ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES 39, 52–83 (1987)

A Meta-Analytic Study of the Effects of Goal Setting on Task Performance: 1966–1984

ANTHONY J. MENTO

Loyola College in Maryland

ROBERT P. STEEL

Air Force Institute of Technology

AND

RONALD J. KARREN

University of Massachusetts, Amherst

A meta-analytic study was conducted involving primarily published research from 1966 to 1984 and focusing on the relationship between goal-setting variables and task performance. Two major sets of studies were analyzed, those contrasting hard goals (goal difficulty) versus easy goals, and those comparing specific hard goals (goal specificity/difficulty) versus general goals, "do best" instructions, or no goal. As expected, strong support was obtained for the goal difficulty and goal specificity/difficulty components of E. A. Locke's (1968a, *Organizational Behavior and Human Performance*, 3, 157–189) theory. A two-stage approach was employed to identify potential moderators of the goal difficulty and goal specificity/difficulty–performance relationships. Setting (laboratory versus field) was identified as a moderator of the relationship between goal specificity/difficulty and task performance. Two supplemental meta-analyses yielded support for the efficacy of combining specific hard goals with feedback versus specific hard goals without feedback and for participatively set goals versus assigned goal setting (when goal level is held constant), although this latter finding was interpreted as inconclusive based on the limited studies available. Implications for future research are addressed.

A motivational approach for enhancing productivity that has generated a plethora of both laboratory and field studies is Locke's (1968a) goal-

We gratefully acknowledge the assistance of Edwin Locke and an anonymous reviewer for their helpful comments on an earlier draft of this manuscript. Funding for this research was made available to the senior author through a Summer Research Grant from the Sellinger School of Business at Loyola College. Requests for reprints should be sent to Dr. Anthony J. Mento, School of Business & Management, Loyola College, Baltimore, MD 21210.

0749-5978/87 $3.00

setting theory. The two major premises of Locke's theory pertain to the effects of goal difficulty and goal specificity/difficulty on task performance. Locke (1968a) postulates that (1) hard goals (if accepted) lead to a higher level of task performance than do easy goals, and (2) specific hard goals lead to higher performance than do general goals, "do best" instructions, or no goal.

Interest in goal setting as a motivational technique has its origins in two distinct lines of inquiry, basic research in academic psychology, and applied management research. Basic university-affiliated research was conducted around the turn of the century by the Wurzberg school, for instance, the work of Kulpe, Watt, and Ach. They were concerned with the concepts of set, task, and intention. Other early researchers concerned with the nature of goals included Lewin with his work on aspiration level, Mace (1935), Miller, Galanter, and Pribram (1960), and Ryan (1970). Ryan's work presented a comprehensive review of the role of intentions on human motivation. His principal contribution was the notion that intentions can be viewed as an immediate cause of human action, and that this relationship should be investigated empirically.

The applied management line of research traces from the work of F. W. Taylor (1911/1967). A key element of scientific management as formulated by Taylor is the task concept. The task was a specific assignment (or goal) given to a worker each day. Presently, the application of goal-setting principles in business settings may be seen in the widespread use of management by objectives programs (Odiorne, 1978). The convergence of these two lines of investigation occurred when management scholars including Locke (1968a) and Latham (Latham & Yukl, 1975a) and a number of other researchers became interested in the effects of goal setting on task performance.

Locke (1966, 1968a) began a program of detailed empirical research and theoretical analysis which laid a solid foundation for what has become one of the most active areas of research in the applied behavioral sciences. This programmatic research has had a significant and continuing influence on the study of motivation in organizations (Garland, 1984a). Miner (1984) in a recent analysis of 32 theories within the organizational sciences domain has concluded that goal-setting theory is one of only four that were both useful and valid. Pinder (1984) remarked that, "goal setting theory has demonstrated more scientific validity to date than any other theory or approach to work motivation" (p. 169).

Traditional narrative literature reviews of the goal-setting literature (Latham & Yukl, 1975a; Locke, 1968a; Locke, Shaw, Saari, & Latham, 1981) have been useful in assessing the impact of goal-setting variables on task performance. For example, Locke *et al.* (1981) determined that 84% of the laboratory and field studies they examined supported the goal dif-

ficulty hypothesis, while 96% of the studies (both lab and field) supported the goal specificity/difficulty hypothesis. Katzell and Guzzo (1983) reported that 21 of 22 field studies of goal setting showed positive effects on output. Latham and Lee (1985) have noted in a review of goal-setting research that specific hard goals lead to higher performance in 64 out of 66 studies reviewed. Generally, previous literature reviews have typically reported the research setting of each study, the population sampled, research design used, and direction of the finding reported.

The traditional approach of integrating research findings in the goal-setting literature usually culminates in what Light and Smith (1971) refer to as the voting method. This approach typically involves tallying the findings of studies which focus on a particular dependent and independent variable of interest. Results are then classified into three possible outcomes; the relationship between the dependent and independent variables is either significantly positive, significantly negative, or no significant relationship exists in either direction. The results in each category are tallied, and the category receiving the strongest support is assumed to represent the best estimate of the relationship between the independent and dependent variables. Some weaknesses of the voting method approach to literature reviews include (1) the magnitude of the effects of interest are not determined, (2) the joint impact of effect size and sample size on determining statistical significance is not taken into account, and (3) under commonly occurring conditions, the voting method can lead to erroneous conclusions about whether an effect exists. Further, the larger the number of available studies, the greater is the certainty of an erroneous conclusion (Hunter, Schmidt, & Jackson, 1982).

Typical literature reviews in the social sciences have been criticized on the grounds of a lack of quality control in integrating results (Glass, McGaw, & Smith, 1981). The traditional literature review involves a highly literary process of evaluation and summarization, and as a consequence researchers sometimes arrive at differing conclusions as a function of their different assessments of the same empirical literature (Salipante, Notz, & Bigelow, 1982).

Within the last few years, quantitative techniques have been developed which permit the quantitative aggregation of results across studies and which should aid reviewers in reaching accurate conclusions about studies dealing with the same phenomena of interest. Glass (1977) used the term *meta-analysis* to refer to the statistical process of aggregating across studies results. Glass (1976, 1977) and Glass *et al.* (1981) have introduced a number of statistical procedures which enable the reviewer to aggregate research findings across studies by using both inferential and descriptive statistics from the studies reviewed. Other investigators (e.g., Cooper, 1979; Rosenthal, 1978) have made significant contributions to

the developing literature on the techniques of meta-analysis. Schmidt, Hunter, and associates (Hunter *et al.*, 1982; Schmidt & Hunter, 1977), beginning with their work on validity generalization have considerably elaborated upon meta-analytic techniques. They have greatly advanced the utility of meta-analysis by suggesting a number of corrections to meta-analytic data which compensate for a variety of statistical artifacts (e.g., sampling error).

The use of meta-analysis for assessing the magnitude of effects and for identifying moderator variables in the behavioral science and management literatures has been rapidly proliferating (e.g., Fisher & Gitelson, 1982; Kraiger & Ford, 1985; Mabe & West, 1981; Steel & Ovalle, 1984).

Hunter and Schmidt (1983) have argued that a state-of-the-art meta-analysis of the goal-setting literature could facilitate our understanding of the importance of this intervention for organizations. The first attempt to statistically aggregate goal-setting results was conducted by Locke, Feren, McCaleb, Shaw, and Denny (1980). Focusing only on experimental field studies in which hard measures of performance were collected, they found the combination of goal setting and incentives to produce median improvements in productivity over untreated control conditions of 46%, and a 16% median improvement in productivity for goal setting alone compared to untreated control groups. Hunter and Schmidt (1983) report that effect sizes (corresponding to standardized scores) for these percentage improvements to productivity would be 1.50 and 0.80, respectively.

A recent meta-analysis of the goal-setting literature was performed by Chidester and Grigsby (1984). They found strong effects for the goal difficulty and goal specificity/difficulty components of Locke's (1968a) theory, and they identified through meta-analysis a number of potential moderating variables of goal-setting–performance relationships. Their research is seriously flawed in a number of critical areas causing one to legitimately question the validity of their findings. The confidence in the magnitude of the effect size estimates developed from a meta-analysis is strongly related to the number of studies comprising the core base of studies analyzed. Chidester and Grigsby (1984) include very few goal-setting studies published prior to 1968, and virtually none after 1980. In fact, they have analyzed less than one-third of the goal difficulty studies that we have analyzed and less than half of the studies in our specificity/difficulty analysis. The potential moderator categories they examined including rewards, education, job autonomy, feedback, and method of goal assignment were either poorly defined, or confounded, and frequently the coding was incorrect. For example, in their moderator variable analysis, Chidester and Grigsby (1984) define participation as actual participation in goal setting *or* verified acceptance of the goal. It was unclear

why verified acceptance of a goal was regarded as an indicator of participation. Obviously, a worker might accept an assigned goal while having no participation whatsoever in the goal-setting process. The authors noted that the aggregated effect sizes obtained were corrected for attenuation due to measurement unreliability, but no specific information was provided on how this was done. Rather than using a single metric, it appears that some effect sizes reported in their tables were calculated indiscriminately from both Pearson *r*'s and point biserial *r*'s. The effect of combining these statistics would serve to systematically inflate the aggregated effect size estimates. A final problem in their analysis involved the sample sizes reported in their tables for the various studies that were used in determining the effect sizes. A careful analysis of the original articles used in their study indicated that sample sizes reported were frequently inaccurate, and they did not reflect the exact sample sizes on which descriptive or inferential statistics were based.

