Detecting moderator effects on construct relationships in empirical sales research: a meta-analysis

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ABSTRACT

The purpose of this study is to identify the construct relationships that may have strong moderator effects in empirical sales research. In this study, six thousand and seven correlation coefficients were collected from 340 empirical sales articles in 12 key marketing journals. Then, meta-analysis was applied to generate 1,873 construct relationships. According to the effect size (correlations) means and their corrected variances, three hundred twenty-eight construct relationships with strong moderator effects were identified. Further, focusing on job performance, eighty-nine construct relationships show strong moderator effects. Based on the study results, researchers not only can comprehensively understand the strength of construct relationships but also may discover possible moderators.

Keywords: Moderator effects, Construct relationships, Sales research, Meta-analysis, Effect size

INTRODUCTION

Moderators provide certain conditions for hypothesized effects and determine whether the effects exist (Cortina & Folger, 1998). Therefore, through the interaction with an independent variable, a moderator may change the direction or strength of a construct relationship. For example, Jaramillo, Grisaffe, Chonko, and Roberts (2009) found that managers' servant leadership has a positive impact on salespeople's customer orientation; however, the influence is weak for experienced salespeople. In other words, salespeople's experience moderates the relationship between servant leadership and customer orientation. Therefore, moderator effects determine the establishment of a theory under certain conditions.

The concept of moderator detection is that if 1) a variance is sufficiently large or 2) a confidence interval includes zero with positive and negative effect sizes, there is probably one or more moderators. In this study, statistical power is the probability of correctly rejecting the null hypothesis of mean of effect sizes equal to zero when the null hypothesis is false. Statistical power was also applied for assessing the soundness of meta-analysis findings, and thus avoiding the occurrence of a Type II error. Statistical power of .8 or higher is typically deemed acceptable (MacCallum, Browne, & Sugawara, 1996; McQuitty, 2004). When statistical power is .8 or higher and the 90% confidence intervals of a bivariate relationship excludes zero, we can conclude that a significant relationship exists between their constructs. In this study, a cutoff of .8 (statistical power) was used to classify the 1,873 effect sizes into two groups. The first group, with statistical power of .8 or higher, includes 819 construct relationships; 280 of them may have larger variances (larger than the mean of the 819 corrected variances .0124). The second group, with statistical power lower than .8, includes 281 construct relationships with confidence intervals including zero; 48 of them have positive and negative correlations.

According to a literature review, no study systematically analyzes construct relationships and identifies those that may have strong moderator effects. Therefore, the purpose of this study is to fully identify the construct relationships that may have strong moderator effects in empirical sales research. Further, researchers may focus on construct relationships in order to explore potential moderators from method, contextual, or theoretical factors.

THEORY AND BACKGROUND

According to the attributions of predictor and moderator (categorical or continuous variables), moderator effects are tested using various methods, namely, correlation methods, multiple regressions, analysis of variance (ANOVA), and hierarchical multiple regression (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004). Studies of moderator effects in meta-analysis focus on analyses of the heterogeneity of effect sizes (study conditions). In order to detect moderators in meta-analysis, researchers have used several statistics, such as Q-statistic, I^2 index, confidence intervals, interval size, and the Schmidt-Hunter ratio (75%, 90%). Moreover, several research studies have also used statistical power to evaluate the soundness of research findings (e.g., Kemery, Mossholder, & Roth, 1987; Sackett, Harris, & Orr, 1986; Sagie & Koslowsky, 1993).

Q-statistic is the most widely used method for determining whether the effect sizes across studies are homogeneous or heterogeneous (Huedo-Medina, Sa´nchez-Meca, Marı´n-Martı´nez, & Botella, 2006). A significant Q-statistic value means that the variance across sample studies is larger than expected by sampling error; this indicates that moderator effects are present. On the

contrary, an insignificant Q-statistic value implies the absence of moderator effects. In addition to Q-statistic, confidence intervals are also used to detect moderators. The concept of confidence intervals is that if 1) a variance is sufficiently large or 2) a confidence interval includes zero, a moderator effect probably exists (one or more moderators). A large interval indicates that there may be several sub-populations present. The interval including zero also implies that there probably are positive or negative effect sizes. On the other hand, if the interval is small or does not include zero, a moderator is unlikely to be present (Kemery, Mossholder, & Dunlap, 1989; Koslowsky & Sagie, 1993; Pearlman, Schmidt, & Hunter, 1980; Whitener, 1990).

