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Creative Collaborations From Afar: The Benefits of Independent Authors

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ABSTRACT: The number of times that an article is cited has served as an indicator of both its creativity and impact. In this study, we investigated the relationship between citations and 2 very simple variables—the number of authors and the number of separate locations. Previous research, on balance, would support the notion that an increased number of collaborators would increase the quality of the product, at least to some asymptote. Research on the effect of separate locations is more sparse. Most work favors collaborations at the same locale, given a sharing of perspective and benefits in terms of coordination and motivation. However, research from the minority influence literature documents the stimulating effects of independent and differing views, leading to the conclusion that independent locations would be an asset. Results from an analysis of 6 journals and 5,113 articles over a 10-year period show the benefit of both the number of authors and the number of independent locations. Journals also differed in their citation average, Psychological Review *being cited significantly more often than any of the other 5 journals.*

Publishing basic research is a primary activity of most academics and one of the goals is to stimulate further research and to reach as broad an audience as possible. The number of citations has often been used as an indicator of such influence both in terms of complex and creative thinking and in terms of its importance and impact on the thinking and research of others (Feist, 1994; Griggs & Proctor, 2002; Helmreich, Spence, Beane, Lucker, & Matthews, 1980). Number of citations is viewed as an objective index of scholarly impact and suggests methodological and/or theoretical advances (Rushton, 1974).

With such impact in mind, one of the most crucial decisions to make at the beginning stages of a research project is whether or not to collaborate and with whom. In considering the number of citations as a proxy for creativity and impact, what is the value of multiple authors? Does having a collaborator (or two or three) increase an article's impact? Or is there an asymptote beyond which an increase in collaborators decreases the impact and creativity of the article? This issue has broader application than publications. The relationship between size of group and performance has a long history and continues to be an important issue in understanding group process and group performance. Less researched but equally important is where the collaborators are located. We investigated the possible impact of collaborating from afar, from having authors at different universities or locations. The literature on this relationship is more sparse and conflicted.

Following the classic work by Steiner (1972), there is evidence that increasing the size of the group increases the resources available for the endeavor (time, energy, expertise) but can create coordination problems (Diehl & Stroebe, 1987; Latane, Williams, & Harkins, 1979) as well as motivational problems such as social loafing or free riding (Albanese & Van Fleet,

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1985; Karau & Williams, 1993). As group size increases, conflict increases (O'Dell, 1968; Slater, 1958), participation decreases (Bass & Norton, 1951), and consensus decreases (Hare, 1952) with some indication of an asymptote (Brewer & Kramer, 1986; Kerr, 1989).

The evidence on quantity or quality of output, however, is somewhat mixed. Hackman and Vidmar (1970) found little evidence of the effects of group size on quantity of group performance leading Cummings, Huber, and Arendt (1974) to conclude that the literature shows "either inconsistent or no size effects in relation to measures of group performance and productivity" (p. 463). On the other hand, there is evidence that, as group size increases, both the originality of answers and objective quality of the group's decision increases (Renzulli, Owen, & Callahan, 1974; Ziller, 1957). Such evidence is consistent with Torrance's (1971) contention that working with others can provide mutual stimulation. Further, groups especially profit from the fact that they are particularly good at being able to detect errors and eliminate wrong answers (Azar, 1994; Shaw, 1932).

For collaborations, however, the issue is not really whether increased size is better than the same individuals working separately. It is whether additional authors increase the quality and impact of the product. The research literature, although mixed, permits the hypothesis that increased number of authors leads to a higher quality publication, one with greater impact.

The benefits of additional collaborators raises another issue, that of independence of that knowledge or judgment. This raises the interesting possibility that the number of locations is important. Collaborators can be in the same location or they may be at geographically different locations, not easily permitting face-to-face communication. Does such a distance impair performance or might it, under some circumstances, aid the quality of the published article?

There is little available literature on collaboration at a distance in social psychology. Some pertinent research in organizational behavior on virtual teams has studied companies with far-flung offices who have employees who are located across time, space, and cultures (Kristof, Brown, Sims, & Smith, 1995; Mowshowitz, 1997; Nemiro, 2002); who communicate by electronic means or telephone; and rarely have face-to-face interactions. Such distant collaborations have been found to suffer from lowered commitment and higher absenteeism and social loafing (O'Hara-Devereaux & Johansen, 1994), leading some researchers to hypothesize the necessity of frequent face-to-face interaction especially for communication, trust, and intimacy (Handy, 1995; Nemiro, 2002). However, there is some evidence that intimacy can be even greater in computer mediated communication than in face-to-face groups (Walther, 1995, 1997).