A meta-analysis of the goal-setting literature has the potential to answer a number of questions which narrative reviews have been unable to resolve. It is important to know, for example, what percentage increase in productivity might be expected when specific hard goals are used as an organizational intervention. Comparisons may be made between the effect sizes of goal-setting studies conducted in the laboratory and the effect sizes obtained in field research. Similarly, one might investigate effect size from experimental studies and from correlational studies. It is also possible to determine whether the presence of feedback and incentives (Locke, 1968a) augments goal-setting–performance relationships. A meta-analysis could also assist in the determination of the moderator effects of level of education on goal difficulty, and goal specificity/difficulty–performance relationships (Ivancevich & McMahon, 1977a).

Information relating to the magnitude of effect sizes for different types of goal-setting programs as well as the identification of moderator variables which impact on these relationships would both advance the research literature on goal setting and possess practical utility to organization decision makers. Theory development should be enhanced by empirically determining the magnitude of goal-setting effects and by isolating reliable moderator variables. Such knowledge will serve to aid in building a solid theoretical framework from which the subtler mechanisms of the goal-setting process may be identified. Goal-setting applications will benefit by focusing attention on consistently reliable aspects of the goal-setting process.

The purpose of the present study was to determine empirically the magnitude of the goal difficulty and goal specificity/difficulty–performance relationships aggregated across all studies. The potential moderating effects of study setting (laboratory or field), study type (experi-

mental or correlational), level of education, feedback, and incentives were assessed through meta-analytic moderator analysis and multiple regression analysis (Hunter *et al.*, 1982). Two additional meta-analyses were conducted. The first focused exclusively on studies which directly compare the effects on performance of hard specific goals with feedback to hard specific goals without feedback. The final analysis included those studies which directly compare the impact on performance of participatively set goals versus assigned goals.

METHOD

Procedure

An exhaustive search was made of the published literature concerned with the effects of goal difficulty and goal specificity on task performance. A manual search was performed of the *Psychological Abstracts* and the *Social Science Citation Index,* and a systematic review was made of the *Journal of Applied Psychology,* the *Academy of Management Journal, Organizational Behavior and Human Performance,* and *Personnel Psychology* from 1966 to December 1984. For goal difficulty a total of 70 studies were available for analysis. This total includes data from some studies with multiple independent samples. A number of studies were excluded from the goal difficulty analysis for various reasons. All studies were excluded if an effect size could not be calculated (Chhokar & Wallin, 1984; Dey & Kaur, 1965; Komaki, Barwick, & Scott, 1978; Komaki, Collins, & Penn, 1982; Reber & Wallin, 1984; Stedry & Kay, 1966; Weed & Mitchell, 1980). The following studies were excluded from the goal difficulty analysis because they contained an experimental artifact in the easy goal condition which involved instructing subjects to stop working when the easy goal was reached (Locke, 1967a; Locke, Frederick, Buckner, & Bobko, 1984; Locke, Mento, & Katcher, 1978). This instruction may serve to artifactually inflate the goal difficulty–performance relationship as noted by Bavelas and Lee (1978). Six studies were eliminated from the analysis due to use of a within-subjects as opposed to a between-subjects experimental design (Bryan & Locke, 1967; Locke, Cartledge, & Knerr, 1970—the first four studies; and Matsui, Okada, & Mizuguchi, 1981). Green and Hall (1984) have cautioned that it is incorrect and inappropriate to include data from a within-subjects design into a meta-analysis since effect sizes cannot be accurately computed. For the goal specificity/difficulty analysis, data were available from 49 studies. Two studies were excluded for utilizing a within-subjects design (Erez & Zidon, 1984; Locke & Bryan, 1967—Study 2).

For studies which presented goal setting-effects over different time in-

tervals within the same study, separate effect sizes were calculated and averaged. A few field studies reported goal-setting effects on both objective and subjective performance criteria. In these cases, the effect size for the objective criterion was used in the prior distribution. For those field studies which contained multiple objective criteria, the performance measure included in the analysis was the one most clearly consonant with the type of goal set and/or which most clearly represented an individual's performance.

Analyses

Each study result was treated as an independent datum. The effect size statistic d represents the difference between the means of the experimental and control groups in standard score units (Hunter & Schmidt, 1983). Results from experimental studies were converted to d from descriptive statistics (i.e., means and standard deviations) or from inferential statistics (i.e., t or F) depending on the type of data reported by a study's investigators (Glass, 1977; Glass *et al.*, 1981; Hunter *et al.*, 1982).

For correlational studies, the point biserial r (r_{pb}) was estimated from Pearson r to represent the effects of goal difficulty and goal specificity/difficulty on performance from formulas given in Glass *et al.* (1981). The size of the point biserial correlation is affected by the relative proportion of cases in the two treatment groups. Effect sizes for all individual studies were corrected for differences in subgroup sample sizes, when appropriate. Since d is an algebraic transformation of the point biserial r (Hunter *et al.*, 1982), it is possible to convert the calculated point biserial r for correlational studies analyzed to d in order to obtain a common metric for use in the cumulation of effect sizes across both experimental and correlational studies.

Corrections for measurement unreliability were made for predictor variables (in field studies which used a questionnaire measure of goal difficulty or specificity) and criteria (for all studies). For those studies which used questionnaires to measure goal difficulty or specificity, the exact reliabilities reported were used to make corrections. If reliabilities were not reported by a study's investigators, artifact distribution means for goal difficulty ($\bar{r}_{xx} = .72$) and goal specificity ($\bar{r}_{xx} = .81$) were employed instead (Mabe & West, 1982). The average reported reliabilities across all studies using performance ratings was .80. For those studies reporting objective measures of performance, the average reported reliability was .92. These reliability estimates were used to correct effect size statistics and variance estimates (s_e^2) for error of measurement (cf. Hunter *et al.*, 1982; Mabe & West, 1982). Next, sampling error variance was calculated using the formulas for sampling error modified to take into account the effect of the corrections for errors of measurement on sam-

pling error, according to Hunter *et al.*, 1982 (pp. 111–115). Finally, the remaining unexplained variance (s^2_v) was determined after correcting for measurement error and sampling.

For both goal difficulty and goal specificity/difficulty, an analysis was conducted to determine if the ratio of sampling error variance to total variance (i.e., variance corrected for measurement unreliability) (Hunter *et al.*, 1982) was, in fact, trivial. Schmidt, Hunter, and Pearlman (1982) propose that if sampling error variance accounts for more than 75% of the total variance, then one may conclude that differences in effect sizes across studies are due entirely to sampling error. Conversely, if this ratio falls below 75%, they advocate supplemental moderator analyses. In both cases, the ratio of sampling variance to total variance was less than 75%, indicating that a search for potential moderators was in order.

Five potential moderator variables were examined within goal difficulty and goal specificity/difficulty analyses. These moderators were study type (experimental or correlational), setting (laboratory or field), level of education, feedback, and incentives. A two-stage approach to moderator variable identification was employed. The first stage contrasted subsample variances and effect sizes to similar overall sampling statistics for the total sample. Hunter *et al.* (1982) advocate this method of moderator identification. The second stage of this process employed multiple regression analysis to identify potential moderator variables (Mabe & West, 1982; Steel & Ovalle, 1984).

Tables 1 and 2 provide descriptive information for all of the studies used in our goal difficulty and goal specificity/difficulty meta-analyses. The study characteristics summarized in the tables include the researchers, sample type, study setting, type of study, presence or absence of feedback, level of education of participants, presence or absence of incentives, effect size *d*, and/or point biserial *r*.

RESULTS

Goal Difficulty and Task Performance

Across both experimental and correlational studies ($N = 7407$), the relationship between goal difficulty and performance was *d* (corrected) = 0.5813, and the variance corrected for measurement error was $s_c^2 = .1495$. The unexplained variance after correcting for sampling error was equal to .1029. The results of the meta-analysis of goal difficulty on performance along with potential moderator variable effects are presented in Table 3. The table depicts the total sample size for each analysis and the number of studies. Also included are the mean observed and corrected *d* values, observed variances and variances corrected for measurement

TABLE 1
STUDIES OF THE RELATIONS BETWEEN GOAL DIFFICULTY AND PERFORMANCE

Investigators	Sample	Setting[a]	Type[b]	Feedback	Education	Incentive	*n*	*d*	*r*
Locke (1966)									
Study 1	Undergraduates	L	E	Yes	High	No	49	0.847	.396
Study 2	Undergraduates	L	E	Yes	High	No	56	1.658	.645
Study 3	Undergraduates	L	E	Yes	High	No	23	1.81	.679
Locke & Bryan (1967)	Undergraduates	L	C	Mixed	High	No	69	0.436	.216
Locke (1968b)	Undergraduates	L	E	Yes	High	Yes	20	0.549	.278
Locke & Bryan (1968)	Undergraduates	F	C	Yes	High	No	323	0.581	.280
Locke, Bryan, & Kendall (1968)									
Study 1	Undergraduates	L	C	No	High	Mixed	70	0.966	.44
Study 2	Undergraduates	L	C	Yes	High	Yes	30	0.990	.456
Locke & Bryan (1969a)	Undergraduates	L	E	Mixed	High	No	40	0.356	.158
Sales (1970)	Undergraduates	L	E	No	High	No	73	0.919	.422
Locke, Cartledge, & Knerr (1970)									
Study 5	Undergraduates	F	C	Yes	High	No	54	0.189	.096
Andrews & Farris (1972)	Scientists	F	C	No	High	No	78	0.336	.168
Pritchard & Curts (1973)	Undergraduates	L	E	No	High	Yes	81	0.507	.248
Dachler & Mobley (1973)	Sewing machine operators	F	C	Yes		Yes	173	0.787	.368
	Production workers	F	C	No		No	366	0.257	.128
Hamner & Harnett (1974)	Undergraduates	L	E	No	High	Yes	80	0.982	.445
Steers (1975)	1st Level utility supervisors	F	C	Yes	High	No	133	0.035	.016
Rothkopf & Billington (1975)	Undergraduates	L	E	No	High	No	92	0.636	.307
Campbell & Ilgen (1976)	Undergraduates	L	E	No	High	No	82	0.467	.230
Hall & Hall (1976)	2nd- to 4th-graders	F	C	Yes	Low	No	283	0.241	.120
Laporte & Nath (1976)	Not described	L	E	No		No	96	0.654	.314
London & Oldham (1976)	Undergraduates	L	E	Yes	High	Yes	180	0.129	.065
Oldham (1976)	Retail managers	F	C	Yes		No	42	0.205	.103
Terborg (1976)	High school students	L	C	No	Low	No	55	0.434	.216