The magnitudes of variances are meaningful when the means of effect sizes are not zero. However, there is lack of agreement regarding the number of effect sizes that are necessary. For example, some meta-analysis studies employed a stricter approach and suggested at least 10 effect sizes in every relationship (e.g., Witter, Okun, Stock, & Haring, 1984). Others used at least three or four correlations in every relationship, and, recently, Arthur, Bennet, Edens, and Bell (2003) as well as Carrillat, Jaramillo, and Mulki (2009) adopted at least five. The statistical power of effect sizes provides a less debated approach to decide the number of effect sizes for meaningful meta-analytical results.

Statistical power is the probability of rejecting the null hypothesis when it is false; in other words, making a correct decision. In this study, statistical power is the probability of correctly rejecting the null hypothesis of the mean of effect sizes equal to zero when the null hypothesis is false. A statistical power of at least .8 (MacCallum et al., 1996; McQuitty, 2004) likely implies that the mean of effect sizes is meaningful; thus, a further analysis of its variance is necessary.

This study applied statistical power, variances, and confidence intervals in order to identify the construct relationships that may have strong moderator effects in empirical sales research. Moreover, Q-statistic was also used in order to determine the soundness of findings. Taken together, these statistics are rather helpful in evaluating the effect of a moderator on central bivariate relationships in sales. This essay includes three procedures. First, the research procedure section presents data sources, analysis processes, and statistics used to identify the means, variances of effect sizes (correlation coefficients), and moderator effects. Then, the results section presents the means and variances of effect sizes, and lists the construct relationships that may have strong moderator effects. Most importantly, the tables clearly identify construct relationships under the dimensions of effect size means and moderator-effect magnitudes. Thereafter, the relationships of Job performance and its related constructs demonstrate the functions of the findings. For example, Job performance and Extrinsic motivation have positive and negative correlations. Finally, the conclusions section discusses the limitations, implications, and subjects for future research.

RESEARCH PROCEDURE

Data Sources

The study reviewed all the empirical sales articles from 12 key marketing journals (*JPSSM*, *JAMS*, *IMM*, *JBR*, *JAP*, *JM*, *JMTP*, *JMR*, *JBIM*, *IJRM*, *EJM*, and *JBE*) in four databases (EBSCO Host, Elsevier ScienceDirect Complete, Emerald Current, and Springer Standard Collection) across the period from 1936 to January 2010 (as indicated in Table 1). The earliest usable article was published in the *Journal of Marketing Research* (*JMR*) in 1971 and the

latest one in January 2010. Finally, 6,007 correlation coefficients from 340 articles were collected; approximately 37% (2,230/6,007) of correlations and 41% (141/340) of articles are from the *Journal of Personal Selling & Sales Management* (*JPSSM*). All these correlations are zero-order correlations and between latent constructs. Moreover, all types of relationships between constructs, between sub-constructs, and between constructs and sub-constructs are included as long as they were presented in the journal articles. For example, Katsikea, Theodosiou, and Morgan (2007) used the following constructs: Organization effectiveness, Job performance, Satisfaction of territory situation, Control system, and Behavioral performance. Among these constructs, Control system has four sub-constructs (Monitoring, Evaluating, Directing, and Rewarding) and Behavioral performance has six (Adaptive selling, Technical knowledge, Sales support, Teamwork, Sales presentation, and Sales planning). In this case, the study collected not only the correlations between constructs but also those between sub-constructs (e.g., Adaptive selling-Monitoring, .09) and those between constructs and sub-constructs (e.g., Adaptive selling-Job performance, .38).

Analysis Processes

Figure 1 indicates the processes used for identifying the construct relationships that may have strong moderator effects by corrected variances (sufficiently large) and confidence intervals (includes zero). First, Hunter and Schmidt's (2004) meta-analysis methods are followed to combine the 6,007 correlations according to different construct relationships. Then, 1,873 construct relationships were generated with corrected means, corrected variances, confidence intervals, Q-statistics (Lipsey & Wilson, 2001), and statistical power (Hedges & Pigott, 2001).

Second, according to the statistical power values with the cutoff point .8, the 1,873 corrected means were divided into two categories: rejecting the null hypothesis of mean effect size equal to zero (statistical power $\geq .8$) and not rejecting it (statistical power $< .8$). The reason for this is that when the means of effect sizes are not zero, it is meaningful to discuss the magnitudes of variances. However, when the null hypothesis cannot be rejected, it may be because the mean of effect size is zero, or because there are positive and negative effect sizes.

