

**SELF-REPORTED LIMITATIONS AND FUTURE DIRECTIONS IN SCHOLARLY
REPORTS: ANALYSIS AND RECOMMENDATIONS**

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ABSTRACT**

We content analyzed self-reported limitations and directions for future research in 1,276 articles published between 1982 and 2007 in *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, and *Strategic Management Journal*. In order of frequency, the majority of self-reported limitations as well as directions for future research pertain to threats to internal, external, and construct validity issues and there is a significant increase in the reporting of these elements over time. Longitudinal analyses revealed that some of these increases varied across management sub-fields (i.e., business policy and strategy, organizational behavior, organizational theory, and human resource management), indicating unique research contexts within some research domains. Based on our analysis of self-reported limitations and future research directions, we offer eight guidelines for authors, reviewers, and editors. These guidelines refer to the need to report limitations, the use of a separate section for them, asking reviewers to list limitations in their evaluations of manuscripts, prioritizing limitations, and reporting them in a way that describes their consequences for the interpretation of the results. Guidelines for directions for future research focus on positioning them as a starting point for future research endeavors and for the advancement of theoretical issues. We also offer recommendations on how to use limitations and future research directions for the training of researchers. We hope the adoption of our proposed guidelines and recommendations will maximize their value so that they can serve as true catalysts for further scientific progress in the field of management.

SELF-REPORTED LIMITATIONS AND FUTURE DIRECTIONS IN SCHOLARLY REPORTS: ANALYSIS AND RECOMMENDATIONS

As the field of management matures into an established scientific discipline, we have collectively strived to reflect and gain perspective on the state of our science by systematically synthesizing research evidence (e.g., Aguinis, Pierce, Bosco, & Muslin, 2009; Hitt, Boyd, & Li, 2004; Pfeffer, 1993; Scandura & Williams, 2000). Such synthesis is especially relevant within a body of work as diverse as management research because it helps not only to define the scientific boundaries of the discipline but also to improve the robustness of the methodologies and theories (Rousseau, Manning, & Denyer, 2008). In recent years, researchers have analyzed a broad set of elements included in published articles such as, for example, methodological choices (e.g., Aguinis, Dalton, Bosco, Pierce, & Dalton, 2011; Scandura & Williams, 2000) and the nature of theoretical propositions (e.g., Colquitt & Zapata-Phelan, 2007; Werner, 2002). This interest in state-of-science assessments has raised awareness of methodological and theoretical concerns and served as a guide for research efforts.

A common feature of peer-reviewed journal articles is the description of the study's limitations as well as suggestions for future research efforts. These sections provide "... a realistic (and adequately self-critical) delineation of limitations and weaknesses" of the research presented (Campion, 1993: 717). Limitation sections are useful for understanding the importance of the weaknesses of the specific research effort as reported by the authors, placing the study in context, and attributing a credibility level to it (Ioannidis, 2007). Future research directions, on the other hand, are not as directly rooted in the presented research and are forward looking, pointing to theoretical and methodological areas where further development is required or desirable. These two features of empirical articles are interesting to consider within a state-of-

the-science context because they are inherently evaluative in nature and, thus, provide a unique perspective on the research effort.

Self-reported limitations and directions for future research are also unique because they represent critical information that can possibly affect the likelihood of a manuscript being published. The pressure stemming from the increasingly low acceptance rates for peer-reviewed journals (Ashkanasy, 2010) and emphasis on publications in academic reward structures (Certo, Sirmon, & Brymer, 2010; Gomez-Mejia & Balkin, 1992) represent clear motives for not acknowledging limitations and for offering only benign directions for future research. At the very least, these pressures create a context for a tentative approach to disclosure. In the field of management, the recent attention to ethical issues in research communication (Bedeian, Taylor, & Miller, 2010; Honig & Bedi, 2012) and the absence of established standards for reporting limitations and directions for future research highlight the need for a closer examination of these features with the goal of offering useful guidelines for authors, reviewers, and editors.

In the present study we offer a comprehensive content analysis of self-reported limitations and future research directions in peer-reviewed scholarly journal articles in management. The analysis of limitations has proven fruitful for other fields such as entrepreneurship (Aguinis & Lawal, 2012), leadership (Brutus & Duniewicz, 2012), industrial-organizational psychology (Brutus, Gill, & Duniewicz, 2010), and the natural sciences (Ioannidis, 2007). For example, Brutus et al. (2010) uncovered that a majority of the limitations reported in industrial-organizational psychology pertained to internal validity, mostly causality issues. For the leadership field (Brutus & Duniewicz, 2012), the primary concern that arose pertained to external validity. In entrepreneurship, internal and external validity issues are the most concerning (Aguinis & Lawal, 2012). We extend these previous efforts on the study of

limitations by also investigating directions for future research, another common and key section in journal articles. We expect that the analysis of directions for future research will provide a broader overview of state-of-science in the field of management. Also, we use a longitudinal time frame to provide insights into the evolution of the field with regards to these features. Finally, we seek evidence of these trends within four substantive research domains in management: business policy and strategy (BPS), organizational behavior (OB), organizational theory (OT), and human resource management (HRM). We chose to focus both on macro and micro research domains because such an inclusive approach has the greatest potential to make important advancements in the field of management as a whole (Aguinis, Boyd, Pierce, & Short, 2011).

The remainder of our article is structured around four sections. First, we explain the use of limitations and directions for future research as state-of-science indicators. Second, we describe our methodological approach, including the sample, procedures, and taxonomy of reporting format and methodological choices, and present results of our analysis. Third, we discuss implications of our results for the progress of the field of management in general as well as the BPS, OB, OT, and HRM research domains. As part of our discussion, we offer a set of guidelines aimed at helping authors, reviewers, and editors so that limitations and directions for future research included in published research articles represent important drivers for the advancement of the field. We also offer recommendations on how to use limitations and future research directions for the training of researchers. In short, our study offers insights about where we have been, where we are, and where we should go in terms of enhancing the value-added contribution of self-reported limitations and directions for future research.

SELF-REPORTED LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Peer-reviewed journal articles are an essential element in the communication of science (Huff, 1999) and thus an appropriate and promising data source for conducting state-of-science research. As a result, it is not surprising that a vast majority of perspective-taking efforts rely on data drawn from articles published in scholarly peer-reviewed journals.

For the most part, previous efforts have focused on the direct assessment and tabulation of objective elements of articles (e.g., Aguinis et al., 2009; Aguinis, Dalton, et al., 2011; Casper, Eby, Bordeaux, Lockwood, & Lambert, 2007; Scandura & Williams, 2000; Williams, Edwards, & Vandenberg, 2003). In contrast, our analysis of self-reported limitations and directions for future research represents an opportunity to assess published articles in context. Contextual elements in the evaluation of research include idiosyncratic norms and constraints of research areas and disciplines. Consider, for example, the strength of internal validity evidence that can be expected from research in OB and BPS. The fact that experimental designs are less accessible for BPS researchers leads to different expectations regarding their ability to infer causality (e.g., Bergh, Hanke, Balkundi, Brown, & Chen, 2004). Consider also the historical context within which a study is conducted. Mature research areas command higher standards of validity evidence than emerging ones and, within a single area, the strength of the validity evidence required to make a scholarly contribution increases over time. In sum, context influences methodological choices and, consequently, should also influence how they are evaluated (Buchanan & Bryman, 2007). This is not to say, however, that the evaluation of research efforts is totally driven by context and disconnected from the internal characteristics of a scholarly report. Previous research has shown that limitations are indeed rooted within the methodological choices of a study (e.g., external validity concerns stemming from using laboratory experimental

designs; Aguinis & Lawal, 2012; Brutus et al., 2010). It follows that state-of-science efforts and the appreciation of research endeavors are meaningful when the objective characteristics of the study are considered *in situ*—a notion that has long been advocated by science historians (e.g., Kuhn, 1996; Merton, 1973) and that is best captured by self-reported limitations and directions for future research.

