Negative Life Events and Depression in Elderly Persons: A Meta-Analysis

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Depression is a common mental health problem among elderly persons. In the general population, about 10–15% of elderly persons suffer from depressive symptoms requiring intervention (Beekman et al., 1997; Cappeliez, 1988; Gurland & Cross, 1982; O’Hara, Kohout, & Wallace, 1985; Ruegg, Zisook, & Swerdlow, 1988; van Marwijk, 1995). Studies using more stringent diagnostic criteria (e.g., DSM-IV or ICD-10 criteria) have shown prevalence rates of 0.8–8% (Beekman et al., 1997; Blazer, Hughes, & George, 1987; Cappeliez, 1988; Gurland & Cross, 1982; Livingston & Hinchliffe, 1993; O’Hara et al., 1985; Ruegg et al., 1988; van Marwijk, 1995). Unfortunately, depression in old age is often ignored, misdiagnosed, and inadequately treated, resulting in unnecessary morbidity and mortality (Ruegg et al., 1988). Depression is even the leading psychological factor associated with suicide among elderly persons (Draper, 1994; Lapierre, Pronovost, Dube, & Delisle, 1992; McIntosh, Santos, Hubbard, & Overholser, 1994).

To improve knowledge about how to prevent and treat depression in elderly persons, investigators must identify risk factors. Negative life events have been the focus of past research. A substantial number of studies have been carried out on the relationship between negative life events and depression at old age. However, a systematic screening of the literature, including a meta-analysis, seems to be absent. In the available reviews, it is unclear which inclusion criteria authors used to select studies and how the information was processed. In addition, in most of the reviews, the focus was on a broader range of risk factors of elderly depression and they only partly addressed the influence of negative life events. Their general conclusion is that an association exists between negative life events and depression in elderly persons (Henderson, 1989; Katona, 1993; Kurlowicz, 1993; Murrell, Norris, & Grote, 1988; Orrell & Davies, 1994; Parkes, 1992; Ruegg et al., 1988; Silliman, 1986). Kurlowicz (1993), however, concluded that the data were not consistent and that the question of whether depressive episodes in late life are precipitated by life events could not be answered. Moreover, several reviews of studies on the relationship between life events and depression with adult samples have been published. They all found that stressful events were related to depression (Kessler, 1997; Lloyd, 1980a, 1980b; Paykel, 1994). However, in these reviews the age range was not specified.

Our aim in the present study was to systematically review all available studies concerning negative life events and depression in people aged 65 and older. We did this using meta-analytical techniques. The relationship of both specific types of negative life events and the total number of experienced events to depression was studied. If studies appeared not to have homogeneous findings, moderators accounting for the systematic variation in findings were explored.

Methods

Selection of Studies

Li”erature search.—We carried out a literature search using several bibliographic databases, such as Psyclit, Medline, and Current Contents. We performed a computer search using combinations of key words, including depression, depressive disorder, well-being, stressful events, traumatic events, risk factors, disaster, daily hassles, and elderly. Reference lists of available reviews were also screened.

Inclusion criteria.—Studies were included in the meta-analysis if the following inclusion criteria were fulfilled: (a) Depression was operationalized in terms of depressive symptoms, depressive disorder, or dysthymia. (b) Negative life events included a wide array of events. First, events were included that fulfilled the criteria of a traumatic event as described by the DSM-IV: “Direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one’s physical integrity; or witness-
ing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (American Psychiatric Association, 1994, p. 424). Examples are violent personal assault, diagnosis with a life-threatening illness, or natural disaster. Also included were events of a lesser extreme (i.e., life-threatening) nature meeting the criteria of an event of an adjustment disorder where the stressor can be of any severity (American Psychiatric Association, 1994). Examples are divorce and financial problems. Finally, daily hassles, defined as mini-events that require small behavioral readjustment during the course of a day (Thoits, 1995), were included. Examples are traffic jams and unexpected visitors. Not included were studies with “health” as a risk factor, because they reflect the well-being of an individual instead of a specific event. The experience of a life-threatening illness, however, was included if a “healthy” comparison was available. (c) The study contained empirical data on the association between the negative life event and depression. (d) The sample, including comparison groups, was 65 years or older. If information was missing on the minimum age of the sample, we sent a request to the author to obtain information on the age range of the sample.