Third, after omitting the corrected variances close to zero in the category with statistical power of at least .8, the mean of the 819 corrected variances (.0124) is used as the cutoff point in order to define small and large corrected variances. Fourth, the study reviewed the 985 relationships in the category with statistical power lower than .8 and found 281 with confidence intervals including zero. Then, those with positive and negative effect sizes and with the number of effect size no less than four were identified in order to ensure that the results are more meaningful. Finally, the construct relationships with large intervals or intervals including zero—relationships that may have significant moderator effects in empirical sales research—were listed.

Statistics Employed

1. Weighted means of correlations in the within-study sample size. Hunter and Schmidt (2004) provided sample-size-weighted means of correlations in order to eliminate sampling error. Assuming that sampling error is the only artifact, studies with large sample sizes are more accurate than those with small ones are. Therefore, means weighted by the sample sizes of studies provide the best estimate of population correlations when considering only sampling

error and ignoring other artifacts.

2. Corrected means of the correlations across studies. Hunter and Schmidt (2004) also used sample sizes, measurement reliabilities, and sample correlations in order to eliminate artifacts and correct the sample means. Since the corrected means are attenuated by artifacts, they are larger than the sample and weighted means, and are used to ascertain the "true" correlation means between latent constructs. Therefore, the corrected mean of correlations is the best estimate of population correlations after eliminating artifacts.
3. The corrected variances of the correlations across studies. In the calculation of corrected means, the corrected variances are generated simultaneously. Similar to corrected means, corrected variances are used to estimate the "true" variances of the "true" correlations between latent constructs after eliminating the artifacts. In other words, the corrected variance is the difference between the total variance and sample error variance. More importantly, corrected variances influence confidence intervals, and large confidence intervals indicate moderator effects. Therefore, when corrected variances are large, there should be moderator effects between the latent constructs.
4. The 90% confidence intervals. Following the corrected variances, the 90% confidence intervals were calculated using corrected means and corrected stand errors (square root of corrected variances). In this manner, the study detected whether confidence intervals include zero, and scrutinized the correlation values within the construct relationships.
5. Statistical powers. Hedges and Pigott (2001) provided details for calculating the statistical power in meta-analysis. Using the power of statistical tests, the probability of whether the weighted means are different from zero was identified in order to resolve the debate on the number of effect size correlations.
6. Q-statistics. Following Lipsey and Wilson's (2001) formulas, the Q-statistics were computed by summing the squares of each study's effect size weighted by its inverse variance ($\sum \frac{(EffectSize)^2}{Variance}$). Q-statistics follow chi-square distribution with (number of effect size estimates - 1) degree of freedom. A significant Q-statistic implies that the variance across the sample studies is larger than expected by sampling error; thus, moderator effects can be detected.

RESULTS

Construct Relationships with Large Corrected Variances

There are 819 corrected means (3,458 correlations) with statistical power larger than .8. According to their absolute values of corrected means (overall range .116–.979), they were divided into nine groups (as indicated in Table 2) in order to analyze the stretches of effect sizes and variances. The first group includes corrected means with statistical power less than .2, the second group at least .2 but less than .3, and, following the rule, the ninth group covers corrected means with a statistical power of at least .9. Although the ranges of corrected variances of the nine groups are mixed, it was found that group 9 has a smaller range (.0002–.0276), followed by groups 8 (.0001–.0352) and 1 (.0028–.041). For instance, job satisfaction–customer orientation is in group 1 with a .109 corrected mean and a .041 corrected variance. Transformational leadership–transactional leadership is in group 9 with a .973 corrected mean and a .008 corrected variance. The groups having more frequencies of corrected means have neither small nor large

corrected means but with statistical power between .3 and .7. Group 4 (.4–.5) has the most corrected means with 194, followed by group 3 (.2–.3) with 158. The study used the average of the 819 corrected variances (.0124) as the cutoff point in order to identify significant large variances. The 539 construct relationships with corrected variances smaller than .0124 are classified into a small-corrected-variance category. Construct relationships with large corrected variances (over .0124) are only approximately one-third of the samples (280/819).

Table 3 lists the largest 25 meta-analytic variances from among the 280, and the Q-statistics of the top 25 are all significant. The top three construct relationships have corrected variances larger than .1: Trust–Commitment between buyers and salespeople (.1886), Skill variety–Task significance (.113), and Sportsmanship–Civic virtue (.1). The Trust–Commitment between buyers and salespeople relationship has the largest corrected variance (.1886) among the 280. A corrected mean of .668 indicates that approximately 45% (square of .668) of the variation in the construct relationship is shared variance.

