A Meta-analysis of the Association Between Stress and Health in Taiwan

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This study adopted the meta-analysis technique to analyze 354 journal articles, theses, and dissertations that had investigated the association between stress and health in Taiwan between January 1980 and December 2003. This study was conducted with the purpose of understanding the association between general stress and general health, the discrepant associations between different stress types and health facets, and the possible moderators between general stress and general health. A computer search for relevant studies was conducted on several databases using the key words "stress" and "life event". For each eligible study, the important study characteristics were recorded, and the effect sizes of the relationship between stress and health were computed. Furthermore, in order to investigate the moderating effects of the study characteristics on the stress–health relationship, the methods of categorical model analysis and correlation analysis were employed. The results of this study revealed that: (1) the correlations between general stress and general health as well as between general stress and various health facets fell between medium and high; (2) there existed different degrees of association between various stress types and health facets; and (3) none of the demographic and methodologic variables could by itself moderate the relationship between general stress and general health as the moderator effects were not sufficient and strong enough. This study presents a multidimensional framework of the issues on the relationship between stress and health, and it provides guiding references for future research. No evidence was found for moderating effects of social support, coping strategies, and personality traits on the stress–health relationship. Such findings may be due to methodologic limitations. This suggests that further investigation is needed.

Key Words: health, meta-analysis, stress
(*Kaohsiung J Med Sci* 2007;23:287–97)

Studies on the association between stress and health have been conducted for many years [1–7]. However, the research findings are inconsistent in terms of their significance, magnitude, and, in some cases, direction. Some studies found a significant positive relationship between stress and health distress [8–11]. Some studies showed little association between them. Other studies even demonstrated a negative correlation between them [3,12–14].

These inconsistent findings could result from three causes. First, different studies investigated different types of stress. For example, some studies focused on specific work stress or caregiver's stress, while others focused on the measure of general life stress. Second, different studies were concerned with different health facets. For example, some studies focused on health index, such as clinical diseases or symptoms, others focused on social role functions or adaptive behavior,

Received: August 18, 2006 Accepted: November 10, 2006
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and still others focused on subjective life quality. Third, some moderators may exist between stress and health—such as social support, coping strategies, personality traits, demographic variables, study quality, and so on—which alter the association between stress and health [15–17]. In sum, "stress" and "health" are multidimensional concepts [18–19]. Different stress types and health facets could result in different degrees of association, as shown in many studies. The exploration of moderators between stress and health is drawing more attention. A moderator is a qualitative or quantitative variable that affects the direction and/or strength of the relationship between an independent variable and a dependent variable.

With a view to achieving better understanding of the association between general stress and general health, the discrepant associations between different stress types and health facets, and the possible moderators between general stress and general health, this study adopted the meta-analysis method to systematically re-analyze the findings of related studies on stress and health in Taiwan. Meta-analysis, a quantitative method of summarizing existing studies, is defined as an analysis of analyses. That is, the pooled results of individual studies that have previously appeared to be contradictory or confusing are re-analyzed to provide a systematic, quantitative review of the data, and thus to arrive at strong, credible conclusions.

Materials and Methods

Conceptualization and classification of stress and health

Stress is a multidimensional concept. In the theoretical dimension, stress has been viewed as a stimulus, a response, or a process. In short, the stress defined by the stimulus approach is the stressors, or objective stressful events; the stress defined by the response approach is the strains, or one's reactions to stressors. The stress defined by the process approach puts emphasis on one's subjective appraisal of the demands of environments [16]. On the basis of the investigation of stress and health constructs, we placed the concepts of the response approach in the health domain and the concepts of stimulus and process approaches in the stress domain in this study.

In the research field classification dimension, the trend in recent studies has been to classify studies into different research fields according to the contexts in which different life events occur. Such research fields include, for example, work stress [4], stress of caregiving [5], illness stress [6], stress of military service [7], etc. Thus, after reviewing the related studies in our meta-analysis and following the classification of recent research fields, we divided the general stress into seven stress types: stresses of caregiving, military service, major disaster, work, practicum, illness, and student life.