Hall & Foster (1977)	Undergraduates	L	C	No	High	No	61	0.000	.00
Erez (1977)	Undergraduates	L	C	Yes	High	No	38	1.065	.480
		L	C	No	High	No	48	0.016	.008
Organ (1977)	Undergraduates	L	E	No	High	No	55	−0.326	−.164
Ivancevich & McMahon (1977a)	Skilled maintenance technicians	F	C	No	High	No	190	0.474	.232
Ivancevich & McMahon (1977b)	Skilled maintenance technicians	F	C	No	High	No	141	0.111	.056
Ivancevich & McMahon (1977c)	Skilled maintenance technicians	F	C	No	High	No	90	0.668	.32
		F	C	No	Low	No	38	0.204	.104
Masters, Furman, & Barden (1977)	4- and 5-year-olds	L	E	Yes	Low	Yes	32	1.116	.494
Bavelas & Lee (1978)									
Study 1	Undergraduates	L	E	No	High	No	48	0.10	.05
Study 2	Undergraduates	L	E	No	High	No	128	1.76	.664
Study 2a	Undergraduates	L	E	No	High	No	54	1.066	.476
Bavelas & Lee (1978)									
Study 3	Undergraduates	L	E	No	High	No	48	1.128	.500
Study 4	Undergraduates	L	E	No	High	No	30	1.273	.551
Becker (1978)	Homeowners	F	E	Mixed	High	No	40	0.356	.179
Latham, Mitchell, & Dossett (1978)	Scientists/engineers	F	C	Yes	High	Yes	76	0.967	.44
Motowidlo, Loehr, & Dunnette (1978)	Undergraduates	L	E	No	High	Yes	175	0.288	.143
Strang, Lawrence, & Fowler (1978)	Undergraduates	L	E	Yes	High	No	50	0.364	.183
	Undergraduates	L	E	No	High	No	50	−0.273	−.135
Yukl & Latham (1978)	Typists	F	C	Yes		No	41	0.924	.428
Dossett, Latham, & Mitchell (1979)	Clerks	F	C	Mixed		No	40	0.913	.424
Bassett (1979)	Temporary employees	F	E	No	High	No	116	0.344	.171
Latham & Saari (1979a)	Undergraduates	L	C	Yes	High	No	60	1.099	.488
Mento, Cartledge, & Locke (1980)									
Study 1	Undergraduates	L	E	No	High	Yes	195	0.524	.256
Study 2	Undergraduates	L	E	Yes	High	No	406	0.513	.248

TABLE 1—*Continued*

Investigators	Sample	Setting[a]	Type[b]	Feedback	Education	Incentive	*n*	*d*	*r*
Mowen, Middlemist, & Luther (1981)	Undergraduates	L	E	Yes	High	Yes	62	0.585	.284
	Undergraduates	L	E	Yes	High	Yes	62	−0.335	−.165
Rakestraw & Weiss (1981)	Undergraduates	L	C	Yes	High	No	174	0.827	.384
Garland (1982)	Undergraduates	L	E	Yes	High	No	60	1.145	.504
Jackson & Zedeck (1982)	Undergraduates	L	E	No	High	No	125	0.163	.082
Latham & Marshall (1982)	Public sector managers	F	C	No	High	No	57	1.280	.546
Locke (1982)	Undergraduates	L	E	No	High	No	247	0.871	.384
Matsui, Okada, & Kakayuma (1982)	Undergraduates	L	C	Yes	High	No	91	0.684	.327
Peters, Chassie, Lindholm, O'Connor, & Kline (1982)	Undergraduates	L	E	Yes	High	No	120	0.793	.373
Wofford (1982) Study 1	Undergraduates	L	E	Yes	High	No	92	0.464	.228
Garland (1983)	Undergraduates	L	E	Yes	High	No	58	1.032	.458
Latham & Steele (1983)	Undergraduates	L	C	Yes	High	No	48	0.501	.248
Campbell (1984)	Undergraduates and graduate students	L	E	Yes	High	Mixed	56	0.346	.187
Locke, Frederick, Lee & Bobko (1984)	Undergraduates	L	C	No	High	No	181	0.931	.424
Locke & Shaw (1984)	Undergraduates	L	C	Mixed	High	Yes	212	0.289	.144
Garland (1984a)	Undergraduates	L	E	Yes	High	No	71	0.738	.351
Wood & Locke (1984)									
Study 2	Undergraduates	F	C	No	High	No	216	0.273	.136
Study 3	Undergraduates	F	C	No	High	No	329	0.467	.228
Study 4	Undergraduates	F	C	No	High	No	142	0.671	.320
Study 5	Undergraduates	F	C	No	High	N0	37	0.953	.440
Taylor, Locke, Lee, & Gist (1984)	University faculty	F	C	Yes	High	No	169	0.406	.200

[a] "L" = laboratory and "F" = field.
[b] "C" = correlational and "E" = experimental.

TABLE 2

STUDIES OF THE RELATIONS BETWEEN GOAL SPECIFICITY/DIFFICULTY AND PERFORMANCE

Investigators	Sample	Setting[a]	Type[b]	Feedback	Education	Incentive	*n*	*d*	*r*
Locke & Bryan (1966)	Undergraduates	L	E	Yes	High	No	28	1.051	.479
Locke (1967a)	Undergraduates	L	E	Mixed	High	No	36	0.733	.353
Locke & Bryan (1967) Study 1	Undergraduates	L	E	No	High	Yes	41	1.090	.488
Blumenfield & Leidy (1969)	Vending machine personnel	F	E	No		Yes	55	0.930	.347
Burke & Wilcox (1969)	Telephone operators	F	C	No	High	No	211	0.475	.232
Locke & Bryan (1969a)	Undergraduates and research center employees	F	E	Yes		No	30	0.582	.289
Rothkopf & Kaplan (1972)	High school students	L	E	No	Low	No	432	0.280	.140
Ronan, Latham, & Kinne (1973)	Wood harvesters	F	C	Yes		No	864	0.299	.148
Kaplan & Rothkopf (1974)	High school students	L	E	No	Low	No	378	0.371	.179
Latham & Kinne (1974)	Logging crews	F	E	No		No	40	0.586	.288
Latham & Locke (1975)	Wood harvesters	F	E	No		No	379	0.138	.069
Rothkopf & Billington (1975)	Undergraduates	L	E	No	High	No	92	0.548	.264
Steers (1975)	Public utility 1st-level supervisors	F	C	No	High	No	133	0.191	.096
Wexley & Nemeroff (1975)	Medical center managers	F	E	No	High	No	114	0.478	.236
Frost & Mahoney (1976)	Undergraduates	L	E	Mixed	High	No	140	0.241	.124
Ivancevich (1976)	Sales personnel	F	E	Yes	High	Yes	97	0.518	.253
Laporte & Nath (1976)	Not described	L	E	No		No	96	0.917	.442
Latham & Yukl (1976)	Typists	F	E	Yes		No	41	0.337	.170

TABLE 2—*Continued*

Investigators	Sample	Setting[a]	Type[b]	Feedback	Education	Incentive	*n*	*d*	*r*
Umstot, Bell, & Mitchell (1976)	Not described	F	E	Mixed		No	42	0.781	.372
Ivancevich (1977)	Maintenance technicians	F	C	No	High	No	114	0.527	.258
Ivancevich & McMahon (1977a)	Maintenance technicians	F	C	No	High	No	141	0.095	.048
Ivancevich & McMahon (1977b)	Maintenance technicians	F	C	No	High	No	190	0.144	.072
Ivancevich & McMahon (1977c)	Maintenance technicians	F	C	No	High	No	90	0.177	.089
White, Mitchell, & Bell (1977)	Undergraduates	L	E	No	Low	No	38	0.621	.304
Becker (1978)	Homeowners	F	E	No	High	No	104	0.382	.191
Latham, Mitchell, & Dossett (1978)	Scientists/ engineers	F	E	Mixed	High	No	40	0.453	.218
Locke, Mento, & Katcher (1978)	Undergraduates	L	E	Yes	High	Yes	132	0.451	.207
Rosswork (1977)	6th Graders	L	E	Yes	High	No	101	1.388	.574
Strang, Lawrence, & Fowler (1978)	Undergraduates	L	E	Yes	Low	Yes	80	0.648	.312
Terborg & Miller (1978)	Undergraduates	L	E	Mixed	High	No	75	0.505	.255
Dossett, Latham, & Mitchell (1979)	Typists	L	E	No	High	Yes	60	0.556	.246
				Mixed		No	60	0.597	.292

