

Group Interactional Processes: Individual and Group Level Effects

Kevin W. Mossholder
Arthur G. Bedeian

Though it is generally held that groups can influence individual behavior and affective responses, the majority of group studies fail to test for such effects. Using data collected at an individual level to make inferences concerning the effects of group level processes on individual behavior and attitudes often results in unrecognized inaccuracies. Similarly, operationalizing group constructs through within-group aggregation of individual responses across groups for inferential purposes is also problematic. This article demonstrates a multilevel approach for examining the individual and group level influences of a social interaction variable on various individual outcomes. In doing so, it illustrates a means for simultaneously considering micro and macro organizational phenomena.

It is a basic assumption of most contemporary group research that group context influences individual behavior and attitudes. This influence is typically thought to act both directly through interaction with group member characteristics and indirectly through the subtle but potent effects of a group as a totality. Interest in such effects can be traced to Cattell's (1948) notion of *syntality*—those activities which synergistically combine to make a group a unique entity. In this regard, Cattell specified two essential forms of group activity: (1) *maintenance*

synergy—that portion of a group's energy expended for establishing and preserving group harmony, and (2) *effective synergy*—that portion of a group's energy devoted to goal accomplishment.

The legacy of syntality theory is evident in at least two streams of current group research. The first primarily focuses on internal group characteristics basic to the melding of individual actors into a coherent group (e.g., Hackman, 1976; Kozan, 1982; Stogdill, 1972). As an example of this stream, researchers in the field of organizational behavior have long emphasized the importance of positive interactional processes in enhancing group outcomes. Researchers representing this stream maintain that supportive group interactions serve to vitiating emotional blocks to group functioning, bolster group self-image, and encourage the focusing of available resources on group performance.

The second stream of group research in which the legacy of syntality theory is evident examines the degree to which groups persist as concerted totalities. According to this stream, groups persist as purposive entities as a result of technological or goal commonalities. Research on group commitment, aspirations, and task accomplishment is representative of this stream (e.g., Shiflett, 1979; Steiner, 1972; Zander, 1982). Present interest in autonomous work groups also represents one flow in this stream (e.g., Kanawaty, Thorsrud, Semiono, & Singh, 1981). The importance of a proper match between group processes and technological demands is at the heart of autonomous work group design. A basic tenet of research in this area is that, given specific technological requirements, individuals placed in groups are more prone to develop collaborative relationships that augment work effectiveness.

Although the substantive tradition of syntality theory holds that group processes substantially influence individual behavior and attitudes, a majority of group studies fail to test for such effects (Firebaugh, 1980). Rather, most group research employs a single level of aggregation (all individual or all group level data), which does not allow for the delineation and differentiation of individual and group effects. This limitation notwithstanding, it is not unusual in group research for data collected at an individual level to be used for making inferences concerning the effects of group level processes on individual behavior and attitudes. Such is the case in instances where an independent variable representing a group construct and a dependent variable representing an affective or behavioral response are measured and analyzed solely at the individual level. One example of this practice would be the measurement of group members' individual perceptions of shared decision making and relating these perceptions to individual member satisfaction. Another example can be taken from the literature dealing with individual employee reactions to autonomous work groups (e.g., Cummings & Griggs, 1977). Consider a measure of autonomous group functioning that gauges individual member perceptions of a group's self-regulating behavior (e.g., decision making, goal setting, feedback, control). Members of different groups would most likely vary in the amount and types of self-regulating behavior with which they are involved or emit. Such variations would understandably influence individual members' perceptions of the total amount of autonomy possessed by a group. As a consequence, information about autonomous work groups drawn from the correlation of individual member responses with individual or group outcome variables is inevitably

colored by perceptual influences. Conclusions drawn from such research reflect within-person rather than between-group differences. Granted, this type of analysis may yield useful information. However, it does not directly address the impact of autonomous group functioning on individual reactions, but rather taps individual perceptual interpretations of this impact.

A second form of this inferential process occurs where a group construct is operationalized through within-group aggregation of individual responses across groups. Each group's aggregate response (usually defined by a mean score) is then assigned to all members of a particular group with subsequent analyses treating both aggregate level and corresponding affective/behavioral responses within a regular within-subjects paradigm. This would be exemplified where group morale is defined as average member satisfaction and correlated with a response such as individual member absenteeism. Within-group morale levels of each group member would be treated as identical and the degrees of freedom in a statistical analysis would be determined by the total number of individuals in all groups.