Problem of multiplicity.—If multiple articles were identified concerning the same study, the key article reporting on the relationship between negative life events and depression was selected. We used the other articles to locate supplementary data.

Coding

Two independent raters (clinical psychologists) coded study features and effect size data. One rater coded all studies and the other coded half of the studies, except for the quality criteria, which were coded by both raters. The percentage of agreement between the two raters was 100% for the classification of the negative life events, 98% for the other study features and effect size data, and 89% for the criteria used for quality assessment. In the event of discrepancies between the two raters, the coding was discussed and consensus was reached about the best possible solution. In most cases, discrepancies were due to unclear information in the articles.

The studies were categorized according to type of event. Negative life events were coded according to the following clusters: death of significant others, severe illness of self, severe illness of significant others, negative socioeconomic circumstances (e.g., financial problems), sexual abuse, physical abuse, emotional abuse and neglect, sudden unexpected events (e.g., crime, disasters, car accidents, and wartime events), negative events with relationships (e.g., arguments with family or friends and major relationship problems), and problem behavior of significant others (e.g., suicide attempt or alcohol problems of close others). Studies using a sum score of various experienced events were coded as “total number of life events.” Subsequently, this was specified into “total number of negative life events” or “total number of daily hassles.” If type of abuse was not specified, it was coded into a more general cluster: “abuse.” Finally, the time when negative life events occurred was coded.

In addition, the following study features were coded: year of publication (of the key article), type of population (community sample [without selection or without information on possible selection procedures], “healthy” people from a community sample, “unhealthy” people from a community sample, depressive people from a community sample, patient group, presence of comparison group), mean age of respondents, gender of respondents (percentage of men), response rate, type of life event instrument (existing [or modified] instrument, self-developed instrument or question, combination, or other), type of instrument to measure depressive symptoms (existing self-report instrument, modified self-report instrument, or psychiatric diagnosis by a psychiatrist), type of assessment (interview, paper and pencil test, or a combination), and whether cognitive dysfunction was used as exclusion criterion.

Additionally, the quality of the studies was coded. Wortman (1994) stated that the main problem in comparing studies is not whether to eliminate studies from a research synthesis but how to assess the quality of primary studies. Therefore, we formulated four criteria to judge the quality of research articles, some of which were derived from Arensman and Kerkhof (1996). The following criteria were applied: (a) Operationalization of depression: If depression was operationalized (measured) by a validated instrument (or validated modified version), the study received a positive score. If no validated instrument was used, a negative score was given. (b) Operationalization of negative life events: If negative life events were operationalized (measured) by a standardized procedure, the study received a positive score. If no standardized procedure was used, a negative score was given. (c) Selection of the sample: If authors performed a selection procedure of participants resulting in a group representative of the group they wanted to study, the publication received a positive score. If a selective sample was included, a negative score was given. (d) Appropriate statistical analyses: If investigators used adequate analyses to answer the research question and if statistical analyses were used appropriately, without violation of the assumptions of statistical tests, the publication received a positive score. If statistical analyses were used inappropriately, a negative score was given. If no information on the quality aspects was provided in the article, a negative score was given. We calculated a total quality score by counting the number of positive scores per study.

Effect Size Computation

In the present meta-analysis correlations were used as a measure of effect size. If no correlation measure r was reported in the article, we used the software program META 5.3 (Schwarzer, 1989a) to estimate the correlation measure r from the statistical information provided in the article. Betas from multiple regression analysis were not used, because the covariates could differ among studies. If exact results were absent and only the significance level was reported, this was used to estimate the correlation measure r. If no information was available on whether the p value was one-tailed or two-
tailed, the \( p \) value was divided by two. If a study reported only a nonsignificant relation, a one-tailed \( p \) level of .50 was assumed, resulting in a correlation measure \( r \) of zero. If no statistical information was given that we could use to estimate the correlation measure \( r \), we requested the necessary additional information from the author.

