

## **Testing the "Glass Ceiling" Effect on Gender Differences in Upper Level Management: The Case of Innovator Orientation**

**Geir Kaufmann**

*Institute of Organization and Leadership; Norwegian School of Management, Bergen, Norway*

**Scott G. Isaksen**

*Center for Studies in Creativity, Buffalo State College, USA*

**Ken Lauer**

*Creative Problem Solving Group, Buffalo, USA*

The issue of the "glass ceiling" effect on gender differences in upper level management was addressed. Three different explanations of the gender difference in participating at upper level management were tested, and designated as the Stereotype theory, the Experience theory, and the Personality theory. The first claims the "glass ceiling" effect to be a genuine phenomenon, while the two latter ones disclaim the concept in favour of alternative interpretations. 553 surveys (405 males and 148 females) at different managerial levels responded to a questionnaire measuring adaptor vs. innovator orientations in problem solving. Results show a significant interaction between gender and managerial level on innovation-oriented problem solving, where females at the executive level exhibit a strikingly higher innovator score than their male colleagues. The results are taken as support for the Stereotype theory. Finally, some limitations of the present study are pointed out, and suggestions for further studies are made.

In spite of extended and strong political efforts to influence the process of promoting women for leadership positions, the traditional gender differences in the occupation of management and leadership positions are still strong and seem to be particularly resistant to change. Admittedly, there has been a significant increase from 6% to 39% of women in management in the period from 1960-1988 (Bureau of Labor Statistics, 1988), but this increase has largely been concentrated in the lower ranks of management, and women are still conspicuously under-represented in more powerful

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Requests for reprints should be addressed to Dr G. Kaufmann, Institute of Organization and Leadership, Norwegian School of Management, Elias Smith vei. 15, P.O. Box 580, 1301 Sandoika, Norway.

management positions at the upper echelons of leadership. In the US, only about 5% of women hold middle management positions, and at the top level the figure is as low as 1–2% (Brown, 1979; Dipboye, 1987; Morrison, 1992; Morrison & Von Glinow, 1990).

This pattern seems to be quite general. In Norway, equality of opportunities for men and women is a very strong cultural value. Considerable political pressure, in the form of influencing opinion towards more gender equity in powerful positions such as higher level management, has been exerted. For a long period, women have held half of the cabinet positions in government. Implementation of policy measures such as gender quotas has also been used to reach an improved gender job equity. Yet, the percentages of women in different levels of management is strikingly similar to the US statistics (Bergens Tidende, 1995).

Several explanations have been offered for the strongly skewed gender representation in management at higher levels. In the present article we will concentrate on two of the major theories that have been subjected to empirical research. We will then introduce a third alternative explanation that will be the target for an empirical test.

### THE STEREOTYPE THEORY

According to Lord and Maher (1991), the core defining aspect of leadership is perceptual in the sense that a leader is a person that is *perceived* to be a leader. This may be pushing the subjective, perceptual dimension of leadership to an excessive extreme. However, few will doubt that perceptions of leadership are crucial to the promotion and acceptance of a leader.

From a cognitive perspective, such job perceptions may be seen as based on schemas, stereotypes, and prototypes (*cf.* Perry, Davis-Blake, & Kulik, 1994). Schemas constitute the more general type of cognitive representation. A schema typically may leave some attributes unspecified, whereas a prototype represents a single instance, where all features are coded in the form of default values (*cf.* Fiske & Taylor, 1984). A stereotype is a special case of schema, where general, often very stylized, perceptions of people falling into clearly definable categories, such as race, age, and gender, are organized. A job-holder schema organizes perceptions about people who perform a particular job, such as “professor”, “secretary”, and “manager”.

According to the definition of schema given above, such job-holder schemas extract “gist” information, and are often a powerful determinant of interpretation, organization, and processing of information. New subschemas may be developed on the basis of repeated, differentiating experience, and schema may be reorganized in the light of repeated and consistently deviating experiences. However, a large number of findings both

in experimental cognitive psychology and in the area of social cognition show consistently that there is a considerable degree of inertia in such change processes, and that schemas are often extremely resistant to change (cf. Anderson, 1990; Lord & Maher, 1991; Perry, Davis-Blake, & Kulik, 1994).

In the domain of management and leadership, research shows quite consistently that male-trait stereotypes overlap to a considerable degree with traits associated with the "successful manager". This holds true for student samples (Powell & Butterfield, 1979; Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968) as well as for actual management samples (Brenner, Tomkiewicz, & Chilstrom, 1989; Schein, 1973, 1975). Exactly the opposite is true for women. Female-trait stereotypes have been demonstrated to differ significantly from the overlapping zone between male- and manager-trait stereotypes (cf. Dubno, 1985; Heilman, 1983). Such findings have important consequences for judgements based on schema-driven information processing, where "female" and "leadership" categories are involved. Adding to this effect are findings suggesting that it is difficult to access different categories, such as "leadership" and "gender", simultaneously, due to basic cognitive processing capacity limitations (cf. Srull & Wyer, 1989). Such conditions will have a tendency to aggravate bias in social perceptions and judgements.