A more common variant of this second form of inferential process occurs when both group and affective/behavioral responses are aggregated and analyzed using the group as the "unit" of analysis. For instance, Kozan (1982), in developing a measure of work group flexibility, identified and measured group behaviors indicative of flexibility, rigidity, and disorganization. He then asked individual group members to cite behaviors they used to respond to work changes. These responses were coded and aggregated by group to represent the collective response of each member of a particular group. Among other analyses, Kozan correlated the work group

flexibility scores with supervisory leadership scores that had been formed by aggregating and averaging individual members' perceptions of leadership. Degrees of freedom were determined using the number of work groups rather than the number of respondents.

Where inferences about group phenomena are drawn from individual level data and analyzed in a within-subjects design, as in the first form cited, unrecognized inaccuracies may result. If group effects do exist, they will not be detectable except as confounded with individual level responses. Fallacies of the wrong level are said to occur when inferences possible at only one level of analysis are translated to another level of analysis (Galtung, 1967). Finding that individual perceptions of shared decision making are positively correlated with member satisfaction does not necessarily reveal the nature of the relationship between amount of shared group decision making and group satisfaction. Nor does it directly reveal the influence that amount of shared group decision making has on individual member satisfaction.

Aggregating individual responses to tap group level constructs (the second form cited) represents a step toward isolating group influences, but is still problematic. First, for an aggregate measure to properly represent a group variable, there must be a degree of homogeneity among group member responses vis-à-vis the group level construct (James, 1982). The examples concerning group morale and group flexibility coincide with what James (1982) respectively labels single and double aggregate approaches. Both may overlook within-group response variation relevant to the phenomenon of interest. Second, even if there is high within-group agreement among member responses, simply correlat-

ing an aggregate measure with individual level responses disregards the potential effect of individual level influences.

In partial reaction to the shortcomings of single level analyses in situations where effects on individuals stem from multiple levels (e.g., various group influence phenomena), multilevel analysis techniques have become increasingly popular. Broadly considered, multilevel analysis refers to an analytical paradigm that seeks to partition effects at one level of analysis among variables conceptually belonging to separate levels of analysis, e.g., individual and supraindividual units (Burstein, 1980; Roberts & Burstein, 1980). That there are multilevel influences on individuals within organizations (especially those above a certain size) is a point that few group-oriented theorists would dispute.

Accordingly, the intent of this article is to demonstrate the utility of multilevel logic for examining the individual and group level influences of a social interaction variable on various individual outcomes. The impetus for the current study originated from a larger research effort concerning the nature and impact of certain group process variables (Mossholder, Bedeian, & Armenakis, 1982). A major focus of this larger project was a construct designated peer group interaction (PGI). As defined, PGI incorporates activities such as encouraging team effort, supporting group goal attainment, developing and exchanging job-related information, and contributing to mutually satisfying relationships through attentive/supportive interpersonal behaviors. Such behaviors should be perceived by individual work group members as affecting intragroup relations, commitment to group objectives, and acceptance of procedures established to accomplish these objectives (Likert, 1967). Because various studies have suggested that positive

affective intragroup processes have positive effects on group member behavior (Beer, 1976; Bowers & Seashore, 1966; Kolodny & Kiggundu, 1980; Stogdill, 1972), significant relationships were expected between PGI and various work outcomes. Such effects were found.

Since PGI was construed to be a perceived organizational characteristic (Payne, Fineman, & Wall, 1976), the research in question was conducted and thus could only be explained at an individual level of analysis. In counterpoint, the present study was performed in an attempt to determine if PGI has supraindividual importance. Given the apparent connection between PGI and various group level constructs, it is legitimate to question whether PGI (a) has meaning at a group level and (b) affects individual work outcomes after controlling for the influence of individual reactions with respect to PGI. In the context of syntality theory, it could reasonably be assumed that positive PGI has an impact on individual work outcomes beyond that explained by individual members' particular perceptions of PGI. One means of tapping PGI at the group level of measurement is to utilize data aggregation (Roberts & Burstein, 1980; Roberts, Hulin, & Rousseau, 1978). A common method through which aggregate measures are operationalized is the use of unit or group means. Although alternative indicators of group level measures exist (Burstein, 1980), group means were used in the present investigation because of their widespread acceptance in multilevel studies.

METHOD

Characteristics of the sample and instruments are briefly summarized below.

Subjects

The primary sample for the study was 164 nursing employees participating in a larger research effort. For the present multilevel analysis, only participants belonging to groups of three or more (only three triads occurred) were studied. This reduced the sample to 18 groups totaling 112 individuals. Groups ranged in size from 3 to 15 members and included employees working all three shifts of the hospital's six services. All measures except performance were gathered using a survey questionnaire administered during work hours.