Researchers have further argued that the physical proximity reinforces shared values and expectations and heightens the threat from failure to meet expectations (Latane, Liu. Nowak, Bonevento, & Zheng, 1995; see Jarvenpaa & Leidner, 1999). In this context, the question is whether that distance with the primary modes of communication, being the telephone and electronic means, serves as a detriment to the finished product or not. Most researchers suggest that multiple authors would be better served by being in one location rather than dispersed across several locations. Almost none would suggest that collaboration from afar is an advantage.

Such shared values and expectations might lead to an opposite prediction. A contrasting viewpoint could be argued from the perspective of research showing the value of independent and even competing viewpoints (Janis, 1982; Nemeth, 1997, 2003; Rubenson & Runco, 1995). Faced with dissenting viewpoints, people search for more information in an unbiased manner, utilize more strategies, and consider more options. As such, performance is improved, errors are detected, and creativity is enhanced (see Nemeth 1997, 2003). To the extent that being in geographically different locations increases the likelihood of independence of thought, an assumption consistent with evidence that conformity is higher in highly cohesive and face-to-face groups (Deutsch & Gerard, 1955; Schachter, 1951), this would suggest that there is value in collaborating from afar, from geographically different locations. Such an hypothesis is consistent with research showing that there is the perception of higher quality judgments when there is agreement between independent individuals relative to those who can be categorized together; the latter are assumed to share a bias (Wilder, 1977).

In this study, we investigate the number of citations across a wide range of journals over a 10-year period to assess the effect of number of authors and number of locations. Although the relationship is an empirical matter, we hypothesize that citations will increase with

additional authors with possibly an asymptote at the point where coordination and motivational issues outweigh the additional resources. Regarding the number of locations, many would predict an inverse relationship with citations, given the potential problems with communication, coordination, and intimacy when collaborating from afar. However, given the possibility that differing locations permits an independence from which divergent perspectives and creativity is likely to be enhanced, we hypothesize a positive linear relationship between number of locations and number of citations, again with the possibility of an asymptote.

Method

Data and Procedure

Data were collected from the Social Science Citation Index, a searchable database of academic articles from more than 1,700 journals across more than 50 disciplines, published since 1972. For each article published, the index records the names of each author, his or her affiliation, and the number of times that particular article has been cited (listed in the reference section) in other published articles. For our analysis, we collected data on all articles published from 1981 to 1990 in 6 journals: *American Psychologist, Psychological Review*, *Psychological Bulletin, Journal of Personality and Social Psychology, Journal of Applied Psychology,* and *Organizational Behavior and Human Decision Processes*. There were a total of 5,113 articles in our analysis.

To obtain information on each article, we selected "Full Search" from the index menu, specified the particular year of our search (e.g., 1981), and selected the journal to be searched (e.g., *American Psychologist*). This permitted us to view every article published in a particular journal in a given year. For each article we noted the number of authors, the number of locations (affiliations) of the authors, and the number of times that article was cited. The unit of analysis was the individual article.

As an example, the article

> Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45,* 357–376.

was coded as one author, one location (Brandeis University), and 103 times cited.

Dependent Variable

Times cited. Our primary dependent variable was the number of times each article was cited in other published articles.

Independent Variables

Number of authors. For each article, the citation index specifies the authors who contributed to the piece. The number of those authors constituted a main independent variable.

Number of locations. Each author had an affiliation listed. This can be at the same institution as another author on that article or a different institution. Two authors from the same university were entered as one location because they are both affiliated with the same institution. Two authors who were each from a different university were entered as two locations.

Control Variables

Journal. Given likely citation differences and publication rates between journals, we controlled for journal in all analyses. We created a dummy variable for each journal, using *Organizational Behavior and Human Decision Processes* as the reference category.

Year. The year in which an article was published was also controlled in that it is likely that older articles were cited more often than more recent ones. Thus, a variable was created such that 1981 = 1, 1982 = 2, and so forth until 1990.

Results

To map the sample, the vast majority of articles had one or two authors, which comprised 71.3% of the sample. If we included articles with three authors, over 90.6% of the sample were represented. By contrast, articles having more than five authors were exceedingly rare, comprising only 1% of the sample. Similarly, the vast majority of articles had either 1 or 2 locations, comprising 91.7%; adding three locations accounted

Table 1. *Number of Articles in Sample: Author and Location Distribution*

	1		2		3		4		5		>5	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Authors	1,627	31.9	2,011	39.4	980	19.2	329	6.4	97	1.9	55	1.1
Locations	3,357	65.7	1,320	25.8	339	6.6	59	1.2	10	0.2	26	0.5

for 98% of the sample. The number of articles with more than five locations was 0.5%. The mean number of authors was 2.12. The mean number of locations was 1.45. The average number of citations across all articles was 46.03 (see Table 1).