Lord and Maher (1991) put forward an interesting argument to the effect that stereotypically biased perceptions and judgements in the context of gender and leadership may be particularly strong at higher levels of leadership. They distinguish between "direct" and "indirect" influences of leadership behaviour. Direct behaviours, such as supervision, are more easy to assess and, if consistent, may alter pre-existing schemas. Indirect behaviours, more typical at higher levels of leadership, such as influencing organizational culture, are not that visible and are far more difficult to assess as a basis for differentiation or revision of modifications of existing schema. Thus, we would expect that perceptions and judgements of leadership at higher levels are more prone to be guided by automatic, schema-driven information processing.

Moreover, Kanter (1977) has identified a mechanism of "homosocial reproduction", where persons having characteristics similar to powerful incumbents in organizations are more likely to gain entry to an inner circle.

The considerations presented above have the implications that women face a double uphill battle when seeking higher management positions. Due to the discordance of female- and leadership-trait stereotypes, schema-driven processing, and homosocial reproduction, women can be expected to be less visible in terms of candidacy for higher leadership. A consequence of this may be that women may have to prove that they are not just qualified, but *better* than qualified. Thus, we would expect that a

biased selection process is operating against female candidates, and that the qualification criteria for women are stiffer than for males with regard to leadership positions, particularly at the highest levels. This is the essence of the concept of a "glass ceiling" blocking the path to positions at the upper echelons of the organization (*cf.* Morrison, White, Van Velsor, & Center for Creative Leadership, 1987).

### THE EXPERIENCE HYPOTHESIS

In strong contrast to the stereotype-bias-discrimination hypothesis discussed above, the argument has been put forward that women have not been sufficiently long in the workforce to have the qualifications needed to gain positions at the higher levels of leadership. When the real qualifications are present, on the basis of education and the proper amount and kind of experience, males and females will be treated equally.

In line with this hypothesis, Kesner (1988), in a study of the corporate board structure of Fortune 500 companies, found that women were indeed less likely to be members of nominating and executive committees. But female directors were also correspondingly less experienced. Kesner took this to be a likely explanation of the unequal proportions of committee membership among males and females. Other studies have reported that qualifications can explain gender differences in job selection to a substantial degree (Graves & Powell, 1988; Olian, Schwab, & Haberfeld, 1988).

These findings are suggestive, but not definitive. A more direct and precise test of the experience hypothesis is needed. In a recently performed study by Bilimoria and Piderit (1994), an attempt was made at performing such an empirical test.

In this study, the dependent variable was membership on board committees. The major goal of the study was to examine if gender differences in board committee membership would be eliminated when the relevant experience-based qualifications were controlled for. Experience-based director characteristics included were director type (insider vs. outsider), board tenure, occupation (business vs. non-business), business interlocks (directorship of other boards), and non-business interlocks (director of non-corporate institutions, such as educational, religious organizations, etc.).

The effect of experience-based qualities was controlled for by partialling out the effect of this variable in a logistic regression analysis. The main result of the analyses performed was that a pervasive gender bias in the selection of committee members, favouring males, still existed. Bilimoria and Piderit (1994) concluded that the most likely explanation of the observed gender differences was stereotypical perceptions and judgements as described in the preceding theory.

### THE PERSONALITY THEORY

We may still argue, however, that even if experience and formal qualifications are the same for males and females, there may exist significant differences among males and females in personal qualities and abilities related to effective management and leadership behaviour. These gender differences in qualities may then be thought to explain the differences observed in the occupation of leadership positions among males and females, without necessitating any assumptions about stereotypical and schema-based biases leading to discrimination against females.

Such qualities may be high drive, achievement orientation, dominance, toughness, ability to make strategic decisions, withstanding pressure, ability to take risks, willingness to take an unpopular stance, etc. The concept of "leadership qualities" constitutes such a comprehensive category that the testing of the hypothesis considered here requires a series of studies in the form of a concerted research programme, rather than a "crucial" test of a single study.