Measures

Peer group interaction was identified through a factor analysis of Survey of Organizations (SOO) questionnaire items (Taylor & Bowers, 1972) dealing with leadership, organizational climate, satisfaction, and group related dimensions. Four factors were extracted using an item factor loading of .50 as a cutoff point. Three factors accounting for 95.1% of the common variance were considered interpretable. Following the procedures of Korth and Tucker (1975), the stability of these three factors was examined. Factor structures were determined within randomly selected halves of the sample, and congruency coefficients between the two structures were computed. All coefficients were greater than .95 ($p < .05$), indicating sufficient factor stability. One of three interpretable factors (consisting of 18 items) was composed of SOO scales pertaining to intra-group relations—peer interaction, work facilitation, peer goal emphasis, peer support, and group process. The factor was scored by summing across participant responses to the relevant items. It is noteworthy that aspects of the PGI measure parallel

several of the summary variables suggested by Hackman and Morris (1975) as influencing variations in group members' work behavior: interaction facilitation as team performance strategy; work facilitation as supplementing ability; goal emphasis and peer support as supplementing arousal and effort. Thus, PGI appears to tap an important type of group interactional process that influences member behavior.

Since PGI was composed of a set of perceptions held by individuals about group interaction processes, participant responses served as operational measures of PGI at an individual level. Group level measures were formed by calculating unit group means and assigning the resulting mean score to each group member.

Employee performance was tapped by supervisory ratings across five separate dimensions: quantity, quality, and knowledge of work, dependability, and overall performance. Since the five dimensions were considered to be related, they were summed to form a global index.

Propensity to leave was measured by a three-item instrument developed by Lyons (1971) specifically for nursing personnel. Job tension was composed of three items developed by Lyons in the same study. Finally job satisfaction was measured using five SOO questionnaire items gauging satisfaction with work group, job, organization, past progress, and future potential in the organization.

Analyses

A contextual approach was employed in the multilevel analysis (Burstein, 1980). Given present theoretical rationale, individual level PGI responses were entered first in a hierarchical regression model in order to control variation in the work outcome measures attributable to the

individual level of analysis. Next, group level PGI was entered into the regression equation. If this variable accounted for significant increments in variance explained, evidence for group level effects due to PGI would exist.

Some amount of homogeneity of within-group variance must exist before an aggregate measure such as group level PGI may be used (Roberts, Hulin, & Rousseau, 1978). This ensures that a concept developed to measure individual reactions is also applicable to higher units of analysis. Following techniques suggested by James and his colleagues (James, 1982; James, Demaree, & Hater, 1980), eta coefficients were computed to estimate within-group agreement across nursing groups.

RESULTS AND CONCLUSIONS

Descriptive statistics for the study variables are shown in Table 1. Individual level PGI was positively related to satisfaction and negatively related to tension and propensity to leave. A similar pattern held for group level PGI, although the magnitude of relationships was lower. Finally, the common variance between group and individual PGI was moderate. Coefficient alpha reliability estimates for these variables were acceptable, ranging from .75 to .95. The eta coefficient (η) computed for homogeneity was .50. Thus, 25% of the total variation in PGI was associated with between group differences, indicating a moderate amount of within-group agreement. Though no formal guidelines exist for establishing the minimal level of η^2 needed to justify aggregation (see Jones & James, 1979), it was felt that for exploratory purposes the η^2 obtained was sufficient.

TABLE 1
Descriptive Statistics and Intercorrelations Among Study Variables

Variables	M	SD	r				
			2	3	4	5	6
1. PGI (individual)	3.39	.77	.50	.57	-.36	-.34	.01
2. PGI (group)	3.39	.39		.33	-.17	-.26	.12
3. Satisfaction	3.88	.76			-.40	-.52	.15
4. Tension	2.39	.92				-.40	-.10
5. Propensity to leave	2.09	.87					-.08
6. Performance	3.63	1.03					

NOTE: Correlations greater than .16 are significant at $p \leq .05$.

The individual level measure of PGI accounted for nearly all of the variance explained with regard to the study's dependent variables. The R^2 terms and partial F-test values for the variables were as follows: satisfaction, $R^2 = .33$, $F = 28.69$, $R^2 = .00$, $F < 1$; tension, $R^2 = .13$, $F = 11.70$; propensity to leave, $R^2 = .12$, $F = 5.67$. With the exception of performance, all of the partial-F values were significant at the .05 level. The addition of group level PGI did not increase the R^2 value for any variable by more than .02. Thus, group level PGI did not explain significant amounts of variance in the work outcomes beyond that explained by individual level PGI. The impact of shared variance on the explanatory power of the PGI measures was examined by entering group level PGI into the regression first, followed by individual level PGI. For all variables except perfor-

mance, individual level PGI significantly added to the variance explained by group level PGI alone.

