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The Role of Social Support in the Process of Work Stress:
A Meta-Analysis

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After summarizing the literature on the various models for the role of social support in the process of work stress, two studies are reported. In the first study, correlations between (1) social support and workplace stressors and (2) between social support and strains as well as (3) incremental R^2s across 68 studies, when the interaction term of stressors and support was added to the regression of strain on stressors and support, were meta-analytically cumulated. Potential moderators of these relationships were weak, suggesting the presence of three general constructs of stressors, strains, and social support. In the second study, the various models for the role of social support in the process of workplace stress were tested for the general constructs identified in the first study. Results indicated that social support had a threefold effect on work stressor–strain relations. Social support reduced the strains experienced, social support mitigated perceived stressors, and social support moderated the stressor–strain relationship. Evidence for mediational and suppressor effects of social support on the process of work stress was weak. In addition, the argument that social support is mobilized when stressors are encountered was not consistent with the available empirical evidence. A similar lack of support was found for the arguments that support is mobilized when strains are encountered and that support is provided when individuals are afflicted with strains.   © 1999 Academic Press

This study advances the theoretical understanding of the role of social support in the process of work stress by cumulating the empirical results from the relevant literature. Despite the well-documented relationship between work stressors and strains (Beehr, 1985; House 1981; Fisher & Gitelson, 1983; Jackson & Schuler, 1985), our understanding of the intervening variables in the process through which work stressors affect strains is limited (Beehr, 1994; Folkman, 1981; Kinicki, McKee, & Wade, 1996). One of the variables thought to intervene in this process is social support (e.g., Ganster, Fusilier, & Mayes, 1986; Turner, Frankel, & Levin, 1983; Vaux, 1988). Social support has been defined broadly as "the availability of helping relationships and the quality of those relationships" (Leavy, 1983, p.5).

Several competing process mechanisms have been advanced to explain the role of social support in the stressor–strain relationship (cf. Cohen & Wills, 1985;

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Osipow & Davis, 1988). Direct, mediational, suppressor, and moderator effects models of social support on the stressor–strain relationship have been postulated and empirically investigated. The term "buffering effects" has been used by some researchers to denote moderator effects and by others to refer to both moderator as well as mediational and suppressor effects. In light of this inconsistent use, and to avoid ambiguity, we eschew the use of the term "buffering." Moderator, mediator, and suppressor effects are explicitly referred to as such.

The term "stressors" has generally been used in reference to environmental conditions that adversely affect health, whereas the term "strains" has been used to refer to the individual responses to the stressors (e.g., Jex, Beehr, & Roberts, 1992). Previous reviews of empirical studies that have examined the role of social support in the stressor–strain relationship (e.g., Alloway & Bebbington, 1987; Cohen & Wills, 1985; Kessler & McLeod, 1985; Leavy, 1983; Lin, 1986; Mitchell, Billings, & Moos, 1982; Schwartzer & Leppin, 1989; 1991) have been restricted to a few models of social support. A majority of the reviews have focused on the evidence for direct effects and for moderating effects. For example, Leavy (1983) reported mixed support for the moderating effects model and consistent support for the direct effects model. Cohen and Wills (1985) also found few interaction effects. Given that large sample sizes are required to detect moderating effects among continuous variables (Aiken & West, 1993), it is not surprising that only a few interaction effects had been found. None of the previous reviews has examined in detail the mediational and suppressor models of social support.

In contrast to previous qualitative reviews of this literature, our meta-analytic cumulation aimed at quantifying the effect sizes associated with several models of how social support affects the stressor–strain relationship. We also investigated the existence of the moderators of the relationship between social support and stressors as well as the relationship between social support and strains. Given the inconsistent terminology and numerous versions of the different models of social support, a conceptual synthesis of the various models precedes our empirical cumulation.

MODELS OF SOCIAL SUPPORT

Direct Effects Models

Direct effect models assume that social support and stressors act independent of one another on strains. A common interpretation of the direct effect model of social support postulates that social support reduces the level of strain regardless of the intensity of the stressors experienced (e.g., Beehr, 1985; Cohen & Wills, 1985; Eisenberger, Fasolo, & Davis-LaMastro, 1990; Eisenberger, Huntington, Hutchinson, & Sowa, 1986; Sullivan & Bhagat, 1992). This direct effects model has received various labels: "independent model" (Lin, 1986), "independent distress deterrent" Wheaton (1985), and "additive-burden" hypothesis (Dohrenwend & Dohrenwend, 1984). In operational terms, a negative correlation be-

tween measures of support and measures of strain can be construed as supporting evidence for this process mechanism.

