
CRITICAL REVIEW AND DISCUSSION

Industrial-Organizational Psychology and Organizational Behavior Management: An Objective Comparison

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ABSTRACT. This article compares traditional industrial-organizational psychology (I-O) research published in *Journal of Applied Psychology (JAP)* with organizational behavior management (OBM) research published in *Journal of Organizational Behavior Management (JOBM)*. The purpose of this comparison was to identify similarities and differences with respect to research topics and methodologies, and to offer suggestions for what OBM researchers and practitioners can learn from I-O. Articles published in *JAP* from 1987-1997 were reviewed and compared to articles published during the same decade in *JOBM* (Nolan, Jarema, & Austin, 1999). This comparison includes

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(a) author characteristics, (b) authors published in both journals, (c) topics addressed, (d) type of article, and (e) research characteristics and methodologies. Among the conclusions are: (a) the primary relative strength of OBM is its practical significance, demonstrated by the proportion of research addressing applied issues; (b) the greatest strength of traditional I-O appears to be the variety and complexity of organizational research topics; and (c) each field could benefit from contact with research published in the other. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: <getinfo@haworthpressinc.com> Website: <<http://www.HaworthPress.com>>]

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In 1989, Balcazar, Shupert, Daniels, Mawhinney and Hopkins (1989) reviewed and analyzed the articles that were published in the first 10 years of the *Journal of Organizational Behavior Management (JOBM)* to assess whether the *Journal* was meeting its original objectives. Nolan, Jarema and Austin (1999) recently analyzed *JOBM* articles from 1987-1997 as a follow-up assessment. Data collected by Nolan et al. was used in this study to compare current research topics and methodologies in Organizational Behavior Management (OBM) to those in traditional Industrial-Organizational (I-O) psychology. To make this comparison, we reviewed and analyzed articles published in the *Journal of Applied Psychology (JAP)* for the same ten-year period (1987-1997). The purpose of the comparison was to identify similarities and differences with respect to research topics and methodologies used in OBM and I-O psychology.

To provide context for the comparison of these two fields, we briefly describe the history, topics of interest, and conceptual and theoretical underpinnings of both I-O psychology and OBM, after which we describe the primary publication outlets for these fields, *JAP* and *JOBM*, respectively. We then compare the (a) author characteristics, (b) authors published in both journals, (c) topics addressed, (d) types of articles, and (e) research characteristics and methodologies. We conclude with a general discussion about similarities and differences, relative strengths and weaknesses, suggestions for what OBM can learn from I-O, and questions regarding the future relationship between OBM and I-O psychology.

Industrial-Organizational Psychology History

In a recent issue of *JAP*, Katzell and Austin (1992) provided an extensive history of the development of I-O psychology. We summarize the major events and influences here, but interested readers should see Katzell and Austin for a more detailed account. I-O psychology was shaped by many events in the early 1900s including the publication of *Psychology and Industrial Efficiency*, by Hugo Munsterberg in 1913, the first department of applied psychology at Carnegie Institute of Technology (now Carnegie-Mellon University) in 1915, and the initiation of *JAP* in 1917. During this time, applied psychologists began to address two major areas of application in work settings: personnel selection and placement, and productivity improvement (Aamodt, 1991; Hilgard, 1987). The development and validation of selection instruments for military personnel in World War I resulted in further progress and recognition for I-O psychology (Scott, 1920). The first Ph.D. in I-O psychology was awarded to Bruce Moore from the Carnegie Institute in 1921. By the end of the 1920s, there were approximately 50 Ph.D. level I-O psychologists in the country, and major universities were adding increasing numbers of I-O faculty.

The Hawthorne studies, conducted at Western Electric Company in the 1930s, are often cited as one of the most salient developments in the field (e.g., Aamodt, 1991; Hilgard, 1987; Katzell & Austin, 1992). These studies were among the first scientific experiments conducted in an organizational setting and, in addition, expanded the topics that I-O psychologists examined to variables such as the work environment, wage incentives, and employee attitudes. Prior to that time, I-O psychologists were mainly involved in personnel issues. In essence, the "O" in I-O psychology can be attributed to the Hawthorne studies and the new research they fostered.

During the past sixty years, I-O psychology has grown tremendously. Current membership in the Society for Industrial-Organizational Psychology (SIOP) (established as the Society for Industrial Psychology in 1945) is over 5,000, and more than 90 universities now offer Ph.D.'s in I-O psychology. Although personnel selection and placement remains one of the largest areas in the field, research and application now cover a wide array of topics that will be detailed later in this article.

Theory and Concepts

In the first handbook of I-O psychology, published in 1976, England stated, "Industrial and Organizational Psychology possesses no unified and generally accepted theoretical or conceptual base" (p. 15). In a more recent version of the handbook, Dunnette (1990) explained that this has not changed; no one unifying underlying theory exists today. He stated, however, that a primary purpose of the I-O handbook was to describe the dozens of theories that do exist and consider the relevance of each to the field.

Individual traits and individual differences were the primary theoretical concepts underlying the initial development of I-O psychology. Early I-O psychologists developed mental tests, measurement tools and statistical analyses to identify individual differences in order to select employees and identify performance differences on various work tasks (Ackerman & Humphreys, 1990; Guion, 1976). Selection and placement has been described as the hallmark of traditional I-O psychology and, prior to the 1970s, situational or environmental variables were not typically considered in the selection of individuals for employment (Guion, 1976).

In addition to a general theoretical focus on individual differences, more specific theories were also responsible for shaping the field. For example, as one explanation for the lack of behavior analytic influence on traditional I-O, Weiss (1984, 1990) described the influence of Kurt Lewin and explained that Lewin used Galilean models to develop his own explanation for behavior. Weiss explained, "He [Lewin] concluded that the best way to conceptualize the causes of behavior was in terms of the immediate relationship between the person and the environment" (1990, p. 174). Weiss also stated that Lewin disdained behaviorist explanations as well as any theory that sought causes for current behavior in past history. Weiss maintained that Lewin's influence remains strong, indicating that Lewin's theoretical concepts can be seen in expectancy theory, goal setting theory, leadership theory and several organizational development theories.

Starting in the 1960s, I-O psychology became heavily influenced by cognitive psychology as well. This influence resulted in an emphasis on mental processes to explain work-site measures such as supervisory performance ratings, skill acquisition, transfer of training, and leadership (Katzell & Austin, 1992; Lord & Maher, 1990).

These theoretical influences (i.e., trait theory, Lewinian theory, and cognitive psychology) are evident in the research questions and methodology used by mainstream I-O psychologists and also account for many of the differences between I-O and OBM research topics. Not surprisingly, much of traditional I-O research is theory-driven, and designed to test hypotheses derived from various theories.

Journal of Applied Psychology

In the I-O Handbook, Dunnette (1990) stated that *JAP* is one of the key journals that serve as publication outlets for I-O psychologists. Other authors have cited *JAP* as the premier publication journal for I-O researchers and practitioners (e.g., Darley, 1968; Katzell & Austin, 1992; Lowenberg & Conrad, 1998). In 1917, *JAP* was the first journal to publish I-O psychology research. The editors of the first volume of *JAP* described the purpose of the journal as an outlet for the publication of (a) the application of psychology to law, art, public speaking, industrial and commercial work, and business problems, (b) studies of individual differences, (c) the influence of environmental conditions, and (d) the application of psychology to everyday activities (Hall, Baird, & Geissler, 1917). These first editors explained that, “the most strikingly original endeavor to utilize the methods and the results of psychological investigation has been in the realm of business” (p. 5). The purpose of the journal does not appear to have changed significantly over the past 80 years. When the current *JAP* editor, Kevin Murphy, became editor in 1997 he stated *JAP*’s mission was “devoted primarily to original investigations that contribute knowledge or understanding to the fields of applied psychology other than clinical and applied experimental human factors” (Murphy, 1997, p. 3). Murphy explained that papers published in *JAP* should contribute to the interaction between basic and applied psychology in settings where applied research is conducted (e.g., organizations, military and educational settings). However, he clarified that it is not necessarily the setting (e.g., field or laboratory) that makes an article relevant to applied psychology; rather it is its contribution to the field.

ORGANIZATIONAL BEHAVIOR MANAGEMENT

Theory and Concepts

The history and theoretical basis of OBM are so intertwined that it is difficult to explain one without the other. Unlike I-O psychology, OBM has one consistent theoretical basis. OBM began as the application of behavior analysis to organizational settings and retains the philosophical and methodological principles of behavior analysis. In an overview of behavior analysis, Michael (1993) explained that many have considered behavior analytic work to be a sub-class of learning theory, while others have viewed it as anti-theoretical. Michael argued that it does not fit the learning theory description, because in addition to learning (i.e., in the sense of skill acquisition), behavior analysts are concerned with the maintenance of skills following acquisition (e.g., schedules of reinforcement). Although Michael contended that behavior analysis is not anti-theoretical, the purpose of behavior analytic research is not specifically to test theories and furthermore, it is not an application of the hypothetical deductive model. Rather than anti-theoretical (except with respect to inferred mental events) it is “a deterministic view that sees human behavior as the inevitable product of innate endowment and environmental events taking place during the person’s lifetime” (Michael, 1993, p. 43-44). In a recent discussion of behavioral principles in OBM, Hopkins (1999) described behavior analysts’ reluctance to call the behavioral principles a theory. Hopkins suggested that the principles be called an “empirical theory” to differentiate this type of theory from most cognitive psychology theory that makes use of untestable mental events to causally explain behavior. However, whether or not behavior analytic principles are referred to as “theory,” one of the fundamental differences between OBM and I-O is the descriptive, empirical influence that behavior analysis has had on OBM, and the hypothetical, theory testing influence that cognitive psychology has had on traditional I-O.