These results corroborate previous conceptualizations of PGI as a perceptual variable. As operationalized by aggregation, group level PGI has a negligible impact on individual work outcomes. It appears that an individual's perception of group interactional processes does a better job of explaining work attitudes and behavior than does the relative positioning of an individual's group with respect to interactional processes. Though it may generally be expected that individual versus group level variables will explain more variance in individual attitudes and behavior (i.e., individual differences are almost invariably larger than group differences [Hauser, 1970]), the size of the differences in explanatory power of individual and group level variables further underscores the present interpretation.

Regardless of the lack of evidence for group effects per se, the present research demonstrates the usefulness of multilevel analysis. Simultaneous assessments of constructs at the individual and group levels permit researchers to partition attitudinal and behavioral variance into different components and examine the potential influence of one or both. If group as well as individual processes do influence human behavior, it is essential that research paradigms be developed to better investigate these influences.

A basic implication of the reported findings is that training to increase positive intragroup interactions is of value. However, it may well be that it is the influence of such training on individuals, as much as groups per se, that will be responsible for improved group functioning. Further, in the context of group development efforts, it may be important to measure success in terms of within-group as well as between-group reactions. The presence

of a few individuals with negative evaluations of group interaction processes could stymie group functioning despite most members having a higher than average estimation of the favorableness of such processes. This condition might arise especially in the context of a largely conjunctive or interactive task. The findings of this study intimate however that at least for the task context examined, individual reactions will not be greatly influenced by such a group minority.

Along similar lines, the present findings hold clear implications for group facilitators and organization development (OD) specialists. Taking a systems view, OD in particular emphasizes the interconnectedness of organizational phenomena at all levels. Thus, within this perspective, if one wants to induce change in an organization, one must focus on the organization as a whole and not just on its distinct components. Activities such as team building and intergroup interventions are intended to increase the incidence with which organizational problems are confronted, both within groups and among groups. The success of these and other OD activities requires efforts to increase both individual and group effectiveness. This is so since group (or larger aggregate) training largely occurs through individual information-processing abilities. OD practitioners must by necessity serve multiple constituencies when they attempt change at any level conceptually above the level of the individual. This is not to say that synergistic effects may not occur along with individual effects. It does mean though that it is important for OD practitioners to generate, collect, and analyze data at both the individual and group levels, so that if they may fully comprehend the undercurrents involved in change efforts. Additionally, in an ethical context, trainers promising group effects must be careful that the process used to foment these

effects acts as a catalyst at the group level and not just the individual level.

In closing, several cautions must be noted. First, as others have suggested (see Rousseau, 1978; Vecchio, 1982), cross-level analyses with aggregate measures formed from individual level measures may involve method bias. This bias will generally act to depress the probability of finding group level effects. However, in the present study individual level variables explained two to three times more additional variance than group-level variables when group variables were entered first into their respective regression equations. Thus, this bias would not appear to have greatly influenced the results obtained. Second, the groups employed in the present study were of varying sizes, due to naturally defined work groupings. In this respect, some researchers have suggested that unit size can have an influence on worker affective reactions (Porter & Lawler, 1965). Such influences may have affected the present findings even though group sizes did not vary widely.

REFERENCES

- Beer, M. The technology of organization development. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.
- Bowers, D. G., & Seashore, S. E. Predicting organizational effectiveness with a four-factor theory of leadership. *Administrative Science Quarterly*, 1966, 11, 238-265.
- Burstein, L. The analysis of multilevel data in educational research and evaluation. In L. Schulman (Ed.), *Review of research in education*. Itasca, IL: Peacock, 1980.
- Cattell, R. B. Concepts and methods in the measurement of group syntality. *Psychological Review*, 1948, 55, 48-63.

