11-5-2008

The Researcher as a Consumer of Scientific Publication: How Do Name-Ordering Conventions Affect Inferences About Contribution Credits?

Boris Maciejovsky

David V. Budescu

Dan Ariely

Research Note

The Researcher as a Consumer of Scientific Publications: How Do Name-Ordering Conventions Affect Inferences About Contribution Credits?

Boris Maciejovsky

Imperial College Business School, Imperial College, London SW7 2AZ, United Kingdom,
b.maciejovsky@imperial.ac.uk

David V. Budescu

Department of Psychology, University of Illinois, Champaign, Illinois 61820, and
Department of Psychology, Fordham University, Bronx, New York 10458, budescu@fordham.edu

Dan Ariely

Fuqua School of Business, Duke University, Durham, North Carolina 27708,
dandan@duke.edu

When researchers from different fields with different norms collaborate, the question arises of how name-ordering conventions are chosen and how they affect contribution credits. In this paper, we answer these questions by studying two disciplines that exemplify the two cornerstones of name-ordering conventions: lexicographical ordering (i.e., alphabetical ordering, endorsed in economics) and nonlexicographical ordering (i.e., ordering according to individual contributions, endorsed in psychology). Inferences about credits are unambiguous in the latter arrangement but imperfect in the former, because alphabetical listing can reflect ordering according to individual contributions by chance.

We contrast the fields of economics and psychology with marketing, a discipline heavily influenced by both. Based on archival data, consisting of more than 38,000 journal articles, we show that the three fields have different ordering practices. In two empirical studies with 351 faculty and graduate student participants from all three disciplines, as well as in a computer simulation, we show that ordering practices systematically affect and shape the allocation of perceived contributions and credit. Whereas strong disciplinary norms in economics and psychology govern the allocation of contribution credits, a more heterogeneous picture emerges for marketing. This lack of strong norms has detrimental effects in terms of assigned contribution credits.

Introduction

Social norms and conventions establish implicit rules of conduct that facilitate and coordinate social interactions (Akerlof 2007, Elster 1989, Sherif 1966). Applications range from food sharing among small-scale societies (Kaplan and Hill 1985) to demand for free consumer products (Shampanier et al. 2007) and personalized recommendations (Kramer et al. 2007) permeating private and professional life. In academia, social norms provide guiding standards for academic integrity and methodological practices. Norms also govern more mundane areas, such as refereeing for academic journals or deciding on the ordering of author names in academic publications.

Two recent trends highlight the importance of name ordering. First, many disciplines have noted a steady increase in collaborations, resulting in a sharp rise of multiauthored publications (e.g., Hudson 1996, Mendenhall and Higbee 1982) and higher citation rates (Wuchty et al. 2007). Second, the higher rate of interdisciplinary collaboration (e.g., Morillo et al. 2003) often leads to publications in journals different from the main outlets of an author's "home" discipline. When collaborators from different fields with different conventions determine name ordering, they can either accept a convention of one of the fields or create a new convention. In either case, inferences about contribution credits are imperfect for a number

of reasons:

1. Scientific disciplines cannot, and are not expected to, formally enforce their prevalent ordering conventions. Although the majority of researchers follow the customary norms, some researchers use different conventions.

2. Whereas inference about relative contributions for nonalphabetically ordered papers is unambiguous, alphabetical listing of authors can either reflect equal contributions or relative contributions when the names reflect alphabetical order by chance.

3. Attribution ambiguity becomes progressively more important with the growth in interdisciplinary research, the rising number of publications in multidisciplinary journals, and the increase of citations across disciplinary boundaries.

4. Attribution ambiguity may also affect how individual researchers are evaluated. Authors involved in collaborative work may use multiple name-ordering conventions in their scientific publications (i.e., using both alphabetical and nonalphabetical orderings), which might cause them to be penalized if they are evaluated according to the prevalent norms of their "home discipline."

In this paper we investigate the question of name-ordering conventions—and inferred contribution credits—from the perspective of new and emerging fields. We consider two disciplines that exemplify the two cornerstones of name-ordering conventions in scientific publications: alphabetical name ordering (endorsed in economics) and nonlexicographical ordering, according to individual contributions (endorsed in psychology). We study how name-ordering conventions are shaped in a relatively young and emerging field—marketing—a discipline strongly influenced by the research culture of both economics and psychology (Simonson et al. 2001). Deciding about the name ordering on scientific publications is not only a question of which conventions or social norms to invoke. It also signals how researchers decide to "market" themselves. From this perspective, this paper can be seen as an attempt to understand how the consumers of scientific research, i.e., fellow academics, view and evaluate authors' marketing efforts.

To illustrate the differential name-ordering conventions, we asked 163 faculty members from all three disciplines (economics, marketing, and psychology) to participate in a survey ranking of the top journals in their respective disciplines. The selection of journals presented was based on previously published journal rankings (see Stigler et al. 1995, for economics; Hult et al. 1997 and Tellis et al. 1999, for marketing; and Burgard 2001, for psychology).