The large corrected variance and significant Q-statistic implies that the relationship may have strong moderator effects; thus, researchers can find possible moderators by comparing the original studies. For example, the second construct relationship, Skill variety–Task significance, has three correlations: .58 (Evans et al., 2002), .34 (Naumann, Widmier, & Jackson, 2000), and .11 (Tyagi, 1985). Researchers can identify possible moderators by comparing these theories, measures, samples, or models. In summary, the corrected variances and means help researchers to recognize highly correlated relationships that may have strong moderator effects.

Construct Relationships with Positive and Negative Correlations

The corrected means of construct relationships are probably zero not because the *true* correlation means are zero but because they include positive and negative correlations in the sample studies. Table 4 lists 25 of the 48 construct relationships with positive and negative correlations in the sample studies, and the Q-statistics of the top 25 are all significant. For example, the construct relationships have corrected variances that are larger than .25: Causal attribution in strategy–No change in behavior intention (.393), Intrinsic motivation–Extrinsic motivation (.283), Causal attribution in ability–Make no change (.253), Customer orientation–Selling orientation (.252).

The relationship Causal attribution in strategy–No change in behavior intention has the largest corrected variance (.393) among the 48. Causal attribution in strategy is one of five sub-constructs (effort, ability, task, strategy, and luck) used to measure salespeople's attributions, and No change in behavior intention is one of five sub-constructs (increase effort, seek assistance, avoid the situation, change strategy, and make no change) used to measure salespeople's behavior intentions. The four original correlations are .46 (Dixon, Forbes, & Schertzer, 2005), -.63 (Dixon & Schertzer, 2005), .51, and -.65 (Dixon, Spiro, & Jamil, 2001). These positive and negative correlations imply that salespeople, who attribute their performance to adapting a specific strategy, may or may not intend to change their selling behaviors. By comparing the theories, measures, samples, or models of empirical studies, researchers can find possible moderators on the relationship Causal attribution in strategy–No change in behavior intention.

These listed relationships with large corrected variances and positive and negative correlations indicate the possible presence of one or more moderators. The relationships with large corrected variances presented in Table 3 are often studied because they have significant corrected means, while the relationships in Table 4 are under discussed because their corrected

means are close to zero. Therefore, researchers may explore findings that are more interesting in terms of construct relationships with positive and negative correlations.

Relationships between Job Performance and its Related Constructs

Further, this study focuses on the relationships between Job performance and its related constructs in order to identify those that may have strong moderator effects. Table 5 lists those from among the 68 construct relationships of Job performance that have large corrected variances. For example, Autonomy–Job performance has a high corrected mean (.526); thus, Autonomy is an important construct associated with Job performance. The corrected variance of Autonomy–Job performance is .084, the largest among the 68 construct relationships of Job performance. This indicates that although Autonomy is positively related to Job performance, some moderators (e.g., manager's support or job involvement) may strengthen the relationship, while others (e.g., felt stress or role ambiguity) may weaken it.

Table 6 presents the 21 construct relationships of Job performance that have positive and negative correlations in their confidence intervals. For example, Job performance and Extrinsic motivation have positive (.28 [Ingram, Lee, & Skinner, 1989] and .34 [Miao, Evans, & Zou , 2007]) and negative (-.22 [Jaramillo & Mulki, 2008] and -.17 [Noble, 2008]) correlations. There is lack of agreement regarding the interaction of Job performance–Extrinsic motivation. The moderators could be age (the elderly are less concerned with regard to monetary rewards), motivation methods (it is very difficult to obtain the rewards), or personality (people want good feelings or achievements rather than monetary rewards). By comparing studies with positive and negative correlations among method, contextual, or theoretical factors, researchers may find ignored but important moderators.

CONCLUSIONS

Theoretical and Managerial Implications

From the theoretical perspective, this is the first study to systematically seek the moderator effects of construct relationships in empirical sales research. Further, this study clearly identifies construct relationships that may have strong moderator effects, which provide researchers distinct objects to focus on. Moreover, the corrected means indicate the magnitudes of influences between constructs. When researchers focus on a specific construct, they can consider corrected means and variances together and find relationships that have greater correlation and significant moderator effects. Further, the relationships that may have strong moderator effects can be indicators for researchers to explore possible moderators by considering method, contextual, or theoretical factors. All these findings greatly help researchers not only to understand existing knowledge but also to create new models and theories.