- Cummings, T. S., & Griggs, W. Worker reactions to autonomous work groups: Conditions for functioning, differential effects and individual differences. *Organization and Administrative Sciences*, 1977, 7, 87-100.
- Firebaugh, G. Groups as contexts and frog ponds. In K. H. Roberts and L. Burstein (Eds.), *New directions for methodology of social and behavioral science: Issues in aggregation*. San Francisco: Jossey-Bass, 1980, 43-52.
- Galtung, J. *Theory and methods of social research*. New York: Columbia University Press, 1967.
- Hackman, J. R. Group influences on individuals. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.
- Hackman, J. R., & Morris, C. G. Group tasks, group interaction process and group performance effectiveness: A review and proposed integration. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 9). New York: Academic Press, 1975.
- Hauser, R. M. Context and consex: A cautionary tale. *American Journal Sociology*, 1970, 75, 645-654.
- James, L. R. Aggregation bias in estimates of perceptual agreement. *Journal of Applied Psychology*, 1982, 67, 219-229.
- James, L. R., Demaree, R. G., & Hater, J. J. A statistical rationale for relating situational variables and individual differences. *Organizational Behavior and Human Performance*, 1980, 25, 354-364.
- Jones, A. P., & James, L. R. Psychology climate: Dimensions and relationships of individual and aggregated work environment perceptions. *Organizational Behavior and Human Performance*, 1979, 23, 201-250.
- Kanawaty, G., Thorsrud, E., Semiono, J. R., & Singh, J. P. Field experiences with new forms of work organization. *International Labor Review*, 120, 1981, 263-277.
- Kolodny, H. F., & Kiggundu, M. N. Towards the development of a sociotechnical systems model in woodlands mechanical harvesting. *Human Relations*, 1980, 33, 623-645.
- Korth, B., & Tucker, L. B. The distribution of chance congruence coefficients from simulated data. *Psychometrika*, 1975, 40, 361-372.
- Kozan, K. Work group flexibility: Development and construct validation of measure. *Human Relations*, 1982, 35, 239-259.
- Likert, R. *The human organization*. New York: McGraw-Hill, 1967.
- Lyons, T. Role clarity, need for clarity, satisfaction, tension, and withdrawal. *Organizational Behavior and Human Performance*, 1971, 6, 99-110.
- Mossholder, K. W., Bedeian, A. G., & Armenakis, A. A. Group process-work outcome relationships: A note on the moderating impact of self-esteem. *Academy of Management Journal*, 1982, 25, 575-585.
- Payne, R. L., Fineman, S., & Wall, J. D. Organizational climate and job satisfaction: A conceptual synthesis. *Organizational Behavior and Human Performance*, 1976, 16, 45-62.
- Porter, L. W., & Lawler, E. E. Properties of organization structure in relation to job attitudes and behavior. *Psychological Bulletin*, 1965, 64, 23-51.

Roberts, K. H., & Burstein, L. (Eds.). *New directions for methodology of social and behavioral science: Issues in aggregation*. San Francisco: Jossey-Bass, 1980.

Roberts, K. H., Hulin, C. L., & Rousseau, D. *Developing an interdisciplinary science of organizations*. San Francisco: Jossey-Bass, 1978.

Rousseau, D.M. Measures of technology as predictors of employee attitudes. *Journal of Applied Psychology*, 1978, 63, 213-218.

Shiflett, S. Toward a general model of small group productivity. *Psychological Bulletin*, 1979, 86, 67-79.

Steiner, I. D. *Group process and productivity*. New York: Academic Press, 1972.

Stogdill, R. M. Group productivity. *Organizational Behavior and Human Performance*, 1972, 8, 26-43.

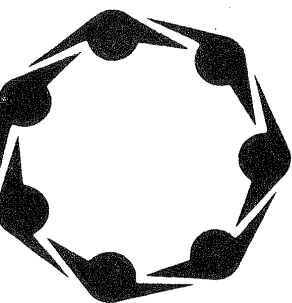
Taylor, J., & Bowers, D. G. *Survey of organizations*. Ann Arbor: Institute for Social Research, University of Michigan, 1972.

Vecchio, R. P. A further test of leadership effects due to between-group variation and within-group variation. *Journal of Applied Psychology*, 1982, 67, 200-208.

Zander, A. *Making groups effective*. San Francisco: Jossey-Bass, 1982.

Kevin W. Mossholder is an associate professor in the Department of Management at Auburn University. His research interests include behavioral control and appraisal systems, multilevel analysis, role stress, and human resource issues. He has published articles on these topics in such journals as Organizational Behavior and Human Performance, Academy of Management Journal, Academy of Management Review, and Journal of Applied Psychology.

Arthur G. Bedeian is Edward L. Lowder Professor of Management, Auburn University. His research interests include the impact of role strain, measurement of change, and small group behavior. He is the author of Management (Dryden Press, 1983) and Organizations: Theory and Analysis (Dryden Press, 1984).

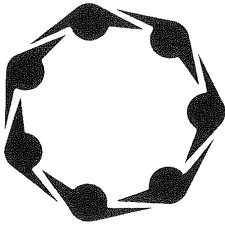


INDIVIDUAL PSYCHOLOGY

The Journal of Adlerian
Theory, Research
& Practice

Volume 44, Number 4, December 1988

Published by the University of Texas Press
for The North American Society
of Adlerian Psychology



Birth Order and Selected Work-Related Personality Variables

**Antoinette S. Phillips, Arthur G. Bedeian,
Kevin W. Mossholder, and John Touliatos**

A possible link between birth order and various individual characteristics (e.g., intelligence, potential eminence, need for achievement, sociability) has been suggested by personality theorists such as Alfred Adler (1956) for well over a century. Since the publication of Sir Francis Galton's *English Men of Science* (1874), hundreds of researchers have relentlessly sought to replicate and extend his birth order findings. While Galton reported an overrepresentation of firstborn and only sons among British scientists, succeeding researchers have investigated the association between birth order and an almost endless array of psychological, physiological, and sociological factors. While much of the extant research conflicts, a limited number of generally agreed on findings have emerged. For example, it has been shown that relative to later borns, firstborns seek greater acceptance, have a stronger need for achievement, are more likely to achieve intellectual eminence, are judged as more dependent, more serious, more seclusive, and more sensitive. In contrast, relative to first borns, later borns are more popular, more gregarious, and more socially oriented (for a review, see Ernst & Angst, 1983).