Early theoretical influences that shaped the foundation of behavior analysis (i.e., OBM) also differ from those that influenced early I-O psychology. As previously mentioned, early I-O was partially shaped by Lewin’s theory, which was influenced by Galilean models derived from the laws of physics (Weiss, 1990), whereas, OBM’s behavior analytic theory was derived from Darwin’s influence on Skinner (Donahoe & Palmer, 1994; Michael, 1993) and the principle of behavioral

selection by consequences. In other words, this difference is between modeling “causal” laws of behavior from the laws of physics (i.e., Galilean’s a historic approach) versus modeling them from biology (i.e., Darwin’s selectionist approach) (Donahoe & Palmer, 1994; T. Mawhinney, personal communication, December, 1999).

Although Darwin’s approach was a major influence on Skinner and the field of behavior analysis, there were others that helped shape Skinner’s intellectual repertoire. In a chapter entitled, “Historical Antecedents to Behavior Analysis,” Michael (1993) provided a detailed description of those influences. In addition to Darwin, he noted the contributions of Francis Bacon, Ivan Sechenov, Ernst Mach, Edward Thorndike, Ivan Pavlov, John Watson, Bertrand Russell, Jacques Lobe, and W. J. Crozier. Readers are referred to that chapter for a detailed description of those contributions.

Duncan and Lloyd (1982) contended that an understanding of the theory and philosophy of behaviorism was necessary for successful OBM practitioners. In other words, practitioners should view behavior as naturally-occurring, scientific subject matter, and understand that orderly relations between behavior and the environment allow for the prediction and control of behavior. In addition to a theoretical understanding, knowledge of the experimental principles of behavior (e.g., reinforcement, punishment, stimulus control, discrimination and generalization) is necessary for successful application of behavior analysis to organizational problems. Analyses of work behavior in terms of the principles of behavior analysis are provided in many sources (e.g., Brown, 1982; Daniels, 1989; O’Brien & Dickinson, 1982; Mawhinney, 1984). For particularly detailed analyses, including the role of rules and establishing operations, readers are referred to Johnson, Redmon, and Mawhinney (in press), Mawhinney and Mawhinney (1982) Mawhinney and Fellows-Kubert (1999) and Poling and Braatz (in press).

History

An extensive history of the field of OBM is beyond the scope of this paper, thus for a more detailed account, readers are encouraged to see Frederiksen’s (1982) introduction to the *Handbook of Organizational Behavior Management*, or Dickinson’s (in press) article, “The Historical Roots of OBM in the Private Sector: The 1950s-1970s.” Although the history of OBM is short compared to the history of I-O psycholo-

gy, some of the early influences on the field of OBM also influenced the field of I-O psychology. For example, in their historical account of I-O psychology, Katzell and Austin (1992) cited John B. Watson and E. L. Thorndike as important contributors to early I-O. The work of Watson and Thorndike also influenced B. F. Skinner and subsequently the field of behavior analysis on which OBM is based (Frederiksen, 1982; Michael, 1993). Frederiksen cited other individuals and events as important precursors to both fields including Fredrick Taylor and his approach to scientific management, the Hawthorne studies, and Munsterberg's application of psychology to industrial settings. Dickinson (in press) did not include these influences as precursors in her history of OBM. Rather she restricted her account to events and individuals within the behavioral community, such as Skinner's development of programmed instruction and the advent of behavior modification in other settings, contending that while the early events in I-O were chronological precursors, they were not causal precursors. She maintained that OBM developed in relative isolation from traditional I-O events, and that those events influenced OBM only after the field expanded in the late 1970s and the 1980s. Nonetheless, it is certainly the case that the application of psychology to the work site predated behavioral involvement and that this earlier work subsequently, if not immediately, helped shape OBM.

OBM did not emerge as a separate field until the 1960s (e.g., Andrasik, 1979; Daniels, 1989; Dickinson, 1995, in press; Frederiksen & Johnson, 1981; O'Brien & Dickinson, 1982). Frederiksen (1982) stated "the decade of the seventies was a period of accelerated growth and integration of the field" (p. 8). Early OBM interventions primarily addressed small-scale organizational problems, but OBM was considered to be a promising approach to performance improvement in a large range of settings (Frederiksen, 1982). Through the 1970s OBM became much more widely researched and applied, with a substantial increase in the volume of publications. Whereas fewer than 10 or so articles were published in the 1960s, more than 45 had been published by 1977, the year that *JOBM* was initiated (Dickinson, in press). *JOBM* was begun by Behavioral Systems, Inc., a behavioral consulting firm, to disseminate OBM applications and was the first journal devoted solely to the publication of OBM interventions (Dickinson, in press). The *Journal* quickly became the flagship journal of the field. At approximately the same time that *JOBM* was first published, the

OBM Network was formed as a professional association for OBM researchers and practitioners (Dickinson, in press; Frederiksen, 1982).

In Frederiksen's (1982) account, he described four features that define the field of OBM. These features include the purpose, the subject matter, the theoretical and conceptual basis, and the methodology. Three of these four features are unique to OBM. However, the purpose of OBM as a method to improve performance and satisfaction and to make organizations more effective in achieving their goals, is similar to the purpose of other approaches that study and apply interventions in work settings (e.g., I-O psychology). Although improved performance and organizational effectiveness are undeniably purposes of OBM, increased satisfaction as a purpose is debatable. In 1984, Mawhinney provided some evaluative feedback to OBM, and stated that although OBM researchers and practitioners professed a concern for both productivity and satisfaction, satisfaction was rarely measured. He argued that it should be:

If we are seriously committed to the values of improved productivity and job satisfaction we must come to grips with the satisfaction issue. Our theory is clear on this point. We can achieve high productivity and high satisfaction. But we can also achieve high productivity with low satisfaction. Unless we measure Eden-actual value received discrepancies (dissatisfaction) we cannot hope to achieve our equally worthy objectives of high productivity and high work satisfaction. (p. 23)

Later in this comparison we will discuss the current frequency of social validity (i.e., satisfaction) measures in OBM and in I-O psychology and raise questions about whether OBM should adopt methods for social validity assessment from traditional I-O.

The other features of OBM, such as the behavior of individuals and groups in organizational settings as the primary subject matter, clearly differentiates it from other approaches that tend to rely on self-reports and mentalistic constructs as subject matter. Furthermore, OBM's theoretical and conceptual basis, behavior analysis, results in a clear difference between OBM and traditional I-O psychology. Traditional researchers often infer underlying mental processes and use these to explain behavior, rather than analyzing the relationship between behavior and the environment. OBM relies on direct observation of

behavior as its main dependent variable rather than survey data, which is often used in I-O research (Frederiksen, 1982).

In addition, when I-O psychologists study direct measures of behavior, these observations are typically collected during a one-time cross-sectional event. OBM measures, on the other hand, are usually collected repeatedly over time and assessed using a within-subject design. This latter methodology results in an emphasis on practical significance as a measure of successful OBM interventions. Conversely, statistical significance is often used as the measure of successful interventions in I-O research. These and other features that differentiate OBM from traditional approaches will be compared and discussed later in this review.

Journal of Organizational Behavior Management

In the first issue of *JOBM*, Aubrey Daniels (1977), then editor, described the purpose of the *Journal* as three-fold: (a) research should meet the criteria described a decade earlier by Baer, Wolf and Risley (1968) for applied behavior analysis; (b) these behavioral methodologies should be applied to organizational settings; and (c) in addition to the value of the *Journal* to OBM researchers and practitioners, it should also have practical value for managers. In their 1989 review of *JOBM*, Balcazar et al. found that the *Journal* was clearly meeting the first two stated objectives, but perhaps not the third. In Nolan et al.'s (1999) recent review of the second decade (1987-1997), they agreed that the *Journal* was meeting the first objective but stated, "However, the remaining objectives are not directly addressed by the data collected in the current review (and neither were they, we feel, in that of Balcazar et al., 1989)" (p. 109). They offered suggestions for data collection that would address the remaining objectives as well as suggestions that could result in increased dissemination of OBM to the general business public. Readers are referred to that article for further detail.

HISTORICAL SIMILARITIES AND DIFFERENCES

While there are clearly differences in the concepts and theories that formed and underlie the fields of OBM and I-O, the purpose for both

fields is essentially the same: to improve the performance and satisfaction of individuals in business settings in order to ensure the efficiency and effectiveness of organizations. From the time of their respective inceptions, both fields have faced similar dilemmas, such as the distribution of resources devoted to research and practice, and the extent to which research findings have been used to solve practical problems (Frederiksen, 1982; Katzell & Austin, 1992). In our comparison, we will address the respective emphases on theoretically oriented research (I-O) versus practical research (OBM).