Directions for future research also offer a critique of the work presented albeit in an indirect manner (i.e., X is a limitation and thus future research should focus on remedying X). In other words, while limitations raise awareness about shortcomings, directions for future research can point to possible solutions for these shortcomings. However, future directions are broader in scope than limitations because they are not necessarily bound by the methodological characteristics of the research at hand. Stated differently, directions for future research provide authors with an opportunity to discuss theoretical and methodological avenues in need of refinement and offer keys to advancing management research. In an examination of the evolution of the scientific article through the last three centuries, Gross, Harmon, and Reidy (2002) observed a gradual but steady structuring of presentational features over time. These authors found that by the 20th century, a majority of scientific articles contained a formal conclusion section with “suggestions for future work to validate and expand upon claims” (Gross et al., 2002: 185).

As a scientific field, collectively choosing to make room for self-critical elements in our scholarly reports raises certain ethical issues. As mentioned earlier, the self-disclosure inherent to these sections is somewhat at odds with the context of academic publishing. Bedeian et al. (2010) reported that a high proportion of business school faculty members knew of a colleague who, in presenting research, withheld methodological details or were selective in reporting data.

The pressure to publish is real and it would be naïve to think that it does not influence the reporting of critical information. In biomedical science, for example, Cokol, Ozbay, and Rodriguez-Esteban (2008) found a drastic increase in the number of formal and published retractions in recent years. Cokol et al. (2008: 2) hypothesized that this trend resulted, in part, from “... increasing competition in science and the pressure to publish” and saw in this trend a worrying decline in scientific integrity. In short, our study raises awareness of both methodological and theoretical issues in management research. Perhaps more importantly, based on our review and content analysis, we derive specific guidelines that authors, reviewers, and editors can use to maximize the value of limitations and directions for future research so that they can serve as true catalysts for further scientific progress in the field of management.

METHOD

Sample

Our sample included articles published in five leading journals. We selected *Academy of Management Journal* (AMJ), *Administrative Science Quarterly* (ASQ), and *Journal of Management* (JOM) because they are consistently ranked as top journals in the field (Aldag & Stearns, 1988; Coe & Weinstock, 1984; Podsakoff, McKenzie, Podsakoff, & Bachrach, 2008) and publish influential and highly cited work (Scandura & Williams, 2000). We also selected *Strategic Management Journal* (SMJ) and *Journal of Applied Psychology* (JAP) because of their similar high stature and also because their foci on macro and micro research domains, respectively, offers a broader coverage of the field.

To obtain a longitudinal perspective on the evolution of the field, we chose the time period 1982 through 2007. Similar to Scandura and Williams (2000), we selected five-year time intervals to have a representative yet manageable number of articles to code. Specifically, we

investigated all the articles published in the years 1982, 1987, 1992, 1997, 2002, and 2007. Our sampling process focused exclusively on empirical contributions; theoretical articles, literature reviews, book reviews, commentaries, and all other non-empirical articles were excluded from our analysis. A total of 1,276 articles met our criteria: 230 in AMJ (18.03 % of our sample), 103 in ASQ (8.07%), 571 in JAP (44.74%), 130 in JOM (10.19%), and 242 in SMJ (18.97%). Table 1 displays the frequency of articles by journal and year of publication.

[Insert Table 1 about here]

We used the framework proposed by Scandura and Williams (2000) to guide the coding of the articles into the four substantive management content areas: BPS, OB, OT, and HRM. Two of the authors (an OB/HRM researcher and a BPS researcher) coded the articles independently in order to assign them to a substantive content area. Table 1 also includes a summary of the results of this categorization effort.

Procedures

We used content analysis to convert self-reported limitations and directions for future research contained in the articles into quantitative data. In recent years, content analysis has emerged as a useful methodology for aggregating and drawing inferences from textual material (Aguinis et al., 2009; Duriau, Reger, & Pfaffer, 2007; García-Izquierdo, Aguinis, & Ramos-Villagrasa, 2010; McClelland, Liang, & Barker, 2010). To code limitations and directions for future research, we based our taxonomy on that used by Brutus et al. (2010) and Brutus and Duniewicz (2012). This taxonomy maps onto the four general threats to validity (i.e., internal, statistical conclusion, construct, and external). Internal validity pertains to causality, which implies a cause-and-effect relationship between two variables in addition to ruling out alternative explanations for this relationship. Statistical conclusion validity refers to the extent to which

inferences can be made on the basis of the statistical evidence presented. Construct validity is concerned with the fit between the measures employed and the constructs that they claim to represent. The extent to which results generalize across time, settings, and individuals is the chief concern of external validity.

In addition, we expanded the taxonomy by including a fifth category labeled theory issues. This new category was required to capture limitations with regards to theory as well as suggestions pertaining to elements of theory in directions for future research. Table 2 provides a description of the five categories and also some illustrations. We used these categories to code self-reported limitations (focused on the particular weaknesses of a research endeavor) and directions for future research (focused on guiding upcoming research endeavors).

[Insert Table 2 about here]

Two trained coders examined the 463 articles published in AMJ, ASQ, and JOM according to the aforementioned taxonomy. Coding was exhaustive in that each self-reported limitation and direction for future research was attributed to a single category. To gather evidence regarding reliability, both coders initially coded 100 randomly selected articles. After confirming satisfactory agreement levels ($\kappa = .74$ for limitations and $.71$ for future research) we divided the remaining 363 articles between the two coders. The coding of the 813 JAP and SMJ articles was conducted by three coders (one of which also participated in the coding of the 463 AMJ, ASQ, and JOM articles). All three researchers first coded 100 randomly selected articles and reached acceptable levels of agreement for limitations ($\kappa = .79$) and directions for future research ($\kappa = .52$) (Munoz & Bangdiwala, 1997). We then divided the remaining 713 articles among the three coders.

Taxonomy of Reporting Format

In general, empirical research articles report limitations and future research in two different formats: some clearly identify this information with a heading including the term limitations, future research, or both, while others embed it within the discussion section. Thus, coders also categorized the location of the material in the articles we reviewed ($\kappa = .97$). Table 3 presents the results of this categorization.

[Insert Table 3 about here]

Taxonomy of Methodological Choices

We coded the methodological choices that authors made when they conducted the studies reported in their articles to compare them with how authors reported limitations. To do so, we relied on the framework developed by Austin, Scherbaum, and Mahlman (2004). This framework distinguishes between study setting (laboratory, field, or simulation); design type (passive observation, experiment, case, archival, or other); temporal perspective (cross-sectional, longitudinal, cohort, or other); and data analysis (quantitative or qualitative). Note that 79 articles were based on at least two separate studies that relied on different methodologies (6.2%). Table 4 includes a summary of the results of this categorization.

[Insert Table 4 about here]

RESULTS

Descriptive Information

Of the 1,276 articles we content analyzed, 798 (i.e., 62.5%) reported at least one limitation and 822 (i.e., 64.4%) one direction for future research. Over the 25-year period under study, the reporting of these elements has increased substantially. In 1982, 44.6% of articles contained at least one limitation and this percentage increased to 82.9% in 2007. We uncovered a similar trend for directions for future research: 49.9% of articles reported at least one in 1982 and

this percentage increased to 79.5% in 2007.

On average, each article contained 1.27 limitations and 1.14 directions for future research. Limitations pertaining to internal and external validity were the most commonly reported; internal validity was mentioned in 559 articles (43.8% of them mentioned this limitation at least once), and external validity was mentioned in 518 articles (40.5% of articles). The frequencies of directions for future research mirror those found for limitations. Those pertaining to internal validity were the most common; these were mentioned in 671 articles (52.6%), followed by external validity (in 385 articles; 30.2%). The least frequently reported feature was limitations pertaining to theory (40 articles; 3.1%). This result is consistent with our premise that limitations are rooted in the methodological choices of papers. Tables 5 and 6 include a summary of these results.