Citations also differed considerably by journal. Articles published in *Psychological Review* were cited significantly more often than articles in any of the other journals. All comparisons were made by *F* tests and were significant at less than the .05 level. Articles in *Psychological Bulletin* were next most cited. Although significantly less often than those in *Psychological Review,* articles in *Psychological Bulletin* were cited significantly more often than those in *American Psychologist, Journal of Personality and Social Psychology, Journal of Applied Psychology,* and *Organizational Behavior and Human Decision Processes* ($p < .05$ for all comparisons).

American Psychologist and *Journal of Personality and Social Psychology* were next. Although not significantly different from each other, articles in these two journals were cited significantly more often than those in the *Journal of Applied Psychology* and *Organizational Behavior and Human Decision Processes* ($p < .05$). The latter two did not differ significantly from one another in number of citations but were the least cited in this group of 6 journals. All differences reported were significant at less than the .05 level (see Table 2).

To test the various hypotheses, we computed ordinary least squares regressions. Since the data were highly skewed (skewness = 9.62; range = 0–2,130; $M = 46$) and given that linear regression analysis assumes a normal distribution of values, we log transformed the times cited variable. In all analyses and in Table 3, we report standardized beta coefficients unless otherwise indicated. Model 2.1 is a baseline model showing differences in citations by journal. It also shows that articles published earlier did not have significantly more citations than articles published more recently ($\beta = .07$, ns).

Model 2.2 tested the hypothesis regarding the relationship between number of authors and citations. The variable number of authors was positive and significant, indicating that as number of authors on the article increased, the number of citations to this article significantly increased ($\beta = .05$, $p < .05$). The model's adjusted R Square was .067, indicating that the variables in the model explained 6.7% of variance in the dependent variable.

Model 2.3 tested the hypothesis regarding the value of different locations. The variable "number of locations" is positive and significant indicating that articles published by authors from different universities were cited significantly more often than those produced by authors with the same affiliations ($\beta = .03$, $p < .05$). This result was independent of the number of authors. The model's adjusted R Square is .068, indicating that the variables in the model explain 6.8% of variance in the dependent variable. Quadratic terms were not significant either for authors or locations and are not included in the models (see Table 3).

Of interest is the fact that, although articles published in *Psychological Review* are cited more than those in any of the other 5 journals we studied, it did not publish the article with the most citations. Table 4

Table 2. *Citations by Journal*

	N	Mean Number of Citations
Psychological Review	180	134.35_a
Psychological Bulletin	357	56.95_b
Journal of Personality and Social Psychology	2,268	47.76_c
American Psychologist	939	43.85_c
Journal of Applied Psychology	912	31.76_d
Organizational Behavior and Human Decision Processes	442	26.47_d

Note. Subscripts in common are not significantly different at the .05 level.

Table 3. *Ordinary Least Squares Regression of Effects of Number of Authors and Number of Locations on Citation Count (Standard Errors Shown in Parentheses)*

Journal	Model 2.1	Model 2.2	Model 2.3
American Psychologist	.06** (.028)	.07** (.028)	.07** (.028)
Psychological Review	.26** (.043)	.26** (.043)	.26** (.043)
Psychological Bulletin	.09** (.035)	.09** (.035)	.09** (.035)
Journal of Personality and Social Psychology	.22** (.025)	.21** (.025)	.21** (.025)
Journal of Applied Psychology	.05* (.028)	.05** (.028)	.05** (.028)
Year	.03 (.009)	.02* (.009)	.07* (.009)
Authors		.05* (.013)	.03* (.013)
Locations			.03* (.011)

Note. Betas reported are standardized coefficients.
*$p < .05$. **$p < .01$ by one tailed tests.

Table 4. *Most Cited Articles*

	Journal	Author(s)	Location[a]	Article	Year	Citations[b]
1	*Journal of Personality and Social Psychology*	Baron & Kenny	University of Connecticut	The moderator mediator variable in social psychological research: Conceptual, strategic, and statistical considerations	1986	2,130
2	*American Psychologist*	Bandura	Stanford University	Self-efficacy mechanisms in human agency	1982	1,660
3	*American Psychologist*	Bower	Stanford University	Mood and memory	1981	1,372
4	*Psychological Review*	McClelland & Rumelhart	University of California, San Diego	An interactive activation model of context effects in letter perception: An account of basic findings	1981	1,118
5	*Journal of Personality and Social Psychology*	Watson, Clark, &Tellegen	Southern Methodist University, University of Minnesota	Development and validation of brief measures of positive and negative affect: The PANAS Scales	1988	1,010
6	*Psychological Bulletin*	Bentler	University of California, Los Angeles	Comparative fit indexes in structural models	1990	915
7	*Journal of Personality and Social Psychology*	Folkman & Lazarus	University of California, Berkeley	If it changes it must be a process: Study of emotion and coping during 3 stages of a college examination	1985	707
8	*Psychological Review*	Biederman	SUNY Buffalo	Recognition by components: A theory of human image understanding	1987	706
9	*Psychological Review*	Weiner	University of California, Los Angeles	An attributional theory of achievement motivation and emotion	1985	663
10	*Psychological Bulletin*	Locke, Saari, Shaw, & Latham	University of Maryland, University of Washington (Psych), University of Washington (Business)	Goal setting and task performance (1969–1980)	1981	654