In the present study we focus on one particular aspect of leadership that may seem to be particularly relevant in the present context. This is the aspect of managing change, premised on its concomitant theoretically postulated leadership qualities. Making and managing change is a key aspect of top-level leadership (*cf.* Katz & Kahn, 1978). Presumably it requires abilities related to risk taking, opportunity seeking, willingness to go against and to be able to modify prevailing, traditional procedures and business paradigms. In essence these are qualities that constitute a personality syndrome that may be termed "innovator orientation". This complex of qualities is of special interest in the present context, since there is a large number of psychological studies that seem to show significant, and often substantial, gender differences in favour of males in innovation-oriented problem solving (Kirton, 1989; Maier, 1970; Tyler, 1965).

The aim of the present study is to perform an empirical test of this hypothesis, by examining proportions of males and females at different levels in the organization, and how they score on a measure of innovative vs. adaptive orientation in problem solving. A subsidiary goal is to check the postulated experience factor, by including age as a control factor in the analyses.

According to the stereotype hypothesis we would expect that women face stricter demands for required leadership qualities than do males. Thus, we expect that there will be a significant interaction between gender and organizational level on the dependent innovator-adaptor variable. The stereotype theory in its "glass ceiling" version requires that, whereas females may score lower than their male counterparts at lower levels, they should score significantly higher than their male colleagues at the highest levels.

According to the theory of genuine gender differences in the required leadership qualities, there should be no such interaction effects. Males should outperform females in the general score across levels, and no significant differences should obtain at the highest levels.

## METHOD

### Subjects

553 subjects (405 males and 148 females) took part in the study. Mean age was 37.5 years with a range from 21 to 63 years. Subjects were drawn from different organizations consisting of a food products manufacturer, an advertising company, an industrial products manufacturer, a consumer products manufacturer, and a group of university business officers. Subjects were drawn from different managerial levels, and divided into upper ( $n = 39$ ), middle ( $n = 384$ ), and lower level ( $n = 130$ ).

### Instruments

As a measure of innovator orientation in problem solving, Kirton's Adaptor-Innovator Questionnaire (KAI) was employed. The measure is premised on a theory claiming that individuals possess relatively stable preferences for either an adaptive or an innovative problem solving strategy (Kirton, 1976, 1989). The adaptive preference is to stay within the confines of existing frameworks or "paradigms" for solving problems (doing things better), whereas the innovative preference consists in re-defining existing frameworks and change existing procedures and solution approaches (doing things differently).

A substantial body of research seems to show that the KAI is a reliable measure that can be used validly to describe such general preferences for approaching and solving problems (Kirton, 1989).

Based on factor analytic studies, Kirton (1987, 1989) suggests that the KAI scale can be further broken down into three subscales. The first subscale, Sufficiency vs. Proliferation of Originality, is held to measure the extent to which an individual prefers to produce original vs. sufficient ideas, and consists of 13 items. A sample item from the Originality subscale is item 15 "A person who copes with several new ideas and problems at the same time". The next subscale, Efficiency, is meant to capture the extent to which individuals are concerned with precision and reliability, and consists of seven items. A sample item of the Efficiency subscale is item 25, "A person who is methodical and systematic". The third subscale is referred to as Rule Group Conformity, measuring inclination to conform to norm and peer pressure. A sample item from the Conformity subscale is item 10, "A person who holds back ideas until they are obviously needed". This scale consists of 12 items.

## Procedure

Subjects completed the KAI as part of training sessions requested for creative problem solving in organizations. All subjects completed the KAI test prior to their attendance at the training sessions. Thus, there was no possibility of contamination of training experiences and scores on the KAI.

## RESULTS

A critical point of validation for the premise of the arguments put forward above is that innovator orientation as measured by the KAI significantly increases from low to high levels of management. As is seen in Table 1, this theoretical premise is met by the results in the present study.

From the lowest to highest level, a significant increase in KAI scores of 6.28 was obtained ( $F = 2.23, P = 0.015$ ). These results are consistent with the hypothesis that the personality attributes measured by KAI are requirements for higher level leadership in organizations.

The most critical comparison for testing the main hypothesis about gender-based "glass ceiling" effects in promotion to top-level leadership pertains to the distribution of KAI scores by gender across managerial levels. It is commonly observed that in the general population males score significantly higher than females on the KAI (Kirton, 1982, 1988, 1989). In the present study there was no significant difference. These findings are consistent with results reported by Kirton (1989) to the effect that there are small and often non-significant differences between males and females as member of organizations. Somewhat along the lines of the stereotype theory presented above, Kirton (1989) argues that this may be due to selective recruitment of males and females into the workforce. However, when KAI scores for males and females are analyzed across managerial levels, a striking gender difference appears. As shown in Table 2, males were found to be more innovatively inclined than females at the lowest managerial level, whereas females obtained almost a full standard deviation higher innovator score at the top, executive, level of leadership.