[Insert Tables 5 and 6 about here]

Relationships between Self-reported Limitations and Methodological Choices

We computed phi coefficients to understand the extent to which (a) self-reported limitations and (b) directions for future research are related to objective characteristics of the studies. This information is useful because it provides evidence regarding the extent to which limitations are directly and accurately related to a study's objective weaknesses. We excluded the 79 articles that relied on multiple studies using mixed methodologies from these analyses. A summary of these results is included in Table 7.

[Insert Table 7 about here]

As would be expected, the presence of limitations pertaining to internal validity was negatively related to the use of laboratory studies ($\phi = -.07$; $p < .05$) and positively to passive observation studies ($\phi = .12$; $p < .001$). This is an expected result because researchers usually

implement randomization and have control over independent variables in laboratory settings but not in passive observation designs—thereby having more confidence regarding internal validity when research is conducted in laboratory settings. Construct validity showed the strongest associations with methodological choices. Limitations and directions for future research related to construct validity were negatively related to the use of laboratory studies ($\phi = -.11; p < .001$ and $\phi = -.09; p < .01$) and experiments ($\phi = -.14; p < .001$ and $\phi = -.10; p < .001$). The control provided in these settings is exercised via better measurement. Conversely, the lack of experimental control inherent to field studies ($\phi = .13; p < .001$ and $\phi = .10; p < .001$) and passive observation ($\phi = .23; p < .001$ and $\phi = .10; p < .001$) is associated with the presence of more construct validity issues.

Changes in Self-Reported Limitations and Future Directions over Time

We conducted repeated measures analyses of covariance (ANCOVA) to understand trends in reporting limitations and directions for future research over time. To control trends from other factors, we used journal, methodological choice, and reporting formats as covariates in the analyses. We excluded the 79 articles that relied on multiple studies using mixed methodologies from these analyses.

We obtained main effects for the reporting of limitations pertaining to internal validity ($F[5, 1174] = 4.17; p < .001$; partial $\eta^2 = .08$), external validity ($F[5, 1174] = 2.53; p < .001$; partial $\eta^2 = .05$), and construct validity ($F[5, 1174] = 1.67; p < .001$; partial $\eta^2 = .04$). For directions for future research, we found main effects for internal validity ($F[5, 1174] = 2.17; p < .001$; partial $\eta^2 = .04$), external validity ($F[5, 1174] = 5.95; p < .001$; partial $\eta^2 = .02$), and construct validity ($F[5, 1174] = 2.23; p < .001$; partial $\eta^2 = .01$). These trends indicate that researchers have clearly increased the number of self-reported limitations and directions for

future research over time. Figure 1 includes graphic representations of these trends.

[Insert Figure 1 about here]

We conducted the same ANCOVAs within the BPS, OB, OT, and HRM research domains to identify possible area-specific trends. We detected a significant increase in limitations in internal validity in each of the four domains: BPS: $F(5, 317) = 3.08, p < .05, \eta^2 = .04$; OB: $F(5, 459) = 9.57, p < .001, \eta^2 = .09$; OT: $F(5, 53) = 1.99, p < .05, \eta^2 = .19$; and HRM: $F(5, 135) = 4.63, p < .001, \eta^2 = .14$. However, we found an increase in limitations in construct validity only for OB ($F[5, 459] = 4.07; p < .01; \eta^2 = .04$) and HRM ($F[5, 135] = 4.60; p < .01; \text{partial } \eta^2 = .16$). Finally, we found an increase in limitations in external validity only for OB, $F(5, 459) = 7.18; p < .001; \eta^2 = .06$. In terms of trends regarding directions for future research, we found a statistically significant trend for OB only. In this research domain, the number of directions for future research in internal validity ($F[5, 459] = 4.41; p < .001; \eta^2 = .05$) and in external validity ($F[5, 459] = 2.51; p < .05; \eta^2 = .02$) increased over time.

DISCUSSION

The peer-reviewed journal article is the main communication tool in science (Huff, 1999) and our study focused on self-reported limitations and directions for future research, two common elements of scholarly reports in the field of management. In Table 8 we contrast the design and results of this research effort with others conducted on this topic. Our study not only covers the longest time span (i.e., 25 years) but it also encompasses the analysis of both limitations and directions for future research. Also, for each of these sections, we coded theoretical content in addition to the more traditional four threats to validity.

[Insert Table 8 about here]

In this section we comment on the presence of these features, their content in published

articles, and implications of our findings. Then, we discuss the longitudinal trends uncovered in the field as a whole and within specific research domains. Third, given our results and discussion, we offer eight guidelines for authors, reviewers, and editors that will hopefully lead to an improvement in the role that limitations and directions for future research play in terms of serving as catalysts for scientific progress. Finally, we offer recommendations on how to use limitations and future research directions for the training of researchers.

A majority of the articles included at least one limitation (i.e., an average of 1.27 per article) and at least one direction for future research (i.e., an average of 1.14 per article). These results are in line with previous work on self-reported limitations in related fields. For example, Aguinis and Lawal (2012) reported a similar average of 1.94 limitations per article in entrepreneurship and Brutus et al. (2010) reported an average of 1.66 limitations per article in industrial-organizational psychology. Our results also suggest that the inclusion of limitations and directions for future research in empirical research articles is progressing in our publications. Over the 25-year period of our study, the reporting of these elements in major management journals increased substantially and, in 2007, 82.9% of published articles contained at least one limitation and 79.5% contained at least one direction for future research. While these trends are encouraging, our position is that every empirical study published should list at least one limitation and one direction for future research. Later in the discussion we propose a set of guidelines that we hope will help in this regard.

The articles we content analyzed contained, on average, at least one limitation and one direction for future research that pertained to internal, external, or construct validity. Interestingly, we found that limitations related to these three threats to validity increased over the 25-year period. These increases are telling in light of the relative stability of the objective

characteristics of management research. To wit, Aguinis et al. (2009: 75) noted that “the modal design, measurement, and analysis characteristics of an article today have not changed much compared to an article published 20 years ago”. Yet, despite this relative stability in methodological choices, the increases in self-reported limitations were substantial: limitations regarding internal validity, for example, almost tripled and increased from only 25% of articles including this limitation in 1982 to 66% of articles including it in 2007.

Our content analysis reveals as much about the research that was conducted as it does about the evolution of our research context or, more specifically, how the appraisal of research in management has changed over time. Consider the fact that limitations pertaining to internal validity were the most frequently reported and were found to increase over time in all areas of management. Causality evidence remains elusive in management research (Aguinis & Lawal, 2012; Grant & Wall, 2009; Highhouse, 2009) and such concern, whether for theory testing or applied research, has long been recognized to be of the highest priority in the social sciences reflecting what Cook and Campbell (1976: 245) labeled the “general primacy of internal validity.” The theoretical compartmentalization that characterizes current management research (Aguinis, Boyd, et al., 2011), however, puts the focus on fine-tuning existing models over time, leading to an increased emphasis on internal validity issues (Chatman & Flynn, 2005).

The area of BPS, with its relatively shorter history given the foundation of the *Strategic Management Society* in 1981 and the publication of *SMJ*'s first issue in 1980, best illustrates this trend. Since its inception, BPS has witnessed rapid theoretical as well as methodological developments (Hitt et al., 2004; Hitt, Gimeno, & Hoskisson, 1998; Ketchen, Boyd, & Bergh, 2008). As a result of the increasing level of sophistication of the BPS domain, past research and approaches have been challenged and questioned. In particular, various scholars have highlighted

the failure of many studies to control for threats to internal validity (Bergh et al., 2004) and the need to incorporate analysis of endogenous relationships (Hitt et al., 2004). Our results show that in BPS self-reported limitations concerning internal validity more than doubled over the time of our study. Specifically, only 21% of articles included this limitation in 1982, but 50% of articles included it in 2007.