Birth Order and Work-Related Personality Variables

Since existing research has shown birth order to be related to various individual characteristics such as intellectual achievement and need for achievement, it would seem appropriate to investigate its

- Friedan, B. (1981). *The Second Stage*. New York: Summit Books.
- Greer, G. (1984). *Sex and Destiny*. New York: Harper & Row.
- Hammer, M. (1970). Preference for a male child: Cultural factor. *Journal of Individual Psychology*, 26, 54–56.
- Jong, E. (1981, October). A New Feminist Manifesto. *Saturday Review*, pp. 66–68.

association with different personality variables that may be related to various work outcomes. Of interest to managers is the question of whether birth order can result in predictable job-related behaviors. If true, birth order data may take on significance in the employee selection process. Specifically, if certain sibship positions are shown to be successful in specific professions, or more predictive of managerial potential, these data would constitute valuable input in employee selection decisions.

While general studies abound, few birth order investigations have been conducted in organizational settings. In a review of relevant literature, Heer (1985) reports that the results are nonsignificant or nonsignificant between number of siblings and both job status and earnings. Along the same lines, Berger and Ivancevich (1973) studied the relationship between birth order and average rate of earnings progression. They found that middle managers who were firstborn or only children had the highest progression rates.

Dubno and his colleagues (Dubno, Bedrosian, & Freedman, 1966) and Dubno & Freedman (1971) have conducted two studies on birth order and managerial achievement. The first involved a simple correlation of managerial rank (middle or top) with ordinal position. Interestingly, they found a nonsignificant difference between numbers of firstborns and later borns at top levels, but a preponderance of firstborns in middle positions. They interpreted these findings in terms of conformity by positing that since firstborns are more likely to conform to expectations of others, they lack the creative genius necessary to advance in greater proportions to top management.

In his second study, Dubno (Dubno & Freedman, 1971) analyzed birth order frequencies using college education and managerial attainment as moderators. In line with previous findings (Altus, 1966) there was a strong birth order effect for college graduates, but none for non-graduates.

Hypotheses

The present study attempts to examine the association between birth order and a number of personality variables that may be related to various work outcomes. Of particular interest were two special-purpose scales derived from the California Psychological Inventory (CPI; Gough, 1975). Gough (1984) has developed and validated a managerial potential scale derived from CPI items found to differentiate managers from nonmanagers (Goodstein & Schrader, 1963). If we view managerial potential as a measure of achievement propensity, we would expect firstborns to rate higher than later borns.

Work orientation is a second special scale designed by Gough (1985) to assess "the sense of commitment and obligation to work that one finds in persons of exceptionally conscientious, dependable, and self-disciplined temperament" (p. 505). Given indications that firstborns are more approval-seeking than later borns, they should also rate higher on this scale.

Likewise, due to their stronger need for achievement, firstborns should rate higher than later borns in leadership potential. Leadership potential, including characteristics such as aggression, confidence, persistence, and persuasiveness, can be assessed using the CPI measure of dominance (Gough, 1975).

Good impression (Gough, 1975) identifies persons concerned with making a good impression and how others react to them. Firstborns would again be expected to score higher than later borns because of their desire to meet others' expectations and their vulnerability to others' opinions.

Observed differences between firstborns and later borns lead to two hypotheses concerning achievement. Firstborns should score higher than later borns on achievement via conformity (Gough, 1975), which includes being industrious and persistent, and valuing intellectual activity and achievement. In contrast, later borns should score higher than firstborns on achievement via independence (Gough, 1975), which is related to autonomy and self-reliance. Finally, later borns should score higher than firstborns on sociability (Gough, 1975), given their outgoing and sociable nature.

In summary, the following seven specific hypotheses are suggested: Firstborns should score higher than later borns on:

1. Managerial potential
2. Work orientation
3. Dominance
4. Good impression
5. Achievement by conformity.

- Later borns should score higher than firstborns on:
6. Achievement by independence
 7. Sociability.

Method

Subjects. The study's sample consisted of 835 public, government and industrial accountants responding to a national survey of account professionals. Participants in the survey were randomly selected from membership rosters of the American Society of Certified Public Accountants, Association of Women Accountants, National Association of Government Accountants.