Health is also a multidimensional concept. In this study, we adopted and expanded the concept of health on the basis of Smith's framework [20]. According to Smith, the concept of health involves a gradation of health or illness, which can be divided into four distinct facets: clinical, adaptive, role-performance, and eudemonistic. First, the clinical facet relates to the presence or absence of signs or symptoms of disease or disability in the individual as identified by medical science. In this study, we further subdivided the clinical facet into physical and psychologic facets. The former included variables such as stomach ache, hypertension, etc., and the latter included depression, anxiety, etc. Second, the adaptive facet, including such variables as health behavior, social behavior, self-esteem, etc., is concerned with the extent to which the individual maintains flexible adaptation to the environment. Third, the role-performance facet, including variables such as job involvement, organizational commitment, etc., relates to the degree to which the individual performs social roles with expected output. Fourth, the eudemonistic facet, including such variables as job satisfaction, life satisfaction, quality of life, etc., is concerned with the degree of exuberant wellbeing and satisfaction. In this meta-analysis, these above-mentioned health facets were included in the concept of general health.

Literature search

This quantitative review included studies conducted between January 1980 and December 2003 in Taiwan. A computer search of the following databases was conducted: PerioPath—Index to Chinese Periodical Literature, Dissertation and Thesis Abstracts System, and NSC Science and Technology Information System. The key words used to identify studies included "stress" and "life event". The search was restricted to studies published in Chinese and involving human subjects. The references cited in the studies identified

by the above approach were also used to locate additional studies.

Three inclusion criteria were adopted in this meta-analysis. First, the studies must examine the relationship between stress and health. Second, they must provide information sufficient for the computation of effect sizes. Third, for duplicate studies, only those that provided the most comprehensive and necessary information were selected. In the preliminary literature search, the abstracts of 722 dissertations and theses and 746 research articles were identified and reviewed. Of these studies, 354 studies, including 281 dissertations and theses and 73 research articles, met the inclusion criteria and were included in our meta-analysis. A list of these 354 studies is available from the corresponding author upon request.

Study characteristics coded from each study

A coding sheet was designed to record the three types of study characteristics from each study: demographic, methodologic, and substantive. The first two types included the study characteristics of predominant sex, age, marital status, education level, occupation, socioeconomic status, date of publication, type of publication, and study quality. The third type included the study characteristics of social support, coping strategies (including problem-focused coping and emotion-focused coping), and personality traits (including Type A/Type B personality and internal/external locus of control type of personality).

Based on the methodologic suggestions outlined by Brown [21], and on our knowledge obtained from some literature reviews of stress and health, the criteria for evaluating the quality of a study included the following items: sampling method (e.g. convenience sample, random sample; maximum 15 points), sample size (e.g. ≤30, 31–100, 101–500; maximum 15 points), specification of study sample (e.g. incomplete description, complete description; maximum 10 points), validity of instruments (e.g. describing validity of less than half of the instruments, describing validity of more than half of the instruments; maximum 10 points), reliability of instruments (e.g. all scales $\alpha \geq 0.90$ or test–retest reliability/split-half reliability/subscales $\alpha \geq 0.80$, all scales $\alpha \geq 0.80$ or test–retest reliability/split-half reliability/subscales $\alpha \geq 0.70$; maximum 20 points), and appropriateness of instruments for measuring alleged concepts (e.g. somewhat appropriate, very appropriate; maximum 20 points). We then summed all item scores for each study and ranked all the studies from the highest (90 points) to the lowest (34 points) according to their total scores and divided them into three groups—low, medium, and high quality studies—based on an equal interval.

As far as the substantive study characteristics were concerned, because many original studies used different instruments to measure the same construct (e.g. social support), we converted these different measures for the same construct to a common metric scale, with scores ranging from 0 to 100, to make them comparable. Different stress types and health facets were also categorized and recorded such that the higher the score on health outcome measures, the poorer the health conditions.