Across the field of management as a whole, the greater attention recently given to multilevel effects has undoubtedly exacerbated our focus on internal validity (e.g., Aguinis, Boyd, et al., 2011; Hitt, Beamish, Jackson, & Mathieu, 2007; Molloy, Ployhart, & Wright, 2011). As an illustration of this trend, consider the OT domain. Since the 1980s, empirical OT research has shifted from paradigm-driven to problem-oriented research reflecting events and developments in large firms (Davis & Marquis, 2005). Part of this trend in OT research led to an increased focus on mechanisms that link variables at different levels of analysis. The rise of institutional theory as a powerful framework within the OT domain, for example, has exacerbated this trend by incorporating multilevel issues such as the influence of social structure or organizational agency on organizational behavior, the effect of conformity to institutional norms on organizational performance, and the presence of cross-level interaction effects (Aguinis & Glavas, 2012; Foss, 2011; Heugens & Lander, 2009). Thus, the increasing pressure to better understand the mechanisms in OT that link these constructs to individual, organizational, and interorganizational behaviors is reflected in the trends in self-reported limitations.

Increasing concerns for external validity, also a longitudinal trend revealed by our content analysis, coincides with mounting attention given to contextual elements of research (Johns, 2001, 2006; Rousseau & Fried, 2001). As noted by Johns (2006: 389), “context is likely

responsible for one of the most vexing problems in the field: study to study variation in research findings.” It could also be argued that generalizability concerns are easy targets when it comes time to evaluate research. For example, many scholars have criticized how the use of students in OB research is often automatically linked to threats to generalizability (Anderson, Lindsay, & Bushman, 1999; Highhouse, 2009; Highhouse & Gillespie, 2009).

Construct validity, the third major trend uncovered by our review, is concerned with the fit between the measures employed and the constructs that they claim to represent. Over the years, many scholars have voiced concerns about the quality of measures in our field (Bagozzi, Yi, & Phillips, 1991; Podsakoff & Dalton, 1987). Less than ideal operationalization of constructs affects the validity of the findings and thus limits the potential contribution of the research to direct future work. Schwab (1980) cautioned organizational researchers about the peril of focusing on substantive research (i.e., the relationship between constructs) at the expense of preliminary construct validation research. That we found this trend in OB and HRM but not in OT or BPS may be the result of the extensive use of cross-sectional survey research in these areas and a heightened sensitivity of OB and HRM researchers regarding common method variance issues (e.g., Brannick, Chan, Conway, Lance, & Spector, 2010; Lindell, & Whitney, 2001; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Taken together, these trends support the fact that, as scientific communities mature, standards of proof also progress (Gross et al., 2002). Because a focus on internal validity often comes at the expense of external validity (and vice versa), it appears that we are pushing for improvement in two diametrically opposed directions. We interpret this as a positive sign, one that reflects our unique tradition of introspection and self-evaluation. As stated in the Introduction, our discipline is relatively unique in this respect, even within the social sciences.

While disciplines such as economics, sociology, and political science use self-reported limitations, they do so in more implicit fashion than we found to be the case in management, without the use of separate subheadings and/or sections to discuss self-reported limitations and future research directions. Specifically, a recent survey of the top 25 most-cited scientific journals (e.g., *Nature*, *Proceedings of the National Academy of Sciences*, *Science*) found that only 1 percent of articles contained a separate limitations section and only 17 percent actually included limitations (Ioannidis, 2007). This is not to say that our discipline is consistent in the use of these sections. AMJ stands out in this regard with 45% of articles containing at least one separate section for limitations and/or directions for future research. For ASQ, JOM, SMJ, and JAP these percentages are lower—24%, 25%, 28%, and 32%, respectively.

A basic premise of our study is that limitations and directions for future research provide valid insights into our collective self-awareness. In support of this premise, limitations uncovered by our content analysis appear to be more than rhetorical exercises because they are significantly related to many of their more objective methodological choice counterparts. For example, limitations pertaining to internal validity are over-represented in articles based on passive observation designs and underrepresented in those that used laboratory studies. Thus, these elements of publications are meaningful, and our results provide some evidence of construct validity of self-reported limitations.

The nomological network of directions for future research, on the other hand, is not as clear. Directions for future research were only weakly related to objective elements of the research endeavor, as would be expected, because such recommendations are not specifically bound to the research at hand but are forward looking. While directions for future research inform readers as to where research should be heading, they are not completely dissociated from

limitations because, in an indirect manner, they also represent an indictment of the weaknesses of the research. As a result, future research opportunities are often the mirror image of the stated limitations. We can illustrate this point by the following example from a published article on acquisition decisions: “Although we control in our study for firm size, our sample is composed mainly of large corporations. We believe that extending our research to include small-and medium-sized and non-U.S. firms could be a potential avenue for future research” (Deutsch, Keil, & Laamanen, 2007: 50). In this example, the authors restated a limiting element of their research (i.e., the types of firms studied). They also indirectly pointed to another limitation: the use of U.S. firms. In sum, these two common features of empirical publications are related conceptually yet serve distinct purposes. The above discussion raises a fundamental question about the results of our study: Besides being descriptive and diagnostic, what role do limitations and directions for future research play in the communication of science in the field of management? In the next section we pose a critical eye on this role and offer specific guidelines on how to increase the value-added contribution of these sections.

Looking Forward: Increasing the Value of Reporting Limitations and Directions for Future Research

While conducting background research for our study, we were surprised to find that such a well-ingrained tradition as reporting limitations and directions for future research is not addressed in the editorial guidelines of any of the major management journals. In many disciplines, the trend toward standardization of research publications has been quite drastic. For example, editorial policies of the *Journal of the American Medical Association*, *British Medical Journal*, and *Lancet* require that submissions adhere to a very strict structure, ranging from guidelines about how to write abstracts, discussion sections and, in the case of random clinical

trials, whole articles (Doherty & Smith, 1999; Taddio, Pain, Fassos, Boon, Ilersich, & Einarson, 1994). Our field has also witnessed an increased focus on the structural features of journal articles, and particularly the relevance of these features. For example, the *Journal of Applied Psychology* is now requiring that submissions using meta-analytic methodology list all sources (i.e., primary-level studies) that were initially considered but eventually excluded from the meta-analysis as “supplemental material” that is made available online when a manuscript is accepted for publication (e.g., O’Boyle, Forsyth, Banks, & McDaniel, 2012).

A fundamental thesis of our paper is that limitations and directions for future research are important for the advancement of our discipline and, as such, they should be regulated in order to maximize their value. In line with the work of Bartunek and Rynes (2010), who analyzed the content of implications for practice sections and provided suggestions aimed at increasing their usefulness, we offer eight specific suggestions for authors, reviewers, and editors to enhance the value of limitations and directions for future research. We group these guidelines into three categories: (a) Disclosing limitations, (b) describing limitations, and (c) describing directions for future research.

Disclosing Limitations

Guideline #1: Make it a priority. In our study, over a third of 38% of articles did not report any limitation. While this percentage has decreased substantially over the years (from 56% in 1982 to 17% in 2007), all empirical research is flawed to some degree and limitations should therefore be reported in every article published. The presence of self-critical elements within research articles is consistent with the principles of falsificationism as a requirement for robust science and scientific progress (Popper, 1959). Journal editors are certainly in the best position to make sure limitations are mentioned in every empirically-based manuscript.