Those journals (see Table 1 for a complete listing) that received at least 80% agreement were included

Table 1   Frequency of Alphabetical Name Ordering as a Function of the Academic Discipline and the Number of Authors

No. of authors	Economics				Marketing				Psychology			
	Frequency	Frequency of alphabetic order	Percentage of alphabetic order		Frequency	Frequency of alphabetic order	Percentage of alphabetic order		Frequency	Frequency of alphabetic order	Percentage of alphabetic order	
			O_i	E_i			O_i	E_i			O_i	E_i
1	8,676 (56.25%)	—	—	—	2,812 (45.90%)	—	—	—	6,756 (40.30%)	—	—	—
2	5,328 (34.54%)	4,773	89.58	50.00	2,120 (34.61%)	1,276	60.19	50.00	5,445 (32.48%)	2,704	49.66	50.00
3	1,229 (7.97%)	996	81.04	16.67	1,010 (16.49%)	333	32.97	16.67	2,674 (15.95%)	500	18.70	16.67
4	166 (1.08%)	122	73.49	4.17	148 (2.42%)	36	24.32	4.17	1,125 (6.71%)	77	6.84	4.17
5	19 (0.12%)	13	68.42	0.83	22 (0.36%)	6	27.27	0.83	446 (2.66%)	12	2.69	0.83
6	2 (0.02%)	0	0	0.14	8 (0.13%)	0	0	0.14	149 (0.89%)	9	6.04	0.14
>6	4 (0.03%)	0			6 (0.10%)	1			170 (1.01%)	5		
Total	15,424	5,904	87.49	42.65	6,126	1,652	49.85	37.33	16,765	3,307	33.04	32.72

Notes. O_i denotes the observed percentage of alphabetically ordered author names, whereas E_i denotes the probability in percent that alphabetic order occurs purely by chance. The value in column "E_i," row "Total," denotes the conditional probability.

Prob(alphabetical | No. of authors) ∗ Prob(No of authors).

For economics, we included the *American Economic Review*, *Econometrica*, *Quarterly Journal of Economics*, *Journal of Political Economy*, and *Journal of Economic Theory*. For psychology, we included *Psychological Review*, *Journal of Experimental Psychology*: *General* (1975–), *Journal of Personality and Social Psychology*, *Psychological Science* (1990–), *American Psychologist*, and *Cognitive Psychology*. For marketing, we included the *Journal of Marketing Research*, *Journal of Marketing*, *Journal of Consumer Research* (1974–), and *Marketing Science* (1991–).

in our analysis, and all scientific articles published in these journals between January 1973 and December 2005 (except if noted otherwise) were downloaded from the Social Sciences Citation Index (SSCI). This generated a data set of 38,315 articles (16,765 in psychology; 15,424 in economics; 6,126 in marketing).

Table 1 shows the frequency of alphabetical name ordering as a function of the number of authors for economics, marketing, and psychology. The rate of alphabetical name ordering in multiauthored papers ranges from 33% in psychology to 87% in economics. As expected, marketing assumes an intermediate position with a rate of 50%. We compared the expected (E_i) and the observed (O_i) percentages of alphabetical name ordering for papers with i authors (i ranging from two to six) for the various disciplines. The prevalence of alphabetical name ordering exceeds chance level by a factor of two in economics (see the row "Total"). A substantially different picture emerges in psychology, where the prevalence of alphabetical name ordering closely matches the expectation. Marketing is in between these two extremes.

Analyzing the prevalence of alphabetical name ordering across years by discipline (see Figure A1 in the Technical Appendix, which can be found at http://mktsci.pubs.informs.org) reveals a higher variance for marketing, which might reflect the existence of different research traditions (behavioral versus quantitative) *within* the field. For instance, outlets that specialize in behavioral research might show ordering patterns that closely correspond to the existing norms of psychology, whereas others that specialize in quantitative research might correspond to the norms of economics. We find some directional support for this conjecture with respect to the behavioral tradition, but no support for the quantitative tradition.

The differential name-ordering conventions in economics and psychology are reflected in the disciplines' research on this topic. In psychology, researchers emphasize the importance of visibility, inferred from author positions, as the driving motivation for non-lexicographical ordering (Over and Smallman 1973). In economics most efforts have been devoted to identifying conditions under which alphabetical name ordering is attainable (Engers et al. 1999, Joseph et al. 2005, Laband and Tollison 2006). Recent research by Einav and Yariv (2006), however, has shown that researchers in economics with names earlier in the alphabet were more successful professionally. They suspect this finding to be linked to the prevalence of alphabetical name ordering in economics.

Previous research has identified differential norms of name orderings used in distinct academic fields, and the conditions under which they are sustainable, but not much is known about the "consumers"

of academic output and the meaning they assign to name orderings. How do they perceive the contributions of individual authors, and what are the potential factors that shape and influence these inferences? Understanding these factors is of crucial importance for the evaluation of individual scientific output (e.g., grants, promotions, awards) as well as for the motivation of the researchers in a given project. We address these questions in three studies.

Study 1: Allocation of Contribution Credit

We study whether scholars in economics, marketing, and psychology departments endorse the prevalent conventions of their discipline when assigning contribution credit.