Latham & Saari (1979a)	Undergraduates	L	E	Yes	High	No	90	0.399	.199
Latham & Saari (1979b)	Undergraduates	L	E	Yes	High	No	60	0.887	.414
Nemeroff & Consentino (1979)	Insurance company managers	F	E	Yes	High	No	30	0.923	.431
Rothkopf & Billington (1979)									
Study 2	High school students	L	E	No	Low	No	120	0.386	.192
Study 3	High school students	L	E	No	Low	No	18	0.983	.462
Dossett, Latham, & Saari (1980)	Industrial firm employees	F	E	No	High	No	209	0.289	.144
Mossholder (1980)	Undergraduates	L	E	No	High	No	80	0.797	.370
Bandura & Schunk (1981)	Elementary school children	L	E	No	Low	No	40	0.502	.230
Ivancevich (1982)	R&D team leaders	F	E	No	High	No	101	0.121	.061
Ivancevich & McMahon (1982)	Engineers	F	E	No	High	No	70	0.244	.115
Jackson & Zedeck (1982)	Undergraduates	L	E	No	High	No	121	0.672	.309
McKaul & Kopp (1982)	Undergraduates	F	E	No	High	No	120	0.384	.189
Wofford (1982)									
Study 3	Undergraduates	L	E	No	High	No	34	1.152	.511
Bandura & Cervone (1983)	Undergraduates	L	E	Mixed	High	No	40	0.601	.294
Latham & Steele (1983)	Undergraduates	L	E	No	High	No	72	0.581	.282
Garland (1984a)	Undergraduates	L	E	Yes	High	No	72	0.667	.320
Kim (1984)	Sales personnel	F	E	Yes	High	No	93	0.436	.215

[a] "L" = laboratory and "F" = field.
[b] "C" = correlational and "E" = experimental.

TABLE 3
META-ANALYSIS RESULTS OF GOAL DIFFICULTY ON PERFORMANCE WITH POTENTIAL MODERATOR VARIABLES

Variable	Sample size	Number of studies	Mean observed *d*	Observed variance	Mean corrected *d*	Variance corrected for measurement error	Variance corrected for sampling error	Unexplained variance
Goal difficulty	7407	70	0.5451	.1397	0.5813	.1495	.0466	.1029
Type								
Experimental	3252	36	0.6080	.1998	0.6307	.2152	.0551	.1601
Correlational	4155	34	0.4959	.0871	0.5426	.0946	.0401	.0545
Setting								
Laboratory	4233	47	0.6240	.1812	0.6486	.1958	.0554	.1404
Field	3174	23	0.4399	.0650	0.4915	.0735	.0353	.0382
Education (total)	6649	64	0.5507	.1469	0.5867	.1573	.0475	.1098
High	6241	60	0.5650	.1495	0.6014	.1602	.0476	.1127
Low	408	4	0.3322	.0569	0.3605	.0582	.0473	.0109
Feedback (total)	7006	65	0.5540	.1443	0.5913	.1541	.0458	.1083
Yes	3132	31	0.5708	.1292	0.6144	.1366	.0490	.0876
No	3874	34	0.5404	.1562	0.5727	.1674	.0433	.1241
Incentives (total)	7281	68	0.5426	.1401	0.5789	.1499	.0461	.1039
Yes	1378	13	0.4777	.1117	0.4990	.1223	.0462	.0762
No	5903	55	0.5577	.1455	0.5976	.1545	.0460	.1085

Note. For some of the moderator variables (i.e., education, feedback, and incentives) missing data reduced the total number of studies available for analysis. In those instances, total sample statistics were recomputed based on the reduced number of cases. These statistics are provided in the table.

error, variances due to sampling error, and the remaining variances after adjusting for the two artifacts.

For the subset of 36 experimental studies, the corrected d was 0.6307 and the corrected variance was .2152 (N = 3252). The variance corrected for sampling was .0551, leaving .1601 as unexplained variance.

Since a considerable amount of unexplained variance remained across studies of the goal difficulty–performance relationship (s_v^2 = .1029) after correction for artifacts, a search for potential moderator variables was undertaken. Using the general guidelines suggested by Schmidt *et al.* (1982), the ratio of sampling error variance was less than 75% of the corrected variance (s_c^2) and, therefore, a moderator analysis was deemed appropriate.

Moderator Analysis of the Goal Difficulty–Performance Relationship

The following variables were investigated as potential moderators of the goal difficulty–performance relationship: study type (experimental or correlational), study setting (laboratory or field), level of education (high or low), feedback (present or absent), and monetary incentives (present or absent). Stage one of this process employed moderator search techniques recommended by Hunter *et al.* (1982). One first dichotomizes the potential moderator variable and then compares subsequent subset statistics to statistics for the total sample. More explicitly, if the obtained subset effect sizes (d's) (after correcting for measurement error) differ from the total sample corrected effect size (d), and if *both* the unexplained subset variances (s_{v1}^2 and s_{v2}^2) are less than the overall unexplained variance (s_v^2), then one may deduce that a moderator variable has been identified.

For the sake of simplicity, comparisons of moderator effects were made in terms of d.

As seen in Table 3, there was a slight tendency for experimental studies to be more strongly related to performance than correlational studies; corrected d's were 0.6307 and 0.5426, respectively. The unexplained variance for experimental studies s_{v1}^2 = .1601 was larger than the unexplained variance for all studies (i.e., s_v^2 = .1029). Thus, study type does not appear to moderate goal difficulty–performance relationships.

There was a difference between the corrected d of 0.6486 for laboratory studies as compared to the d of 0.4915 for field studies. However, the unexplained variance for laboratory studies exceeded s_v^2 and therefore we concluded that study type was not a viable moderator.

The education level reported for a study's participants by the original researchers was used to test for the moderating effect of education level on a study's outcomes. Samples with greater than a high school education were classified as "high," and those reporting a level of education less than or equal to high school completion were categorized as "low"

(cf. Ivancevich & McMahon, 1977a). The existence of unclassifiable studies necessitated the recomputation of statistics for the overall sample. Thus, the overall corrected d for both high- and low-education samples combined was 0.5867, and $s_c^2 = .0475$, residual unexplained variance was $s_v^2 = .1098$.

Difficulty–performance relationships were stronger for high-education than for low-education samples, with d's = 0.6014 and 0.3605, respectively. However, the unexplained variance for high-education subjects exceeded the unexplained variance for the total sample. Hence, Hunter *et al.* (1982) would conclude that education level does not moderate the relationship.

Studies were classified on the feedback variable with respect to whether or not feedback was explicitly given concerning goals and performance. As the data in the table show, the presence of feedback did produce a larger d than that in studies with no feedback present. Once again, considering unexplained variance for a subsample, the feedback absent studies yielded an estimate of unexplained variance (s_{v1}^2) which exceeded the unexplained variance for all studies with and without feedback combined.

Studies were classified as including incentives if incentives were offered in conjunction with the goal-setting manipulation. Surprisingly, the goal difficulty–performance relationship was higher in the no incentive condition than it was in the incentive present condition. However, s_{v2}^2 was greater than s_v^2, thus eliminating this potential moderator from further consideration.

Hunter *et al.*'s (1982) moderator analysis provides a fairly conservative test for the detection of moderators. An alternative technique gaining popularity in the literature involves multiple regression analysis. Stage 2 of our moderator analysis involved the use of the multiple regression approach (Mabe & West, 1982; Steel & Ovalle, 1984). In this analysis goal difficulty–performance d's were utilized as the criterion variable and potential moderators served as predictors. The following coding scheme was used: (1) study type—experimental studies were coded 2 and correlational studies were coded 1; (2) study setting—laboratory studies were coded 2 and field studies were coded 1; (3) level of education—studies with a median education level greater than high school were coded 2, and studies with median education levels less than 12 years were coded 1; (4) feedback—studies incorporating feedback were coded 2 and studies without feedback were coded 1; (5) incentives—studies incorporating incentives in conjunction with performance goals were coded 2 and studies without incentives were coded 1.

There were 58 studies available for which moderator variable information could be obtained for each predictor. Table 4 contains the results of

TABLE 4
MULTIPLE REGRESSION ANALYSIS USING POTENTIAL MODERATORS TO PREDICT A GOAL DIFFICULTY–PERFORMANCE OUTCOME VARIABLE

Moderator	r	Beta	Value
Type	.135	.061	
Setting	.194	.154	
Feedback	.155	.154	
Education	−.073	−.041	
Incentive	−.053	−.126	
			Unadjusted R = .268
			Adjusted R^2 = −.018

Note. N = 58. Cases containing missing data were deleted from this analysis.

the regression analysis, and it also includes zero-order correlations between potential moderators and the goal difficulty–performance outcome variable. The results indicated that none of the predictor variables functioned to moderate the focal relationship between goal difficulty and performance.

Overall, goal difficulty exerted a strong influence on task performance. Across all studies, the corrected d was 0.5813. Clearly, difficult goals have a dramatic effect on performance outcomes.

Goal Specificity/Difficulty and Task Performance

Across both experimental and correlational studies (N = 5844), the relationship (corrected) between goal difficulty/specificity and performance was calculated to be d = 0.4441 (s_c^2 = .0695). This effect size estimate was smaller than the estimate for goal difficulty, but it was still nevertheless of considerable magnitude. The relevant statistics for the meta-analysis on goal specificity/difficulty effects and potential moderators may be found in Table 5.

Examining experimental studies only, the corrected d was 0.4945 and its associated variance was s_c^2 = .0807. The variance correcting for sampling was .075, leaving s_v^2 = .0333 as unexplained variance.

Again, since a considerable amount of unexplained variance remained when examining the overall goal specificity/difficulty–performance relationship (s_v^2 = .0303), a search for potential moderator variables was undertaken.