Katzell and Austin (1992) explained that OBM had some influence on traditional I-O psychology as OBM emerged in the 1970s; however, OBM has remained largely outside the mainstream of I-O. The use of different conceptual and methodological approaches to guide and explain research has no doubt resulted in reluctance from both fields to adopt methods and ideas from the other. However, despite the previous lack of cross-fertilization between fields, Katzell and Austin stated that some OBM influence has returned to I-O psychology. For example, Katzell and Austin cited Komaki's work on supervision and teams (e.g., Komaki, Desselles, & Bowman, 1989) as evidence that OBM research has been making a reappearance in *JAP*. Behavioral research and methods have also appeared in recent I-O text books (e.g., Lowenberg & Conrad, 1998; Muchinsky, 1997). The purpose of this paper is to identify and discuss the similarities and differences between fields during the most recent decade.

METHOD

The first author reviewed every article published in *JAP* between 1987 and 1997, including short notes, research reports and monographs ($N = 997$). The second author independently reviewed every article in volumes published in even years ($N = 452$). The categories and operational definitions used to classify the articles were derived from those developed by Nolan et al. (1999). Nolan et al. based their categories on those used by Balcazar et al. (1989) in their review of the first ten years of *JOBM*, however, they added sub-categories to some of variables for a more detailed analysis. Some of the categories in Nolan et al.'s review were not used in the present review because they would not have resulted in relevant comparisons (e.g., number of pages published). One category (correlational research versus experimental research) was

added for purposes of the current comparison. For this new category, the first and second authors evaluated the articles in *JOBM* using the same method they used to review the *JAP* articles. The categories and definitions used to classify articles are detailed in the following section.

The data-recording sheet used by the first two authors to classify the articles listed all of the relevant categories and sub-categories and authors circled the appropriate classification. The Appendix identifies a random sample of the *JAP* articles that were reviewed and indicates how they were classified with respect to each of the relevant categories. Data are provided for 45 articles, which represents 4.5% of the articles that were reviewed. It was not feasible to publish all of the data due to the large number of articles ($N = 997$). The complete *JAP* data base is, however, available from the third author.

Interobserver agreement was calculated for every article that was reviewed by both authors. The following formula was used: # of agreements for categories and sub-categories used to classify the article/total number of categories used [i.e., (number of agreements)/(number of agreements plus disagreements)]. This figure was then multiplied by 100 to obtain the percentage of agreement. Initial agreement ranged from 86.1% to 95.4%, with a mean of 92.1%. All disagreements were discussed until the two reviewers arrived at a unanimous decision; thus, ultimate agreement was 100% for the articles ($N = 452$) that were reviewed by both authors.

The results of the present classification were compared to the results reported by Nolan et al. (1999) who reviewed the articles from *JOBM* for the same years ($N = 119$ articles). The comparative data are presented in terms of the percentage of articles classified according to each variable (i.e., the percentage of *JAP* articles that were research articles versus the percentage of *JOBM* articles that were research articles). When Nolan et al. presented percentage data, they did not specify the numbers of articles used to calculate them. The first author contacted Nolan et al. to obtain these raw data (J. Austin, personal communication, September, 1999). Most, but not all, of these data were available. Thus, in the present comparison, the numbers used to calculate the percentages for the *JOBM* articles are reported when they were available; otherwise only the percentages are reported.

CATEGORIES AND OPERATIONAL DEFINITIONS

As indicated earlier, we adopted the categories and operational definitions used by Nolan et al. (1999). This was done so that the results of the present classification could be compared to those reported by Nolan et al.

Author Characteristics

For each article, one of the following affiliations was recorded for each author (if more than one affiliation was listed for an author, the first one to appear was used as the classification): (a) academic (college or university), (b) company (private business, organization or consulting firm), or (c) agency (government or public agency).

Nolan et al. (1999) did not assess author gender in *JOBM*; however, Jarema, Syncerski, Bagge, Austin, and Poling (1999) did assess author gender for the same years we used in our analysis, 1987-1997. Thus, we used those data to make our comparisons. To classify author gender, author names that were typically male (e.g., John, Brad, Alan) were recorded as male, and author names that were typically female (e.g., Jennifer, Susan, Melissa) were recorded as female. Additional information (e.g., author gender known by a data recorder, or some indication of gender in the author note or article) was also used for classification. An "unknown" category was used for authors with gender-neutral names, and no additional information available.

Authors Published in Both Journals

To assess the relationship between I-O psychology and OBM, the data recorders identified the authors who published in both journals between 1987 and 1997. The first author recorded the names of each author appearing on articles published in *JOBM* during this decade. The second author reviewed this list for accuracy (i.e., to ensure all names were spelled correctly and no author was excluded). Using this list as a data-recording sheet, the first and second authors independently reviewed all tables of contents in *JAP* from 1987-1997, comparing author names against the list compiled from *JOBM* and recording references for all *JAP* articles published by those authors. Agreement was 100%.

Topics Addressed

The data recorders used the list of topics that Nolan et al. (1999) used to classify *JOBM* articles. This list included: Productivity and quality, customer satisfaction, training and development, safety/health, accuracy, rate of performance, sales, labor, timeliness, novelty, management, material, and other. However, due to the variety of additional topics addressed in *JAP*, the data recorders labeled the topics that were recorded as other. Some of these additional topics included: Selection and placement, statistical analyses, performance appraisals, attitudes, cognitive processes, legal issues, turnover/absenteeism/attendance, gender and minority issues, group performance, leadership, and decision making.

Type of Article: Research versus Discussion/Review

To be classified as research, the article “must have contained, at minimum, empirical data and a description of the methodology for collecting and analyzing data” (Nolan et al., 1999, p. 86). All other articles were classified as discussion/review articles. Statistical meta-analyses were classified as research; however, they were not classified with respect to the research article sub-categories that follow. They were excluded because they analyzed extant data from a variety of different types of studies, and thus could not be appropriately classified.

Research Article Sub-Categories

When articles were classified as research, they were further evaluated with respect to the following two sub-categories: (a) Type of research article: Experimental versus correlational, and (b) Field versus laboratory research. Experimental research articles were further reviewed according to the following categories: (a) Applied versus theoretical research; (b) Type of dependent variable(s): Behavior or product of behavior; (c) Participant characteristics; (d) Types of independent variables; (e) Research designs and analyses; and (f) Additional relevant categories (whether they contained cost-benefit analyses, follow-up data, program continuation information, social validity data, and reliability data for dependent and independent variables).

With the exception of the first sub-category, the preceding categories were examined and defined by Nolan et al. (1999). As indicated above, it should be noted that the correlational research articles were reviewed only to determine whether they were conducted in field or laboratory settings. They were excluded from further sub-classification because the *JOBM* and *JAP* data could not be validly compared. Only three *JOBM* research articles were classified as correlational, therefore there were insufficient data to make comparisons. Nonetheless, this exclusion should certainly be taken into account when reviewing the results.

Type of Research Article: Experimental versus Correlational

To be classified as “experimental,” articles contained at least one independent variable that was manipulated by the researchers. Articles classified as correlational contained analyses of variables that already existed in the environment.

Field versus Laboratory Research

Articles were classified as “field” research if they (a) contained data collected in an applied (non-laboratory) setting for analysis in that article, (b) re-analyzed data collected in an applied setting at an earlier time (excluding meta-analyses), or (c) collected survey or observational data that applied directly to the population observed/surveyed (e.g., drug use among employees). Experimental or correlational articles were classified as “laboratory” when data were collected in a laboratory or simulated setting, or if survey questions were not relevant to current setting (e.g., college students asked about preference for management style).

Applied versus Theoretical Experimental Research

Although the distinction between applied and theoretical research could arguably be operationalized in a number of different ways, because we compared our data to those reported by Nolan et al. (1999), we retained their definition. Experimental research articles were classified as “applied” if the interventions addressed specific problems in organizations (e.g., to increase productivity or decrease

absenteeism). All articles classified as “applied” were field studies, however, not all research studies conducted in field settings were classified as “applied.” In other words, research that was conducted to specifically solve an organizational problem was classified as “applied”; all other research was classified as theoretical. Theoretical research was therefore defined as research conducted to answer more basic questions, or “bridge” research questions.

Types of Dependent Variables in Experimental Research: Behavior or Product of Behavior

If researchers “reported having directly observed behavior” (Nolan et al., 1999, p. 96), dependent variables were classified as behavior. If researchers “examined permanent products of behavior” (Nolan et al., 1999, p. 96), dependent variables were classified as products of behavior. Articles that reported both types of dependent variables were classified as “both.” Products of behaviors were further sub-categorized as “outcomes,” defined as directly measured behavioral outcomes such as number of errors, or “self-report,” defined as answers to survey or test questions.

Participant Characteristics in Experimental Research

Experimental research participants were classified as: (a) “non-management” (those supervised or managed and not themselves in any position of formal authority), (b) “management” (those in any position of recognized authority over other individuals), (c) “executive” (those identified as top level management), (d) “college student” (participants identified in the article as students, college students, university students, or students enrolled in a specific course), or (e) “other” (those not fitting any of the other operational definitions in this category).

Types of Independent Variables in Experimental Research

The independent variables were classified using the following categories: (a) feedback (information about past performance provided to the participant), (b) praise (positive verbal consequence following performance), (c) goal-setting (performance standard set and commu-

nicated to the participant, or set by the participant, before performance was measured), (d) monetary rewards (any monetary consequence), (e) non-monetary rewards [any positive consequence that was not monetary or verbal (i.e., praise)], (f) training (any intervention called “training” and/or that included information or exercises to teach new skills to participants), (g) antecedents (any intervention implemented prior the behavior of interest, excluding training and goal-setting), and (h) punishment (any aversive, or negative consequence, designed to reduce or terminate behavior). If a study examined more than one independent variable, all of the independent variables that were examined were recorded.