Guideline #2: Use a separate section. Half of the articles included in our study did not have a separate section identifying limitations. We suggest a mandatory use of separate headings for limitations in the editorial guidelines of journals. This recommendation goes beyond those from usual editorial guidelines such as, for example, the latest edition of the Publication Manual of the American Psychological Association (6th Edition) which only instructs authors to “Acknowledge the limitations of your research, and address alternative explanations of the results” (American Psychological Association, 2009: 36). Our prescription is especially relevant for BPS where only 35% of articles included such a section (compared to 68% for OB). Brutus et al. (2010) ascertained that more limitations are reported when located in separate sections. They also found significant variation in the presence of limitation sections across journal editors, indicating a certain amount of editorial control in this regard. Insisting on a separate section is not only another mechanism for journal editors to draw this information out but it also makes limitations more salient for readers.

Guidelines #3: Specifically ask reviewers to address them. As mentioned earlier, publishing in top journals has become very competitive (Ashkanasy, 2010; Certo et al., 2010) and it is somewhat idealistic, in such a context, to expect authors to expand on information that may jeopardize their chance of publishing their work. Thus, our third recommendation is based on the belief that the reporting of limitations should be treated differently than other sections of manuscripts in the review process. Specifically, we argue that the onus of teasing out the main flaws of manuscripts should belong, for the most part, to reviewers. As stated by Harrison (2002: 1078) “... the main purpose of the review process—to cull the best from the rest—inevitably focuses attention on a paper’s weaknesses”. Reviewers are not only particularly attentive to the adequacy of methods (Gilliland & Cortina, 1997) but, in comparison with authors and editors,

they tend to the most critical issues in their evaluations of articles (VanLange, 1999). Reviewers are selected for their expertise in the manuscript topic and, with the protection provided by anonymity, they are in the best position to bring forward limitations. To channel this information in a systematic fashion, we suggest adding a separate section to reviewer evaluation forms. In this section, reviewers would be asked to list, explicitly, limitations and the extent to which the study is affected by them in terms of substantive conclusions.

Guideline #4: Focus on those weaknesses that matter. Every research effort is limited in multiple ways and, for every manuscript deemed worthy of publication, a discerning set of reviewers will be able to point to multiple threats to every type of validity evidence. As stated previously, it is the role of the review process to bring forward these weaknesses and weigh their importance in light of the contribution of the study. Self-reported limitations, however, should not reflect a comprehensive inventory of a study's weaknesses but rather include those weaknesses that matter most. As such, limitations that matter are not necessarily those which are inherently linked to a methodological choice (e.g., external validity for laboratory study or causality for cross-sectional designs). In our previous guideline we suggested that reviewers bring forward limitations. For our fourth guideline, we suggest that editors, after having considered the opinion of the reviewers, bear the responsibility of prioritizing limitations and directing authors as to which ones to include in their manuscript.

Our first four guidelines pertain to the identification of limitations. We now turn our focus to their formulation and the manner in which they are reported.

Describing Limitations

Guideline #5: Highlight the “so-what.” In addition to describing the shortcomings of the study, limitations statements should distinguish the “what” from the “so-what.” In conducting

our study, we encountered numerous single-sentence descriptions of limitations that were simply not very informative. Limitations need to state not only the shortcomings of a study but also the implications of these shortcomings for the interpretation of the research, and possibly for the area under study in general. For example, it is quite common to encounter statements to the effect that a particular sample characteristic (e.g., student-based, culture-specific) represents a limitation in terms of the generalization of results. However, the particular nature of a sample is not inevitably related to external validity concerns (Highhouse, 2009). If the use of a student or an international sample relates to the phenomenon under study and influence the interpretation of the results the relationship should be explained, and explained well. Once again, the primary responsibility in detailing the nature of limitations and their consequences belongs to the authors but we also see the role of editors as important to ensure that this is done.

Guideline #6: Describe each limitation, do not justify. A very common rhetorical issue in the reporting of limitations consists of describing a weakness but immediately discounting it as an issue that is minor and that does not threaten the interpretation of results. Most of us will recognize statements along the lines of: “The study had limitation X, but X does not really matter that much because of Y and Z.” Recently, Aguinis and Lawal (2012) found that differences between reported and objectively coded limitations are quantitative and not qualitative in nature in that authors do seem to accurately report limitations but do so in a way that lessens their severity. That we encountered a vast number of limitations whose purpose seemed to be one of justification is problematic but not surprising. Again, authors have to establish the credibility of their research endeavor and convince the readers that their results stand despite being limited in some way. However, such a rhetorical exercise should not preclude the provision of a clear description of the impact of the limitation on the interpretation of the study. Here again, we

believe that reviewers and editors should ensure that reported limitations contain the details necessary to make them informative for readers.

Table 9 includes examples of how to implement our suggestions for the formulation of limitations. This table includes examples of typical ways in which self-reported limitations are described in current research. Each of these limitations, included in the column labeled “Currently Reported” suffers from the typical weaknesses we described in the previous sections. In addition, Table 9 includes a separate column labeled “Reported following our guidelines” in which each limitation is re-written following our recommendations. For example, the first limitation refers to internal validity. The text for the currently reported limitation indicates that one (a) cannot infer causality from cross-sectional designs but that (b) it is unlikely that the non-hypothesized directions of the effect has occurred. This information is not useful. In contrast, the same limitation written using our guidelines has greater potential to educate readers as it highlights and explains in relative detail the process by which reverse causality could occur.

[Insert Table 9 about here]

Describing Directions for Future Research

Guideline #7: Focus on immediate and incremental opportunities. Our analysis uncovered many future research directions that were essentially framed as limitations turned inside-out. In many of the studies we analyzed, limitations and directions for future research were presented as two sides of the same coin. The weaknesses of a meaningful research effort will, de facto, also point toward reasonable ways in which to address them or to avenues for future investigations. It may come as no surprise that our results for limitations are almost perfectly mirrored by directions for future research—in fact, Figure 1 shows their parallel progression over time. However, we posit that replicating the same information under both

headings is redundant and not a good use of valuable journal space and reader time. This is not to say that these sections should be merged. Directions for future research are distinct in that they offer a unique opportunity for the authors to share where they believe immediate extensions are required. However, every published study can be the inspiration for dozens of ideas for future research and we suggest that authors frame their suggestions within a relatively short and proximal time frame. Including ideas that are thought to address current gaps in the literature as opposed to ones that are more distal would increase the instrumental value of these sections for readers. Constructive replications, often thought as mundane, should be promoted as they accentuate the cumulative and incremental nature of progress in the behavioral sciences (Shen, Kiger, Davies, Rasch, Simon & Ones, 2011). Suggestions that are projected into the distant future of a particular area are often interesting but not particularly useful if not complemented by actionable, incremental steps.

Guideline #8: Use them as a vehicle for theoretical advancement. Directions for future research offer an opportunity to advance theoretical issues—an opportunity of which few authors take advantage. Specifically, only 11% of the articles in our review included recommendations related to the advancement of theoretical issues. Much attention has recently been given to ways of enriching the theoretical landscape in the organizational sciences (e.g., Corley & Gioia, 2011; Edwards, 2010; Glynn & Rafaelli, 2010). Some authors have hinted that a lack of journal space hinders theoretical contribution. Barley (2006: 18) stated that “a paper is usually too short to provide adequate space for a full accounting of ‘why,’ especially if the primitives, logic, corollaries, and implications of a theory are complex.” We argue that directions for future research should be positioned in relation to theoretical development. The illustrations included in Table 2 highlight the value of such positioning for readers. Ironically, introducing

possible theoretical touchstones in directions for future research could actually help curtail theoretical pluralism and promote theoretical pruning. As stated by Davis (2010: 692), “Without head-to-head competition, there is little Darwinian selection on theories of organizations.” Sections devoted to directions for future research represent an ideal forum for such competition.