Decisions were made about four types of multiplicity: multiple assessment points, multiple measures for the outcome variable (depression), multiple measures for negative life events coded into the same cluster, and multiple groups. With respect to the first type, the first assessment point was used for each study, because follow-up data were only rarely reported. With respect to the second and third types of multiplicity, if a study used multiple measures to measure a construct, their association measures were averaged. With respect to the last type of multiplicity, if the groups were comparable with respect to the negative life events studied, for the overall integration a weighted association measure was computed.

**Statistical Analysis**

Our analysis strategy was based on that used in Dusseldorp, van Elderen, Maes, Meulman, and Kraaij (1999).

To estimate a population effect size for each negative life event cluster, we multiplied the study effect size estimates \( r \) by the corresponding sample sizes and then combined them using Fisher’s \( r \) to \( Z \) transformation (Schwarzer, 1989b).

Because the relationship studied between negative life events and depression can be considered as a sample from all possible relationships between negative life events and depression, a random effects model was assumed. In this model the variation of observed effect sizes partly mirrors the true variation of the population effect size. Therefore, the observed variance can be considered to consist of two components: true population variance and sampling error. We used the software program META 5.3 to estimate the population weighted average effect size (WAES \( r \)) and its variance by means of the Hunter-Schmidt method (Schwarzer, 1989a).

Effect sizes were considered to be homogeneous if the percentage of observed variance accounted for by sampling error was at least 75% and if the chi-square test of homogeneity was not significant (Schwarzer, 1989b). In cases of heterogeneity, we tried to find moderators (i.e., the study features described in the coding section) that might account for the systematic variation in the effect sizes. No moderator search was performed if the number of studies was too small (five or less) to make examination of differences between subgroups of studies defined by the moderator meaningful. We performed disjoint cluster analysis (using META 5.3) to identify possible clusters of similar effect sizes. For each level of a moderator, an estimate of the population effect size was computed separately. A study feature was considered to be a moderator if its categories (or combination of categories) identified distinct homogeneous sets of study effect sizes.

**RESULTS**

**Description of Study Features**

All studies identified through the literature search were screened, and those not fulfilling the inclusion criteria were not further included in the meta-analysis. Possible reasons for exclusion were, for example, that part of the sample was younger than 65 years of age, or that all respondents in the sample had experienced a disaster or were bereaved, which would have made it impossible for us to derive a correlation measure between the negative life event and depression. The meta-analysis included 25 studies, reported in 26 publications, that fulfilled the inclusion criteria (see Table 1 for an overview of the studies and their features). The earliest study was published in 1980, and the most recent study was published in 1998. The total number of negative life events and death of significant others were studied most frequently. Sexual abuse, physical abuse, and problem behavior of significant others were not examined in any of the studies. The quality of the studies was good overall, with the majority of studies scoring positive on all four quality criteria. Most of the studies included community samples. Only 3 studies (Foster & Gallagher, 1986; Lam, Brewin, Woods, & Bebbington, 1987; Murphy, 1982) included patient samples. The majority of studies used existing (or modified) instruments to measure negative life events, and almost all studies used an existing (self-report) instrument to measure depression. In most studies, the data were obtained by interview.

Only one study (Kraaij, Kremers, & Arensman, 1997) reported on negative life events occurring throughout life (i.e., childhood/early adolescence [0–14 years], late adolescence/adulthood [≥ 15 years], and last year). All other studies reported on recent events (time period ranging from 5 years ago and after retirement to the last 6 months). Therefore, the data used in the calculation of the population effect sizes were on recent negative life events. Findings on negative life events earlier in life are reported separately.

**Effect Sizes of Negative Life Events**

**Population effect sizes and moderators of recent negative life events.**—Table 2 shows the population effect size estimates (WAES \( r \)) for each life event cluster. Death of significant others was included in 13 studies. The WAES \( r \) was modest but significant, indicating that loss of significant others was related to higher depression scores. However, the set of study effect sizes was not homogeneous. No moderators were found.