A different form of the direct effects model would be reflected in a positive correlation between social support and strain. For example, consider the case where support is mobilized when strains are encountered (or conversely, the support providers extend support primarily when the individual is afflicted with strain). In these two instances, social support and strain will correlate positively. By meta-analytically cumulating the correlations between support and strain, one could illuminate the validity of these two competing processes: (1) does social support reduce the effects of strains? or (2) do strains mobilize/elicit support?

Although the direct effects model of social support is most commonly investigated in terms of the correlation between social support and strains, support can also have a direct effect by acting directly on stressors. However, this effect may take various forms. For instance, because lack of support constitutes a stressor in itself, there may be a negative stressor–support correlation. Alternatively, Wheaton (1985) argued that support resources are mobilized when stressors are encountered. The core idea in this version of the direct effects model is that when stressors come into play, individuals mobilize their resources and, as a result, strain is reduced (Eckenrode, 1983). This explanation suggests a positive relationship between stressors and support. A meta-analytic cumulation of the stressor–support correlation would also illuminate the validity of these competing processes.

Moderator Effects Model

The moderating hypothesis (e.g., Kirmeyer & Dougherty, 1988; LaRocco, House, & French, 1980) states that social support interacts with stressors to affect strains; specifically, the relationship between stressor and strain is thought to be stronger for those individuals with low levels of support. To test for moderator effects, the most widely used data-analytic strategy involves examining the increase in R^2 when the interaction term (the cross-product of stressors and support) is added to the regression equation of strain on the main effects of stressors and support.

An alternative to the regression approach employs analysis of variance (ANOVA). In ANOVA, strain is conceptualized as a continuous dependent measure, but both stressors and support are treated as discrete independent factors. A significant F value corresponding to the interaction of the two independent factors is taken as evidence of moderator effects. Because most stressors (and social support measures) are conceptually closer to continuous than to categorical variables, the use of ANOVA is questionable. Further, because few studies have employed ANOVA, we restricted this review to studies employing the regression strategy.

Empirical support for the moderating effects of social support has been mixed across studies. Whereas some studies have found moderating effects (e.g., Abdul-Halim, 1982), others have not (e.g., Ganster et al., 1986) or have found

support for a reverse or opposite moderating effect (e.g., Kaufmann & Beehr, 1986). A reverse moderating effect is encountered when high levels of social support exacerbate rather than alleviate the effects of stressors on strains. Given that individual studies are constrained by sample sizes and by the homogeneity of their samples, a meta-analytic cumulation of R^2's could identify the factors that determine the moderating effects of social support on the work stressor–strain relationship. The present investigation meta-analytically cumulated R^2's across studies to identify factors that determine moderating effects of social support.

Mediational Models

Mediator effects models. To test for mediational effects, we cumulated the correlations (1) between social support and work stressors and (2) between social support and strains. These correlations, along with the correlation between stressors and strain, can be used to test the partial and the full mediation model. Evidence supports a full mediation model if the partial correlation between stressors and strain drops to zero after partialing social support. A drop in the partial correlation (between stressors and strains after partialing social support), compared to the zero-order correlation between stressors and strains, supports a partial mediation model.

Of course, a mediational hypothesis implies a causal sequence that cannot be tested with cross-sectional data. Nevertheless, if mediation effects are operating, the partial correlation will drop compared to the zero-order correlation. In other words, if the accumulated results indicate that the partial correlation is not smaller than the zero-order correlation, it seems reasonable to conclude that the mediational model is not supported. By contrast, if accumulated results show that the partial correlation is less than the zero-order correlation, it would not support the mediational model.

Two full and two partial mediation models have been hypothesized in the literature. First, social support has been hypothesized to mediate the stressor–strain correlation. To test this mediation the zero-order correlation between stressors and strains needs to be compared to the partial correlation between stressors and strains with social support partialed out. An alternative mediational model (Beehr & McGrath, 1992) has stressors mediate the support–strain relationship. To test this model we need to compare the zero-order correlation between support and strains to the correlation between support and strains with stressors partialed out.

Suppressor effects models. Evidence for the mediational models implies a positive stressor–strain correlation, a negative support–strain correlation, and a *negative* stressor–support correlation. If the two other correlations are accompanied by a *positive* stressor–support correlation, then social support is said to suppress the invalid variance in stressors. In this case, the partial correlation (between stressors and strains after partialing social support) should increase as compared to the zero-order correlation between stressors and strains.