Measures. The California Psychological Inventory (CPI; Gough, 1975) was used to assess the personality characteristics of interest. The CPI contains eighteen scales subsumed under four categories: (1) Poise, Ascendancy, Self-Assurance, and Interpersonal Adequacy; (2) Socialization, Maturity, Responsibility, and Interpersonal Structuring of Values; (3) Achievement Potential and Intellectual Efficiency; and (4) Intellectual and Interest Modes. Five of these scales—dominance, good impression, achievement via conformity, achievement via independence, and sociability—were used in the present study. In addition, the managerial potential (Gough, 1984) and work orientation (Gough, 1985) special purpose scales of the CPI were used to measure these constructs.

All participants completed a biodata questionnaire in which birth order information was included along with general items such as gender, age, family data, and education-related questions.

Analysis

The focal hypotheses were examined using multiple analysis of variance (MANOVA). Birth order was treated as a predictor (independent variable), with the various identified personality variables serving as criterion (dependent variables). The Bartlett-Box *F*, Cochran's *C*, and Box's *M* tests were conducted to assess the homogeneity of the individual and pooled variance-covariance matrices. Univariate *F*-tests, followed by discriminant function analysis, were then performed to identify significant differences between firstborns and later borns relevant to the study's seven hypotheses.

Results

The study's sample included 373 firstborns (from families with two or more children) and 462 later borns. Only borns were excluded from the analysis although they are often collapsed into a single group along with firstborns (Sampson, 1965) because of supposed similarities between the two groups. While it is true that both first and only children have undivided access to parents (at least for a time, in the case of firstborns; Altus, 1966) only borns are similar to youngest children in that neither experiences superiority with respect to a younger, less-experienced sibling (Warren, 1966). To avoid possible contamination of results, this group was excluded from the ensuing analysis.

The Bartlett-Box *F*, Cochran's *C*, and Box's *M* tests supported the assumption of homogeneity of the individual and pooled variance-co-

variance matrices. MANOVA results indicated a significant main effect for birth order, $F(7,827) = 2.16, p < .05$.

Given the high intercorrelations ($r = .384$) among the study's dependent variables, structure coefficients rather than standardized discriminant function coefficients were utilized in the following discriminant analysis. As compared to standardized discriminant function coefficients, structure coefficients are less influenced by correlations. Moreover, when variables are correlated, discriminant function coefficients share discriminant weights, making interpretation difficult (Norusis, 1985, p. 214).

Differences between firstborns and later borns were found for dominance ($F[1,883] = 4.87, p < .05, \omega^2 = .005$); good impression, ($F[1,833] = 7.52, p < .01, \omega^2 = .008$); and achievement via conformity, ($F[1,833] = 5.23, p < .05, \omega^2 = .005$), with firstborns scoring higher on each measure. Hypotheses 3, 4, and 5 were thus supported.

Hypotheses 1, 2, 6, and 7 concerning managerial potential, work orientation, achievement via independence, and sociability were not supported, with no differences existing between firstborns and later borns.

Discussion

The present study was designed to determine if birth order is associated with selected personality variables that may be related to various work outcomes. Three of seven hypotheses were supported and the effect sizes for these were small. Firstborns scored significantly higher than later borns on measures of dominance, good impression, and achievement via conformity. No differences between firstborns and later borns were found in managerial potential, work orientation, achievement via independence, and sociability.

The nature of our sample may have been partially responsible for the results obtained. Its homogeneity may have caused any birth order effects to wash out. It can be argued that successful membership in the accountancy profession requires internalization of a set of prescribed rules and standards. If we follow the conformity argument of Dubno et al. (1969), it may be that accountants as a group are locked in to a behavioral framework. Any differentiation would then result from spurious interpersonal differences, not from predictable birth order-related characteristics.

A final interpretation is that birth order effects are nonexistent or statistical artifacts. Given the present data and particularistic sample, however, we have insufficient information from which to draw such a conclusion. Does birth order have a significant effect on life and work outcomes? Evidence at this point is inconclusive at best. Only after more careful, thorough research will this question be answered.

Table 1
 Characteristics of Firstborns and Later Borns

Variable	Firstborns (<i>n</i> = 373)	Later Borns (<i>n</i> = 462)	Total Sample (<i>n</i> = 835)
Managerial potential			
<i>M</i>	23.79	23.45	23.60
<i>SD</i>	5.21	4.93	5.06
Work orientation			
<i>M</i>	30.70	30.66	30.68
<i>SD</i>	4.79	4.45	4.60
Dominance			
<i>M</i>	31.70	30.76	31.18
<i>SD</i>	6.25	5.97	6.11
Good impression			
<i>M</i>	18.05	16.97	17.45
<i>SD</i>	5.81	5.56	5.69
Achievement via conformity			
<i>M</i>	29.40	28.78	29.06
<i>SD</i>	3.98	3.78	3.88
Achievement via independence			
<i>M</i>	21.84	22.00	21.93
<i>SD</i>	3.85	3.47	3.64
Sociability			
<i>M</i>	25.17	24.55	24.83
<i>SD</i>	5.26	5.25	5.26

Note: Firstborns coded = 1; later borns coded = 2.