Interrater agreement

Forty-eight studies were randomly drawn from the 354 studies and independently coded by two coders. Both coders are licensed clinical psychologists. The interrater agreement ranged from 96% to 100% for the demographic, methodologic and substantive study characteristics, and 95–100% for the categorization of health facets and stress types. Disagreements in coding were eventually resolved through discussion.

Computation and analysis of effect sizes

Each study result was represented in the form of effect sizes. The effect size estimate used in this meta-analysis was *r*, the correlation between stress and health in each original study. We used Hedges and Olkin's [22] meta-analysis method to determine the average (or mean) effect sizes for the relationships between general stress and general health, between general stress and various health facets, and between various stress types and health facets across all studies.

First, we transformed all effect size estimates by using Fisher's Z transformation to reduce the effects of non-normality of the sampling distribution. When more than one effect size was available from a single sample (i.e. a single study), we averaged these effect sizes. To correct for sampling error, we weighted each Fisher's Z transformed correlation by its sample size.

Second, we calculated the mean weighted Fisher's Z transformed correlation for each stress–health relationship mentioned above. Furthermore, with regard to general stress and general health, we examined the variations among effect sizes through a Q_T test of

homogeneity to determine whether the effect size estimates were relatively consistent. In the absence of homogeneity, the study characteristics were used to account for variability in heterogeneous effect sizes. For the categorical demographic and methodologic study characteristics, we performed tests of categorical models to determine the relationship between these study characteristics and the magnitude of the effect sizes. For each study characteristic, the categorical model calculated a between-class homogeneity statistic (Q_B) and several within-class homogeneity statistics (Q_W). A significant Q_B value suggested that the effect size estimates differed across classes (subgroups) of an identified study characteristic and that the study characteristic identified might be an important moderator of effect size estimates, provided that the effect size estimates within classes were found to be homogeneous (i.e. Q_W statistics were not significant). Significant Q_W values, on the other hand, suggested that the study characteristic was not a strong, sufficient moderator because effect sizes remained heterogeneous within classes. In the computational process of categorical model analysis, the mean weighted Fisher's Z transformed correlation of each class was also obtained.

Finally, we transformed all the mean weighted Fisher's Z transformed correlations back to the original correlation metric scale for the purpose of easy interpretation. The Comprehensive Meta-analysis program (Biostat Inc., Englewood, NJ, USA) [23] was used for data analysis.

Owing to the continuous nature of three substantive study characteristics: social support, coping strategies, and personality traits, we examined bivariate correlations between each of the three study characteristics and stress–health effect sizes to identify the study characteristics that might explain substantial portions of effect size variance and further act as the moderators.

Results

As shown in Table 1, across the 354 studies aggregated, the overall mean weighted effect size (r_+ or mean weighted correlation) was 0.359 ($p < 0.001$, 95% confidence interval [CI] = 0.355/0.364), significantly different from zero, indicating a positive association between general stress and general health distress. However, calculation of the homogeneity Q_T statistic ($Q_T = 7{,}061.141$, $p < 0.001$) indicated significant heterogeneity among effect sizes. Therefore, study characteristics were used to account for variability in the effect sizes. The tests of categorical models were performed for the demographic and methodologic study characteristics, and the results are presented in Table 3 in this section. Also, Table 1 shows that in terms of the magnitude of associations between general stress and various health facets, the eudemonistic health facet was the highest ($r_+ = 0.381$) and the adaptive health facet was the lowest ($r_+ = 0.281$), with the clinical health facets falling in between. All of the mean weighted effect sizes presented in Table 1 were significantly different from zero in terms of 95% CI, indicating positive relationships between general stress and distress of various health facets.