Method

Two hundred forty-seven faculty members and advanced graduate students from economics ($n = 45$), marketing ($n = 150$), and psychology ($n = 52$) participated in an Internet study (80% of the participants held tenure track or tenured positions, and the median rank was assistant professor).[1] Participants were presented with two lists of authors, displayed side by side on the screen. In each list, one name (the target author) was highlighted, and the participants were asked to compare the contribution credit that the two authors deserve. First, they were asked to identify the target author that deserves more credit (or to indicate that both deserve equal credit). Next, they were asked for the relative contribution of each target author on a scale from 0% to 100% (for cases of equal contribution, this question was posed only once, applying to both authors).[2]

The lists of authors consisted of one to four names. In case of multiple authors, we presented the lists either in alphabetical or nonalphabetical order, and the target authors could assume positions 1 to 4. Overall, we designed 19 different name listings, resulting in 171 distinct pairs. A screen shot of the task is shown in Figure 1, and a complete listing of names can be found in the Technical Appendix (Table A1), located at http://mktsci.pubs.informs.org.

The author names were randomly sampled from a list of common British names (to eliminate prior opinions about particular researchers) and the coauthors from a list of real author names, obtained from

---

[1] Findings in this study, and in study 3, remain qualitatively unchanged when the group of graduate students is removed from the analyses. However, because of lower statistical power, some significant findings become insignificant.

[2] We used an abstract setting to isolate the role of norms in the contribution process, and acknowledge that the effect size of our findings might be different when using more realistic judgments.

Figure 1   Schematic Screen Shot of Study 1


the initial study. We instructed participants to assume that the papers being compared were published in the same high-quality journals and that the lists of authors were hypothetical. Participants were asked to complete at least one block of 25 comparisons, but could complete more than one block. Incentives were provided by holding weekly lotteries raffling $100 coupons for Amazon.com, with the probability of winning proportional to the number of blocks completed. On average, respondents performed 29.77 comparisons.

Results and Discussion

We analyzed a total of 7,234 pairs of authors (4,544 by marketing scholars; 1,702 by psychologists, and 988 by economists). We included all respondents, who answered at least 15 pairs of lists. Applying the Bradley-Terry-Luce (BTL) choice model (Bradley and Terry 1952, Luce 1959) to the respondents' preferences, we estimated the scale values for the 19 target authors. The normalized solutions are displayed in Figure 2. We fixed the scale value for a single-authored paper to unity in all cases. Thus, the values plotted represent credit assigned to a certain position in a multiauthored paper relative to a single-authored paper. Note that the values inferred from the psychologists' judgments span a wider range, and are considerably lower, than the other two disciplines, indicating that (a) psychologists differentiate more carefully between the various positions, and (b) they value single-authored papers more than the other two disciplines.

Figure 2   Normalized Parameter Estimates of the 19 Author Lists by Academic Discipline (Study 1)
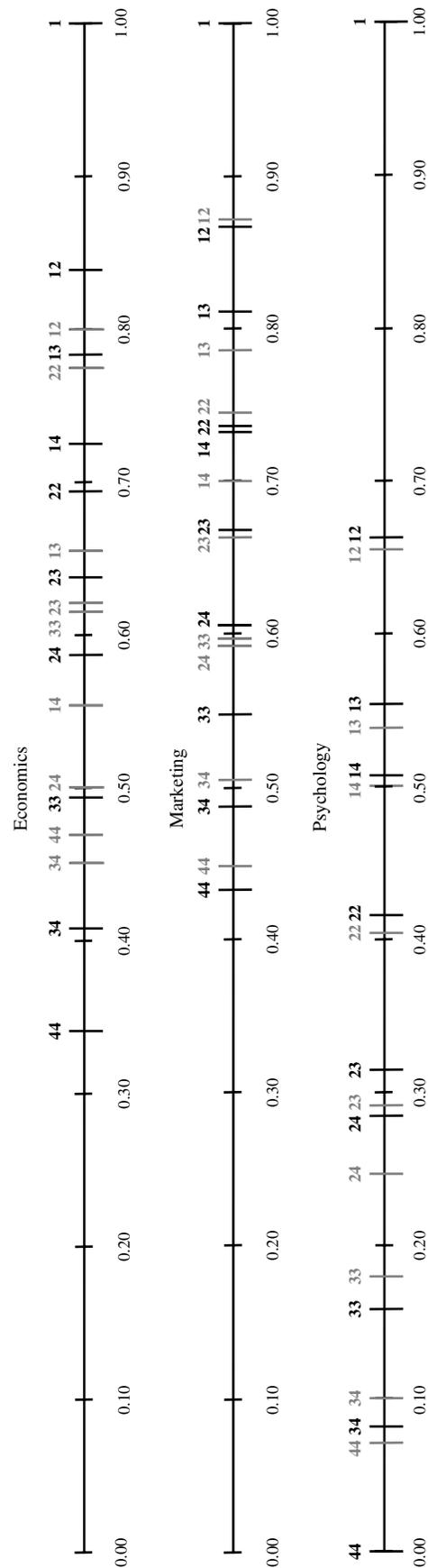
Notes. 1 denotes single-authored papers. Alphabetically ordered papers are depicted in grey and nonalphabetically ordered papers in black. Papers are identified by an ordered pair of numbers. The first digit denotes the author position, and the second digit identifies the total number of authors. For example, an alphabetically (nonalphabetically) ordered paper with two authors, in which the target author assumes position 1, is denoted by 12 (12).