Research Designs and Analyses in Experimental Research

An experimental research article was classified as having used a “within-subject” design if each participant (or group) was exposed to all experimental and control conditions, and data were analyzed across conditions for each participant (or group). “Between-group” design was recorded when comparisons were made between groups of participants who were exposed to different conditions. Designs with and without randomization procedures (i.e., quasi-experimental) were included in the between-group classification. If inferential statistics (e.g., ANOVA, ANCOVA, etc.) were used to analyze the data for within-subject or between-group designs, the name of that test was recorded.

Additional Experimental Research Sub-Categories

All of the following sub-categories appeared on the data-recording sheet under experimental research, and were circled if the article contained the relevant measure or description: (a) cost-benefit for any description of a cost/benefit analysis (e.g., dollar amount spent and dollar amount saved), (b) follow-up data for articles with a description of data collected any time after termination of the intervention, (c) program continuation if they described any continuation of the intervention following completion of the study, (d) social validity for articles that reported participant opinions regarding the nature of the intervention or the results obtained, (e) reliability of the dependent variable for articles that provided a description of inter-rater reliability

or inter-observer agreement, (f) reliability of the independent variable for articles that described any provisions taken to ensure that the intervention was implemented as planned. To remain consistent with the definition of reliability used by Nolan et al. (1999), articles that reported the reliability of the data collection instrument were excluded from analysis. While a good argument can be made for including these articles from a theoretical and conceptual perspective, their inclusion would prohibit a comparison with the data from Nolan et al.

RESULTS AND DISCUSSION

Author Characteristics

Nolan et al. (1999) classified the affiliation of the authors (academic, company, or agency) who published in *JOBM* over the past decade. We compared these data to the affiliations of the authors who published in *JAP*. Comparisons were also made with respect to the gender of authors publishing in *JOBM* and *JAP*. As indicated earlier, Nolan et al. did not assess author gender in *JOBM*; however, Jarema et al. (1999) did assess author gender for the same years we used in our analysis, 1987-1997. Thus, we used those data to make our comparisons. As discussed below, author characteristics from both sources were very similar. Percentages of author affiliation and author gender are displayed in Figure 1.

Author Affiliation

The author affiliation was determined for all authors whose names have appeared on *JOBM* and *JAP* articles over the past decade. In both publications, the majority of authors were affiliated with academic institutions, 79% in *JOBM* (209 of 264 authors) and 87% in *JAP* (2,041 of 2,346 authors).

Author Gender

A majority of the articles in both journals were authored by men (*JOBM* = 68%, 179 of 264 authors; *JAP* = 68%, 1,603 of 2,346 authors). Just over thirty percent (30.5%) of the *JOBM* authors were

women (Jarema et al., 1999) and 25% ($n = 577$) of the *JAP* authors were women. The gender of 7% ($n = 166$) of *JAP* authors and 1.5% ($n = 4$) of *JOBM* authors could not be determined because the names were gender neutral and the data recorders did not personally know the authors.

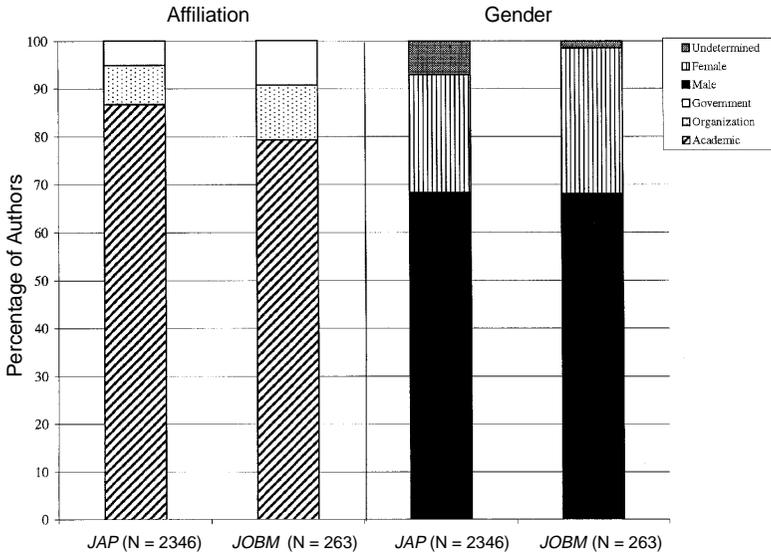
The percentages for first authorship were similar to the overall percentages: For *JOBM*, 73% ($n = 87$) were men, 27% ($n = 32$) were women and 0% were unknown (Jarema et al., 1999); for *JAP*, 70.1% ($n = 699$) were men, 22.3% ($n = 222$) were women, and 7.6% ($n = 76$) were unknown. Rodgers and Maranto (1989) reviewed gender issues with respect to publication in I-O psychology and used correlational analyses to determine the relationship between gender and publishing productivity. They reported that the quality of publications for men and women was equal; however, the quantity was significantly higher for men. Jarema et al. made the following conclusions about the role of women in OBM, "Things, it appears, are looking up for female researchers. Nonetheless, progress has been slow and there is a need to recognize, as well as encourage, productive female researchers" (p. 90).

Authors Published in Both Journals

Table 1 presents an alphabetical list of the authors who have published articles in both *JAP* and *JOBM* over the past decade. *JOBM* articles are listed for each of these authors first, followed by *JAP* articles. This table also includes author names, article titles and type of article published in both journals.

Only nine authors have published in both sources during the past decade, and none of these authors had multiple publications in both journals. That is, while some authors had multiple publications in one journal, they had only one in the other. Due to this limited sample, it is difficult to compare the methodology used by the same authors in each journal. Moreover, three of the nine authors published discussion articles in *JOBM* (Latham & Huber 1992; Notz, Boschman, & Tax, 1987) and research articles in *JAP* (Cole & Latham, 1997; Frayne & Latham, 1987; Huber, 1991; Huber & Neale, 1987; Latham, Erez, & Locke, 1988; Latham & Frayne, 1989; Notz & Starke, 1987; Scarpello, Huber, & Vandenberg, 1988) making comparisons more difficult. However, a comparison of articles published by Ludwig and Geller (1997, 1999) in both sources demonstrates the different methodology and data display between journals. The *JOBM* article published by Ludwig and Geller (1999) was too recent to be included in the current

FIGURE 1. Author characteristics in *JOBM* and *JAP* from 1987-1997: The percentage of authors with academic, organizational or governmental affiliations; and the percentage of male, female and undetermined authors.



comparison which was restricted to 1997, however, due to the similar topics addressed, and methodologies used in these articles, they provide a clear illustration of the differences. These publications examined the effects of goal setting and feedback (Ludwig & Geller, 1997) and participants serving as change agents (Ludwig & Geller, 1999) on a targeted safe driving behavior, while also measuring additional non-targeted safe driving behaviors. The data analysis in the *JAP* article focused on statistical analysis of the means across conditions (i.e., 3 × 3 repeated measures ANOVA) with no display of the time series data. Conversely, the *JOBM* article displayed the entire time series (i.e., each data point) to evaluate the impact of the intervention. This comparison of articles by Ludwig and Geller supports the comparison of research designs and analyses favored by OBM versus traditional I-O, presented later.

Types of Problems Addressed

Table 2 identifies the problems most frequently addressed in *JAP* and *JOBM* (Nolan et al., 1999). The topics are rank ordered, starting

TABLE 1. Authors Published in Both *JAP* and *JOBM* from 1987-1997

Author	Journal	Type of Article
1. <u>Anderson</u> , Crowell, Hantula, & Siroky (1988)	<i>JOBM</i>	Experimental
<u>Anderson</u> , Crowell, Doman, & Howard (1988)	<i>JAP</i>	Experimental
2. Anderson, <u>Crowell</u> , Hantula, & Siroky (1988)	<i>JOBM</i>	Experimental
Hantula, & <u>Crowell</u> (1994)	<i>JOBM</i>	Experimental
Anderson, <u>Crowell</u> , Doman, & Howard (1988)	<i>JAP</i>	Experimental
3. Kello, <u>Geller</u> , Rice, & Bryant (1988)	<i>JOBM</i>	Experimental
<u>Geller</u> (1989)	<i>JOBM</i>	Discussion
<u>Geller</u> (1990)	<i>JOBM</i>	Discussion
Streff, Kalsher, & <u>Geller</u> (1993)	<i>JOBM</i>	Experimental
Ludwig & <u>Geller</u> (1997)	<i>JAP</i>	Experimental
4. Latham & <u>Huber</u> (1992)	<i>JOBM</i>	Discussion
<u>Huber</u> & Neale (1987)	<i>JAP</i>	Experimental
Scarpello, <u>Huber</u> , & Vandenberg (1988)	<i>JAP</i>	Correlational
<u>Huber</u> (1991)	<i>JAP</i>	Correlational
5. Goltz, Citera, Jensen, Favero, & <u>Komaki</u> (1989)	<i>JOBM</i>	Experimental
<u>Komaki</u> , Desselles, & Bowman (1989)	<i>JAP</i>	Correlational
6. <u>Latham</u> & Huber (1992)	<i>JOBM</i>	Discussion
Frayne & <u>Latham</u> (1987)	<i>JAP</i>	Experimental
<u>Latham</u> , Erez, & Locke (1988)	<i>JAP</i>	Experimental
<u>Latham</u> & Frayne, (1989)	<i>JAP</i>	Experimental
Cole & <u>Latham</u> , (1997)	<i>JAP</i>	Experimental
7. Evans, Kienast, & <u>Mitchell</u> (1988)	<i>JOBM</i>	Experimental
<u>Mitchell</u> & Silver (1990)	<i>JAP</i>	Experimental
Doerr, <u>Mitchell</u> , Klastorin, & Brown (1996)	<i>JAP</i>	Experimental
8. <u>Notz</u> Boschman, & Tax (1987)	<i>JOBM</i>	Discussion
<u>Notz</u> & Starke (1987)	<i>JAP</i>	Experimental
9. Eubanks, <u>O'Driscoll</u> , Hayward, Daniels, & Connor (1990)	<i>JOBM</i>	Correlational
<u>O'Driscoll</u> , Ilgen, & Hildreth, K. (1992)	<i>JAP</i>	Correlational