Only two studies reported on severe illness of self. The WAES \( r \) was modest but significant, indicating that severe illness of respondents was related to higher depression scores. Five studies reported on severe illness of significant others, and five studies reported on negative socioeconomic circumstances. The WAES \( r \)s of both clusters were again modest but significant (and homogeneous), indicating that being confronted with severe illness of significant others was related to higher depression scores and that experiencing socioeconomic problems was related to higher depression scores. Sudden unexpected events were assessed by four studies. The WAES \( r \) was not significant, indicating that these events were not related to depression scores.

Negative events with relationships were assessed in six studies. The WAES \( r \) was modest but significant, indicating that experiencing negative events with relationships was re-
related to higher depression scores. However, the set of study effect sizes was not homogeneous. Two study features were found to have a moderating effect: sample size and percentage of men in the study (Table 3). Studies based on sample sizes smaller than 200 showed a higher WAES than studies based on sample sizes larger than 200. Further, studies in which the sample comprised more than 45% men reported a higher WAES than samples with a lower percentage of men. A closer examination of the population effect sizes and their confidence intervals showed that the percentage of men in the total sample appeared to be the best moderator.

The total number of negative life events was assessed in 14 studies and appeared to have the second highest (significant) population effect size. Experiencing a higher number of negative life events was related to higher depression scores. However, the set of study effect sizes was not homogeneous. No moderators were found.

The total number of daily hassles was assessed by three studies and showed the highest population effect size of all the relationships studied. Experiencing more daily hassles appeared to be strongly related to higher depression scores. However, the set of study effect sizes was not homogeneous. Because only three studies were represented in this cluster, it was not possible to look for moderators.

Abuse was included in two studies. One study assessed emotional abuse (Kraaij et al., 1997); the other study did not specify the type of abuse studied (Kivelä, Köngäs-Saviaro, Kesti, Pahkala, & Jäät. 1992). A small significant WAES was found, indicating that the experience of abuse was related to higher depression scores.

**Study effect sizes of negative life events earlier in life.**—Only one study assessed negative life events occurring throughout life (Kraaij et al., 1997). Four clusters of negative life events were examined with respect to negative life events occurring in childhood and early adolescence. Negative socioeconomic circumstances during early life appeared to be related to higher depression scores in late life ($r = .24, p = .019$). Emotional abuse, negative events with relationships, and the total number of negative life events during early life were not related to actual depression scores (respectively, $r = .05, p = .334$; $r = .16, p = .084$; and $r = .15, p = .098$).

Four clusters of negative life events were examined with respect to negative life events occurring in late adolescence and adulthood. Severe illness of significant others, negative socioeconomic circumstances, negative events with relationships, and the total number of negative life events were all significantly related to actual depression scores (respec-
interpreting these findings, because only 3 studies reported on daily hassles and the set of study effect sizes was not homogeneous. However, the results seem to confirm findings of other studies that daily hassles play an important role in determining the level of depression (Monroe, 1983; Zautra, Guarmannia, Reich, & Dohrenwend, 1988). This does not necessarily mean that daily hassles play a greater role than major life events, but it could indicate that the effects of major stressors on psychological distress are mediated in large part through minor stressors (Pillow, Zautra, & Sandler, 1996).

Not all sets of study effect sizes are homogeneous. A moderator was only found for negative events with relationships. Studies including a higher percentage of men in their sample (more than 45%) reported a higher estimated population effect size than studies with a lower percentage of men in their sample. Possibly, depression in men is more often activated by network crisis and relationship problems than it is in women. In contrast, other studies have suggested that women seem to be more vulnerable to network events, whereas men may be more vulnerable to financial and job-related stressors (Thoits, 1995). However, most elderly men are retired. Perhaps men become more vulnerable to network events after a role transition from work life to retirement. Another explanation could be that women tend to seek social support to a greater extent than men (Bowling, 1994; Thoits, 1995), which may buffer the impact of network problems. Finally, other factors that we did not include might explain the gender difference. Sexual abuse, physical abuse, and problem behavior of significant others could not be examined because these events were not included in the studies selected for the review.