THE MATCHING/SPECIFICITY HYPOTHESIS

So far we have assumed that there is an underlying general construct across different measures of stressors, another general construct across different measures of strains, and a third general construct across different measures of social support. However, this assumption of single underlying constructs for stressors, support, and strains is debatable. Previous qualitative reviews (Cohen & Wills, 1985) have argued that the relations between stressors, strains, and support depend on factors such as the source of support and kinds of support, strain, and stressors. This line of thinking is referred to as the matching or specificity hypothesis. The main thesis is that if the right kind of support from the right source of support is matched to the kind of stressors faced, then specific strains will be reduced.

The matching or specificity hypothesis implies that each of the eight process mechanisms have to be tested for specific combinations of stressor, strain, and support measures. Unfortunately, in many empirical studies the specific combinations are not presented as a priori hypotheses embedded in a theoretical framework, but discussed as post hoc speculations. Thus, a complete test of the matching or specificity hypothesis implies that the eight process mechanisms have to be tested separately for *each* combination of stressor, strain, and support. The data for such a test is not available. Even if we were to test some specific combinations (e.g., job dissatisfaction with role ambiguity with tangible support from supervisors), the small number of studies available for such a meta-analytic investigation would increase sampling error and reduce heterogeneity of the samples (Ganster et al., 1986).

Given the available data, we used a two-pronged data-analytic strategy and conducted two studies. First, before testing the eight process mechanisms involving the role of social support in the stressor–strain relationship, using the general constructs of stressors, strains, and support, we examined whether subgroups of these constructs moderated (1) the stressor–social support correlation, (2) the strain–social support correlation, and (3) the moderating effects of support on the stressor–strain relationship. We examined four moderators: source of support (co-workers, supervisors, family and friends, others at work, and miscellaneous), kind of support (nontangible, tangible, and miscellaneous), type of strain (job dissatisfaction, self-reported health, life dissatisfaction, withdrawal intentions, neuroticism, burnout, and miscellaneous), and type of stressors (role conflict, role ambiguity, work overload, autonomy/job control, underutilization of skills assessed as boredom, monotony, work underload, and miscellaneous). If evidence is found for *any* of the moderators, testing for the different process models using general constructs of stressor, strain, and support is probably unwarranted. Assuming that the results of the first study permit the aggregation of measures into three general constructs (stressor, strain, support), the second study was designed to test the different process models for explaining the role of social support in the stressor–strain relationship.

STUDY 1

In this first study, we present theoretical and empirical findings indicating that the eight process mechanisms can be tested with aggregated data. The zero-order correlations between social support and strains and stressors were analyzed for the moderating effects of kind of support, source of support, type of strain, and type of stressors. If empirical evidence suggesting moderating influences in this database is not present, such findings would encourage us to postulate a general construct across strains, a general construct across stressors, and a general construct across support, and so on. In such an eventuality, the question arises as to what the general factor means theoretically. We posit that the general factor of stressors (across different measures of stressors) represents an overall assessment of the significance of the extant environment for individual well-being; similarly, the general factor representing measures of strain captures the quality of the overall adaptive responses of the individual (Selye, 1993), and the general factor of support captures the helping elements and processes of the socio-relational systems in which the individual is embedded.

Note that others have hinted the presence of these general constructs. For instance, Beehr and Newman (1978) noted that empirical research exists on only a few workplace stressors and that most of these stressors could be categorized as one monolithic megaconstruct, namely, environmental stressors. Similarly, Selye (1993) has argued persuasively for a general construct of strain. Beehr (1994, p. 117) further noted that there is a positive manifold of correlations across various measures of strains. Beehr (1994) reported a median correlation of .46 across different types of strain measures. In addition, given that this median correlation is uncorrected for the effects of unreliability in the measures, range restriction, and other statistical artifacts, it is safe to assume that the corrected mean correlation between the different measures of strains is higher than .46.

A similar positive manifold of correlations has also been reported for measures of support (Vaux, 1988). Indeed, there is overlap in the different types of supportive behavior so that it is often difficult to isolate the occurrence of one type of support from another type (e.g., emotional backing usually accompanies tangible support). Thus, it seems reasonable to treat the different types of support as manifest measures of a general construct of social support. Next, we summarize the evidence for moderating influences, if any, in this database. If moderating influences are absent, we would test the process models with aggregated data.