Regarding the different combinations of stress types and health facets, the mean weighted effect sizes of all the combinations were significantly different from zero, ranging from 0.165 ($p < 0.001$) for the combination of disaster stress and clinical–psychologic health

Table 1. The mean weighted effect sizes of the relationship between general stress and general health as well as between general stress and various health facets

Health facet	k	r_+	95% CI for r_+
General	354	0.359*	0.355/0.364
Clinical	185	0.356*	0.350/0.362
Clinical–physical	88	0.308*	0.299/0.317
Clinical–psychologic	127	0.367*	0.360/0.374
Role-performance	123	0.303*	0.295/0.311
Adaptive	96	0.281*	0.273/0.289
Eudemonistic	96	0.381*	0.373/0.390

*$p < 0.001$. k = number of studies/effect sizes in the health facets; r_+ = mean weighted effect size (i.e. mean weighted correlation); CI = confidence interval.

facet to 0.485 ($p < 0.001$) for that of caregiver's stress and clinical–psychologic health facet. This suggested that there existed different degrees of positive association between different stress types and distress of various health facets. Table 2 shows the mean weighted effect sizes of different health facets in each stress type. In terms of the largest effect sizes of health facets in each stress type, almost all the stress types brought the greatest impacts on the clinical–psychologic health facet and eudemonistic health facet. Among them, caregivers' stress was the type of stress that had the greatest influence on health. Specifically, the association between stress of caregivers and clinical–psychologic health facet was the largest, whereas the relationship between the stress of student life and the same psychologic facet was the smallest, and the association between work stress and the same psychologic facet fell in between.

Table 3 presents tests of categorical models by demographic and methodologic study characteristics. Almost all of the mean weighted effect sizes (r_+) within each class were above 0.30, significantly different from zero with 95% CIs, which indicated positive relationships between general stress and general health

Table 2. The mean weighted effect sizes of different health facets in each stress type

Stress type	Health facet	k	r_+	95% CI for r_+
Caregiving	Clinical–psychologic	10	0.485*	0.427/0.540
	Clinical–physical	7	0.464*	0.394/0.529
	Clinical	15	0.387*	0.342/0.431
	Adaptive	6	0.319*	0.242/0.393
	Eudemonistic	5	0.241*	0.149/0.329
Military service	Eudemonistic	3	0.473*	0.437/0.509
	Clinical	5	0.378*	0.347/0.407
	Adaptive	3	0.354*	0.326/0.380
	Clinical–psychologic	3	0.273*	0.225/0.319
	Clinical–physical	3	0.268*	0.220/0.314
	Role-performance	2	0.212*	0.140/0.282
Major disaster	Clinical–physical	1	0.410*	0.283/0.523
	Adaptive	1	0.400*	0.272/0.514
	Clinical	4	0.202*	0.161/0.243
	Clinical–psychologic	3	0.165*	0.117/0.213
Work	Clinical–psychologic	51	0.399*	0.387/0.410
	Clinical	68	0.379*	0.368/0.389
	Eudemonistic	74	0.350*	0.340/0.361
	Clinical–physical	43	0.319*	0.306/0.331
	Role-performance	113	0.315*	0.306/0.323
	Adaptive	34	0.254*	0.239/0.269
Practicum	Clinical–psychologic	4	0.395*	0.357/0.431
	Clinical	9	0.361*	0.334/0.388
	Clinical–physical	3	0.176*	0.108/0.243
Illness	Eudemonistic	4	0.387*	0.300/0.467
	Clinical–psychologic	9	0.384*	0.333/0.434
	Clinical	13	0.368*	0.323/0.412
	Clinical–physical	4	0.309*	0.223/0.390
	Adaptive	11	0.308*	0.262/0.352
	Role-performance	1	0.190*	0.047/0.325
Student life	Clinical–psychologic	29	0.327*	0.316/0.339
	Clinical	43	0.325*	0.314/0.335
	Clinical–physical	16	0.287*	0.269/0.304
	Adaptive	27	0.262*	0.249/0.274
	Eudemonistic	2	0.204*	0.153/0.254

*$p < 0.001$. k = number of studies/effect sizes in different health facets of each stress type; r_+ = mean weighted effect size (i.e. mean weighted correlation); CI = confidence interval.