Table 2   Regression Analysis of the 19 Estimated Scale Values (Study 1)

Variables	Zero-order correlations	Standardized coefficients	t (df = 44)	General dominance
Economist	0.25	−0.16	−2.30*	0.026
Psychologist	−0.65	−0.38	−5.43*	0.211
Authors	−0.49	−0.22	−5.54*	0.111
Position	−0.66	−0.58	−10.69*	0.224
Alphabetical	−0.01	−0.04	−0.36	0.015
Authors × Alphabetical	−0.12	−0.23	−1.91	0.017
Position × Alphabetical	−0.22	0.31	4.27*	0.029
Economist × Position	0.06	0.06	0.83	0.022
Psychologist × Position	−0.82	−0.38	−5.16*	0.317
Model's R^2				0.971

*$p < 0.05$.

Although there is high agreement in the ordering across disciplines, systematic differences are observed. Psychologists ordered the name listings lexicographically according to (a) the target author's position and (b) the total number of coauthors. This ordering identifies nine distinct clusters (starting with the first author in a pair and ending with the last author in a group of four). Each of these clusters includes two scenarios that vary in their (alphabetical and nonalphabetical) ordering (being first of two authors, being first of three authors , ... , being fourth of four authors). No systematic ordering within these pairs was found, confirming the hypothesis that psychologists do not pay attention to this distinction. On the other hand, economists assign credit differentially for alphabetical and nonalphabetical orderings of authors. They cluster all positions under alphabetical ordering together but reproduce the psychologists' differentiation for nonalphabetical ordering. The marketing solution is quite similar to psychology, with a few deviations from the lexicographical ordering that, in most cases, are consistent with the economists' judgments.

We regressed these estimates on the following explanatory variables: number of "authors" 1, 2, 3, 4; "position" of the target author 1, 2, 3, 4; and the dummy variables "alphabetical" ordering (1 = yes, 0 = no), "economist" (1 = yes, 0 = no), and "psychologist" (1 = yes, 0 = no); and interactions between these variables. The model selected includes only those interactions that contributed significantly to the fit. Table 2 presents the correlation coefficients and the standardized regression coefficients of all nine predictors.

The regression results indicate a systematic and highly predictable pattern (Adjusted $R^2 = 0.97$, $F(9; 44) = 161.58$, $p < 0.05$) and confirm our impressions from the BTL analysis. We observe significant differences between the disciplines (lower contributions for psychologists) and, not surprisingly,

significant effects for the number of authors and their position in the author list.[3] A significant interaction between the position of an author and the name ordering of the paper suggests that when the names are ordered alphabetically the assigned contribution credit is higher for later positions. More important for our purposes, we found an interaction between the position and the academic discipline of psychology, indicating that psychologists strongly discount the contribution of authors whose names appear in later positions.

A dominance analysis (Azen and Budescu 2003, Budescu 1993) performed to identify the predictors' contributions to the overall fit (based on comparisons among them in all subset regressions) indicates that the author's position, the distinction between psychologists and the other disciplines, and the interaction of these two factors account for the largest share of the variance in the model (see the last column of Table 2).

We also analyzed the average contributions assigned by the three academic disciplines, as a function of the name ordering (alphabetical in the top panel and nonalphabetical in the bottom panel) and the number and position of authors (see the Technical Appendix, located at http://mktsci.pubs.informs.org, Figure A2). Although economists tend to assign equal contributions to all authors in the case of alphabetical name ordering, they display a slight decrease in credit for authors in later positions. In the case of nonalphabetical name ordering, however, the three disciplines show very similar patterns, suggesting a strong first-author advantage and relatively steep discounting of contributions in later positions.

Next, we analyze the first-author advantage across disciplines. To achieve comparability across differential numbers of authors, we divided the assigned contributions by the expected contributions, assuming that all authors contributed equally (i.e., 50% for two-authored papers, 33.3% for three-authored papers, and 25% for four-authored papers). This value is greater than one in all cases (grand mean = 1.33, SD = 0.22), suggesting that it always pays to be the lead author. We performed a three-way analysis of variance with the factors "academic discipline" (economics, marketing, psychology), "number of authors" (2, 3, 4), and "name ordering" (alphabetical, nonalphabetical) on this measure and found significant main effects for academic discipline ($F(2; 162) = 52.74$, $p < 0.05$, $\eta^2 = 0.39$), number of authors ($F(2; 162) = 102.67$, $p < 0.05$, $\eta^2 = 0.56$), and name ordering ($F(1; 162) = 40.41$, $p < 0.05$,

---

[3] In a similar vein, Stremersch et al. (2007) found that author visibility, as captured—among other things—by the number of coauthors, predicts citation counts for marketing articles.

$\eta^2 = 0.20$). We observed a significant two-way interaction between discipline and number of authors ($F(4; 162) = 9.13$, $p < 0.05$, $\eta^2 = 0.18$), suggesting that as the number of authors increases, the perceived difference in the first-author advantage between economists and psychologists increases (see the Technical Appendix, located at http://mktsci.pubs.informs.org, Figure A3a). Another two-way significant interaction between discipline and name ordering ($F(2; 162) = 13.58$, $p < 0.05$, $\eta^2 = 0.14$) indicates that the perceived advantage of being first author is more pronounced in cases with nonalphabetical ordering (psychologists are insensitive to this factor, as shown in the Technical Appendix, located at http://mktsci.pubs.informs.org, Figure A3b). Marketing is between economics and psychology, showing considerably less differentiation of assigned contribution credits.