Moderator Analysis of the Goal Specificity/Difficulty–Performance Relationship

The same five potential moderator variables discussed above as moderators of the goal specificity/difficulty–performance relations were also

TABLE 5
META-ANALYSIS RESULTS OF GOAL SPECIFICITY/DIFFICULTY AND PERFORMANCE INCLUDING POTENTIAL MODERATOR VARIABLES

Variable	Sample size	Number of studies	Mean observed *d*	Observed variance	Mean corrected *d*	Variance corrected for measurement error	Variance corrected for sampling error	Unexplained variance
Goal specificity	5844	49	0.4185	.0638	0.4441	.0695	.0392	.0303
Type								
Experimental	4063	41	0.4729	.0747	0.4945	.0807	.0475	.0333
Correlational	1781	8	0.2944	.0167	0.3290	.0249	.0208	.0041
Setting								
Laboratory	2512	26	0.5481	.0808	0.5690	.0868	.0491	.0377
Field	3332	23	0.3208	.0287	0.3498	.0358	.0320	.0038
Education (total)	4237	40	0.4420	.0661	0.4720	.0717	.0442	.0275
High	3131	33	0.4637	.0815	0.4987	.0872	.0496	.0377
Low	1106	7	0.3804	.0176	0.3965	.0201	.0295	0
Feedback (total)	5411	42	0.4134	.0656	0.4396	.0717	.0363	.0354
Yes	1790	14	0.4850	.0805	0.5044	.0865	.0368	.0497
No	3621	28	0.3780	.0545	0.4075	.0613	.0315	.0298
Incentives								
Yes	465	6	0.6254	.0418	0.6488	.0450	.0619	0
No	5379	43	0.4006	.0616	0.4264	.0677	.0373	.0304

Note. For some of the moderator variables (i.e., education and feedback) missing data reduced the total number of studies available for analysis. In those instances, total sample statistics were recomputed based on the reduced number of cases. These statistics are provided in the table.

examined. Again a two-stage approach to moderator identification was undertaken, the first involving subset formation and variance comparison per Hunter *et al.* (1982), and the second approach employing multiple regression analysis.

The data in Table 5 reveal a tendency for experimental studies to be more strongly related to performance than correlational studies. However, the unexplained variance (s^2_{v1} = .0333) for experimental studies exceeded the unexplained variance (s^2_v = .0303) across all studies. Hence, the Hunter *et al.* (1982) moderator analyses indicated that type of study had no apparent impact on the magnitude of goal specificity/difficulty–performance outcomes.

The data in the table indicate, as was the case for goal difficulty, that the impact of goal specificity/difficulty on performance is somewhat greater in laboratory studies than in field studies. However, inspection of the relevant subsample variances indicated, using the Hunter *et al.* (1982) criterion, that study setting could not be treated as a moderating variable.

The overall corrected *d* for both high- and low-education samples was 0.472 based on a sample of 4237 cases from 40 studies. The obtained effect was stronger in the high-education group than in the low-education subsamples. Initial comparisons argue against the identification of education as a moderator, since the unexplained variance for the aggregated high- and low-education subsamples was less than the unexplained variance for the high-education subsample (i.e., s^2_v = .0275 vs s^2_{v1} = .0377).

Across the 42 studies (N = 5411) for which the presence or absence of explicit feedback in relation to performance could be clearly determined, the corrected *d* was = 0.4396, with s^2_v = .0354. In this comparison the goal specificity/difficulty–performance relationship for feedback present studies (d = 0.5044) was greater than for feedback absent studies (d = 0.4075). The unexplained variance in the feedback present subsample (s^2_{v1} = .0497) exceeded the unexplained variance (s^2_v = .0354) in the aggregated overall feedback sample. Thus, according to the Hunter *et al.* (1982) methodology, preliminary evidence was lacking for the identification of feedback as a moderator variable.

Previously, we found that goal difficulty and performance were more highly related in the incentive *absent* condition. In analyzing the potential of incentives to serve as a moderator between goal specificity/difficulty and performance, we determined that larger effect sizes were associated with the incentive *present* condition. Even so, comparison of the relevant variances again dictated rejection of incentives as a viable moderator variable.

Based on the initial stage of our moderator analysis which focused primarily on unexplained variance, no clear-cut moderator variables were

identified. The next stage of the analysis utilized the multiple regression approach. The coding system used with the moderator variables in the previous regression analysis was retained. There were 35 studies available for regression of the goal specificity/difficulty outcome variable on the five moderator candidates. Table 6 provides zero-order correlation coefficients and regression results from this analysis. The setting (laboratory versus field) was found to significantly ($p < .01$) moderate goal specificity/difficulty–performance relationships. The other four predictors failed to contribute to the explanation of additional criterion variance. It should be noted that the zero-order correlations for setting, type, and feedback were significant ($p < .05$). A more thorough explanation of the moderator variable results for the goal difficulty and goal specificity/difficulty analyses are explicated in the Discussion section. Overall, goal specificity/difficulty was found to be strongly related to task performance. The corrected d was = 0.4441.

Supplemental Analyses

Two additional prior distributions were developed to perform meta-analyses in order to investigate substantive issues in the goal-setting literature which could not be addressed by the previous meta-analyses of goal difficulty and goal specificity/difficulty. The following analyses focused on feedback and participation in goal setting. This approach used in the supplemental analyses was recommended originally by Green and Hall (1984).

The following meta-analysis was conducted to compare the performance effects of groups assigned specific hard goals with feedback to the effects of groups assigned specific hard goals without feedback. Specifically, a small subset of experimental studies were identified which compared a specific hard goal condition with feedback to a specific hard goal

TABLE 6
MULTIPLE REGRESSION ANALYSIS USING POTENTIAL MODERATORS TO PREDICT A GOAL SPECIFICITY/DIFFICULTY–PERFORMANCE OUTCOME VARIABLE

Moderator	r	Beta	Value
Type	.380	.011	
Setting	.517	.519*	
Feedback	.366	.262	
Education	−.021	−.137	
Incentive	.129	.036	
			Unadjusted R = .613
			Adjusted R^2 = .268

Note. N = 35. Cases containing missing data were deleted from the analysis.
* $p < .01$.

condition without feedback *within* the same study. Three studies were isolated having the relevant statistics needed for the calculation of subsequent meta-analysis statistics. These included one experimental field study (Becker, 1978) and two experimental laboratory studies (Bandura & Cervone, 1983; Strang, Lawrence, & Fowler, 1978). Across these three studies (N = 170), the overall effect size for hard specific goals with feedback compared to hard specific goals without feedback was d = 0.873 (s_c^2 = .0926). The variance due to sampling error was calculated to be .0773, leaving s_v^2 = .0153 as unexplained variance. The magnitude of this d value strongly suggests that the presence of feedback had a considerable impact on performance when used in conjunction with difficult specific goals.

An important issue in goal setting research which has engendered considerable debate deals with the differential effects of assigned versus participative goal setting on task performance. In order to bring some clarity to this issue, the goal-setting literature was reexamined for studies which compared both assigned and participative methods of goal assignment *within* the same study. The studies examined included Dossett, Latham, and Mitchell (1979), Ivancevich (1976, 1977), Latham and Marshall (1982), Latham, Mitchell, and Dossett (1978), Latham and Saari (1979a, 1979b), Latham and Steele (1983), Latham, Steele, and Saari (1982), and Latham and Yukl (1975b, 1976). Seven studies were identified which contained the statistics necessary for conducting this meta-analysis. All seven studies were experimental. Four were laboratory studies (Dossett *et al.*, 1979; Latham & Saari, 1979a, 1979b; Latham & Steele, 1983) and three were field studies (Latham & Marshall, 1982; Latham *et al.*, 1978; Latham & Yukl, 1976). Across these studies (N = 343) the frequency-weighted effect size was d = 0.203 with the *participative* goal-setting groups performing at higher levels than the individuals in the assigned goal-setting conditions. The corrected effect size statistic was d = 0.209 (s_c^2 = .0819). Residual unexplained variance (after corrections for sampling error) was virtually equal to zero. In the Latham *et al.* (1978) study goal levels for the assigned and participative groups were not equal. The participative goal group had a goal level higher than the assigned goal group and subsequently higher performance.

A further meta-analysis was conducted on the six remaining studies of the seven previously identified above in which goal level was held *constant* in *both* the assigned and participative goal-setting conditions. Across these six studies (N = 267), the corrected effect size statistic was d = 0.202, s_c^2 = .105, with the *participative* goal-setting groups performing at higher levels than individuals in the assigned goal-setting condition. Residual unexplained variance (after corrections for sampling error) was equal to .015. Thus in those studies which controlled for goal

difficulty level between assigned and participative conditions, and for which relevant meta-analytic data were available, participatively set goals lead to higher levels of task performance than did assigned goals. The effect size of $d = 0.202$ is equal to a productivity increase of 4% for participative versus assigned goals (Hunter & Schmidt, 1983).

DISCUSSION

The utilization of goal setting as a motivational technique for enhancing task performance is one of the most thoroughly researched areas in the management and organizational behavior literatures. Locke (1978) has argued persuasively that goal setting is either implicitly or explicitly recognized as a component process of virtually every theory of and approach to work motivation.

The present study contributed additional support to the increasingly overwhelming evidence behind two major premises of Locke's (1968a) conceptualization of goal setting as a motivational technique. Goal difficulty and goal specificity/difficulty were found to be strongly related to task performance across a variety of tasks and in both laboratory and field settings. If there is ever to be a viable candidate from the organizational sciences for elevation to the lofty status of a scientific law of nature, then the relationships between goal difficulty, specificity/difficulty, and task performance are most worthy of serious consideration. Certainly, if nothing else, the evidence from numerous studies indicates that these variables behave lawfully. At the same time, it appears as though little more may be gained by continuing to replicate goal difficulty and goal specificity/difficulty–performance relationships. It is time for a change in research emphasis toward underlying mechanisms which contribute to these relationships.