Table 3. Tests of categorical models for effect sizes of the relationship between general stress and general health by demographic and methodologic study characteristics

Variable/class	k	r_+	95% CI for r_+	Q_B	Q_W
Predominant sex				137.471*	
<5% female	20	0.407*	0.393/0.421		861.184*
5–44% female	73	0.352*	0.342/0.362		1,108.058*
45–54% female	76	0.337*	0.328/0.345		2,156.459*
55–94% female	94	0.390*	0.381/0.398		1,935.785*
≥95% female	75	0.337*	0.326/0.349		635.027*
Cannot tell	16	0.350*	0.328/0.372		227.157*
Age (yr)				148.835*	
≤18	49	0.360*	0.351/0.369		1,488.190*
19–30	76	0.314*	0.303/0.324		867.850*
31–45	55	0.408*	0.396/0.419		1,161.472*
≥46	25	0.368*	0.350/0.385		183.012*
Mixed	149	0.364*	0.357/0.371		3,211.782*
Marital status				5.857	
Married	146	0.367*	0.360/0.374		2,440.880*
Single	96	0.357*	0.348/0.362		2,269.888*
Mixed	112	0.355*	0.348/0.365		2,344.517*
Education level				198.644*	
Elementary	13	0.314*	0.295/0.334		150.076*
Junior high	26	0.360*	0.349/0.372		1,038.603*
Senior high	30	0.350*	0.338/0.362		959.712*
Junior college	26	0.460*	0.445/0.475		477.759*
University	77	0.338*	0.327/0.348		1,235.207*
Mixed	182	0.359*	0.353/0.365		3,001.140*
Occupation				316.130*	
Accountant	6	0.424*	0.381/0.466		103.106*
Police	8	0.411*	0.393/0.428		551.569*
Nurse	15	0.399*	0.377/0.420		54.677*
Teacher	17	0.393*	0.368/0.417		103.940*
Soldier	7	0.361*	0.340/0.382		43.778*
Student	73	0.342*	0.334/0.350		1,945.228*
Factory worker	6	0.202*	0.153/0.251		61.430*
Engineer	5	0.171*	0.129/0.212		34.629*
None	41	0.311*	0.299/0.323		913.091*
Mixed	176	0.384*	0.377/0.391		2,933.563*
Socioeconomic status				60.492*	
High	42	0.395*	0.382/0.409		755.597*
Medium	32	0.388*	0.374/0.403		711.696*
Low	85	0.343*	0.336/0.351		2,349.733*
Mixed	195	0.358*	0.352/0.365		3,123.623*
Date of publication				107.848*	
2001–2003	78	0.401*	0.392/0.410		2,176.390*
1991–2000	200	0.352*	0.346/0.358		3,560.070*
1980–1990	76	0.337*	0.337/0.346		1,216.833*
Type of publication				40.737*	
Dissertation and thesis	281	0.367*	0.362/0.372		6,076.044*
Journal article	73	0.332*	0.323/0.342		944.360*
Study quality				211.989*	
High	88	0.395*	0.389/0.402		3,113.316*
Medium	201	0.344*	0.338/0.351		2,955.909*
Low	65	0.305*	0.295/0.317		729.926*

*$p < 0.001$. k = number of studies/effect sizes in the class or subcategory; r_+ = mean weighted correlation; CI = confidence interval; Q_B = between-class homogeneity statistic; Q_w = within-class homogeneity statistic.

distress. As far as the highest associations between general stress and general health were concerned, they were studies with < 5% female subjects for predominant sex variable, studies with 31–45-year-old subjects, studies with married subjects for marital status, studies with junior college subjects for education level, studies with accountant subjects for occupation, and studies with subjects with high socioeconomic status. Among various occupations, the magnitude of associations obtained from studies with accountants, police, nurses, and teachers as subjects was close and high. Moreover, the impact of stress on health increased in recent studies. The associations obtained from theses and dissertations were higher than those obtained from journal articles, and the higher the quality of a study, the greater the association.

As shown in Table 3, the between-class heterogeneity (Q_B) was significant for all of the tested categorical models except for marital status. Marital status yielded a Q_B value that was also very close to the 0.05 significance level ($p = 0.054$). However, the Q_w statistics were significant at the 0.001 level in all of the classes. Therefore, although these study characteristics had some moderating effects because of their significant between-class effect size differences, none of these study characteristics could be regarded as strong, sufficient moderators because the effect sizes remained significantly heterogeneous within each class.