[a]Affiliation at time of article publication. [b]Citation count accurate at the time of data collection.

shows the first and second most cited article in each of the 6 journals. The Baron and Kenny (1986) article in *Journal of Personality and Social Psychology* took the honors with 2,130 citations followed by Bandura (1982) in *American Psychologist* with 1,660 citations. The most cited article in *Psychological Review*—McClelland and Rumelhart (1981)—had 1,118 citations. However, the mean number of citations is highest in *Psychological Review,* averaging just over 134 citations over the 10-year period.

Discussion

Our results support the hypothesis that increasing the number of authors, holding the number of locations constant, increases the number of citations, at least to some asymptote. Further, the results show that increasing the number of locations, holding the authors constant, increases the number of citations. Therefore, our findings provide evidence for the prediction that being in different universities increases the likelihood of independence and decreases the uniformity that being in the same normative environment tends to produce. Although these variables do not account for a large part of the variance, the beta coefficients are significant, indicating that both number of authors and number of locations independently predict the number of citations. It should be remembered, however, that the vast majority of publications had one, two, or three authors in one, two, or three locations.

Given the many and varied reasons for the number of times an article is cited, it is interesting that simple variables such as number of authors and number of locations are significantly related to citations in a large sample of over 5,100 articles from 6 leading journals over a 10-year period. Previous research on size of group and performance points out the advantages of size for resources but also demonstrates an increase in coordination and motivational problems. It is noteworthy that we find no evidence for an inverted U-shaped relation; citations do not decrease even when there are a large number of authors or locations; they just don't add to the article's impact. For these data, the pattern is quite simple—and linear.

We suspect that part of the reason for the simple linear relation is that some of the coordination and motivational problems found in experimental settings may not be operative in collaborations. Most important, people choose whether or not to collaborate and, further, with whom they will collaborate. Authors are identified by name; they each recognize the importance of their contribution and, most likely, they trust one another, all of which have been found to lessen social loafing and to increase motivation to perform well (Kerr, 1989; Renzulli, Owen, & Callahan, 1974). Such a choice of collaborator would also increase the likelihood of an assembly effect, a good combination of talents (Rosenberg, Erlick, & Berkowitz, 1955; Michaelsen, Watson, & Black, 1989). Thus, it is not surprising that number of authors would relate to citations.

What is less obvious is the prediction that number of locations would contribute to the number of citations, holding number of authors constant. One might easily have hypothesized a negative rather than a positive relationship in that collaborations from afar would likely have more coordination and even motivational problems. Yet, as hypothesized from the literature emphasizing the importance of independence and differing views for creativity, we find support for the premise that such independence, as defined by having different affiliations, actually aids the article's impact and creativity, as defined by the number of times it is cited in the literature. Again, we find no evidence for an inverted U-shaped relation.

We might add a complexity, however. Differing affiliations is not identical to different geographical locations. It is possible that some of these collaborations occurred in the same physical setting, at least part of the time. However, we would suggest that differing affiliations is a good indication of independence in that the authors are in different normative contexts.

It is of interest that citations differed considerably by journal. *Psychological Review* articles were cited significantly more often than articles in any of the other 5 journals. Articles published in *Psychological Bulletin* were next most cited. *American Psychologist* and *Journal of Personality and Social Psychology* were next. Although not different from each other, articles in these two journals were cited significantly more often than those in *Journal of Applied Psychology* and *Organizational Behavior and Human Decision Processes*. The latter two did not differ from one another in number of citations but were the least cited in this group of 6 journals. *Psychological Review* and *Psychological Bulletin* are disseminated more widely across fields of psychology and represent theory and integrative reviews respectively. Articles in empirical journals are cited less frequently but *Journal of Personality and Social Psychology* is clearly more cited than the other two empirical journals.

Although the average number of citations were in the order indicated above, it is interesting that the most cited article over the 10-year span was published in *Journal of Personality and Social Psychology*. That article, by Baron and Kenny (1986), was cited 2,130 times. The second most cited article was by Bandura (1982), published in *American Psychologist* and cited

1,660 times. The third most cited was Bower (1981), published in *American Psychologist* and cited 1,372 times.

The conclusion or advice from these findings for increasing the number of times an article is cited is collaborate with others, especially others in different universities. If possible, publish the article in the *Psychological Review*—that is, unless your last name begins with "B."

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