Table 10 includes a summary of our proposed guidelines. Overall, we believe that limitations and directions for future research need to be treated somewhat differently from other sections of manuscripts if they are to be truly informative. In the Discussion sections of peer-reviewed publications in management and related fields, we suggest that a separate Limitations section be rooted in the objective characteristics of the study presented ; exposing these limitations should be the shared responsibility of all participants in the peer review process. In the Future Research Directions section, forward-looking ideas should position the study within the context of the broader research domain. These should target incremental change and provide a unique opportunity to enrich our theoretical landscape. Incorporating the aforementioned guidelines with those proposed by Bartunek and Rynes (2010) for Implications for Practice sections, would lead to more informative and impactful discussion sections.

[Insert Table 10 about here]

Role of Limitations and Directions for Future Research in the Training of Researchers

Throughout our article, we have stressed that the uniqueness of self-reported limitations and directions for future research lies in their evaluative nature. These features offer a critical eye on the research presented. Accordingly, they offer great pedagogical value for researchers in training. The critique of empirical papers is a common exercise in graduate school and we propose that a systematic use of these sections in seminars can be a valuable exercise. We offer two specific suggestions based on our review and analysis.

Using limitations to help students understand the research domain. As mentioned in Guideline #4, reported limitations should only be those that matter. The vetting of limitations is done, for the most part, by top experts in the respective area (i.e., authors, reviewers, and editors). One suggestion would be to have students review published papers and, without consulting the reported limitations, offer their own assessment of the study's weaknesses. This calibration exercise, which could be held in class or at professional development workshops at conferences sponsored by the Academy of Management and other organizations, would help students understand how to appraise empirical work and, indirectly, help them contextualize research efforts.

Using directions for future research as a starting point for student research. As is the case for limitations, directions for future research represent research paths that have already been validated and outlined by a minimum of four experts in an area (i.e., at least one author, at least two reviewers, and an editor). These directions could be used more systematically as a genesis for dissertations and student research projects. For example, supervisors could recommend that students look for some echo of their main research propositions in these sections. For that reason it is even more important that, as proposed in Guideline #5, future research directions go beyond simply reporting fixes to certain limitations present in a study.

Limitations of the Present study

Our study is conditioned by three main limitations. First, we used a 25-year time span for our sample. Published research in management began long before 1982, and different trends could have been obtained with a longer window of observation. The implication of our design choice is that our findings for an older discipline such as OB would surely be interpreted differently if embedded within a longer timeframe. Second, the reliance on five key management

journals represents a very selective coverage of management research. A significant portion of management research is published outside these five journals, and yet other research remains unpublished. A more encompassing sample frame could have led to greater variation in the limitations and directions for future research. Another consequence of this restrictive sample choice is that we are missing the many important management sub-disciplines that have emerged over the past 20 years (e.g., entrepreneurship, research methods) and have their own outlets (e.g., *Journal of Business Venturing*, *Organizational Research Methods*). Finally, our coding of methodological choices is partial. A finer grained analysis could have been performed with a more detailed coding of certain aspects of published articles, such as sample characteristics and types of statistical analyses conducted. The key implication of our coding choice is that we are not able to derive additional insights into the process of how key methodological developments in a given field—for example, accounting for endogeneity (Shaver, 1998) in BPS research—have traveled upstream in the research process.

Now, let's consider the extent to which we have described our study's limitations using our own guidelines. First, we did report limitations and included them in a separate section in our Discussion section (i.e., Guideline #1 and #2). Second, we reported those limitations that we think matter (i.e., Guideline #3 and #4). Third, we explained in detail how each of these limitations matter (i.e., Guideline #5). Finally, we refrained from downplaying the seriousness of each limitation (i.e., Guideline #6).

Directions for Future Research

Our research effort is based on features that are the product of a complex and elaborate review process. This process involves multiple steps and, as mentioned at various points in our manuscript, many contributors to the finished product. While the literature on self-critical

elements of discussions has acknowledged the important role played by the review process in the emergence of these sections (Aguinis & Lawal, 2012; Brutus et al., 2010; Brutus & Duniewicz, 2012; Ioannidis, 2007), no research has investigated how these sections are shaped by this process. Future research should focus on the evolution of these two elements, from the submission of the manuscript to its acceptance for publication. A better understanding of how the review process influences limitations and directions for future research could lead to additional prescriptions that are more specific to the various contributors (i.e., authors, reviewers, and editors). It would also be valuable to investigate the actual role of these features for the communication of science. Is there value in continuing to dedicate valuable journal space to these elements when others scientific disciplines, like those in the natural sciences, seem to be progressing without them? While we believe that self-reported limitations and directions for future research can have a significant impact on readers, such claim should be empirically validated. It would be interesting to explore how these sections are used, by readers, to inform and guide their research agendas and if our suggested guidelines help them in doing so. Moreover, falsification remains the foundation of modern scientific thinking (Popper, 1959). We suggest further exploration of how these self-critical mechanisms contribute to the process of theoretical development.

Now, let's consider the extent to which we have described future directions following our own guidelines. First, we reported directions for future research that go beyond a re-formulation of our limitations (i.e., Guideline #7). Second, we offered an implication for theory (i.e., Guideline #8).

CONCLUSION

We began our article by noting the importance of state-of-science studies as platforms that define the boundaries and evolution of a given scientific discipline and critically reflect on the theories and methods available in the respective domain. Our content analysis based on 1,276 articles published over a 25-year period allowed us to uncover values and norms in the field of management, many of them implicit, regarding what is considered high-quality empirical research. Our results reveal that the collective aspirations of management scholars have evolved over time. The standards of what constitutes high-quality research have changed and researchers are more aware of threats to internal, external, and construct validity that compromise the robustness of our results. In other words, we, as a research community, have our eyes clearly set on these issues. Closing the loop, the same features that helped identify these targets (i.e., self-reported limitations and directions for future research) may also play an important role in attaining them. Limitations and directions for future research are, and have always been, a staple in the communication of scientific findings in the social sciences, and a large majority of the empirical articles we content analyzed in our study devoted at least a few lines to describing the study's shortcomings and pointing researchers to promising avenues of research. As a result of our review and analysis, we have proposed a set of guidelines for authors, reviewers, and editors that attempt to circumvent the agency issue with the reporting of these sections. We hope that our guidelines will help maximize the value of these sections so that they can serve as true catalysts for further scientific progress in management and related fields.

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TABLE 1

Articles by Journal, Year of Publication, and Research Domain

Year	Academy of Management Journal		Administrative Science Quarterly		Journal of Management		Journal of Applied Psychology		Strategic Management Journal		TOTAL
	n	%	n	%	n	%	n	%	n	%	
1982	48	20.9	21	20.4	14	10.8	94	16.5	14	10.8	186
1987	26	11.3	15	14.6	27	20.8	88	15.4	27	20.8	187
1992	55	23.9	20	19.4	21	16.2	78	13.7	21	16.2	209
1997	47	20.4	15	14.6	22	16.9	73	12.8	22	16.9	212
2002	23	10.0	16	15.5	26	20.0	108	18.9	26	20.0	224
2007	31	13.5	16	15.5	20	15.4	130	22.8	20	15.4	258
Research Domain											
Business policy and strategy	68	29.6	28	27.2	35	26.9	1	.2	230	95.0	362
Organizational theory	29	12.6	37	35.9	8	6.2	0	0	0	0	74
Organizational behavior	89	38.7	25	24.3	61	46.9	336	58.8	3	1.2	514
Human resource management	40	17.4	11	10.7	15	11.5	104	18.2	1	0.4	171
Other research domains	4	1.7	2	1.9	11	8.5	130	22.8	8	3.3	155
TOTAL	230		103		130		571		242		1,276