A strong appeal of the goal-setting paradigm might be due to its conceptual simplicity. A recent controversy regarding the generalizability of goal-setting effects from the laboratory to the field has been noted by Latham and Lee (1985). They argue that since goal-setting theory is relatively simple, its testing procedures are similarly simple, and less affected by many of the methodological difficulties that have constrained the refinement of other motivation theories (Pinder, 1984). They conclude that the development of a set of research techniques and experimental paradigms that appear to be effective and effectively sound from a scientific stance facilitate the relatively straightforward adaptation of the process from laboratory to field settings. In a similar vein, Locke and Henne (1986) in a review of various theories of work motivation conclude that the more task specific and the closer the concepts (in this case goals) of various theories to the point of action, the more valid the theory. Our

moderator analysis addresses this issue. The results indicated that goal difficulty and goal specificity/difficulty performance effects appear stable across the type of study (i.e., experimental or correlational), the types of subjects (i.e., educational level) and differing feedback and incentive conditions. In support of Latham and Lee (1985) our goal difficulty–performance moderator analysis indicated that research settings were undifferentiated for all practical purposes. The moderator variable analysis results for goal specificity/difficulty are less clear. We found the research setting statistically moderated the goal specificity/difficulty relationship, and also that zero-order correlations for type and feedback were statistically significant.

In perspective it should be noted that for both the Hunter *et al.* (1982) type moderator analysis and the regression-based moderator analysis, the possibility exists in our study that, because of the relatively small number of studies available, the power to detect moderators was not great. It seems plausible that some of the variables in Tables 3 and 5 that would have been moderators but for an aberrant variance in one of the subsamples of studies analyzed may turn out, when additional studies become available, to actually be moderators.

An additional meta-analysis focusing only on those studies which compared performance of subjects assigned hard specific goals with feedback to hard specific goals without feedback *within* the same study, provided clear support of the efficacy of coupling feedback with hard specific goals. Both knowledge and motivation, it would seem, are necessary for enhanced performance.

Further elaboration of our meta-analysis findings regarding the apparent efficacy of participative goal setting versus assigned goal settings is in order. Latham and Lee (1975), Locke and Latham (1984), and Schweiger and Leana (1975) argue that the evidence has not supported the efficacy of participative over assigned goals with respect to performance. Our meta-analysis was performed on six studies for which the performance of assigned goal groups could be directly compared to the performance of participatively set goal groups, *within* the same study with goal level held constant, and for which relevant statistics were available to permit the computation of an effect size. To permit a more comprehensive view of the available evidence, the following discussion focuses on those studies which did not enter our meta-analysis, since appropriate data were not available for inclusion.

Two of the studies by Ivancevich (1976, 1977) reported no differences in performance between assigned and participative goal-setting groups. The comparability of goal difficulty level between the two groups was not reported. In the Latham and Yukl (1975b) study no differences in performance were obtained between assigned and participative goal-setting

conditions among educated workers. Among uneducated workers, significant performance differences were obtained favoring the participative goal-setting group contrasted to the assigned goal group; however, the goal level was set higher among the participative goal-setting group. In the study by Latham *et al.* (1982) no differences were obtained between participative and assigned goal-setting conditions.

In our meta-analysis of six studies in which goal level was held constant, two of the studies yielded effect sizes favoring assigned goals, while the remaining four effect sizes favored participative over assigned goal setting. In light of all the available evidence regarding the participative–assigned goal-setting issue, we must conclude that our meta-analysis results favoring participative versus assigned goal setting is inconclusive and must await further research.

An important implication of this research for managers concerns the expected utility of goal setting as an organizational intervention. Based on the effect sizes obtained from the goal difficulty and goal specificity/difficulty meta-analyses, one may calculate the expected increase in average performance above baseline for the goal-setting technique used in the field. For goal difficulty the effect size $d = 0.5813$ (across all studies) is equal to a productivity increase of 11.63%; similarly, for goal specificity/difficulty, the effect size $d = 0.4441$ (across all studies) translates into an increase of 8.88% (Hunter & Schmidt, 1983). One further meta-analysis concerns the powerful effect on performance of combining specific hard goals with feedback (which involves both informational and motivational components) as compared to using specific hard goals without knowledge of results. The effect size between these conditions was $d = 0.873$, equating to a 17.46% increase in productivity realized by coupling specific hard goals with feedback. Of course, the expected dollar value of these average performance increments depends on the standard deviation of performance and the dollar value attributed to each performance increment for a given organization (Bobko, Karren, & Parkington, 1982).

The latest research on goal setting has focused on the processes by which goals affect task performance. Locke and his colleagues (Locke, Frederick, Lee, & Bobko, 1984; Taylor, Locke, Lee, & Gist, 1984) and Bandura and Cervone (1983) have identified the self-efficacy construct as an important mechanism underlying the goal-setting–performance process. In the future meta-analysis may be a useful technique for aggregating components of path-analytic models of the mediators of goal-setting–performance relationships, such as the variables of personal goals, expectancy, valence, and self efficacy. Future research on goal setting might further explore the effects of group goal setting and quality goals (Austin & Bobko, 1984) on performance. Other intriguing avenues for

future inquiry are the effects of goal setting in conjunction with competition and the role of strategy development in the goal-setting process.

A final comment deals with the process of meta-analysis. Subjective judgments *are* an important component of the process with respect to which studies to include, the coding process, and in gleaning relevant information from past studies. Meta-analytic procedures appear to offer more quantitative precision in accumulating statistical evidence regarding empirical relationships of interest, but should not replace but rather complement excellent analytical narrative type reviews such as those conducted by Latham and Lee (1985), Locke and Henne (1986), and Schweiger and Leana (1985).

REFERENCES

Andrews, F. M., & Farris, G. F. (1972). Time pressure and performance of scientists and engineers: A five-year panel study. *Organizational Behavior and Human Performance*, **8**, 185–200.

Austin, J. T., & Bobko, P. (1984). *The application of goal setting: Some boundary conditions and future research*. Paper presented at the 44th Annual Convention of the Academy of Management, Boston.

Bandura, A., & Cervone, D. (1983). Self-evaluation and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology*, **45**, 1017–1028.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, **41**, 586–598.

Bassett, G. A. (1979). A study of the effects of task goal and schedule choice on work performance. *Organizational Behavior and Human Performance*, **24**, 202–227.

Bavelas, J. B., & Lee, E. S. (1978). Effects of goal level on performance: A tradeoff of quantity and quality. *Canadian Journal of Psychology*, **32**, 219–240.

Becker, L. J. (1978). Joint effect of feedback and goal setting on performance: A field study of residential energy conservation. *Journal of Applied Psychology*, **63**, 428–433.

Blumenfeld, W. S., & Leidy, T. R. (1969). Effectiveness of goal setting as a management device: Research note. *Psychological Reports*, **24**, 752.

Bobko, P., Karren, R., & Parkington, J. J. (1983). Estimation of standard deviation in utility analyses: An empirical test. *Journal of Applied Psychology*, **68**, 170–176.

Bryan, J. F., & Locke, E. A. (1967). Goal-setting as a means of increasing motivation. *Journal of Applied Psychology*, **51**, 274–277.

Burke, R. J., & Wilcox, D. S. (1969). Characteristics of effective employee performance review and development. *Personnel Psychology*, **22**, 291–305.

Campbell, D. J. (1984). The effect of goal contingent payment on the performance of a complex task. *Personnel Psychology*, **37**, 23–40.

Campbell, D. J., & Ilgen, D. R. (1976). Additive effects of task difficulty and goal setting on subsequent task performance. *Journal of Applied Psychology*, **61**, 319–324.

Chhokar, J. S., & Wallin, J. A. (1984). A field study of the effect of feedback frequency on performance. *Journal of Applied Psychology*, **69**, 524–530.

Chidester, T. R., & Grigsby, W. C. (1984). A meta-analysis of the goal setting-performance literature. In J. A. Pearce II & R. B. Robinson, Jr. (Eds.), *Proceedings of the 44th Annual Meeting of the Academy of Management*, 202–206.

Cooper, H. M. (1979). Statistically combining independent studies: A meta-analysis of sex

differences in conformity research. *Journal of Personality and Social Psychology*, **37**, 141–146.

Dachler, H. P., & Mobley, W. H. (1973). Construct validation of an instrumentality–expectancy–task–goal model of work motivation: Some theoretical boundary conditions. [Monograph]. *Journal of Applied Psychology*, **58**, 397–418.

Dey, M. K., & Kaur, G. (1965). Facilitation of performance by experimentally induced ego motivation. *Journal of General Psychology*, **73**, 237–247.

Dossett, D. L., Latham, G. P., & Mitchell, T. R. (1979). The effects of assigned versus participatively set goals, KR, and individual differences when goal difficulty is held constant. *Journal of Applied Psychology*, **64**, 291–298.

Dossett, D. L., Latham, G. P., & Saari, L. M. (1980). The impact of goal setting on survey returns. *Academy of Management Journal*, **23**, 561–567.

Erez, M. (1977). Feedback: A necessary condition for the goal setting–performance relationship. *Journal of Applied Psychology*, **62**, 624–627.

Erez, M., & Zidon, I. (1984). Effect of goal acceptance on the relationship of goal difficulty to performance. *Journal of Applied Psychology*, **69**, 69–78.

Fisher, C. D., & Gitelson, R. (1983). A meta-analysis of the correlates of role conflict and ambiguity. *Journal of Applied Psychology*, **68**, 320–333.

Frost, P. J., & Mahoney, T. A. (1976). Goal setting and the task process: I. An interactive influence on individual performance. *Organizational Behavior and Human Performance*, **17**, 328–350.