Database

A literature search was conducted to locate all studies examining the relationships between support and either strains or stressors. An electronic search of the Psyclit database using the keywords "work stressors," "social support," and "strains" and their combinations was performed. Next, the resulting abstracts were read to identify studies for inclusion in the meta-analysis. Also, we generated a list of the studies included in previous reviews (Cohen & Wills,

1985; Fisher & Gitelson, 1983; Jackson & Schuler, 1985) of the social support or work stress literature. We identified a few more studies by examining the references in the obtained articles.

We restricted our search to studies focusing on *workplace* stressors. Therefore, studies that addressed life stressors or used unemployed samples (e.g., children, patients) were excluded. In addition, to be included in the database the studies should provide (1) a correlation (or some statistic that could be converted to a correlation) between support and stressors, (2) a correlation between support and strain, or (3) the incremental R^2 (along with the direction of the interaction) when the support-by-stress interaction is added to the regression of stress and support on strain. A total of 68 studies fulfilled at least one of these criteria. The list of articles is included in the references.

Analyses

The articles were coded by the three authors. Disagreements were resolved through mutual discussion until consensus evolved. When more than one effect size was reported on the same sample but the characteristics coded were different (e.g., different stressors were examined), all effect sizes were coded as though they were based on independent samples.

Whereas the violation of the independence assumption has some effects on the variability, its effects on the mean are practically negligible (Hunter & Schmidt, 1990). For example, Anderson and Viswesvaran (1998) recently meta-analyzed the validity of personality variables reported in the literature since 1992. Both multiple correlations from the same sample as well as the average correlation per sample were meta-analyzed separately. Comparison of the two sets of analyses showed that the means varied by only .01, whereas the variance of the corrected validity coefficient was higher when the average correlation per sample was used. In essence, testing the models with the mean corrected correlation does not constitute a problem when the focus is on mean effect sizes, regardless of deviations from the independence assumption.

The question then involves the effect of violating the independence assumption on the standard deviation and how it affects our study. Recall that the objective in this study is to investigate whether the mean varies across studies and, if not, to test process models with aggregated data. Violating the independence assumption implies that we are taking more than one effect size from the same sample. When the sampling error variance is computed, the sample size is inflated. Therefore, the sampling error estimate is underestimated. The underestimation of the sampling error inflates the residual or true variance. Even with this overestimation, if we can conclude that moderator influences are weak, then we have essentially conducted a more stringent (i.e., conservative) test of generalization (i.e., we are being more liberal in concluding that there is a moderator influence). In contrast, if we average one correlation per sample, we will overestimate the sampling error with a concomitant decrease in the estimated true variance. This may lead to the conclusion that there is no moderator effect

when in fact there may be some moderator effect. Thus, given that (1) the mean correlation used to test the process models is unaffected by the violation of the independence assumption and (2) the test of the moderator influences is made more conservative by not always observing the independence assumption (but very liberal when average correlations are used), we employed multiple correlations from the same sample as though they were independent estimates (see also Hunter & Schmidt, 1990, pp. 456–462, for an elaboration of this logic).

Once all studies were coded, a meta-analysis was conducted for the different levels of each moderator. The interactive method of the Schmidt–Hunter approach incorporating methodological refinements such as the use of the mean correlation in estimating the sampling error (Schmidt et al., 1993) was used. Artifact distributions were used to correct for unreliability in the two measures being correlated and internal consistency estimates were used in reliability corrections. The reliability estimates were obtained from the studies included in the meta-analytic database.

The results of the meta-analyses were the sample size weighted mean observed correlation corrected for unreliability in the measures (ρ) and the 95% credibility intervals. If the credibility intervals across the different levels (e.g., tangible, emotional) of a moderator (e.g., kind of support) overlap, then it is inferred that there is no moderating influence (i.e., kind of support does not moderate the relationship under investigation, and one can collapse across different kinds of support for investigating the role of support in the workplace stressor–strain relationship).

Thus, the moderating effects of the source of support, kind of support, type of strain, and type of stressors on (1) the stressor–social support correlation, (2) the strain–social support correlation, and (3) the R^2s representing the moderating effects of support on the stressor–strain relationship were examined. The absence of strong moderating effects supports our decision to aggregate different measures of stressors.

Results and Discussion

Table 1 summarizes the meta-analyses of support–strain correlations for the different levels of each moderator. Table 2 presents the meta-analyses of correlations between support and stressors for the various moderator influences, whereas Table 3 shows the moderating influence of various variables (e.g., kind of support) on the R^2s representing moderating effects of support on the stressor–strain relation. Note that while the bivariate true score correlations were corrected for unreliability in the measures, no such corrections were available for the cumulation of R^2s.