In summary, study 1 showed that researchers apply their respective disciplinary conventions when deciding about contribution credits. Next we report results of a computer simulation designed to explore potential implications of these findings.

Study 2: Computer Simulation

We seek to determine how economists, marketing researchers, and psychologists would assess the aggregate contribution credits of colleagues from their own and from neighboring disciplines. To compare the contribution credits of authors within their own discipline, and across fields, we performed a computer simulation in which we applied the inferred contribution weights from study 1 to the empirical distribution of author names and papers identified in our initial survey.

Method

The simulation was programmed in Matlab and consisted of the following steps:

Step 1(a). Select the discipline of the target author (economics, marketing, or psychology).

Step 1(b). Select the discipline of the evaluator (economics, marketing, or psychology).

Step 2. Randomly draw a surname initial from the distribution of author names of the particular discipline chosen in Step 1(a). The distributions of surname initials were based on the journals selected in our initial survey for the time period 1973 to 2005. It consisted of 34,561 author names in psychology, 23,820 names in economics, and 10,874 names in marketing.

Step 3. Given the empirical distribution of single-authored papers, two-authored papers, three-authored papers, and four-authored papers (see Table 1), as well as the distribution of alphabetical and nonalphabetical orderings, k papers are drawn at random for

Table 3 Mean Simulated Contribution Credits as a Function of the Author's Discipline and the Evaluator's Discipline (Study 2)

Candidate from	Evaluator from			
	Economics	Marketing	Psychology	Mean
Economics	31.21[b]	29.34	31.99	30.85
Marketing	31.84[c]	30.40[a]	32.87[c]	31.70
Psychology	32.36	30.35	32.86[b]	31.86
Mean	31.80	30.03	32.57	31.47

Notes. a < b: Marketing scholars assign colleagues from their field lower contributions than what economists and psychologists assign their respective colleagues.

a < c: Marketing scholars assign colleagues from their field lower contributions than what economists and psychologists would assign them.

the target author identified in Step 2. If the target author's discipline (Step 1(a)) is economics, $k = 20$; if it is marketing, $k = 23$; and if it is psychology, $k = 27$. The differential number of papers across fields reflects our assumption that every author (in every discipline) puts the same amount of time and/or effort into the work, but that time/effort per paper is inversely proportional to the number of authors (meaning that in an m-authored paper each author invests $1/m$ of the amount of time/effort that she would have invested in a single-authored paper). Because the average number of authors differs across fields (1.54 in economics, 1.78 in marketing, and 2.08 in psychology), we allowed the number of papers (k) to differ between disciplines too, reflecting the differential average numbers of authors.

Step 4. For each target author in each of the k papers, the standardized contribution weights from study 2 (see Figure 2) are recorded.[4]

The procedure was repeated 5,000 times for each of the nine cases (three disciplines of the target author × three disciplines of the evaluator).

Results and Discussion

Table 3 displays the average simulated contribution credits (across the 5,000 replications) as a function of the author's discipline as well as the evaluator's discipline. Higher numbers imply higher credits.

Two findings are suggested: First, marketing scholars assign colleagues from their own field lower contributions (30.40) than economists (31.21) and psychologists (32.86)! Second, the contribution credits that marketing scholars assign to colleagues from their field (30.40) are lower than what economists (31.84) and psychologists (32.87) would assign to the same target authors! Marketing is the only field for which these two observations hold.

---

[4] We standardized the contribution weights with mean equal to zero and standard deviation equal to one within each discipline to render them comparable across fields.

These suggestive findings extend the results of our survey and of study 1 by showing that the lack of a well-differentiated name-ordering norm (in interdisciplinary fields such as marketing) can have detrimental effects in terms of overall contribution credits. One shortcoming of this simulation is its implicit assumption that researchers evaluate one's record as a simple summation of all the *individual* papers, without considering potential spillovers from one paper to another. We tackle this possibility in the next study, where we consider publication records with *multiple* publications and conflicting norms, a setting most representative of real-world publication records.

Study 3: Inference Based on Contribution Credit

In this study we investigate inferences based on mixed signals about name-ordering conventions. Mixed signals occur when researchers with multiple publications list their names according to at least two different conventions. We predict that in such cases inferences are moderated by the relative position of an author's surname initial. To see this, consider, for instance, two scenarios involving a researcher (B) with two publications: one two-authored paper and one three-authored paper (note that B is the second author in all the papers):

Scenario I: 1. A, <u>B</u>   2. A, <u>B</u>, C

Scenario II: 1. A, <u>B</u>   2. C, <u>B</u>, A

In scenario I, the authors are listed alphabetically in both papers, whereas in scenario II, they are listed nonalphabetically in the second paper. For simplicity, assume that B is assigned $1/2$ and $1/3$ of the contribution credit in scenario I. Given the mixed signals about author B's name-ordering practices in scenario II, inference about the first paper is ambiguous: It could be that A contributed more than B or that both contributed equally, justifying alphabetical ordering. We expect that, on average, author B's assigned contribution to the first paper gets discounted ($<1/2$) because of this ambiguity.

The reverse pattern is also conceivable: Consider author A in scenarios III and IV. Author A, the target author in scenarios III and IV, is always the lead author.

