followed the recommendation of a reviewer to include in the meta-analysis only studies published in peer-reviewed journals.
2. Because for some outcomes a negative effect is more desirable (e.g., reduction of burden) whereas for some a positive effect is hoped for (e.g., ability/knowledge), the desired direction of the outcome variable is reflected in the column headings in Tables 4 and 5.
3. Our effect size measure g differs from the measure d that was used by Knight and colleagues (1993) in that g is corrected for a bias due to overestimation of the population effect size common for small samples. On the basis of Hedges (1981), g is the product of d and a correction factor $c(m)$ that equals $1 - [3/(4 * df - 1)]$, with $df = \text{degrees of freedom} (n_{\text{intervention}} + n_{\text{control}} - 2)$. For an average $n_{\text{intervention}} = 24$ and $n_{\text{control}} = 20$, g is 1.8% smaller than d . Because this difference is much smaller than the observed differences in the overall effect size between Knight and colleagues (1993) and our meta-analysis, the latter differences cannot be interpreted as mainly reflecting a difference in the computation of effect sizes.