From a managerial perspective, this study indicates the different levels of influences on the relationships between constructs in order to enable managers to realize which factors are more influential (larger correlations) and operate them efficiently (small moderator effects). The moderator effects remind managers to be cautious when they operate those constructs under different situations.

Limitations

This study has certain limitations. First, although the meta-analytic methods (corrected variances, confidence intervals, and Q-statistics) can detect whether moderators are operating, they cannot identify the moderators (Koslowsky & Sagie, 1993; Whitener, 1990). For example, Skill variety and Task significance have the second largest corrected variance (.113) among the 290; however, researchers may not recognize the moderators except by scrutinizing the original articles. Moreover, the moderators that are not identified in the articles cannot be explored. In other words, the collected samples decide the findings.

Second, since correlations are nondirectional, they do not indicate causal relationships. This limits the utility of the findings, and the only way to ascertain the causal relationships is to track the original articles or apply robust meta-analytic results, such as Churchill, Ford, Hartley, and Walker (1985) and Carrillat et al. (2009). Moreover, there may be more than one causal relationship between constructs.

Third, since the statistics (e.g., Q-statistics, statistical power, corrected means, and corrected intervals) are based on statistical probability, it is possible to overlook some construct relationships with strong moderator effects. In addition, the limited sample data of construct relationships may impact the statistical results.

Fourth, this study presents 328 (280+48) construct relationships that may have strong moderator effects in empirical sales research. However, these relationships are so varied that it is difficult to integrate them into specific and meaningful models. The alternative method is to focus on a specific construct, such as Job performance, and discuss its related relationships.

Future Research

This study provides a strong fundamental basis for future research. First, researchers can focus on a specific construct, collect all its related relationships, and then use the corrected means to identify important or incompatible construct relationships. After scrutinizing its related theories, researchers can create new models or verify theoretical relationships. Second, after considering the magnitudes of moderator effects, researchers can focus on a specific construct relationship and try to discover possible moderators. Third, considering the corrected means and variances simultaneously, researchers can focus on the more important construct relationships with stronger moderator effects in order to create interesting models. Another future research direction is to use other meta-analytic statistics to detect moderator effects and identify the relationships detected across different statistics.

Table 1
Data Sources

Journal	Period	No. of Articles	No. of Correlations	Database
Journal of Personal Selling & Sales Management (JPSSM)	1980-2010(1)[1]	141	2230	EBSCO Host
Journal of the Academy of Marketing Science (JAMS)	1973-2009	39	971	Springer Standard Collection
Industrial Marketing Management (IMM)	1971-2009	33	311	Elsevier ScienceDirect Complete
Journal of Business Research (JBR)	1973-2010(1)	30	746	Elsevier ScienceDirect Complete
Journal of Applied Psychology (JAP)	1965-2009	23	464	EBSCO Host
Journal of Marketing (JM)	1936-2010(1)	22	542	EBSCO Host
Journal of Marketing Theory and Practice (JMTP)	1992-2010(1)	16	220	EBSCO Host
Journal of Marketing Research (JMR)	1964-2009	12	200	EBSCO Host
Journal of Business & Industrial Marketing (JBIM)	1994-2009	10	164	Emerald Current
International Journal of Research in Marketing (IJRM)	1984-2010(1)	9	128	Elsevier ScienceDirect Complete
European Journal of Marketing (EJM)	1967-2009	3	24	Emerald Current
Journal of Business Ethics (JBE)	1982-2009	2	7	EBSCO Host
Total		340	6007	

[1]Number in the parentheses is the issue number

Table 2
Summary of Corrected Correlation and Variances for Nine Groups

Group	Range of Corrected Means	Range of Corrected Variances	No. of Corrected Means	No. of Small Corrected Variances	No. of Large Corrected Variances	No. of Correlations
1	0.116-0.198	0.0028-0.041	8	4	4	105
2	0.203-0.299	0.0002-0.0752	59	33	26	404
3	0.301-0.399	0.0001-0.0811	158	102	56	685
4	0.4-0.499	0.0001-0.0999	194	122	72	874
5	0.5-0.599	0.0001-0.0985	122	74	48	545
6	0.601-0.699	0.0001-0.1886	120	82	38	430
7	0.7-0.798	0.0001-0.0721	92	67	25	239
8	0.801-0.897	0.0001-0.0352	45	35	10	127
9	0.9-1	0.0002-0.0276	21	20	1	49
Total			819	539	280	3458