TABLE 2. Types of Problems Addressed in *JAP* and *JOBM* from 1987-1997

<i>JAP</i>	<i>JOBM</i>
1. Selection and Placement (e.g., tests, interviews, assessment centers)	1. Productivity and Quality of Performance
2. Statistical Analyses	2. Customer Satisfaction
3. Performance Appraisals	3. Training and Development
4. Attitudes/Cognitive Processes/Cognitive Abilities	4. Safety/Health
5. Legal Issues	5. Accuracy
6. Turnover/Absenteeism/Attendance	6. Rate of Performance
7. Training and Development	7. Sales
8. Productivity and Quality of Performance	8. Labor
9. Gender and Minority Issues	9. Timeliness
10. Group/Team Performance	10. Novelty
11. Leadership/Decision Making	11. Management
12. Health/Safety/Stress	12. Material

with the most frequently addressed problem. These lists are not exhaustive; rather they reflect the most common categories of topics. Many additional topics have been researched and discussed by authors in both areas.

Although there is overlap between the topics addressed, the differences are noteworthy. Productivity and quality of performance were the most common problems addressed by OBM researchers (Nolan et al., 1999). Furthermore, Nolan et al. categorized some of the other problems addressed by OBM researchers as accuracy, novelty, and rate of performance. Because these are subcategories of quality and performance (Gilbert, 1978; Rummler & Brache, 1995), a higher number of articles could have been included in the "productivity and quality of performance" category. The breadth of organizational topics addressed in *JAP* is much wider. Many of these topics could be researched from a behavior analytic perspective. For example, a *JOBM* article by Cole and Hopkins (1995) examined the relationship between performance and self-efficacy using procedures and analyses that were more behavior analytic than those typically used to address

this relationship in the traditional literature. The OBM field could benefit if researchers addressed topics addressed in the I-O literature, such as leadership, decision-making, and stress reduction. In addition, OBM would be well-served if behavioral scholars would re-analyze the cognitive issues raised in I-O psychology. Articles published in *JAP* can serve as a starting point for these endeavors.

TYPES OF ARTICLES PUBLISHED

Eighty-three percent of the articles published in *JAP* (831 of 997 articles) and 53% of the articles published in *JOBM* (63 of 119 articles) were research studies. Six percent of the *JAP* research articles were statistical meta-analyses (51 of 831); there were no statistical meta-analyses in *JOBM*. The remaining articles in both journals were discussion/review articles. Clearly, there is a higher percentage of research articles in *JAP* than in *JOBM*.

RESEARCH ARTICLES

Experimental versus Correlational Research

Figure 2 depicts the percentages of (a) total research articles, (b) experimental research articles, and (c) correlational research articles published in *JAP* and *JOBM*. Ninety-five percent of the research articles in *JOBM* were experimental (60 of 63 articles) and 5% ($n = 3$) were observational. The proportion of experimental and correlational studies was quite different in *JAP*, with 39% classified as experimental (308 of 780) and 61% ($n = 478$) classified as correlational. The primary research strategy, experimental manipulation versus correlational, reflects one distinction between OBM and I-O.

Field versus Laboratory Research

Another difference between the research in *JOBM* and *JAP* was the setting where experimenters conducted their research. Figure 3 displays the percentage of experimental and correlational research conducted in field settings and in laboratory settings. In *JOBM*, 77% of

the experimental research was conducted in field settings (46 of 60 articles) and 23% ($n = 14$) in laboratory settings. Sixty-seven percent of the correlational studies were conducted in field settings and 33% were conducted in laboratory settings, however, this latter percentage should be interpreted cautiously because it was calculated with only three studies. In contrast, in *JAP*, only 18.5% of the experimental studies (57 of 308 studies) were conducted in field settings whereas 81.5% ($n = 251$) were conducted in laboratory settings. This figure is reversed for correlational studies: 81% were conducted in field settings (386 of 478 studies), 19% ($n = 92$) in laboratory settings (1.3% included measures collected in both laboratory and field settings). The differences with respect to the settings for experimental research (primarily field for *JOBM* and primarily laboratory for *JAP*) are no doubt related to other differences between these two fields, such as a focus on applied (OBM) versus theoretical issues (I-O), use of within-subject (OBM) or between-group (I-O) research designs and the types of dependent variables examined. These topics are addressed in subsequent sections.

FIGURE 2. The percentage of research, experimental research, and correlational research published in *JAP* and *JOBM* from 1987-1997.

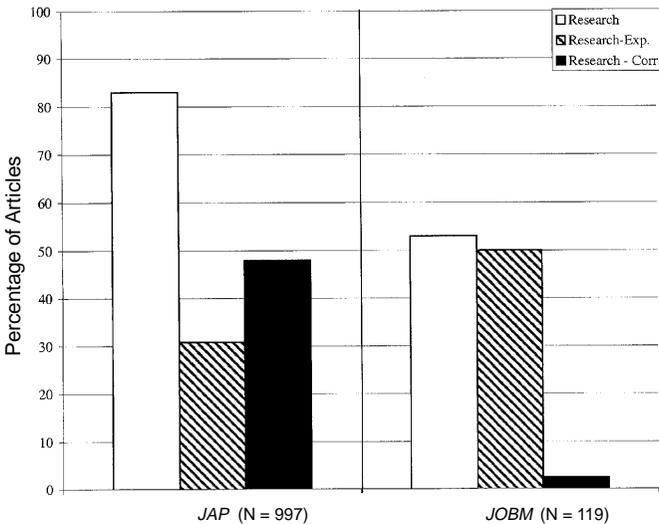
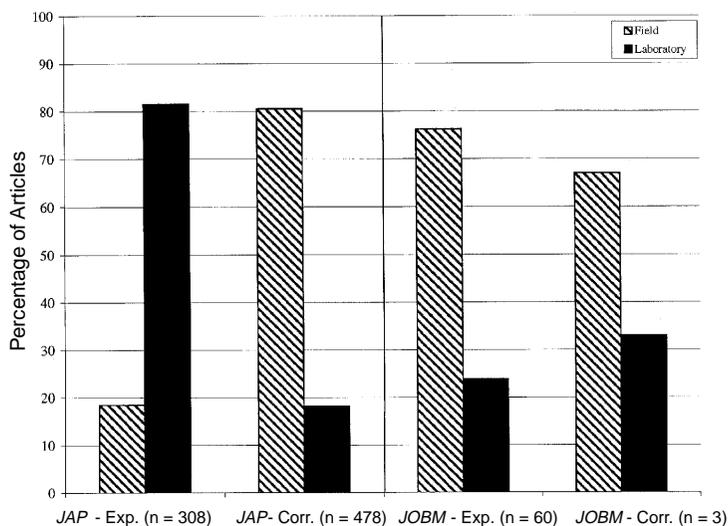


FIGURE 3. The percentage of experimental and correlational studies conducted in field and laboratory settings in *JOBM* and *JAP* from 1987-1997.



Experimental Research Sub-Categories

Nolan et al. (1999) did not classify *JOBM* research articles as experimental or correlational. Thus, when they reported their percentage data regarding research, they used the total number of research articles (63) as the denominator. Because we excluded correlational studies from the following analyses, whenever the data for the numerators were available from Nolan et al., we used the number of experimental articles (60) as the denominator. Thus, the percentages we report differ slightly from the percentages reported by Nolan et al.

Applied versus Theoretical Experimental Research

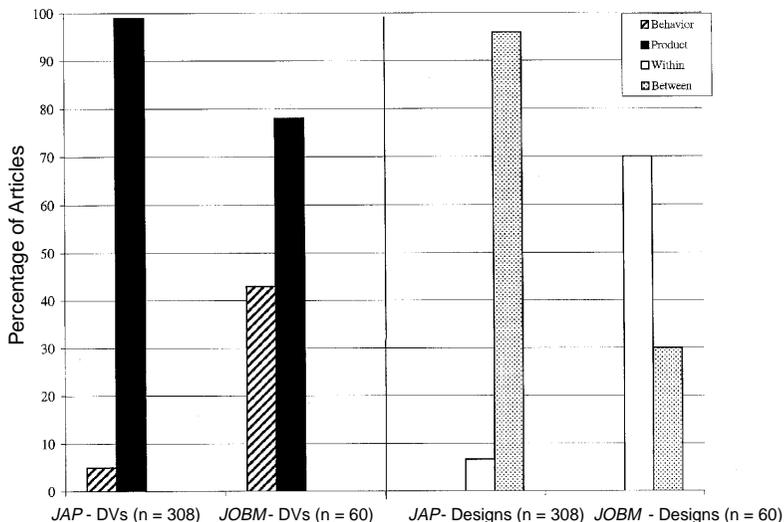
A significantly greater percentage of *JOBM* articles than *JAP* articles were conducted to solve applied problems in organizations, 43% (26 of 60 articles) versus 6.0% (18 of 308) respectively. However, the majority of articles in both publications addressed theoretical issues, 57% (n = 34) in *JOBM* and 94% (n = 290) in *JAP*.