The 95% credibility intervals overlapped in every analysis, suggesting that the strength of potential moderators is tenuous at best (Hunter & Schmidt, 1990). Further, the largest effect sizes were found in the miscellaneous category in most of the subgroup analyses. This finding also weakens the argument that specific matching of stressor–strain–support measures will yield stronger results.

TABLE 1
Moderators of the Support–Strain Relationship

Analysis category	K	N	RBAR	SDr	ρ	$SD\rho$	95%CI	File-N
Source of support								
Co-workers	81	52,204	−.15	.1268	−.18	.1461	−.47, .11	41,763
Supervisors	71	48,000	−.20	.1391	−.24	.1617	−.56, .08	67,200
Family and friends	27	6,703	−.19	.1259	−.23	.1320	−.49, .03	8,714
Others at work	21	3,513	−.19	.1809	−.23	.1993	−.62, .16	4,567
Miscellaneous	17	7,292	−.19	.1254	−.17	.1409	−.45, .11	5,104
Kind of support								
Nontangible	206	114,302	−.17	.1323	−.21	.1517	−.51, .09	125,732
Tangible	7	1,606	.02	.1293	.03	.1352	−.24, .30	—
Type of strain								
Job dissatisfaction	46	31,423	−.24	.1444	−.30	.1679	−.63, .03	62,846
Self-reported health	34	22,106	−.16	.0653	−.20	.0618	−.32, −.08	22,106
Life dissatisfaction	6	2,270	−.14	.1092	−.17	.1168	−.40, .06	1,589
Withdrawal intentions	5	8,700	−.04	.0199	−.05	0	—	—
Neuroticism	62	19,380	−.15	.1257	−.19	.1363	−.46, .08	17,442
Burnout	41	15,015	−.23	.0981	−.28	.0997	−.48, −.09	27,027
Miscellaneous	8	3,262	−.28	.0829	−.34	.0781	−.49, −.19	7,829

Note. K, number of correlations included in analyses; N, total sample size; RBAR, sample size weighted mean observed correlation; ρ, RBAR corrected for unreliability; SDr, sample size weighted standard deviation of mean observed correlation; $SD\rho$, standard deviation of ρ; 95%CI, 95% credibility intervals, computed as $\rho \pm 1.96\ SD\rho$; File-N, the total sample size of studies with a mean effect size of zero that will reduce the reported ρ to −.10.

TABLE 2
Moderators of the Stressor–Support Relationship

Analysis category	K	N	RBAR	SDr	ρ	SDρ	95%CI	File-N
Source of support								
Co-workers	58	36,087	−.08	.1825	−.10	.2318	−.55, .35	—
Supervisors	47	30,315	−.11	.2030	−.14	.2592	−.65, .37	12,126
Family and friends	25	6,705	−.11	.0850	−.14	.0762	−.29, .01	2,682
Others at work	15	4,089	−.26	.1266	−.35	.1427	−.63, −.07	10,222
Miscellaneous	12	6,765	−.07	.1161	−.10	.1407	−.38, .18	—
Kind of support								
Nontangible	151	80,176	−.10	.1819	−.13	.2299	−.58, .32	24,053
Tangible	5	3,190	−.19	.1824	−.25	.2308	−.70, .20	4,785
Type of stressor								
Role conflict	33	10,668	−.24	.1029	−.31	.1100	−.53, −.09	22,403
Role ambiguity	22	4,312	−.52	.0225	−.68	0	—	—
Work overload	29	20,393	−.11	.0979	−.15	.1169	−.38, .08	10,197
Underutilization of skills	12	3,489	−.16	.1316	−.21	.1527	−.51, .09	3,838
Autonomy/job control	14	17,343	.14	.1147	.18	.1437	−.10, .46	—
Miscellaneous	34	19,301	−.06	.1837	−.08	.2330	−.54, .38	—

Note. K, number of correlations in analyses; N, total sample size; RBAR, sample size weighted mean observed correlation; SDr, SD of RBAR; ρ, RBAR corrected for unreliability; $SD\rho$, SD of ρ; 95%CI, 95% credibility intervals, computed as $\rho +/- 1.96\ SD\rho$; File-N, the total sample size of studies with a mean effect size of zero that will reduce the reported ρ to −.10.