Note: The cut-off point between small and large corrected variances is the average of total 819 corrected variances, 0.0124

Table 3
Construct Relationships with Large Corrected Variances (Top 25)

Construct 1	Construct 2	Corrected Mean	Weighted Mean	Corrected Variance	No. of Effect Sizes	Total Sample Size	Q-Statistic[1]
Trust buyers-salespeople	Commitment buyers-salespeople	0.668	0.584	0.1886	6	942	138
Skill variety	Task significance	0.615	0.410	0.1134	3	587	27
Sportsmanship	Civic virtue	0.427	0.335	0.1000	10	3746	241
Sportsmanship	Helping behavior	0.568	0.458	0.0985	10	4002	266
Job satisfaction	Core task variables	0.690	0.542	0.0871	5	1782	90
Job performance	Autonomy	0.526	0.434	0.0843	7	1565	93
Job performance	Helping behavior	0.449	0.384	0.0842	8	3218	203
Organizational commitment	Task significance	0.610	0.454	0.0819	2	483	20
Self-efficacy	Locus of control	0.375	0.300	0.0811	8	1303	69
Role ambiguity	Felt stress	0.273	0.203	0.0752	15	4711	218
Trust between coworkers	Lone wolf	-0.782	-0.568	0.0721	4	446	17
Role conflict	Job involvement	-0.383	-0.291	0.0699	6	1777	65
Job performance	Motivation	0.222	0.166	0.0680	8	2324	90
Job performance	Sportsmanship	0.322	0.259	0.0670	11	4036	185
Job performance	Support	0.661	0.596	0.0641	5	946	50
Role conflict	Felt stress	0.407	0.318	0.0621	10	2205	87
Felt stress	Cohesion	-0.470	-0.394	0.0605	4	1002	45
Felt stress	Recognition	-0.494	-0.416	0.0588	4	1002	43
Job satisfaction	Job satisfaction with opportunities	0.715	0.573	0.0564	7	836	31
Role conflict	Work-family conflict	0.280	0.227	0.0561	6	1120	42
Autonomy	Cohesion	0.696	0.618	0.0557	4	1002	44
Extraversion	Emotional stability	0.404	0.343	0.0553	4	432	17
Organizational commitment	Job satisfaction with pay	0.468	0.375	0.0536	5	713	25
Personal perceptions of technology	Ease of using technology	0.576	0.487	0.0524	5	1015	38
Autonomy	Recognition	0.664	0.591	0.0522	4	1002	41

Note: Ordered by corrected variance.
[1] All Q-statistics are significant under chi-square test at α=.05 and (number of effect size -1) freedom.

Table 4
Construct Relationships with Positive and Negative Correlations (Top 25)

Construct 1	Construct 2	Corrected Mean	Weighted Mean	Corrected Variance	No. of Effect Sizes	Total Sample Size	Q-Statistic[1]
Causal attribution in strategy	No change in behavior intention	-0.111	-0.079	0.393	4	1048	325
Intrinsic motivation	Extrinsic motivation	0.144	0.114	0.283	8	2429	406
Causal attribution in ability	Make no change	-0.067	-0.044	0.253	4	1048	210
Customer orientation	Selling orientation	-0.186	-0.113	0.252	4	1378	227
Causal attribution in effort	Make no change	-0.041	-0.017	0.191	4	1048	153
Job performance	Psychological climate	0.277	0.231	0.187	5	1149	163
Job satisfaction	Expectations	0.247	0.175	0.153	6	1093	113
Job performance	Multifactor leadership	0.441	0.387	0.149	8	1114	128
Job performance	Training	0.078	0.080	0.149	5	958	93
Trust buyers-salespeople	Trust between coworkers	0.187	0.119	0.130	6	858	66
Job performance	Extrinsic motivation	0.038	0.028	0.112	4	888	58
Role ambiguity	Training	-0.328	-0.255	0.1056	6	2134	138
Agreeableness	Emotional stability	0.140	0.121	0.0930	4	432	25
Agreeableness	Extraversion	0.133	0.106	0.0848	5	1012	47
Causal attribution in effort	Causal attribution in luck	-0.074	-0.070	0.0840	6	1292	84
Job performance	Job involvement	0.052	0.031	0.0836	7	2336	124
Causal attribution in effort	Causal attribution in task	0.003	0.000	0.0783	4	932	53
Personal perceptions of technology	Infusion of new system	0.067	0.055	0.0711	4	837	44
Job performance	Job satisfaction with coworkers	0.075	0.068	0.0677	9	2549	113
Job satisfaction	Effort	0.251	0.206	0.0673	6	1239	58
Job performance	Locus of control	0.046	0.046	0.0672	4	789	35
Causal attribution in luck	Make no change	0.026	0.021	0.0639	4	1048	55
Job performance	Manager support	0.171	0.124	0.0631	7	2239	87
Job performance	Planning/time management	0.142	0.110	0.0627	4	606	23
Job performance	Task attribute/ characteristics	0.035	0.030	0.0624	10	2414	111