With regard to negative life events occurring earlier in life, several events (i.e., negative socioeconomic circumstances, severe illness of others, negative events with relationships, and the total number of negative life events) appear to be related to depression in late life. No generalizations can be made because only one study reported on these earlier events. Events occurring earlier in life should be addressed in future studies, especially because studies on adult populations have found that childhood events such as physical, sexual, and emotional abuse or loss experiences can have a long-lasting effect on emotional well-being (Betchman et al., 1992; Bifulco, Harris, & Brown, 1992; Brown & Harris, 1993; Kessler, 1997; Lloyd, 1980b). A life course perspective in stress research was also recommended by Elder, George and Shanahan (1996).

Before we further discuss the meaning and implications of these results, some methodological issues have to be taken into account. For several clusters of negative life events (i.e., severe illness of self and total number of daily hassles), only a few studies were found; for some other clusters of negative life events (i.e., sexual abuse, physical abuse, and problem behavior of significant others), no studies were found. This makes it more difficult to generalize the results. In addition, nearly all studies used only a self-report instrument to measure depression. Therefore, one should be cautious in generalizing the results to clinically depressed people. Furthermore, the results of the meta-analysis suggest that several study features did not have a mod-

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**Table 2. Population Effect Size Estimates of Recent Negative Life Events**

<table>
<thead>
<tr>
<th>Life Event Cluster</th>
<th>k</th>
<th>N</th>
<th>WAES r</th>
<th>95% CI</th>
<th>p</th>
<th>Hom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death of significant others</td>
<td>13</td>
<td>12,471</td>
<td>.103</td>
<td>.066 to .120</td>
<td>.000</td>
<td>no</td>
</tr>
<tr>
<td>Severe illness of self</td>
<td>2</td>
<td>369</td>
<td>.094</td>
<td>-.009 to .194</td>
<td>.036</td>
<td>yes</td>
</tr>
<tr>
<td>Severe illness of significant others</td>
<td>5</td>
<td>4,045</td>
<td>.103</td>
<td>.072 to .133</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>Negative socioeconomic circumstances</td>
<td>5</td>
<td>4,580</td>
<td>.098</td>
<td>.069 to .127</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>Sudden unexpected events</td>
<td>4</td>
<td>857</td>
<td>.047</td>
<td>-.020 to .114</td>
<td>.084</td>
<td>yes</td>
</tr>
<tr>
<td>Negative events with relationships</td>
<td>6</td>
<td>3,207</td>
<td>.102</td>
<td>.067 to .136</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>Total number of negative life events</td>
<td>14</td>
<td>5,037</td>
<td>.150</td>
<td>.122 to .177</td>
<td>.000</td>
<td>no</td>
</tr>
<tr>
<td>Total number of daily hassles</td>
<td>3</td>
<td>461</td>
<td>.048</td>
<td>.328 to .482</td>
<td>.000</td>
<td>no</td>
</tr>
<tr>
<td>Abuse</td>
<td>2</td>
<td>1,096</td>
<td>.063</td>
<td>.004 to .122</td>
<td>.018</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Notes:** k = number of studies; N = total sample size; WAES r = weighted average effect size r; CI = confidence interval; Hom = homogeneity of the set of study effect sizes.

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**Table 3. Population Effect Size Estimates for Negative Events With Relationships by Different Moderators**