The percentage of applied experimental articles was much greater for *JOBM* than for *JAP*. In addition, as indicated previously, in *JAP*, 81.5% of the experimental studies were conducted in the laboratory. Taken together, these data suggest that the gap between theory and practice may be greater in I-O psychology than in OBM. Katzell and Austin (1992) stated that the discrepancy between science and practice was a primary concern of I-O psychologists and a topic that has been frequently discussed at SIOP conferences. It appears from the preceding data that there is a much smaller gap between research and practice in OBM. If true, then traditional I-O psychologists could benefit from exposure to OBM applied research methods.

Types of Dependent Variables in Experimental Research: Behavior versus Product of Behavior

The percentages of experimental studies from *JOBM* and *JAP* that measured products of behavior and behavior are shown in Figure 4. This figure also displays the type of research designs used by *JOBM* and *JAP* researchers, data that will be discussed later. *JAP* researchers primarily measured products of behavior (99%, 306 of 308 articles) rather than behavior (5%, $n = 15$). These percentages, as well as the ones presented next for *JOBM*, sum to more than 100% because several *JAP* and *JOBM* researchers measured both products of behavior and behavior. In *JOBM*, products of behaviors were measured in 78% of the experimental articles (47 of 60), while behaviors were measured in 43% ($n = 26$). Products of behavior were further divided into two categories for the current analysis: response outcomes (e.g., number of errors) and self-report measures (e.g., responses on pencil and paper scales). Approximately half of the products described in *JAP* were self-report measures. Likert-type scales were used to measure such variables as perceived performance level, anxiety, stress, perceived credibility, reward equity, etc. (e.g., Hazer & Highhouse, 1997; Martocchio, 1994; McNeely & Meglino, 1994; Quinones, 1995). Additional self-report measures used by *JAP* researchers were responses to pre-validated construct tests such as self-esteem, personality, self-efficacy, etc. (e.g., Mento, Locke, & Klein, 1992; Schmit, Ryan, Stierwalt, & Powell, 1995). The use of self-report measures as a primary dependent variable does not appear very often in *JOBM* research and represents an additional difference between methods used to conduct research in OBM and I-O.

FIGURE 4. Characteristics of experimental research articles in *JOBM* and *JAP*: The percentage of studies that measured behavior versus response products of behavior; and the percentage that used within-subject versus between-group research designs.



Reliance on self-report data was also evident in correlational studies conducted by *JAP* researchers. In 76% of the correlational studies (360 of 472 articles) the data consisted of responses to self-report measures (e.g., surveys, questionnaires, Likert-scales or construct tests).

Participant Characteristics in Experimental Research

Not surprisingly, participant characteristics were related to the settings where the research was conducted. Figure 5 presents those characteristics. In *JOBM*, where most of the studies were conducted in field settings, non-management personnel were participants in 65% of the studies, management personnel were participants in 10% of the studies, and executive personnel were participants in 1% of the studies (Nolan et al., 1999). College students served as participants in only 21% of the studies (Nolan et al., 1999). Participants were classified as "other" in 12% of the articles (J. Austin, personal communication, September, 1999). It should be noted that the preceding percentages include both experimental and correlational research studies. We were

unable to separate out the data for these types of studies because the numbers upon which the percentages were based were not available from Nolan et al. (J. Austin, personal communication, September, 1999). Nonetheless, because only three of the studies were correlational, the data can be reasonably compared to the data for the *JAP* experimental articles.

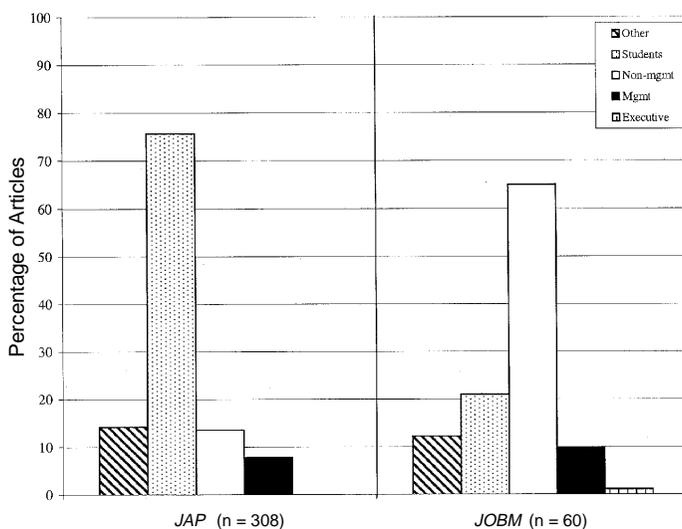
In *JAP*, where most of the studies were conducted in laboratories, college students served as participants in 76% of the experimental articles (234 of 308 articles). Participants held non-management positions in organizations in 14% of the studies ($n = 42$) and managerial or supervisory positions in 8% of the articles ($n = 24$). Participants fell into the "other" category in 14% of the articles ($n = 44$).

Nolan et al. (1999) noted an increasing trend with respect to the use of college student research participants in *JOBM* research studies. Despite this increase, a far greater percentage of participants were organizational members. Furthermore, *JOBM* researchers used student participants far less than *JAP* researchers.

Nolan et al. (1999) argued that the use of college students as participants may pose a threat to the external validity of the research findings. Certainly, student participants may not represent the general population of employees and because of this other researchers have noted that laboratory research results should be interpreted with caution as well (e.g., Gordon, Slade, & Schmitt, 1987; Sackett & Larson, 1990). Nonetheless, as stated by Balcazar et al. (1989), "Simulation researchers can provide a great service to those working in the field if they study phenomena which are modeled from but cannot be effectively or economically evaluated in the field" (p. 35). Similarly, Locke (1986a) stated that when the essential features of the research can be identified and incorporated into a laboratory setting, the results of laboratory research can and do generalize to the work site. And, as demonstrated by LaMere, Dickinson, Henry, Henry, and Poling (1996), college student data can generalize to the work site.

The advantages and disadvantages of both field and laboratory research have been widely discussed (e.g., Dipboye & Flanagan, 1979; Goodwin, 1998; Locke, 1986a; Muchinsky, 2000). Such a discussion is beyond the scope of the current paper. However, for additional empirical demonstrations of the generalizability of laboratory research in I-O psychology, readers are referred to Locke (1986b). Given the data, it is not clear that the use of college students in

FIGURE 5. Experimental research participant characteristics from *JOBM* and *JAP* research from 1987-1997.



laboratory research does threaten the external validity of the research findings (Locke, 1986b).

Types of Independent Variables

Nolan et al. (1999) used the following categories to assess the most commonly used independent variables in *JOBM*: Feedback, praise, goal setting, monetary rewards, non-monetary rewards, training, antecedents, punishment, and systems re-design. Performance feedback was the most commonly used independent variable in *JOBM*, with 75% of the experimental articles (45 of 60) using feedback as at least one of the interventions. *JAP* researchers used antecedents most frequently as independent variables (71%, 220 of 308 studies). These antecedents typically consisted of information provided to participants. Examples include information about different decision-making strategies, information provided to supervisors about subordinate performance, instructions designated as stressful or non-stressful, etc. (e.g., Dvir, Eden, & Banjo, 1995; Johnston, Driskell, & Salas, 1997; Simonson & Staw, 1992). Training was the second most commonly

used intervention in both journals. The types of independent variables examined are ranked in Table 3.

Research Designs and Analyses in Experimental Research

Within-subject designs dominated *JOBM* experimental research (73%, 44 of 60 studies) while between-group designs dominated *JAP* experimental research (96%, 297 of 308 studies). In addition, OBM researchers were much more likely to adopt a between-group design (32%, $n = 19$) than I-O researchers were to adopt a within-subject design (7%, $n = 21$). The results of this analysis were not surprising; however, it is one of the most glaring differences between OBM and I-O research. These data are displayed in Figure 4.