Note: Ordered by corrected variance.
[1]All Q-statistics are significant under chi-square test at α=.05 and (number of effect size -1) freedom

Table 5
Statistics of Relationships between Job Performance and its Related Constructs with Large Corrected Variances (Top 25)

Construct	Corrected Mean	Weighted Mean	Corrected Variance	No. of Effect Sizes	Total Sample Size	Q-Statistic[1]
Autonomy	0.526	0.434	0.084	7	1565	93
Helping behavior	0.449	0.384	0.084	8	3218	203
Motivation	0.222	0.166	0.068	8	2324	90
Sportsmanship	0.322	0.259	0.067	11	4036	185
Support	0.661	0.596	0.064	5	946	50
Effort	0.439	0.358	0.050	18	3950	134
Self-efficacy	0.398	0.327	0.043	10	2021	59
Customer orientation	0.350	0.296	0.042	19	4913	155
Ability to modify	0.294	0.236	0.041	6	1872	48
Expectations	0.371	0.319	0.040	4	561	17
Felt stress	-0.171	-0.147	0.039	12	3215	91
Organizational citizenship behaviors	0.402	0.341	0.037	13	4233	116
Achievement striving	0.429	0.341	0.037	3	561	13
Courtesy	0.418	0.301	0.035	4	1109	22
Control system[2]	0.223	0.184	0.035	23	4273	104
Adaptive selling	0.379	0.322	0.035	36	7753	198
Civic virtue	0.504	0.419	0.030	8	3046	64
Adaptive selling intention	0.416	0.328	0.027	3	380	6
Intention to leave	-0.196	-0.164	0.027	21	4837	90
Effectiveness	0.295	0.248	0.027	10	1852	35
Selling skills	0.489	0.389	0.025	9	2491	41
Innovation	0.731	0.665	0.023	3	713	14
Satisfaction with sales territory design	0.462	0.373	0.023	7	793	12
Cohesion	0.686	0.621	0.022	3	713	13
Intrinsic motivation	0.281	0.224	0.022	9	1906	27

Note: Ordered by corrected variance.
[1] All Q-statistics are significant under chi-square test at α=.05 and (number of effect size -1) freedom.
[2]Control system: Includes all kinds of control scales that do not clearly indicate their specific attributions, such as behavior, output, knowledge control, etc.

Table 6
Statistics of Relationships between Job Performance and its Related Constructs with Positive and Negative Correlations

Construct	Corrected Mean	Weighted Mean	Corrected Variance	No. of Effect Sizes	Total Sample Size	Q-Statistic[1]
Psychological climate	0.277	0.231	0.187	5	1149	163
Multifactor leadership	0.441	0.387	0.149	8	1114	128
Training	0.078	0.080	0.149	5	958	93
Extrinsic motivation	0.038	0.028	0.112	4	888	58
Job involvement	0.052	0.031	0.084	7	2336	124
Job satisfaction with coworkers	0.075	0.068	0.068	9	2549	113
Locus of control	0.046	0.046	0.067	4	789	35
Manager support	0.171	0.124	0.063	7	2239	87
Planning/time management	0.142	0.110	0.063	4	606	23
Task attribute/characteristics	0.035	0.030	0.062	10	2414	111
Participation	0.229	0.196	0.059	5	1226	52
Market conditions	0.042	0.031	0.054	8	1569	58
Agreeableness	0.116	0.098	0.050	4	465	15
Goal specificity	0.068	0.064	0.045	9	2232	82
Behavior control	0.130	0.101	0.034	10	2841	64
Goal difficulty	0.083	0.070	0.031	9	2232	46
Job satisfaction with pay	0.078	0.064	0.026	9	2383	41
Selling orientation	-0.037	-0.030	0.024	4	1378	24
Job satisfaction with manager	0.085	0.071	0.016	9	2457	28
Openness	0.000	0.004	0.016	7	1092	12
Job satisfaction with opportunities	0.055	0.046	0.005	8	2966	11