Table 2
Univariate Analysis of Variance with Work-Related Personality Variables
as the Dependent Set

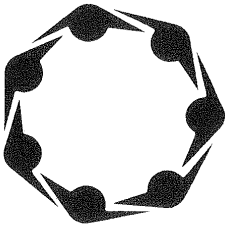
Variable	MS Between Groups	Univariate F^a	$p <$	Structure Coefficients
Managerial potential	22.976	.899	.343	.243
Work orientation	.323	.015	.902	.032
Dominance	181.314	4.872	.028 ✓	.566
Good impression	242.010	7.524	.006 ✓	.703
Achievement via conformity	78.158	5.225	.023 ✓	.586
Achievement via independence	4.550	.343	.559	-.150
Sociability	81.041	2.936	.087	.439

Note: Multivariate $F(7,827) = 2.16, p < .05$
 $^a df = 1/833.$

References

- Adler, A. (1956). *The Individual Psychology of Alfred Adler: A systematic presentation in selections from his writings*. H. L. Ansbacher & R. R. Ansbacher (Eds.). New York: Basic Books.
- Altus, W. D. (1966). Birth order and its sequelae. *Science*, *151*, 44–50.
- Berger, P. K., & Ivancevich, J. M. (1973). Birth order and managerial achievement. *Academy of Management Journal*, *16*(3), 515–519.
- Dubno, P., Bedrosian, H., & Freedman, R. (1969). Birth order, conformity, and managerial achievement. *Personnel Psychology*, *22*, 269–279.
- Dubno, P., & Freedman, R. D. (1971). Birth order, educational achievement, and managerial attainment. *Personnel Psychology*, *24*, 63–70.
- Ernst, C., & Angst, J. (1983). *Birth order: Its influence on personality*. New York: Springer-Verlag.
- Galton, F. (1874). *English men of science: Their nature and nurture*. London: McMillan.
- Goodstein, L. D., & Schrader, W. J. (1963). An empirically-derived mana-

- gerial key for the California Psychological Inventory. *Journal of Applied Psychology*, 47, 42–45.
- Gough, H. G. (1975). *Manual for the California Psychological Inventory* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.
- Gough, H. G. (1984). A managerial potential scale for the California Psychological Inventory. *Journal of Applied Psychology*, 69, 233–240.
- Gough, H. G. (1985). A work orientation scale for the California Psychological Inventory. *Journal of Applied Psychology*, 70, 505–513.
- Heer, D. M. (1985). Effects of sibling number on child outcome. *Annual Review of Sociology*, 11, 27–47.
- Norusis, M. J. (1985). *SPSS^x advanced statistics guide*. New York: McGraw-Hill.
- Sampson, E. E. (1965). The study of ordinal position: Antecedents and outcomes. In B. A. Maher (Ed.), *Progress in Experimental Personality Research* (pp. 175–228). New York: Academic Press.
- Warren, J. R. (1966). Birth order and social behavior. *Psychological Bulletin*, 65, 38–49.



Birth Order, Substance Abuse, and Criminality

Samuel M. Stein, Sylvain De Miranda, and Abigail Stein

This study was conducted to determine whether a relationship exists between birth order, substance abuse, and criminality. The population group comprised 73 confirmed substance abusers undergoing in-patient rehabilitation at Phoenix House Drug Rehabilitation Centre, Johannesburg, South Africa. Data analysis highlighted the tendency of firstborn males to indulge in delinquent behavior, including substance abuse and criminal activities.

Alfred Adler's hypothesis linking birth order and personality development (1924) has generated more than 1,000 studies which both support and refute his statement (Klein, 1984). With both critics and advocates having published substantiating data, the first step in researching ordinal position is to decide whether the concept of birth order holds any validity.

Although Schooler (1972) declared that "birth order effects are largely without consistent evidence," we found greater support for Gecas et al. (1983) who feel that "children occupying different positions in the sibling order, experience different patterns of interaction with parents and siblings."

Depending on their birth order, children are confronted with emotions and circumstances that differ significantly from those of their siblings—undoubtedly contributing to and influencing their progressive personality development.

Initially, older children have the franchise on familial emotions, time, and economic resources but later bear the brunt of increased expectations and responsibility. The younger child is compen-