The high percentage of between-group designs in *JAP* is hardly surprising given the emphasis placed on those designs in traditional psychological research (Kazdin, 1982). Furthermore, the primary use of within-subject research designs in OBM is expected, given OBM's behavior analytic orientation (e.g., Hersen & Barlow, 1976; Johnston & Pennypacker, 1993; Poling & Grossett, 1986; Sidman, 1960). Nonetheless, the research question, not the theoretical orientation of the researcher, should guide the selection of the design as both types of designs have advantages and disadvantages (e.g., Goodwin, 1998; Johnston & Pennypacker, 1993; Kazdin, 1982). For example, a with-

TABLE 3. Most Commonly Used Independent Variables in *JAP* and *JOBM* from 1987-1997

<i>JAP</i> (N = 308)	<i>JOBM</i> (N = 60)
1. Antecedents/information ($n = 220$)	1. Feedback ($n = 45$)
2. Training ($n = 45$)	2. Training ($n = 38$)
3. Goals ($n = 32$)	3. Monetary Consequences ($n = 20$)
4. Feedback ($n = 23$)	4. Antecedents/information ($n = 19$)
5. Monetary Consequences ($n = 16$)	5. Non-Monetary Consequences ($n = 17$)
6. Non-Monetary Consequences ($n = 2$)	6. Goals ($n = 15$)
7. Praise ($n = 1$)	7. Praise ($n = 11$)
	8. Punishment ($n = 3$)
	9. System Re-Design ($n = 1$)

in-subject design may be inappropriate because exposure to one variable may affect how a participant responds to another. On the other hand, between-group designs require equivalent groups that may be impossible to create, particularly in applied settings. Komaki and her colleagues (Komaki, 1982; Komaki, Coombs, & Schepman, 1991) addressed the advantages of using within-subject designs in applied settings, noting that while they allow one “to draw cause-and-effect conclusions with assurance” (Komaki et al., 1991, p. 37), they do not require random assignment of participants or differential exposure to treatment variables.

It is probably the case that behavioral researchers are more familiar with, and more accepting of, between-group designs than I-O researchers are of within-subject designs. For example, noting the high percentage of laboratory studies conducted by I-O psychologists, Katzell and Austin (1992) encouraged researchers to conduct quasi experiments in applied settings, suggesting that devotion to rigorous scientific methodology may have impeded such work. They did not, however, mention the option of adopting within-subject designs. Familiarity with and acceptance of within-subject designs might well lead to more applied I-O research. Within-subject designs do not require randomization of subjects into groups and therefore are more feasible in an applied setting (Grindle, Dickinson, & Boettcher, in press; Komaki, 1982; Komaki, Coombs, & Schepman, 1991).

Data were analyzed statistically in nearly 100% of the *JAP* experiments; in contrast, they were analyzed statistically in only 37% of the *JOBM* studies. The difference reflects preferences for between-group or within-subject designs, although between-group data can be visually analyzed and within-subject data can be statistically analyzed. To quote Huitema (1986), “Thou shalt not confuse the design with the analysis” (p. 210). Nonetheless, when single-subject designs were employed, the data were usually visually inspected. As noted by Kazdin (1982), visual inspection is a behavior analytic tradition: “The underlying rationale of the experimental and applied analysis of behavior is that investigators should seek variables that attain potent effects and that such effects should be obvious from merely inspecting the data (Baer, 1977; Michael, 1974; Sidman, 1960)” (Kazdin, 1982, p. 232). For a recent debate on the statistical analysis versus visual inspection of graphic data, readers are referred to Fisch (1998) and

Hopkins, Cole, and Mason (1998). Fisch argues in favor of statistical analysis while Hopkins et al. argue against it.

The most common statistical test used in both publications was the Analysis of Variance (ANOVA). However, a wide variety of statistical procedures were used to analyze data in *JAP* articles. Because I-O researchers make extensive use of questionnaire and survey data, OBM researchers who administer self-report instruments would be well advised to review I-O articles to determine standard statistical methods for constructing questionnaires and analyzing the results. Behavior analysts are not typically trained in survey research methods because self-report data are not favored in the field. Nonetheless, with increasing demands for satisfaction and social validity data, more OBM researchers are likely to administer self-report questionnaires and surveys. When they do, they could certainly benefit from the well-developed methods in I-O psychology. Finally, the purpose of many *JAP* discussion articles was to describe statistical methods such as factor analysis, event histories, and structural equation modeling. These articles may be useful for OBM researchers who are interested in alternative statistical methods.

Additional Experimental Research Sub-Categories

To improve the quality of research in *JOBM*, Nolan et al. (1999) advised researchers to include cost-benefit analyses, social validity and reliability measures, follow-up data and information about program continuation. Researchers did not report these measures as often as Nolan et al. thought they should have; however, with respect to most of the measures, *JOBM* research fared better than *JAP* research.

Cost-benefit. In *JAP*, cost-benefit analyses were reported in less than 1% of the 308 experimental articles and in only 3.5% of the field experiments (2 of 57 studies). This measure appears to be more important to OBM researchers, who reported it in 40% of the experimental articles (24 of 60 articles). Nolan et al. (1999) did not analyze field and laboratory studies separately with respect to methodological categories, and therefore, comparisons cannot be made for these percentages. However, approximately 80% of the studies published in *JOBM* were field studies and the overall percentages should be similar.

Follow-up and program continuation. Follow-up and program continuation data are primarily relevant to field studies, and because it would be deceiving to report overall percentages for *JAP*, given that

81.5% of the *experimental* studies were conducted in laboratory settings, these data will be presented as the percentage of experimental field studies reporting these data. In *JAP*, 10.5% (6 of 57 studies) included follow-up data and 5% (n = 3) included information about program continuation. Higher percentages of *JOBM* articles have reported these data, with 20% of the experimental articles (12 of 60) reporting follow-up data, and 13% (n = 8) including program continuation data.

Social validity. As indicated previously in the Method section, in order for our data to be consistent with Nolan et al.'s (1999), we adopted their definition of social validity, "participant opinions regarding the nature of the intervention or the results obtained." Arguably, we excluded measures of job satisfaction, self-esteem, etc., that were quite commonly collected as dependent variables (but not as measures of social validity) in *JAP* articles. In *JAP*, 9.4% of all the experimental studies assessed social validity. Quite impressively, however, social validity was assessed in 51% of the field studies (29 of 57). And, as just indicated, many *JAP* researchers also collected measures of job satisfaction and self-esteem using standardized tests and questionnaires as dependent variables. In *JOBM*, social validity was assessed in only 27% of the experimental articles (16 of 60) (Nolan et al., 1999).

OBM could benefit from more frequent assessment of social validity. Assessment could, among other things, increase the acceptance and continuation of interventions by involving organizational members in planning and application and ensuring consumer satisfaction (Schwartz, 1991; Schwartz & Baer, 1991). Nolan et al. (1999) cited examples of social validity measures used by *JOBM* researchers that could serve as models (e.g., Austin, Kessler, Riccobono, & Bailey, 1996; Smith, Kaminski, & Wylie, 1990; Sulzer-Azaroff, Loafman, Merante, & Hlavacek, 1990). Methods used by *JAP* authors could also serve as useful references. For example, when examining the effects of office characteristics on job performance, Greenburg (1988) administered employee satisfaction questionnaires one week prior to the intervention, during the intervention, and one week following the intervention. For additional examples of *JAP* social validity measures, readers are referred to Doerr, Mitchell, Klastorin, and Brown (1996) and Simon and Werner (1996).

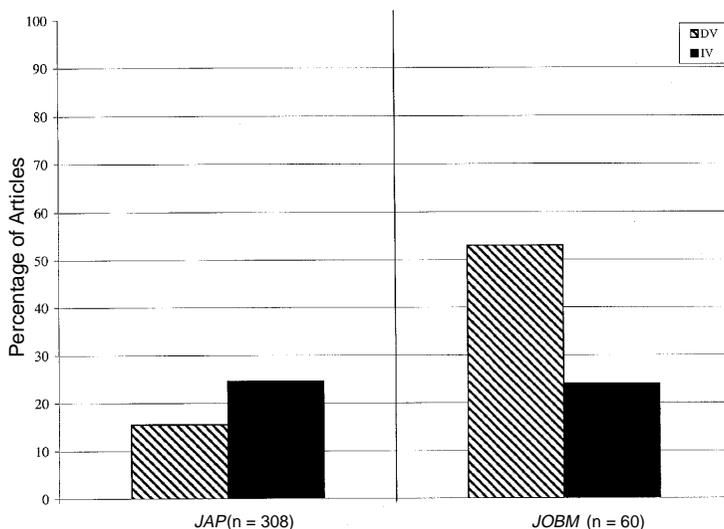
Reliability of dependent variables and independent variables. Fig-

ure 6 presents the percentage of articles that reported reliability measures for the dependent and independent variables. An article was classified as having reported reliability of the dependent variable(s) if any description of inter-rater reliability or inter-observer agreement was described (Nolan et al., 1999). To remain consistent with the definition used by Nolan et al., we excluded articles that reported reliability of the data collection instrument (e.g., scale reliabilities). Fifty-three percent of the experimental articles (32 of 60) in *JOBM* included measures of the reliability of the dependent variable (Nolan et al., 1999). In contrast, only 15.5% of the experimental articles (48 of 308) in *JAP* reported such measures. However, this difference should not be interpreted negatively because it may simply reflect the type of dependent variables favored by OBM and I-O researchers. As previously discussed, 43% of articles in *JOBM* (26 of 60) targeted behavior as the primary dependent variable while only 5% of articles in *JAP* did so. When directly observing behavior, inter-observer agreement is critical. On the other hand, permanent products, which were targeted in 99% of *JAP* articles, do not always require reliability assessments (i.e., self-reported satisfaction and self-esteem). Moreover, 81.5% of *JAP* experimental studies were conducted in the laboratory and laboratory tasks are more likely to have built-in data recording methods for which reliability measures would also be unnecessary (i.e., computerized tasks for which data are automatically recorded). In spite of the potential reasons for the lack of reliability measures in *JAP*, taken at face value, *JOBM* researchers seem to be doing a better job of collecting and reporting these measures.