TABLE 2

Taxonomy Used and Illustrations of Articles Included in the Content Analysis

INTERNAL VALIDITY	EXTERNAL VALIDITY	CONSTRUCT VALIDITY	STATISTICAL CONCLUSION VALIDITY	THEORY ISSUES
<p><i>Determination of cause-and-effect, and the rejection of alternative explanations.</i></p> <p><u>Illustration of limitation</u></p> <p>“First, the data in this study are entirely cross-sectional in nature. Although in the analyses we controlled a number of variables (e.g., environmental uncertainty and industry) that might be alternative reasons for the effects, it will be enlightening for future studies to employ a longitudinal design and examine whether the effects of founder-CEOs’ personal values change across time in the same organization.” (Ling, Zhao, & Baron, 2007: 691)</p> <p><u>Illustration of direction for future research</u></p> <p>“Future studies might also productively examine the role that other types of interfirm linkages, such as director interlocks, alliance networks, and executive migration (Boeker, 1997; Davis, 1991; Gulati, 1995) play in promoting the social learning of adaptive responses to environmental change.” (Kraatz, 1998: 639–640)</p>	<p><i>Extent to which the results generalize across time, settings, and individuals.</i></p> <p><u>Illustration of limitation</u></p> <p>“One of the major limitations of this study is that we have looked only at a single industry. Perhaps CEOs in more turbulent and uncertain industries such as software and semiconductors may be less given to favoritism.” (Miller, Droge, & Vickery, 1997: 164)</p> <p><u>Illustration of direction for future research</u></p> <p>“Future research should examine individual differences and agency controls in organizational settings because such settings do not face the same constraints as laboratory studies; for example, monitoring in a field setting can be tied to negative consequences.” (Fong & Tosi, 2007: 175)</p>	<p><i>Fit between the measures employed and the constructs that they purport to represent.</i></p> <p><u>Illustration of limitation</u></p> <p>“One could also suggest that a third possible limitation is that the present performance related findings are merely an artifact of the type of performance instrument used. That is, it is possible that employees who are psychologically well are simply ‘nicer’ people and more fun to be around.” (Wright & Bonett, 2007: 155)</p> <p><u>Illustration of direction for future research</u></p> <p>“Future research adopting the construct of effort costs should elaborate on our findings by developing and employing a more extensive measure of effort costs to ensure adequate domain coverage.” (Whitaker, Dahling, & Levy, 2007: 588)</p>	<p><i>Capacity to make inferences based on the statistical evidence presented.</i></p> <p><u>Illustration of limitation</u></p> <p>“As for study limitations, first, we did not get the level of support for our hypotheses we had anticipated. Even with 169 subjects, this is partly a function of statistical power.” (Tompson & Werner, 1997: 596)</p> <p><u>Illustration of direction for future research</u></p> <p>“[...] future research must examine the relationship of empowerment to other outcomes including behavioral outcomes, such as creativity and organizational citizenship, and to organizational outcomes, such as absenteeism, quality, or customer satisfaction (Bowen & Lawler, 1992). More sophisticated analyses, such as structural equations modeling, that examine the different dependent variables simultaneously, are also warranted.” (Spreitzer, Kizilos, & Nason, 1997: 700)</p>	<p><i>These issues arise when the adoption or integration of a different theoretical lens could yield an alternative or more comprehensive explanation of the phenomenon under study.</i></p> <p><u>Illustration of limitation</u></p> <p>“This study has important limitations. The Miles and Snow strategic typology is clearly not the most elaborate framework that could have been chosen, but was appropriate for this exploratory study in which it was important to identify strategic ‘opposites’ in an array of industries.”(Hambrick, 1982: 174)</p> <p><u>Illustration of direction for future research</u></p> <p>“Finally, although our findings inform on the theory of other orientation, additional research is needed to expand this theory. For example, although we focused on individual differences in other orientation, research also suggests that context can stimulate other orientation (Batson, 1990). Thus, future research should consider situational influences on other orientation and thus on attitude formation and change.” (Meglino & Krosgaard, 2007: 79)</p>

TABLE 3**Articles by Journal and Location of Self-Reported Limitations and Directions for Future Research**

SECTION	Academy of Management Journal		Administrative Science Quarterly		Journal of Management		Journal of Applied Psychology		Strategic Management Journal		TOTAL^a
	n	%	n	%	n	%	n	%	n	%	
Separate section labeled “Limitations”	56	24.3	10	9.7	15	11.5	82	14.4	24	9.9	187
Separate section labeled “Future Research”	12	5.2	11	10.7	6	4.6	51	8.9	22	9.1	102
Separate section labeled “Limitations and Future research”	35	15.2	4	3.9	12	9.2	50	8.8	23	9.5	124
Embedded in Discussion section	127	55.2	78	75.8	97	74.6	388	67.9	173	71.5	863

Note. ^a Combined totals are greater than 1,276 because some articles had both a “Limitation” and a “Future Research” section.

TABLE 4

Articles by Methodological Choices and Research Domain

METHODOLOGICAL CHOICES	Business Policy and Strategy		Organizational Theory		Organizational Behavior		Human Resource Management		Other Research Domains	
	n	%	n	%	n	%	n	%	n	%
Study setting										
Laboratory	20	5.9	10	13.7	136	28.2	51	32.5	58	39.5
Field	317	93.5	62	84.9	337	69.9	104	66.7	72	49.0
Simulation	2	.6	1	1.4	6	1.2	0	0	17	11.6
Design type										
Passive observation	132	38.9	25	34.9	283	58.7	83	53.2	48	32.7
Experiment	5	1.5	2	2.7	126	26.1	45	28.8	61	41.5
Case study	9	2.7	5	6.8	4	.8	2	1.3	1	.7
Archival	188	55.5	39	53.4	61	12.7	24	15.4	24	16.3
Other	5	1.5	2	2.7	8	1.7	1	1.5	0	0
Temporal perspective										
Cross-sectional	146	43.1	34	46.6	334	69.3	107	68.6	96	65.3
Longitudinal	180	53.1	34	46.6	104	21.6	37	23.7	26	17.7
Cohort	2	.6	2	2.7	6	1.2	3	1.9	0	0
Other	11	3.2	3	4.1	0	0	2	3.0	1	5.9
Data analysis										
Quantitative	289	85.3	64	87.7	421	87.3	140	89.7	131	89.1
Qualitative	50	14.7	9	12.3	61	12.7	16	10.3	16	10.9
TOTAL	339		73		482		156		147	1,197
<i>Multiple/different methods</i>	24		1		32		14		8	79

TABLE 5

Self-Reported Limitations by Research Domain

	Business Policy and Strategy		Organizational Theory		Organizational Behavior		Human Resource Management		Others		
<i>Number of articles</i>	362		74		514		171		155		
LIMITATIONS	n	%	n	%	n	%	n	%	n	%	Total
Internal validity	151	41.7	21	28.4	290	56.4	85	49.7	12	7.7	559
External validity	144	39.8	34	45.9	256	49.8	74	43.3	10	6.4	518
Construct validity	102	28.2	15	20.3	220	42.8	65	38.0	8	5.2	410
Statistical conclusion validity	18	5.0	1	1.4	56	10.9	19	11.1	1	0.6	95
Theoretical issues	12	3.3	6	8.1	18	3.5	4	2.3	0	0	40
TOTAL	427		77		840		247		31		1,622

Note. Average number of limitations per article is 1.18 for business policy and strategy, 1.05 for organization theory, 1.63 for organizational behavior, and 1.44 for human resources management. n: number of articles with each type of limitation, %: percentage of articles with each type of limitation.

TABLE 6

Directions for Future Research by Research Domain

	Business Policy and Strategy		Organizational Theory		Organizational Behavior		Human Resource Management		Others		
<i>Number of articles</i>	362		74		514		171		155		
FUTURE RESEARCH	n	%	n	%	n	%	n	%	n	%	Total
Internal validity	201	55.5	32	43.2	340	66.1	89	52.0	9	5.8	671
External validity	117	32.3	30	40.5	170	33.1	64	37.4	4	2.6	385
Construct validity	65	18.0	17	23.0	124	24.1	42	24.6	5	3.2	253
Statistical validity	5	1.4	1	1.4	24	4.7	7	4.1	1	0.6	38
Theoretical avenues	31	8.6	15	20.3	42	8.2	23	13.5	3	1.9	114
TOTAL^a	419		95		700		225		22		1,461

Note. Average number of directions for future research per article is 1.16 for business policy and strategy, 1.28 for organization theory, 1.36 for organizational behavior, and 1.32 for human resources management. n: number of articles with each type of direction for future research, %: percentage of articles with each type of direction for future research.