Scenario III: 1. <u>A</u>, B   2. <u>A</u>, B, C

Scenario IV: 1. <u>A</u>, B   2. <u>A</u>, C, B

Let us assume that A is assigned $1/2$ and $1/3$ of the contribution credit in scenario III. In scenario IV, author A sends mixed signals about the name-ordering practice, and inference about the

first paper is ambiguous: it could be that A contributed more than B or that both contributed equally. This ambiguity leads us to predict that, on average, author A's assigned contribution to the first paper would increase ($>1/2$).

Our four scenarios highlight the potential interplay of name-ordering conventions and the relative position of an author's surname initial when making contribution inferences.

Method
One hundred four faculty members and advanced graduate students from economics ($n = 21$), marketing ($n = 46$), and psychology ($n = 37$) participated in an Internet study (71% of the participants held tenure track or tenured positions, and the median rank was assistant professor). Participants were shown pairs of candidates for a prestigious scholarship. The six major publications of the two applicants were presented side by side. For each publication we presented the list of author names (with the candidate's name highlighted), a classification of the journal (application, methods, or theory), and the length of the paper (8, 9, 10, 11, 12, or 13 pages). Participants were asked to select the more deserving candidate and to rate the strength of their preference on a scale from 1 (barely preferred) to 7 (strongly preferred).

The publications of each candidate consisted of one single-authored paper, two two-authored papers, one three-authored paper, and two four-authored papers. The positions of each candidate in the list of authors were identical: first and second position in the two-authored papers, third position in the three-authored paper, and third and fourth position in the four-authored papers. The only differences between candidates were (a) the number of alphabetically listed papers, and (b) whether the initial of the candidate's last name was in the first or the second half of the alphabet (initials D to G versus R to U). We asked participants to complete all 28 distinct pairs. A screen shot of the task is shown in Figure 3, and a complete listing of candidate pairs can be found in the Technical Appendix (Table A2), located at http://mktsci.pubs.informs.org.

The names of the candidates were randomly sampled from a list of common British names, and the coauthors' names were taken from the list of authors identified in the initial study. The order of the papers, the journal types, and the length of the papers were sampled randomly (without replacement). We instructed participants to assume that the papers of the two candidates being compared were published in the last three years in high-quality journals. We also informed them that the publications were hypothetical. Incentives were provided by holding weekly lotteries raffling $100 coupons for Amazon.com.

Figure 3   Schematic Screen Shot of Study 3

In your opinion, which of the two candidates is more deserving of the scholarship?   # 9

Sands

Paper	Authors	Journal type	Length
1	**Sands**, Schwartz	Methods	13
2	Galvin, **Sands**	Theory	12
3	Henrekson, Holmlund, **Sands**	Theory	9
4	**Sands**	Application	11
5	Vandervoort, **Sands**, Hofacker, Jordan	Methods	10
6	Thomas, Vanijzendoorn, **Sands**, Bloomfield	Application	8

Tester

Paper	Authors	Journal type	Length
1	Wittenbrink, **Tester**	Methods	8
2	**Tester**	Theory	11
3	Wheatley, White, **Tester**, Gaerner	Application	9
4	**Tester**, Abihashem	Theory	12
5	Venables, **Tester**, Reznick, Farina	Methods	13
6	Mayes, Sternin, **Tester**	Application	10

Please rate your preference on a scale from 1 to 7

○1   ○2   ○3   ○4   ○5   ○6   ○7

Barely preferred   Strongly preferred

Next

Results and Discussion

We analyzed a total of 2,078 paired comparisons among candidates (1,016 by marketing scholars, 664 by psychologists, and 398 by economists), including all respondents who made at least 10 comparisons. We computed the average "strength of preference for candidate L (left author)" for each participant and regressed this measure on the following explanatory variables: "economist" (1 = yes, 0 = no), "psychologist" (1 = yes, 0 = no), "first half" (1 = if candidate L and candidate R's names are in the first half of the alphabet, 0 otherwise), "mixed" (1 = if candidate L's name is in the first half of the alphabet and candidate R in the second half, 0 otherwise), and "alphabetical" (number of alphabetically ordered papers for candidate L minus the corresponding number for candidate R). We also considered interactions between these variables. The model selected includes only those interactions that contributed significantly to the fit (see Table 4).

The results indicate a reasonably high fit (Adjusted $R^2 = 0.55$, $F(9; 74) = 12.33$, $p < 0.05$). The most interesting finding is the interaction of academic discipline and the quality of the ordering signal (as evinced by the number of alphabetically ordered papers). Economists favored candidates with a higher number of papers with alphabetical listing of coauthors, whereas psychologists more often picked the candidate with a higher number of nonalphabetically ordered papers. These findings were not qualified by the position of the candidates' surname initials

in the alphabet. The results of a dominance analysis (see last column of Table 4) confirm that the interaction between economists and alphabetical order, and the interaction between psychologists and alphabetical order, account for the largest share of the variance in the model.