As for the substantive study characteristics, all of the correlations between each of the study characteristics (social support, coping strategies, personality traits) and effect sizes obtained from the relationship between general stress and general health were not significant, ranging from –0.141 ($p = 0.449$) between internal/external control type of personality and stress–health effect sizes to 0.215 ($p = 0.093$) between problem-focused coping and stress–health effect sizes. This indicated that these three substantive study characteristics were not moderators in the stress–health relationship.

Discussion

Owing to the influence of many factors, the answer to the question "How much is stress and health associated?" was still inconclusive [2,24–26]. After systematically meta-analyzing a large body of original studies, the current study revealed that the overall association between general stress and general health reached 0.359 ($p < 0.001$), indicating a positive relationship between stress and health distress. According to Cohen's guidelines [27] for small ($r \leq 0.10$), medium ($r = 0.25$) and large ($r \geq 0.40$) effects, the association of 0.359 was far above the medium level.

After comparing the results of this study with those of other meta-analyses [24,28–30], it was found that the rank of magnitudes of association between general stress and different health facets was similar. The facets associated with general stress, listed from large to small magnitude, were the eudemonistic facet, clinical–psychologic facet, clinical–physical facet, role-performance facet, and adaptive facet.

Moreover, this study also found that the eudemonistic facet and clinical–psychologic facet were closer in magnitude of association, and the clinical–physical facet, role-performance facet, and adaptive facet were closer but lower in strength of association. This seems to show two clusters. There are three possible explanations for this lower cluster. First, according to the three stages of the general adaptation syndrome theory proposed by Selye [31], we may infer that the time sequence pattern of association between stress and clinical–physical health facet would be relatively high at first, becoming lower, and finally returning to high again. However, this study did not take the time variable into account. Owing to coding difficulty, we did not recode the time period in which the health outcomes were measured as a study characteristic. Therefore, it was impossible to examine the change of the influence that the stress imposed on clinical–physical facet over time. Simply aggregating data obtained from different time points might result in central tendency effects. Second, Yerkes and Dodson [32] pointed out that the relationship between work stress and work performance presented an inverted U-shape. This made possible the further inference that the relationship between stress and health might not be linear. This inference was also supported by Chen [33]. In our meta-analysis, work performance was categorized as an important variable of role-performance health facet, and thereby the relationship between stress and role-performance facet might become lower. Third, in terms of sensitivity to the stress change, compared with other health facets, the adaptive health facet was relatively not sensitive. For example, when faced with stress, one may soon show clinical symptoms, such as nervousness, anxiety, or stomach ache.

In terms of the role-performance facet, one may work efficiently soon after being exposed to stress and then may become tired later. In terms of the eudemonistic facet, when encountering stress, one may intuitively feel or experience poor life quality and satisfaction. In contrast, in the adaptive facet, the behaviors such as health behavior, social behavior, deviated behavior, self-esteem, etc., are long-term and stable behavior patterns and mental status, which may not change concurrently or instantly along with stress change.

Because different stress types would impose threats on different health facets, this study picked out the most influential stress type, caregiving, and found that clinical–psychologic and clinical–physical facets of caregivers' health were under the greatest threat. The related literature reviews conducted by Chiu et al [34] concluded that the greatest stresses the caregivers faced were their restricted work schedules, lack of social support, the impacts their families faced, inadequate attendance knowledge, and worry over the sick; the physical health problems they suffered included tiredness and poor quality of sleep; and the psychologic health problems they experienced were frustration, anxiety, and hopelessness. Caregivers' clinical health problems deserve our serious concern. Although the eudemonistic facet of military servicemen's health was also under a great threat, the results of a very small number of studies (five studies or less) in this category are not stable or representative [35].