TABLE 3
Analysis of the Incremental R^2s

Analysis category	K	Mean	SDr	95%CI	File-K
Source of support					
Co-workers	8	.0270	.0274	.008−.046	14
Supervisors	39	.0087	.0152	.004−.013	−
Family & Friends	5	.0200	.0224	0−.040	5
Others at work	10	.0153	.0156	.006−.025	5
Miscellaneous	43	.0395	.0525	.024−.055	127
Kind of support					
Nontangible	60	.0123	.0181	.008−.017	14
Miscellaneous	45	.0393	.0514	.024−.054	132
Type of strain					
Job dissatisfaction	16	.0191	.0234	.008−.031	15
Withdrawal intentions	16	.0263	.0203	.016−.036	26
Neuroticism	8	.0125	.0219	−.003−.028	2
Burnout	22	.0060	.0059	.004−.008	−
Miscellaneous	16	.0738	.0719	.039−.109	102
Type of stressor					
Role conflict	23	.0113	.0189	.004−.019	3
Role ambiguity	13	.0094	.0165	0−.018	−
Work overload	5	.0342	.0303	.008−.061	12
Miscellaneous	33	.0478	.0574	.028−.067	125

Note. K, number of R^2s included in the analyses; Mean, frequency weighted mean of the R^2s; SDr, SD of the R^2s; 95%CI, 95% confidence intervals, computed as mean $+/-$ 1.96 SDr/sqrt(K); File-K, the number of R^2s with an average of zero effect size that should exist in file drawers to reduce the reported means to .01.

Thus, an examination of subgroup differences in the social support–strain correlation and the social support–stressors correlation predicted by the matching/specificity hypothesis did not lend support to the presence of a strong moderator. Type of stressors, type of strains, kinds of support, and source of support had only marginal moderating influences. The same was true for an analysis of R^2s. However, a few methodological caveats should be noted. First, we coded the studies only on moderators that kept reappearing in the published articles. There were many more moderators that individual researchers had examined for which meta-analytic testing was not feasible due to the small number of replications. For example, most of the studies were both cross-sectional and correlational. Therefore, the moderating influence of study design (experimental vs correlational) and time separation (cross-sectional vs longitudinal) could not be investigated. In addition, the type of scale used was not analyzed for because a majority of studies using the same scale [e.g., Caplan, Cobb, French, Harrison, & Pineneau (1975) scales of social support] provided a

rather unbalanced frequency distribution. Moreover, even for some of the moderators tested, the existence of few studies precluded a comprehensive analysis including all levels of that moderator. For example, although we identified six types of stressors, our meta-analyses of R^2s were restricted to a smaller subset of the six types.

Note that we analyzed each moderating influence (e.g., type of stressor) independent of other moderating influences. Given the potential correlations among the moderators, a fully hierarchical analysis is needed to disentangle the unique effects of each moderator as well as potential interactions among the moderators. The number of extant studies precluded such a comprehensive analysis. As more studies are reported, a fully hierarchical design may become feasible.

Further, our meta-analysis was restricted to published studies. However, to address concerns of publication bias, a file drawer analysis was conducted. The total sample size in the studies that should exist unpublished in the file drawers, with an average correlation of zero to reduce the correlations reported in this paper to .10, was substantial (see Tables 1–3). Also, the number of studies included in this database and their combined large sample size mitigate the concern regarding the representativeness of the sample and the subsequent generalizability of the findings.

In conclusion, it is important to underscore what this study is about (and what it is not about). We are *not* suggesting that the different strains (e.g., job satisfaction, organizational commitment, health symptoms) are the same nor are we implying that it is meaningless to distinguish between different stressors or, for that matter, across different conceptualizations of support (e.g., tangible, emotional). All we want to underscore is that for the sake of illustrating different process models of the role of support in the workplace stressor–strain relationship, it is meaningful to conceptualize general constructs of stressors, strain, and support.

STUDY 2

Given the theoretical and empirical evidence for conceptualizing general constructs of stressors, strains, and support (see Study 1), the next step is to test the competing process models advanced to explain the role of social support in the workplace stressor–strain relationship.

Database

The same database as that employed in Study 1 was utilized.

Analyses

The sample size-weighted, corrected correlations across the various categories of stressors, supports, and strains were computed (1) between the general construct of social support and the general construct of stressors and (2) between the general construct of social support and the general construct of strains. Using

an estimated correlation of .43 between the general construct of stressors and the general construct of strains [obtained by averaging the corresponding true correlations reported by Jackson and Schuler (1985)], the suppressor model, the full mediation models, and the partial mediation models were tested.

Consider the mediation model, where social support mediates the relationship between stressors and strain. The partial correlation between the general construct of stressors and the general construct of strains, with the general construct of social support partialed out, was compared to the zero-order correlation between the general construct of stressors and the general construct of strains [obtained from Jackson and Schuler (1985)]. If the partial correlation drops to zero, evidence is inferred for the full mediation model. In the partial mediation model, the partial correlation will be lower than the zero-order correlation (but still greater than zero). The suppressor model predicts that the partial correlation will be greater in magnitude than the zero-order correlation.