Garland, H. (1982). Goal levels and task performance: A compelling replication of some compelling results. *Journal of Applied Psychology*, **67**, 245–248.

Garland, H. (1983). Influence of ability, assigned goals, and normative information on personal goals and performance: A challenge to the goal attainability assumption. *Journal of Applied Psychology*, **68**, 20–30.

Garland, H. (1984a). *A cognitive mediation theory of task goals and human performance*. Paper presented at the 44th Annual Convention of the Academy of Management, Boston.

Garland, H. (1984b). Relation of effort performance expectancy to performance in goal setting experiments. *Journal of Applied Psychology*, **69**, 79–84.

Glass, G. V. (1976). Primary, secondary and meta-analysis of research. *Educational Researcher*, **5**, 3–8.

Glass, G. V. (1977). Integrating findings: The meta-analysis of research. *Review of Research in Education*, **5**, 351–379.

Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research*. Beverly Hills, CA: Sage.

Green, B. F., & Hall, J. A. (1984). Quantitative methods for literature reviews. *Annual Review of Psychology*, **35**, 37–53.

Hall, D. T., & Foster, L. W. (1977). A psychological success cycle and goal setting: Goals, performance, and attitudes. *Academy of Management Journal*, **20**, 282–290.

Hall, D. T., & Hall, F. S. (1976). The relationship between goals, performance, success, self-image, and involvement under different organizational climates. *Journal of Vocational Behavior*, **9**, 267–278.

Hamner, W. C., & Harnett, D. L. (1974). Goal-setting, performance and satisfaction in an interdependent task. *Organizational Behavior and Human Performance*, **12**, 217–230.

Hunter, J. E., & Schmidt, F. L. (1983). Quantifying the effects of psychological interventions on employee job performance and work-force productivity. *American Psychologist*, **38**, 473–478.

Hunter, J. E., Schmidt, F. L., & Jackson, G. B. (1982). *Meta-analysis: Cumulating research findings across studies*. Beverly Hills, CA: Sage.

Ivancevich, J. M. (1976). Effects of goal setting on performance and job satisfaction. *Journal of Applied Psychology*, **61**, 605–612.

Ivancevich, J. M. (1977). Different goal setting treatments and their effects on performance and job satisfaction. *Academy of Management Journal*, **20**, 406–419.

Ivancevich, J. M. (1982). Subordinates' reactions to performance appraisal interviews: A test of feedback and goal-setting techniques. *Journal of Applied Psychology*, **67**, 581–587.

Ivancevich, J. M., & McMahon, J. T. (1977a). Education as a moderator of goal-setting effectiveness. *Journal of Vocational Behavior*, **11**, 83–94.

Ivancevich, J. M., & McMahon, J. T. (1977b). Black–white differences in a goal-setting program. *Organizational Behavior and Human Performance*, **20**, 287–300.

Ivancevich, J. M., & McMahon, J. T. (1977c). A study of task goal attributes, higher order need strength, and performance. *Academy of Management Journal*, **20**, 552–563.

Ivancevich, J. M., & McMahon, J. T. (1982). The effects of goal setting, external feedback, and self-generated feedback on outcome variables: A field experiment. *Academy of Management Journal*, **25**, 359–372.

Jackson, S. E., & Zedeck, S. (1982). Explaining performance variability: Contributions of goal setting, task characteristics and evaluative contexts. *Journal of Applied Psychology*, **67**, 759–768.

Kaplan, R., & Rothkopf, E. Z. (1974). Instructional objectives as directions to learners: Effect of passage length and amount of objective-relevant content. *Journal of Educational Psychology*, **66**, 448–456.

Katzell, R. A., & Guzzo, R. A. (1983). Psychological approaches to productivity improvement. *American Psychologist*, **38**, 468–472.

Kim, J. S. (1984). Effect of behavior plus outcome goal setting and feedback on employee satisfaction and performance. *Academy of Management Journal*, **27**, 139–149.

Komaki, J. L., Barwick, K. D., & Scott, L. R. (1978). A behavioral approach to occupational safety: Pinpointing and reinforcing safe performance in a food manufacturing plant. *Journal of Applied Psychology*, **64**, 434–445.

Komaki, J. L., Collins, R. L., & Penn, P. (1982). The role of performance antecedents and consequences in work motivation. *Journal of Applied Psychology*, **67**, 334–340.

Kraiger, K., & Ford, J. K. (1985). A meta-analysis of rate race effects in performance ratings. *Journal of Applied Psychology*, **70**, 56–67.

LaPorte, R. E., & Nath, R. (1976). Role of performance goals in prose learning. *Journal of Educational Psychology*, **68**, 260–264.

Latham, G. P., & Kinne, S. B. III (1974). Improving job performance through training in goal setting. *Journal of Applied Psychology*, **59**, 187–191.

Latham, G. P., & Lee, T. W. (1985). Goal setting. In E. A. Locke (Ed.), *Generalizing from laboratory to field settings: Research findings from industrial–organizational psychology, organizational behavior and human resource management*. Lexington, MA: Heath Lexington.

Latham, G. P., & Locke, E. A. (1975). Increasing productivity with decreasing time limits: A field replication of Parkinson's Law. *Journal of Applied Psychology*, **60**, 524–526.

Latham, G. P., & Marshall, H. A. (1982). The effects of self set, participatively set, and assigned goals on the performance of government employees. *Personnel Psychology*, **35**, 399–404.

Latham, G. P., Mitchell, T. R., & Dossett, D. L. (1978). The importance of participative goal setting and anticipated rewards on goal difficulty and job performance. *Journal of Applied Psychology*, **63**, 163–171.

Latham, G. P., & Saari, L. M. (1979a). The importance of supportive relationships in goal setting. *Journal of Applied Psychology*, **64**, 151–156.

Latham, G. P., & Saari, L. M. (1979b). The effects of holding goal difficulty constant on assigned and participatively set goals. *Academy of Management Journal*, **22**, 163–168.

Latham, G. P., & Steele, T. P. (1983). The motivational effects of participative versus assigned goal setting on performance. *Academy of Management Journal*, **26**, 406–417.

Latham, G. P., Steele, T. P., & Saari, L. M. (1982). The effects of participation and goal difficulty on performance. *Personnel Psychology*, **35**, 677–686.

Latham, G. P., & Yukl, G. A. (1975a). A review of research on the application of goal setting in organizations. *Academy of Management Journal*, **18**, 824–845.

Latham, G. P., & Yukl, G. A. (1975b). Assigned versus participative goal setting with educated and uneducated wood workers. *Journal of Applied Psychology*, **60**, 299–302.

Latham, G. P., & Yukl, G. A. (1976). The effects of assigned and participative goal setting on performance and job satisfaction. *Journal of Applied Psychology*, **61**, 166–171.

Light, R. J., & Smith, P. V. (1971). Accumulating evidence: Procedures for resolving contradictions among different research studies. *Harvard Educational Review*, **41**, 429–471.

Locke, E. A. (1966). The relationship of intentions to level of performance. *Journal of Applied Psychology*, **50**, 60–66.

Locke, E. A. (1967a). The motivational effects of knowledge of results: Knowledge or goal-setting? *Journal of Applied Psychology*, **51**, 324–329.

Locke, E. A. (1967b). Relationship of goal level to performance level. *Psychological Reports*, **20**, 1068.

Locke, E. A. (1968a). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, **3**, 157–189.

Locke, E. A. (1968b). The effects of knowledge of results, feedback in relation to standards, and goals on reaction time performance. *American Journal of Psychology*, **81**, 566–574.

Locke, E. A. (1978). The ubiquity of the technique of goal setting in theories of and approaches to employee motivation. *Academy of Management Journal*, **3**, 594–601.

Locke, E. A. (1982). Relation of goal level to performance with a short work period and multiple goal levels. *Journal of Applied Psychology*, **67**, 512–514.

Locke, E. A., & Bryan, J. F. (1966). Cognitive aspects of psychomotor performance: The effects of performance goals on level of performance. *Journal of Applied Psychology*, **50**, 417–420.

Locke, E. A., & Bryan, J. F. (1967). Performance goals as determinants of levels of performance and boredom. *Journal of Applied Psychology*, **51**, 120–130.

Locke, E. A., & Bryan, J. F. (1968a). Goal-setting as a determinant of the effect of knowledge of score on performance. *American Journal of Psychology*, **81**, 398–407.

Locke, E. A., & Bryan, J. F. (1968b). Grade goals as determinants of academic achievement. *Journal of General Psychology*, **79**, 217–228.

Locke, E. A., & Bryan, J. F. (1969a). The directing function of goals in task performance. *Organizational Behavior and Human Performance*, **4**, 35–42.

Locke, E. A., & Bryan, J. F. (1969b). Knowledge of score and goal difficulty as determinants of work rate. *Journal of Applied Psychology*, **53**, 59–65.

Locke, E. A., Bryan, J. F., & Kendall, L. M. (1968). Goals and intentions as mediators of the effects of monetary incentives on behavior. *Journal of Applied Psychology*, **52**, 104–121.

Locke, E. A., Cartledge, N., & Knerr, C. (1970). Studies of the relationship between satisfaction, goal setting and performance. *Organizational Behavior and Human Performance*, **5**, 135–158.

Locke, E. A., Feren, D. B., McCaleb, U. M., Shaw, K. N., & Denny, A. T. (1980). The relative effectiveness of four methods of motivating employee performance. In K. Duncan, M. Gruneberg, R. D. Wallis (Eds.), *Changes in working life*. (pp. 368–388). New York: Wiley.