After a series of examinations in this study, Aneshensel's viewpoint [17] that the demographic variables have moderating effects on the stress–health relationship was not strongly supported. Nearly all of the between-class effect size differences were significant, which implied that these variables had some moderating effects. However, the studies' effect sizes remained heterogeneous in all of the classes or subgroups. That is to say, none of these demographic study characteristics could by itself moderate the association between stress and health. We anticipate that the moderating effects of these study characteristics can be significant if these study characteristics interact with each other. We also anticipate that when the heterogeneous classes of a study characteristic are further subdivided on the basis of a second study characteristic, the heterogeneity within subclasses may still remain, even if we conduct higher-order categorical model analyses. This means that many more study characteristics may be needed in combination for moderating the association between stress and health more completely and adequately. This finding about the moderating effects can also be applied to the methodologic characteristics, such as publication date, publication type, and study quality, on the stress–health relationship.

With regard to social support, coping strategies, and personality traits, this study did not find that they functioned as moderators between stress and health. This finding is inconsistent with the viewpoints held by scholars in the field of health psychology [15,16]. In this meta-analysis, many original studies used different instruments or different scales to measure the same construct. In order to make these original scale scores comparable, it was necessary to enlarge the original scale scores and convert them to a common metric system. However, in the process of enlarging and converting scale scores, some data might lose their original meaning. On the other hand, since the numbers and definitions of subscales yielded by the instruments were different in the original studies, we had to recategorize them according to our coding scheme. In so doing, some problems might inevitably result. Therefore, the suggestion for future research is that it would be better to reexamine the appropriateness of research methods of conversion and recategorization than to boldly claim that social support, coping strategies, and personality traits are not moderators between stress and health. Clarifying the moderating effects of these study characteristics should remain the direction for future meta-analysis studies on this issue.

As mentioned earlier, the impacts of stress on different health facets were different under different situations. This implies that we cannot focus on only one single facet in the course of health promotion. According to Smith [20], there are certain significant differences in outlook and emphasis among the four facets of health. Both the clinical and role-performance facets seem to focus on the maintenance of stability. In contrast, the adaptive and eudemonistic facets are oriented toward change and growth. How to strike a balance among these four facets should be the goal.

Based on the review of these original studies, it was found in recent studies that stress imposed a considerable threat. This indeed provides a significant warning of health threat and indicates that stress will play a formidable role in health maintenance and health promotion in future.

We have one final suggestion for future research. This current study only focused on investigating the possible moderators that might influence the association between general stress and general health. Future meta-analyses should focus on investigating the roles that moderator variables play in the relationships between different stress types and health facets.

Acknowledgments

The authors thank the National Science Council, Taiwan, for funding this research (NSC 92-2413-H-037-003).

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國內壓力與健康關聯性之整合分析研究

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本研究旨在整合國內既有的原始研究，通盤瞭解壓力與健康間的關聯性、不同壓力類型和健康構面間關聯性的差異，以及壓力與健康間可能的調節變項。本研究方法採用整合分析技術，結合國內從 **1980** 年至 **2003** 年間相關議題之期刊論文與博碩士論文進行分析，共 **354** 篇。本研究中所回顧之文獻取自國內數個資料庫，系統地蒐集相關文獻，搜尋關鍵字為「壓力」或「生活事件」，之後從每篇納入分析的研究報告中登錄重要特徵變項，計算壓力與健康的關聯效果量。另外，透過類別模式分析與相關分析的統計方法，檢視這些研究特徵變項在壓力與健康關聯性中可能的調節作用。研究結果顯示：(**1**) 總壓力與總健康，及總壓力與各健康構面間有中度偏高的關聯性；(**2**) 各壓力類型與各健康構面間有不同程度的關聯性存在；(**3**) 諸等人口學和方法學變項，無法單獨調節總壓力與總健康兩者的關聯性，其調節作用尚不夠充分有力。本研究為壓力與健康關聯性之研究議題呈現出一個多面向的輪廓，並為未來研究提供可參考的方向。另外，社會支持、因應方式、人格特質之調節作用的檢視，未獲得證據的支持，可能是方法學上的侷限所致，未來宜對此進一步探討。

關鍵詞：健康，整合分析，壓力

(高雄醫誌 **2007;23:287－97**)

收文日期：**95** 年 **8** 月 **18** 日

接受刊載：**95** 年 **11** 月 **10** 日

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