To test the mediation model, where stressors mediate the social support–strain relationship, the partial correlation between support and strains, with social support partialed out, was compared to the zero-order correlation between support and strains. If the partial correlation drops to zero, evidence is inferred for the full mediation model. In the partial mediation model, the partial correlation will be lower than the zero-order correlation (but still greater than zero).

After analyzing the correlations representing main effects, we focused on the R^2s representing the interaction. Existing meta-analytic methods do not address the issue of cumulating R^2s. Exceptions are a study by Viswesvaran, Schmidt, and Deshpande (1994), where the R^2s obtained from a policy-capturing study were cumulated across decision makers, and a technique advanced by Kanetkar, Evans, Everell, Irvine, and Millman (1995), where R^2s from regression equations including the same components, were cumulated. Also of note is the work by Becker (1992), (1995), where she presents a framework to cumulate regression results. A problem that presents itself to those wishing to take these approaches is that the data needed to cumulate results across studies are not usually reported in the individual studies. Further, the effects of variations across studies in the type and reliability of support, strain, and stressor measures as well as the effects of unreliability on the R^2s are difficult to estimate. Therefore, in this review, we restricted our analysis to the computation of the frequency-weighted R^2s. In some sense, our cumulation of R^2s across studies can be construed as a "bare bones" meta-analysis (Hunter & Schmidt, 1990).

Results and Discussion

The sample size-weighted average corrected correlation across measures of support and measures of strain was −.21. This estimated true score correlation (after taking into account sampling error and unreliability in the support and strain measures) suggests that, albeit relatively modest, there is a direct effect of support on strain. The upper 90% credibility interval was negative (−.08 to

−.34), hinting that support and strain are negatively correlated *across* most situations.

The negative correlation between strain and support (averaged across several stressors and strains) is consistent with the predictions of the independent model (Lin, 1986), which is also referred to as the independent distress deterrent model by Wheaton (1985) or as the additive-burden model by Dohrenwend and Dohrenwend (1984). That is, support appears to have a reducing effect on strains independent of stressors. The negative sign of this correlation, however, appears to run counter to the claim that social support is mobilized when strains are encountered or that social support is elicited/provided to individuals when they are perceived to be experiencing strain (both of these models imply a positive strain–support correlation). At least in most situations, it seems that social support acts to mitigate strains rather than social support being mobilized/elicited when strains are faced.

Similarly, the sample size-weighted correlation between measures of stressors and measures of support was −.12 (with a 90% credibility interval of −.00 to −.24). This negative correlation does not lend support to the hypothesis, suggesting the mobilization of social support in the face of stressors (e.g., Eckenrode, 1983; Wheaton, 1985), which would imply a positive correlation between support and stressors.

Using the estimated true score correlation of −.21 between strains and social support, and −.12 between stressors and social support, along with an estimated true score correlation of .43 between strains and stressors derived from Jackson and Schuler (1985), we computed the correlation between stressors and strains with social support partialed out. This partial correlation was .42. Because the partial correlation (.42) was comparable in magnitude and sign to the zero-order correlation of .43, neither the mediational model, where social support mediates the stressor–strain correlation (either full or partial), nor the suppressor model was supported. The partial correlation between support and strains with stressors partialed out was −.18. This partial correlation of −.18 was comparable to the zero-order correlation of −.21 between support and strain. In essence, there seems to be little evidence for the mediational model (either full or partial), where stressors are hypothesized to mediate the support–strain relationship (Beehr & McGrath, 1992).

To examine the moderating effect of social support on the work stressor–strain relationship, we cumulated the R^2s across studies. Across all studies, the frequency-weighted R^2 was .03. Although meta-analytic cumulation of R^2s has not been fully developed and, therefore, the statistical significance of this average R^2 could not be estimated, it appeared large enough to warrant interpretation. That is, in empirical studies with sample sizes of at least $n = 100$, this magnitude of R^2 was statistically significant in virtually all cases. Therefore, there seems to be at least partial evidence of a moderating effect of social support on the work stressor–strain relationship.

GENERAL DISCUSSION

We cumulated results across studies to examine the role of social support in the process of work stress. Given that individual studies often lack enough statistical power to detect interactions, meta-analysis seemed a useful strategy to test the process mechanisms by which social support affects the stressor–strain relationship (cf. Ganster et al., 1986). In their review of the literature, Cohen and Wills (1985) found too few studies to conduct a meta-analyses. The past 10 years have witnessed the publication of sufficient studies to make this meta-analytic cumulation possible.