Nolan et al. (1999) used the following definition to identify independent variable integrity or reliability, "A study was considered to have reported on the reliability of the independent variable if the authors described any provisions taken to ensure that the intervention was being implemented as described" (p. 98). These percentages are equivalent for both journals, with 25% of the experimental articles (15 of 60) reporting reliability of the independent variable in *JOBM* and 25% (76 of 308 studies) reporting this measure in *JAP*.

Nolan et al. (1999) advised OBM researchers to increase the extent to which they measure and report the integrity and reliability of their independent and dependent variables. I-O researchers could be advised similarly. Moreover, researchers in both fields could benefit from examining the methods used in the other. For example, in many

FIGURE 6. The percentage of studies published in *JOBM* and *JAP* from 1987-1997 that reported reliability of dependent variables and independent variables.



of the laboratory studies, *JAP* researchers used follow-up questionnaires, often referred to as manipulation checks, to assess whether the participant understood or was exposed to the independent variable as intended (e.g., Audia, Kristof-Brown, Brown, & Locke, 1996; Glynn, 1994; Prussia, & Kinicki, 1996). While a more stringent method may be preferable in some cases, this type of manipulation check is both cost effective and time effective, and certainly much preferable to none.

CONCLUSIONS

Although OBM and traditional I-O psychology both focus on improving organizational efficiency and effectiveness, the bodies of research from the two fields have differed and each has different strengths and weaknesses. The current comparison indicated that the primary relative strength of OBM is its practical significance, demonstrated by the proportion of research addressing applied issues.

Strengths of traditional I-O are the variety and complexity of organizational research topics and the extent to which I-O researchers report social validity data. As previously mentioned, OBM researchers could benefit from the I-O psychology literature by contacting topics not typically studied in OBM and adopting their survey research methods when appropriate. I-O psychologists could benefit from the OBM literature by adopting more within-subject research methodology, which could lead to more research-based interventions in field settings.

Because of the potential benefits, the following question is important to pose: Should OBM be more closely aligned with I-O psychology? Advantages to OBM include increased exposure by researchers and practitioners to diverse topics and issues and increased dissemination of our principles and methodology. Disadvantages may include the loss of some of our behavioral terminology and methodology (i.e., statistical analysis of data and collection of self-report data). The implications for this type of relationship warrant further discussion among OBM researchers and practitioners.

Earlier, in our introduction to I-O psychology, we mentioned Katzell and Austin's (1992) claim that behavioral concepts and techniques have become more fashionable in traditional I-O psychology. This would indicate that a relationship between the fields has been forming. Our analysis does not fully support Katzell and Austin's contention. Rather, their argument seems to be primarily restricted to the work of Komaki and her colleagues who they reference, prolific authors, who, although behaviorally oriented, have published in traditional I-O journals and books (e.g., Komaki, 1986; Komaki, Barwick, & Scott, 1978; Komaki, Collins, & Penn, 1982; Komaki et al, 1991; Komaki et al., 1989; Komaki, Heinzmann, & Lawson, 1980; Komaki, Zlonick, & Jensen, 1986). As indicated by our analysis of researchers publishing in both journals, there are not many other examples of "cross-overs." Nonetheless, many of the I-O interventions and the problems addressed were similar to those found in *JOBM*. Interventions such as training, goal-setting, feedback, and informational antecedents were found in both journals, typically with a purpose to change performance and satisfaction measures. Although not within the scope of the current paper, an analysis and comparison of specific research topics (e.g., monetary incentives, safety, etc.) published in both journals, could further assess similarities and differences between OBM and

I-O. If research results were significantly different between the two sources, this type of comparison could further identify the implications of those differences.

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Data Base Containing a Random Sample of JAP Article Classifications

Article	Author Characteristics					Research												Discuss				
	M/F	A/O/G				Experimental								Correlational								
	M	F	A	O	G	Y/N	F/L	Ss Job	DV (P-O, DV SR/B)	R-IV	R-Bene.	Cost/	SV	Prog. Cont.	F-up	App/ IV Theo	B/W	Y/N	F/L	SR	Y/N	
Finkelstein, Burke, & Raju (1995)	1	1	3			Y-			Meta													
Garland, Sandefur, & Rogers (1990)	2	1	2	1		Y	L	M	P(O)	N	N	N	N	N	N	T	A	B/W				
Giambra & Quilter (1989)	2		2															Y	L	N		
Gottlieb, Grewal, & Brown (1994)	3		3															Y	F	Y		
Green & Cascio (1987)	2		2															Y	F	Y		
Greenburg(1990)	1		1			Y	F	N	P(O, SR)	N	N	N	N	N	N	T	A	B				
Gregorich, Helmreich, & Wilhelm (1990)	3		3															Y	F	Y		
Hattrup, Rock, & Scalia (1997)	1	2	3			Y			Meta-									Anal.				
Hirst (1988)	1		1			Y	L	M	P(SR)	N	N	N	N	N	N	T	A,G	B				
Jackson, Brett, Sessa, Cooper, Julin, & Peyronnin(1991)	5	1	6															Y	F	N		
Kleinmann (1993)	1		1															Y	L	Y		
Liden, Wayne, & Stilwell (1993)	2	1	3															Y	F	Y		
Martell & Borg (1993)	1	1	2			Y	L	S	P(O)	N	N	N	N	N	N	T	A	B				
McAllister, Bearden, Kohlmaier, & Warner (1997)	2	2	4			Y	L	S	P(O)	N	N	N	N	N	N	T	A	B				

APPENDIX (continued)

Data Base Containing a Random Sample of JAP Article Classifications

Article	Author Characteristics					Research												Discuss				
	M/F	A/O/G				Experimental													Correlational			
	M	F	A	O	G	Y/N	F/L	Ss	DV	R-	R-	Cost/	SV	Prog.	F-up	App/	IV	B/W	Y/N	F/L	SF	Y/N
						Job	(P-O,	DV	IV	Bene.	Cont.											
McGee & Ford (1987)	1	1	2																Y	F	Y	
Melara, DeWitt-Rickards, & O'Brien(1989)	3		2	1		Y	L	S	P(SR)	N	N	N	N	N	N	T	A	B				
Normand, Salyards, & Mahoney (1990)	3		3																Y	L	N	
Nosworthy & Lindsay (1990)	1		2			Y	L	S	P(O)	N	N	N	N	N	N	T	A	B				
Olson-Buchanan (1996)	1	1				Y	L	S	P(O,	N	N	N	Y	N	N	T	F	B				
Ragins & Scandura (1997)																			Y	F	Y	
Raju, Burke, & Normand (1990)	2		2	1																		Y
Rice, Gentile, McFarlin (1991)	3		3																Y	F	Y	
Rodgers, Hunter, & Rodgers (1993)	2	1	2	1		Y -																
Roth, BeVier, Switzer, & Schippmann (1996)	4		3	1		Y -																
Rounds & Tracey (1993)	2	2				Y-																
Roznowski (1989)	1																		Y	F	Y	
Schoorman & Holahan(1996)	1	1	2			YLSP(O,	N	Y	N	N	N	N	N	T	N,A	B						
Sebrechts, Bennett, & Rock (1991)	3		2	1															Y	L	N	

Data Base Containing a Random Sample of JAP Article Classifications

Article	Author Characteristics					Research													Discuss				
	M/F	A/O/G				Experimental														Correlational			
	M	F	A	O	G	Y/N	F/L	Ss Job	DV (P-O, DV SR/B)	R- IV	R- IV	Cost/ Bene.	SV	Prog. Cont.	F-up	App/ Theo	IV	B/W	Y/N	F/L	SR	Y/N	
Simonson & Staw (1992)	2		2			Y	L	S	P(O, SR)	H	Y	H	N	N	N	T	A	B					
Steiner & Gilliland (1996)	2		2																Y	L	Y		
Strube & Bobko (1989)	2		2																				Y
Tetrick & LaRocco (1987)	1	1	1	1															Y	F	Y		
Vancouver, Millsap, & Peters (1994)	2	1	3																Y	F	Y		
Zalesny (1990)	1		1																Y	L	Y		

Note. In the author characteristics category: M = Male, F = Female, A = Academic affiliation, O = Organizational affiliation, G = governmental/agency affiliation. All experimental (including meta-analyses) and correlational research articles are classified in the research category. In the experimental sub-category: The first Y indicates that the article is an experimental article; in the F/L category, F = field research and L = laboratory research; P in the DV category indicates Product (with O = outcome and SR = self-report), and B = Behavior; a Y in the R-DV category indicates that reliability measures for the DV were recorded; a Y in the R-IV category indicates that reliability measures for the IV were recorded; a Y in the Cost/Bene. category indicates that a cost-benefit analysis was included in that article; a Y in the SV category indicates that the article reported social validity measures; a Y is included the Prog. Cont. category if program continuation measures were reported; a Y in the F-up category indicates that follow-up measures were reported; an A in App./Theo. category indicates an applied article and T indicates a theoretical article; in the IV category, A = antecedent, FB = feedback, G = goal setting, \$ = monetary consequence, N = non-monetary consequence, P = praise, T = training; and in the B/W category, B = between-group design, and W = within group design. In the correlational sub-category: The first Y indicates that the article is a correlational article; F = field research, L = laboratory research; and a Y in the SR category indicates that self-report data were included. All discussion articles are classified with a Y in that category. An N in any category indicates that a No was recorded on the data sheet for that category.