Note: Ordered by corrected variance.
[1] All Q-statistics are significant under chi-square test at α=.05 and (number of effect size -1) freedom

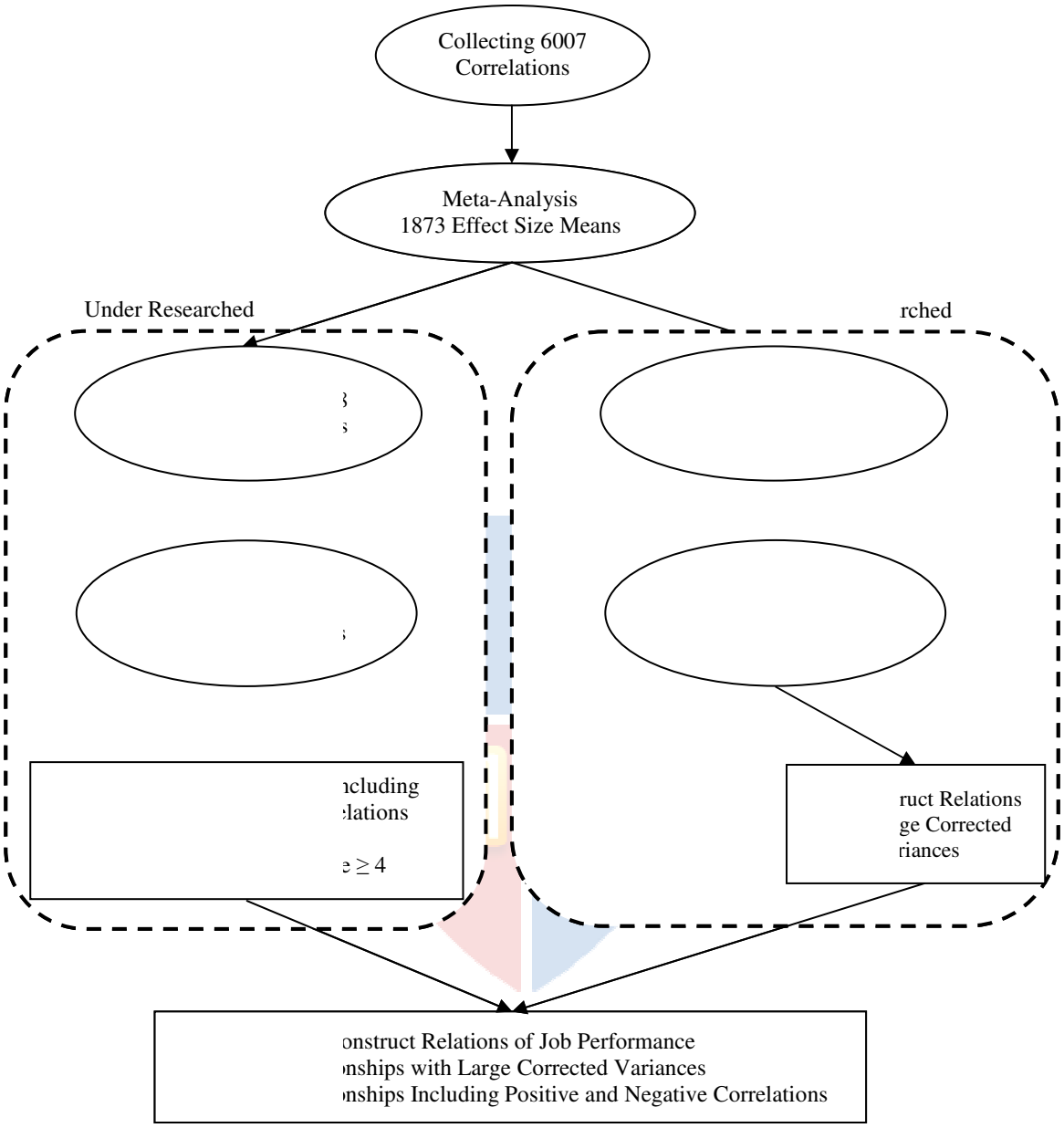

Figure 1 Analysis Process

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