The empirical evidence for eight process mechanisms was examined: the direct effects of social support on strains, direct effects of social support on stressors, two full mediation models, two partial mediation models, a suppressor model, and a moderating model. For the sake of testing these models, and given the absence of significant differences across the various types, general constructs underlying stressors, strains, and support were assumed. The sign of the direct effect of social support on strains indicated that social support generally mitigates strains rather than being mobilized or elicited when strains are encountered. Similarly, the direction of the effects of social support on stressors was such that social support reduced the level of stressors experienced rather than social support being mobilized when stressors were encountered. The correlations did not support the mediation and suppressor models. Finally, moderating effects (R^2s) of social support on the work stressor–strain relationship were also found.

One question concerns the interpretation of interaction terms in the presence of main effects. This question is especially salient when certain support measures interact with certain measures of stressors in predicting particular strains. Consider a researcher who uses three measures of stressors, three measures of strains, and three measures of support. If a subset of the 27 interactions were significant, the question becomes whether the significant terms were due to Type I error? In several cases, researchers seemed to provide post hoc explanations as to why the significant terms occurred. Future research should endeavor to refine theoretical models that guide how different sources of support can be matched to particular stressors and strains.

Although we examined eight process mechanisms possibly underlying the effects of social support on the stressor–strain relationship, Vaux (1988) summarizes additional process mechanisms. Similarly, Lin (1986) had presented up to 12 different models. To test these models, one would need data on variables such as blood chemical changes as well as data from longitudinal and experimental study designs. However, our review of the literature identified very few studies including biomedical measures of strain and very few longitudinal or experimental studies.

The reliance on nonexperimental and cross-sectional studies raises the concern of reverse causation (Dooley, 1985). For example, the negative correlation between social support and strains may lead us to conclude that social support

mitigates strains rather than is mobilized when strains are faced. However, we do not know from this negative correlation whether (1) support acts to reduce strain or (2) a strained individual fails to maintain his/her support network. But given the pervasiveness of cross-sectional designs, one cannot conclude which one, social support or strain, occurred first. Longitudinal panel studies and experimental designs are required to decouple these effects.

Still another caveat concerns the ubiquitous use of self-report measures of support, strains, and stressors. Studies that employ multiple methods are sorely needed. In fact, the pervasiveness of measures of perceived social support might have limited our ability to detect complex models. For instance, the support mobilization hypothesis would be better tested using others' reports of enacted support rather than self-reports of perceived support. Thus, future research in this area should strive for longitudinal and experimental designs that do not employ self-reports.

Occupational health had been an important topic for researchers interested in vocational behavior (cf. Kinicki et al., 1996). The effects of relationships with supervisors (Beehr, King & King, 1990), Type A behavior (Matteson, Ivancevich & Smith, 1984), and coping styles (Osipow & Davis, 1988) have been explored by researchers interested in vocational behavior. The rapidly changing workplace necessitates more attention to the role of support and other variables in the process of worplace stress. The findings reported in this paper serve to summarize the extant literature and to guide future data collection so as to facilitate development of comprehensive models of vocational behavior and workplace interventions.

Perhaps the most important contribution of this meta-analysis lies in the clarification of the mixed evidence regarding the effects of social support on the process of work stress. Specifically, the data appear to support the coexistence of both the direct and buffering effects models. It appears that social support acts in a threefold manner. First, its primary role is to reduce strains (estimated true correlation across categories $= -.21$), whereas its secondary role is to reduce the strength of the stressors themselves (estimated true correlation $= -.12$) and to alleviate the effects of stressors on strains (cumulated $R^2 = .03$). Future research should explore ways to explain more of the variance. Afterall, the R^2 derived here imply that only a small fraction of the variance is explained.

Social support does not appear to function as a mediator or as a suppressor variable in the stressor–strain relationship. Neither does it seem likely that support is mobilized primarily in the presence of stressors. However, as pointed out before, the limitations in the number (e.g., not all combinations of stressor–support–strain are represented in the literature) as well as the design (e.g., virtually all studies were cross-sectional and/or all self-reports) of the individual studies available placed important boundaries on the scope of the models that could be tested here. In future research, it is imperative that researchers who postulate complex models choose their design and sources of information accordingly. For instance, despite their relative convenience and ease of data

collection, cross-sectional studies involving only self-reports of received support do not always lend themselves to adequate tests of such complex models.

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