<table>
<thead>
<tr>
<th>Moderator</th>
<th>k</th>
<th>N</th>
<th>WAES r</th>
<th>95% CI</th>
<th>p</th>
<th>Hom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;200</td>
<td>3</td>
<td>443</td>
<td>.217</td>
<td>.125 to .304</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>&gt;200</td>
<td>3</td>
<td>2,764</td>
<td>.083</td>
<td>.046 to .120</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>Male Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;45%</td>
<td>4</td>
<td>2,838</td>
<td>.083</td>
<td>.046 to .119</td>
<td>.000</td>
<td>yes</td>
</tr>
<tr>
<td>&gt;45%</td>
<td>2</td>
<td>369</td>
<td>.243</td>
<td>.144 to .337</td>
<td>.000</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Notes:** k = number of studies; N = total sample size; WAES r = weighted average effect size r; CI = confidence interval; Hom = homogeneity of the set of study effect sizes.
erating influence on the strength of the relationships that were found. However, one should consider that, firstly, some moderators showed very little variation (i.e., mean age of the sample and type of instrument used to measure depressive symptoms); secondly, in one case the heterogeneous population effect size could not be further analyzed because of the small number of studies; and finally, a restrictive definition of a moderator was used in the sense that all subsets had to be homogeneous. In addition, in the present meta-analysis we might have overestimated true population effect sizes, because only published studies were included (the “file-drawer” problem). To attenuate the overestimation, we used a conservative method of estimation (i.e., a correlation measure r of zero for nonsignificant results), and when estimating aggregated effect sizes we used a random effects model. Finally, one should consider that several studies were excluded because part of the sample was under 65 years of age.

The present review also has some important strengths. To our knowledge it is the first systematic review concerning the relationship between negative life events and depression in elderly people. In addition, we took the whole life span of elderly people into account by including negative life events occurring throughout life. Furthermore, almost all studies included in the review appeared to be of good quality.

The present review suggests that the experience of different types of negative life events is related to depression in late life. Therefore, it could be argued that prevention and intervention programs for elderly depressed people should pay attention to the occurrence of negative life events. Special attention should be given to elderly people who have experienced an accumulation of stressful events and daily hassles, because they seem to be a group at greater risk.

Several lacunas in the set of studies involved in the present review can be identified. Various events, such as sexual and physical abuse, were not included in the studies. In addition, almost all studies focused on recent negative life events only. Future research should include a wider range of negative life events and focus on the whole life span. Furthermore, most studies included community samples, and depression was mainly measured by means of self-report instruments. More studies should be performed with clinical samples, and a psychiatric diagnosis of depression should also be used.

Because many studies on adult populations have revealed a relatively weak effect of stressful life events on psychopathology, the focus has shifted to the various buffering factors (such as social support and coping) between the occurrence of these events and response (Aldwin, 1994; Mechanic, 1998; Rutter, 1985; Taylor & Aspinwall, 1996). The present meta-analysis also shows a significant but overall moderate relationship between negative life events and depression in elderly persons. The influence of buffering factors could not be examined systematically, because only six of the included studies reported on the buffering role of social support (Biegel, Magaziner, & Baum, 1991; Evans & Katona, 1993; Murphy, 1982; Prince, Harwood, Blizard, Thomas, & Mann, 1997b; Russell & Cutrona, 1991; Siegel & Kuykendall, 1990), one on the buffering role of coping (Catanzaro, Horaney, & Creasey, 1995), and one on the buffering role of self-efficacy (Holahan, Holahan, & Belk, 1984). The majority of the studies found a buffering effect of social support (Biegel et al., 1991; Evans & Katona, 1993; Murphy, 1982; Siegel & Kuykendall, 1990). The other studies all found main effects rather than buffering effects of social support, coping, and self-efficacy. Because no strong conclusions can be drawn from these findings, it is suggested that future research should systematically address these and other stress-buffering factors.

Of course, life events and buffering factors should not be considered as the only causes for depression. More complex diathesis-stress models, including genetic, biological, and psychological attributes, should be considered (see, e.g., Gatz, Kasl-Godley, & Karel, 1996). In addition, a personal history of depression has been found to be associated with depression in later life. Kessler introduced a control for history of depression into a risk-factor model for episode onset of recent depression and found that a number of previously significant predictors became insignificant (Kessler, 1997; Kessler & Magee, 1994). This finding suggests that future research on the relationship between negative life events and depressive episodes should look separately at the predictors of onset and recurrence of depression.

In conclusion, the present review suggests that among elderly people the importance of various types of negative life events should not be underestimated. Unfortunately, we could not accumulate information on certain types of negative life events that also may be relevant in the development of depression. This is particularly true for negative life events experienced throughout life. We encourage further research in this direction.

Acknowledgments

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References

References marked with an asterisk indicate studies included in the meta-analysis. The article preceded by two asterisks was also used for effect size data computation and study features.


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