Locke, E. A., Frederick, E., Buckner, E., & Bobko, P. (1984). Effects of previously as-

signed goals on self-set goals and performance. *Journal of Applied Psychology*, **69**, 694–699.

Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effects of self-efficacy, goals, and task strategies on task performance. *Journal of Applied Psychology*, **69**, 241–251.

Locke, E. A., & Henne, D. (1986). Work motivation theories. In C. L. Cooper & I. Robertson (Eds.), *Review of industrial and organizational psychology*. Chichester, England: Wiley.

Locke, E. A., & Latham, G. P. (1984). *Goal setting: A motivational technique that works!* Englewood Cliffs, NJ: Prentice-Hall.

Locke, E. A., Mento, A. J., & Katcher, B. (1978). The interaction of ability and motivation in performance: An exploration of the meaning of moderators. *Personnel Psychology*, **31**, 269–280.

Locke, E. A., & Shaw, K. N. (1984). Atkinson's inverse-*U* curve and the missing cognitive variables. *Psychological Reports*, **55**, 403–412.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969–1980. *Psychological Bulletin*, **90**, 125–152.

London, M., & Oldham, G. R. (1976). Effects of varying goal types and incentive systems on performance and satisfaction. *Academy of Management Journal*, **19**, 537–546.

Mabe, P. A., & West, S. G. (1982). Validity of self-evaluation of ability: A review and meta-analysis. *Journal of Applied Psychology*, **67**, 280–296.

Mace, C. A. (1935). *Incentives: Some experimental studies* (Rep. No. 72). Great Britain: Industrial Health Research Board.

Masters, J. C., Furman, W., & Barden, R. C. (1977). Effects of achievement standards, tangible rewards and self-dispensed achievement evaluations on children's task mastery. *Child Development*, **48**, 217–224.

Matsui, T., Okada, A., Kakuyuma, T. (1982). Influence of achievement need on goal setting, performance, and feedback effectiveness. *Journal of Applied Psychology*, **67**, 645–648.

Matsui, T., Okada, A., & Mizuguchi, R. (1981). Expectancy theory prediction of the goal theory postulate, "the harder the goals, the higher the performance." *Journal of Applied Psychology*, **66**, 54–58.

McCaul, K. D., & Kopp, J. T. (1982). Effects of goal setting and commitment on increasing metal recycling. *Journal of Applied Psychology*, **67**, 377–379.

Mento, A. J., Cartledge, N. D., & Locke, E. A. (1980). Maryland vs Michigan vs Minnesota: Another look at the relationship of expectancy and goal difficulty to task performance. *Organizational Behavior and Human Performance*, **25**, 419–440.

Miller, G. A., Galanter, E., & Pribram, K. H. (1960). *Plans and the structure of behavior*. New York: Holt.

Miner, J. B. (1984). The validity and usefulness of theories in an emerging organizational science. *Academy of Management Review*, **9**, 296–306.

Mossholder, K. W. (1980). Effects of externally mediated goal setting on intrinsic motivation: A laboratory experiment. *Journal of Applied Psychology*, **65**, 202–210.

Motowidlo, S., Loehr, V., & Dunnette, M. D. (1978). A laboratory study of the effects of goal specificity on the relationship between probability of success and performance. *Journal of Applied Psychology*, **23**, 172–179.

Mowen, J. C., Middlemist, R. D., & Luther, D. (1981). Joint effects of assigned goal level and incentive structure on task performance: A laboratory study. *Journal of Applied Psychology*, **66**, 598–603.

Nemeroff, W. F., & Consentino, J. (1979). Utilizing feedback and goal setting to increase performance appraisal interviewer skills of managers. *Academy of Management Journal*, **22**, 566–576.

Odiorne, G. S. (1978). MBO: A backward glance. *Business Horizons*, **21**(5), 14–24.

Oldham, G. R. (1976). The motivational strategies used by supervisors: Relationships to effectiveness indicators. *Organizational Behavior and Human Performance*, **15**, 66–86.

Organ, D. W. (1977). Intentional vs arousal effects of goal setting. *Organizational Behavior and Human Performance*, **18**, 377–389.

Peters, L. H., Chassie, M. B., Lindholm, H. R., O'Connor, E. J., & Kline, C. R. (1982). The joint influence of situational constraints and goal setting on performance and affective outcomes. *Journal of Management*, **8**, 7–20.

Pinder, C. (1984). *Work motivation*. Glenview, IL: Scott, Foresman.

Pritchard, R. D., & Curtis, M. I. (1973). The influence of goal setting and financial incentives on task performance. *Organizational Behavior and Human Performance*, **10**, 175–183.

Rakestraw, T. L., Jr., & Weiss, H. M. (1981). The interaction of social influences and task experience on goals, performance, and performance satisfaction. *Organizational Behavior and Human Performance*, **27**, 326–344.

Reber, R. A., & Wallin, J. A. (1984). The effects of training, goal setting, and knowledge of results on safe behavior: A component analysis. *Academy of Management Journal*, **27**, 544–560.

Ronan, W. W., Latham, G. P., & Kinne, S. B. (1973). Effects of goal setting and supervision on worker behavior in an industrial situation. *Journal of Applied Psychology*, **58**, 302–307.

Rosenthal, R. (1978). Combining results from independent studies. *Psychological Bulletin*, **85**, 185–193.

Rosswork, S. G. (1977). Goal setting: The effects on an academic task with varying magnitudes of incentive. *Journal of Educational Psychology*, **69**, 710–715.

Rothkopf, E. Z., & Billington, M. J. (1975). A two factor model of the effect of goal-descriptive directions on learning from text. *Journal of Educational Psychology*, **67**, 192–204.

Rothkopf, E. Z., & Billington, M. J. (1979). Goal-guided learning from text: Inferring a descriptive processing model from inspection times and eye movements. *Journal of Educational Psychology*, **71**, 310–327.

Rothkopf, E. Z., & Kaplan, R. (1972). Exploration of the effect of density and specificity of instructional objectives on learning from text. *Journal of Educational Psychology*, **63**, 295–302.

Ryan, T. A. (1970). *Intentional behavior: An approach to human motivation*. New York: Ronald Press.

Sales, S. M. (1970). Some effects of role overload and role underload. *Organizational Behavior and Human Performance*, **5**, 592–608.

Salipante, P., Notz, W., & Bigelow, J. (1982). A matrix approach to literature reviews. In B. M. Staw & L. L. Cuminings (Eds.), *Research in organizational behavior* (Vol. 4, pp. 321–348). Greenwich, CT: JAI Press.

Schmidt, F. L., & Hunter, J. E. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology*, **62**, 529–540.

Schmidt, F. L., Hunter, J. E., & Pearlman, K. (1982). Progress in validity generalization: Comments on Callender and Osburn and further developments. *Journal of Applied Psychology*, **67**, 835–845.

Schweiger, D. M., & Leana, C. R. (1985). Participation in decision making. In E. A. Locke (Ed.), *Generalizing from laboratory to field setting: Research findings from industrial–organizational psychology, organizational behavior and human resource management*. Lexington, MA: Heath Lexington.

Stedry, A. C., & Kay, E. (1966). The effects of goal difficulty on performance: A field experiment. *Behavioral Science*, **11**, 459–470.

Steel, R. P., & Ovalle, N. K. II (1984). A review and meta-analysis of research on the relationship between behavioral intentions and employee turnover. *Journal of Applied Psychology*, **69**, 673–686.

Steers, R. M. (1975). Task–goal attributes, achievement, and supervisory performance. *Organizational Behavior and Human Performance*, **13**, 392–403.

Strang, H. R., Lawrence, E. C., & Fowler, P. C. (1978). Effects of assigned goal level and knowledge of results on arithmetic computation: A laboratory study. *Journal of Applied Psychology*, **63**, 29–39.

Taylor, F. W. (1967). *The principles of scientific management*. New York: Norton. (Original work published 1911)

Taylor, M. S., Locke, E. A., Lee, C., & Gist, M. (1984). Type A. behavior and faculty research productivity: What are the mechanisms? *Organizational Behavior and Human Performance*, **34**, 402–418.

Terborg, J. R. (1976). The motivational components of goal setting. *Journal of Applied Psychology*, **61**, 613–621.

Terborg, J. R., & Miller, H. E. (1978). Motivation, behavior and performance: A closer examination of goal setting and monetary incentives. *Journal of Applied Psychology*, **63**, 29–39.

Umstot, D. D., Bell, C. H., Jr., & Mitchell, T. R. (1976). Effects of job enrichment and task goals on satisfaction and productivity: Implications for job design. *Journal of Applied Psychology*, **61**, 379–394.

Weed, S. E., & Mitchell, T. R. (1980). The role of environmental and behavioral uncertainty as a mediator of situation–performance relationships. *Academy of Management Journal*, **23**, 38–60.

Wexley, K. N., & Nemeroff, W. F. (1975). Effectiveness of positive reinforcement and goal setting as methods of management development. *Journal of Applied Psychology*, **60**, 446–450.

White, S. E., Mitchell, T. R., & Bell, C. H., Jr. (1977). Goal setting, evaluation apprehension, and social cues as determinants of job performance and job satisfaction in a simulated organization. *Journal of Applied Psychology*, **62**, 665–673.

Wofford, J. C. (1982). Experimental tests of the goal–energy–effort requirement theory of work motivation. *Psychological Reports*, **50**, 1259–1273.

Wood, R. E., & Locke, E. A. (1984). *The effects of self-efficacy on academic performance*. Unpublished manuscript.

Yukl, G. A., & Latham, G. P. (1978). Interrelationships among employee participation, individual differences, goal difficulty, goal acceptance, goal instrumentality and performance. *Personnel Psychology*, **31**, 305–323.

RECEIVED: August 19, 1985