Contrary to expectation, inferences were invariant across the surname initials of the authors. This finding demonstrates the power of norms. Researchers in economics and psychology relied on their professions' norms as a heuristic to resolve the conflict induced by the mixed signals: they preferred those candidates with "familiar" publication records that

Table 4   Regression Analysis of the Standardized Strength of Preference for Candidate L (Study 3)

Variables	Zero-order correlations	Standardized coefficients	t (df = 44)	General dominance
Economist	0.47	0.24	2.53*	0.108
Psychologist	−0.28	0.06	0.67	0.024
First half	−0.01	−0.01	−0.06	0.002
Mixed	−0.07	−0.10	−0.51	0.008
Alphabetical	0.03	−0.07	−0.20	0.020
Economist × Alphabetical	0.61	0.60	5.10*	0.283
Psychologist × Alphabetical	−0.45	−0.34	−3.03*	0.138
First half × Alphabetical	−0.03	−0.09	−0.40	0.004
Mixed × Alphabetical	−0.01	−0.05	−0.21	0.012
Model's R^2				0.776

*$p < 0.05$.

matched the prevalent ordering patterns of their disciplines. Because of marketing's weaker disciplinary norms, these researchers could not rely on simple rules to resolve the mixed signals.

An obvious question, then, is whether marketing scholars *either* adhere to the norms of economics or psychology, or whether they use their own norms. To answer this question, we calculated the mean ratings of the eight candidates (D to G and R to U, see the Technical Appendix, located at http://mktsci.pubs.informs.org, Table A3), as inferred from the expressed preferences. On average, economists preferred candidates with a higher number of alphabetical papers and psychologists those with a higher number of nonalphabetical papers. The mean marketing rating shows much less variance and lacks a clear ordering, suggesting that the marketing respondents do not fall into two distinct subgroups that follow either the norms of economics or psychology.[5]

General Discussion

Name-ordering norms allow for inferences about contributions to joint research by unifying the standards of evaluation and help coordinate effort among authors. For example, if the authors agree to list names alphabetically, the equal-contribution norm is invoked, leading authors to exert the same level of effort. Conversely, a decision to list authors nonalphabetically might create incentives to exert effort as a function of how important it is for an author to be listed in various positions. Researchers who place a high value on being listed in a prominent position are likely to exert more effort than those who place less value on these positions.

Various conventions have different strategic implications. For example, ordering authors by relative contributions provides incentives to include more authors as a research project progresses and allows rewarding these authors accordingly at a smaller cost to oneself than in the case of alphabetical ordering. This might be particularly conducive to interdisciplinary research or to projects that require different types of skills (analytical tools, statistical analysis, clinical skills, etc.). An obvious problem of this norm stems from the fact that researchers often have different perceptions of the importance of their own contribution to joint work (Fine and Kurdek 1993, Floyd et al. 1994),[6] possibly resulting in fierce arguments about the final ordering of author names on research papers. This, of course, is precisely the problem

that alphabetical ordering intends to solve. However, alphabetical ordering is not immune to manipulation: a shrewd and strategically sophisticated researcher who understands the universal first-author advantage would seek collaborators whose last names are later in the alphabet to place her in a position of "first among equals."[7]

Although it is perfectly feasible to use a set of different norms—as a coordination device—for each particular project, this actually might have detrimental effects on the evaluation of a collection of works, such as in promotion and tenure decisions. These credit inferences are the focus of our work. Our results show that disciplines with strong norms—economics and psychology—rely on conventions to resolve conflicting contribution signals. Marketing scholars lacked this opportunity because of weak ordering norms. What are the implications of this?

First, strong norms render inferences about contribution credits more accurate (i.e., more likely to reflect the authors' intentions). Second, when the norms are violated, researchers are penalized in terms of their assigned contribution credits. Third, the penalty for mixed contribution signals is more complex when the norms are alphabetical, because a nonalphabetical ordering on one paper questions the ordering norm of other (alphabetically ordered) papers. Fourth, the signal about individual contributions is least clear for two-authored papers, where alphabetical ordering either reflects equal contribution or relative contribution (when the ordering happens to coincide with the surnames' alphabetical order). In marketing, 64% of all multiauthored papers are two authored, and 60% of these papers list authors alphabetically.

Our results suggest that marketing scholars could benefit from clearer norms. Moreover, the increasing rate of interdisciplinary research, joint projects, and mixing of alphabetical and nonalphabetical papers suggests that it would be best for the discipline to adopt the individual-contribution norm. If this is not possible, researchers could increase the accuracy of inferences about their contributions by specifying, for example, in an author's note: (a) what conventions the authors used to order names (e.g., alphabetical) and (b) how much each of the authors contributed to the research.[8] These explicit clarifications render later evaluations of joint research less ambiguous and therefore increase the likelihood of accurate and fair

---

[5] A similar result is suggested by multidimensional scaling.

[6] See Bohlmann et al. (2006) for an example of how group interaction may affect satisfaction levels.

[7] See Mishra et al. (2007) for a recent account of the interplay, and interference, of strategic, deliberate, and affective components in information aggregation.

[8] A similar policy is currently implemented for publications in the *Proceedings of the National Academy of Sciences of the United States of America* (http://www.pnas.org/misc/iforc.shtml). A paper that follows this recommendation is, e.g., Syam and Kumar (2006).

evaluations (e.g., for tenure review) of a researcher's output.

Finally, it is worth pointing out that the importance of norms is not limited to academia. Credit sharing is also important for business and public policy, such as for teamwork, press releases, patents, and the contribution to public goods. In these domains, norms can highlight individual contributions, thereby serving as an implicit motivator and reward, facilitating coordination. Along these lines, Weber and Camerer (2003) show that declines of productivity after company mergers can be partly attributed to conflicting cultures and norms, and Sell and Wilson (1991) show that individual visibility improves contributions to public goods.