TABLE 7

Phi Coefficients between Methodological Choices and Frequency of (a) Self-Reported Limitations and (b) Directions for Future Research

	Limitations					Directions for Future Research				
DESIGN	Internal Validity	External Validity	Construct Validity	Statistical Conclusion Validity	Theoretical Issues	Internal Validity	External Validity	Construct Validity	Statistical Conclusion Validity	Theoretical Issues
Setting										
Laboratory	-.07*	.02	-.11**	-.03	-.07*	-.07	.00	-.09**	-.05	-.08**
Field	.09	.00	.13**	.04	.07*	.10**	.02	.10**	.05	.09**
Simulation	-.06	-.06*	-.06*	-.02	-.03	-.11**	-.06*	-.06*	.01	-.03
Type										
Passive observation	.12**	.07*	.23**	.09**	.02	.07*	.07*	.10**	.05	.04
Experiment	-.07*	-.02	-.14**	-.07*	-.07	-.07*	-.03	-.10**	-.05	-.09**
Case study	-.04	.00	-.02	-.01	.01	.06*	.04	.00	-.02	.02
Archival	-.05	-.04	-.11**	-.02	.02	.00	-.05	-.02	.01	.02
Temporal perspective										
Cross-sectional	.04	.05	.07*	.02	-.01	-.04	.03	.02	.00	-.02
Longitudinal	.00	-.01	-.04	-.04	.01	.07*	.01	-.02	-.06	.00
Cohort	.01	.05	-.02	.00	-.01	-.03	.02	.01	-.02	-.01
Data analysis										
Quantitative	.04	.00	.03	.07	-.01	-.02	.02	.00	-.03	.00
Qualitative	-.04	.00	-.03	-.07	.01	.02	-.02	.00	.03	.00

Note. $N = 1,197$, $p < .05$, ** $p < .01$

TABLE 8**Summary of Research on Self-Reported Limitations in Various Disciplines**

Study characteristics	Present study	Aguinis & Lawal (2012)	Brutus & Duniewicz (2012)	Brutus, Gill, & Duniewicz (2010)	Ioannidis (2007)
Specialty area	Management	Entrepreneurship	Leadership	Industrial-Organizational Psychology	Natural Sciences
Journal(s)	AMJ, ASQ, JAP, JOM, SMJ	Journal of Business Venturing	Leadership Quarterly	AMJ, JAP, Personnel Psychology	Science, Nature, Proceedings of the National Academy of Sciences, Journal of Biological Chemistry, Physical Review Letters, Journal of the American Chemical Society, PLoS Biology, PLoS Medicine
Number of articles coded	1,276	175	174	2,402	400
Years included	1982, 1987, 1992, 1997, 2002, 2007	2005-2010	1990 to 2007	1995 to 2008	2005
Total time span	25 years	5 years	15 years	14 years	1 year

TABLE 8 (Cont'd)

Summary of Research on Self-Reported Limitations in Various Disciplines

Study characteristics	Present study	Aguinis & Lawal (2012)	Brutus & Duniewicz (2012)	Brutus, Gill, & Duniewicz (2010)	Ioannidis (2007)
Percent of articles with at least one limitation	62.5%	82.9%	88.5%	75.0%	16.7%
Average number of limitations per article	1.27	1.94	2.3	1.66	N/A
Percent of articles with limitations addressing ^a					
Internal validity	43.8% (↑)	36.9%	27.6% (↑)	41.1%	N/A
External validity	40.5% (↑)	33.3%	63.8%	36.6% (↓)	N/A
Construct validity	32.1% (↑)	26.0%	31.0%	37.6%	N/A
Statistical conclusion validity	7.4%	3.8%	51.7%	20.4% (↑)	N/A
Theory issues	3.1%	N/A	N/A	N/A	N/A

Note. AMJ: Academy of Management Journal, ASQ: Administrative Science Quarterly, JAP: Journal of Applied Psychology, JOM: Journal of Management, PLoS Biology: Public Library of Science Biology, PLoS Medicine: Public Library of Science Medicine, SMJ: Strategic Management Journal. N/A: issue not addressed in this particular study. ↑ and ↓ denote statistically significant upward and downward trends over time, respectively.

TABLE 9

Illustrations of How Limitations Are Currently Reported and How They Should Be Reported Based on Our Suggested Guidelines

	Currently Reported	Reported Following our Guidelines
<i>Internal Validity</i>	The cross-sectional nature of our design makes it difficult to infer a causal relationship between job characteristics and employee well-being.	One limitation in our study is that we cannot rule out the possibility of fatigue influencing the self-report of work characteristics, a reversed causality effect. The influences of mental and physical fatigue on psychological states are pervasive and well-established in the literature. It is thus possible that fatigue led to the emergence of some job characteristics.
<i>External Validity</i>	One limitation in our study is that we focus only on one interfirm collaboration type, namely collaborations in which firms share physical assets such as plants or distribution networks.	The fact that our study examines interfirm collaborations focusing on the sharing of physical assets (e.g. plants, distribution networks, etc.) is likely to affect the generalizability of our findings to interfirm collaborations that focus on learning or the exchange of skills and knowledge.
<i>Construct Validity</i>	One limitation of our study is that we proxied firm performance through the abnormal stock market return following merger announcements.	The interpretation of our results is constrained by our measure for firm performance (i.e., abnormal stock market return). Because post-merger integration tends to be complex and take time, this measure does not allow drawing any conclusions about the long term performance impact of such events.
<i>Statistical Conclusion Validity</i>	The regression analyses were sensitive to the effects of measurement error. However, the coefficients were statistically significant, thereby providing support for the hypothesized relationships.	The regression analyses were sensitive to the effects of measurement error. Specifically, measurement error decreases observed coefficients in relationship to their true (population) counterparts. Thus, the fact that our results showed that the coefficients are statistically significant imply that the population effects are likely even larger than the ones we report in our tables.

TABLE 10

Summary of Suggested Guidelines for Limitations and Direction for Future Research

Disclosing Limitations

1. **Guideline #1: Make it a priority.** Journal editors should ensure that limitations are reported in every empirically-based article. (E)
2. **Guideline #2: Use a separate section.** Separate headings for limitations should be mandatory in the editorial guidelines of journals. (E)
3. **Guidelines #3: Specifically ask reviewers to address them.** Reviewers should be asked to list, explicitly, limitations and the extent to which the study is affected by them in terms of substantive conclusions. (R)
4. **Guideline #4: Focus on those weaknesses that matter.** Self-reported limitations should reflect those weaknesses that matter most. (R, E)

Describing Limitations

5. **Guideline #5: Highlight the “so-what.”** Limitations need to state not only the shortcomings of a study but also the implications of these shortcomings for the interpretation of the research. (A, E)
6. **Guideline #6: Describe each limitation, do not justify.** Limitations should provide a clear description of how they affect the interpretation of the results. (A, R, E)

Describing Directions for Future Research

7. **Guideline #7: Focus on immediate and incremental opportunities.** Directions for future research should be framed within a relatively short and proximal time frame. (A)
 8. **Guideline #8: Use them as a vehicle for theoretical advancement.** Directions for future research should be positioned in relation to theoretical development. (A)
-

Note. The individual(s) who is primarily responsible for the implementation of each guideline is found in parenthesis. E: Editor, R: Reviewers, and A: Author

FIGURE 1

Self-Reported Limitations and Directions for Future Research Over Time