References

Akerlof, G. A. 2007. The missing motivation in macroeconomics. *Amer. Econom. Rev.* **97**(1) 5–36.

Azen, R., D. V. Budescu. 2003. Dominance analysis: A method for comparing predictors in multiple regression. *Psych. Methods* **8**(2) 129–148.

Bohlmann, J. D., J. A. Rosa, R. N. Bolton, W. J. Qualls. 2006. The effect of group interactions on satisfaction judgments: Satisfaction escalation. *Marketing Sci.* **25**(4) 301–321.

Bradley, R. A., M. E. Terry. 1952. Rank analysis of incomplete block designs: I. The method of paired comparisons. *Biometrika* **39**(3-4) 324–345.

Budescu, D. V. 1993. Dominance analysis: A new approach to the problem of relative importance of predictors in multiple regression. *Psych. Bull.* **114** 542–551.

Burgard, D. E. 2001. Journals of the century in psychology. *Serials Librarian* **39**(3) 41–56.

Einav, L., L. Yariv. 2006. What's in a surname? The effects of surname initials on academic success. *J. Econom. Perspect.* **20**(1) 175–188.

Elster, J. 1989. Social norms and economic theory. *J. Econom. Perspect.* **3**(4) 99–117.

Engers, M., J. S. Gans, S. Grant, S. P. King. 1999. First-author conditions. *J. Political Econom.* **107**(4) 859–883.

Fine, M. A., L. A. Kurdek. 1993. Reflections on determining authorship credit and authorship order on faculty-student collaborations. *Amer. Psych.* **48**(11) 1141–1147.

Floyd, S. W., D. M. Schroeder, D. M. Finn. 1994. "Only if I'm first author": Conflict over credit in management scholarship. *Acad. Management J.* **37**(3) 734–747.

Hudson, J. 1996. Trends in multi-authored papers in economics. *J. Econom. Perspect.* **10**(3) 153–158.

Hult, G. T., W. T. Neese, R. E. Bashaw. 1997. Faculty perceptions of marketing journals. *J. Marketing Ed.* **19**(1) 37–52.

Joseph, K., D. N. Laband, V. Patil. 2005. Author order and research quality. *Southern Econom. J.* **71**(3) 545–555.

Kaplan, H., K. Hill. 1985. Food sharing among Ache foragers: Tests of explanatory hypotheses. *Current Anthropology* **26**(2) 223–246.

Kramer, T., S. Spolter-Weisfeld, M. Thakkar. 2007. The effect of cultural orientation on consumer responses to personalization. *Marketing Sci.* **26**(2) 246–258.

Laband, D. N., R. D. Tollison. 2006. Alphabetized coauthorship. *Appl. Econom.* **38**(14) 1649–1653.

Luce, R. D. 1959. *Individual Choice Behavior: A Theoretical Analysis*. John Wiley & Sons, New York.

Mendenhall, M., K. L. Higbee. 1982. Recent trends in multiple authorship in psychology. *Psych. Rep.* **51**(3) 1019–1022.

Mishra, H., A. Mishra, D. Nayakankuppam. 2007. Seeing through the heart's eye: The interference of system 1 in system 2. *Marketing Sci.* **26**(5) 666–678.

Morillo, F., M. Bordons, I. Gómez. 2003. Interdisciplinarity in science: A tentative typology of disciplines and research areas. *J. Amer. Soc. Inform. Sci. Tech.* **54**(13) 1237–1249.

Over, R., S. Smallman. 1973. Maintenance of individual visibility in publication of collaborative research by psychologists. *Amer. Psych.* **28**(2) 161–166.

Sell, J., R. K. Wilson. 1991. Levels of information and contributions to public goods. *Soc. Forces* **70**(1) 107–124.

Shampanier, K., N. Mazar, D. Ariely. 2007. Zero as a special price: The true value of free products. *Marketing Sci.* **26**(6) 742–757.

Sherif, M. 1966. *The Psychology of Social Norms*. Harper Touchbooks, New York.

Simonson, I., Z. Carmon, R. Dhar, A. Drolet, S. M. Nowlis. 2001. Consumer research: In search of identity. *Ann. Rev. Psych.* **52** 249–275.

Stigler, G. J., S. M. Stigler, C. Friedland. 1995. The journals of economics. *J. Political Econom.* **103**(2) 331–359.

Stremersch, S., I. Verniers, P. C. Verhoef. 2007. The quest for citations: Drivers of article impact. *J. Marketing* **71**(3) 171–193.

Syam, N. B., N. Kumar. 2006. On customized goods, standard goods, and competition. *Marketing Sci.* **25**(5) 525–537.

Tellis, G. J., R. K. Chandy, D. S. Ackerman. 1999. In search of diversity: The record major marketing journals. *J. Marketing Res.* **36**(1) 120–131.

Weber, R., C. F. Camerer. 2003. Cultural conflict and merger failure: An experimental approach. *Management Sci.* **29**(4) 400–415.

Wuchty, S., B. F. Jones, B. Uzzi. 2007. The increasing dominance of teams in production of knowledge. *Science* **316**(5827) 1036–1039.