This interaction between managerial level and gender on KAI scores is clearly significant ( $F = 4.30, P < 0.014$ ). Strictly, the analysis of variance

TABLE 1  
KAI Scores for the Three Different Managerial Levels

	<i>High</i>	<i>Medium</i>	<i>Low</i>
Mean	106.59	104.83	100.02
<i>N</i>	39	387	130

TABLE 2  
Mean KAI Scores Across Managerial Level  
by Gender

<i>Managerial Level</i>	<i>Gender</i>	
	<i>Males</i>	<i>Females</i>
High	102.60 ( <i>N</i> = 30)	119.89 ( <i>N</i> = 9)
Medium	105.05 ( <i>N</i> = 282)	104.23 ( <i>N</i> = 102)
Low	101.18 ( <i>N</i> = 93)	97.81 ( <i>N</i> = 37)

performed above may be argued to violate the requirement of orthogonality of groups, since there are unequal numbers of subjects in the different groups of gender and level. To control for a potential contaminating effect of non-zero correlations between groups, a regression analysis was performed, where correlations between groups are partialled out, following the procedure recommended by Cohen and Cohen (1983). In this analysis the age variable was entered as the first variable through forced entry to control for the possible interpretation presented above, that gender differences at the executive level in organizations are spurious, and really reflect level of general experience, irrespective of gender. Thus age is being used as a proxy for experience. The results of this control analysis show that the gender-level product term is still significant in the same direction as shown in Table 2 ( $\beta = -0.104$ ,  $T = -2.10$ ,  $P = 0.036$ ).

In Fig. 1, the results of Table 2 are graphically represented in a regression plane. The most conspicuous feature clearly is the rather dramatic increase in KAI scores for females over levels, whereas the curve for males increases from low to medium, and then seems to taper off.

The personality traits most closely related to the innovator orientation are captured in the originality and the rule conformity subscales, and less so in the efficiency subscale. According to the hypothesis set forward in the present study, we would therefore expect that the gender by level interaction should be most marked in the two first subscales, and less in the last one.

The results show a significant increase in originality scores over levels (44.32, low level, 45.91, medium level, and 47.72, high level,  $F = 3.00$ ,  $P < 0.050$ ). In Table 3, the results for the originality subscale are analyzed by gender on managerial level. As can be seen, there is a marked increase in originality scores for females across managerial level. The interaction is statistically significant ( $F = 3.98$ ,  $P < 0.021$ ).



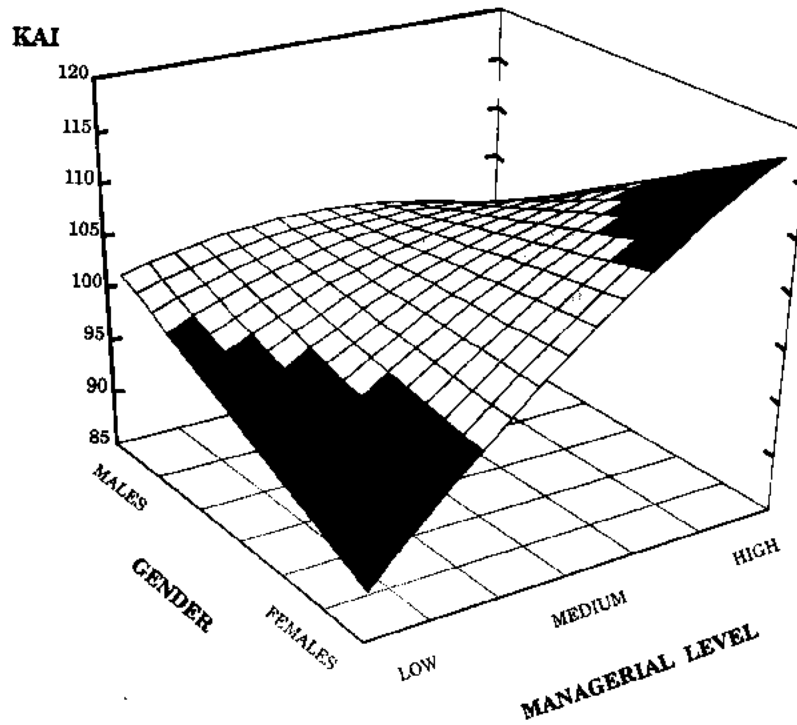


FIG. 1. Regression plane showing the distribution of KAI scores across managerial levels by gender.

TABLE 3  
Mean KAI Originality Scores Across  
Managerial Level by Gender

Managerial Level	Gender	
	Males	Females
High	45.83 (N = 30)	54.00 (N = 9)
Medium	45.88 (N = 283)	46.12 (N = 104)
Low	44.91 (N = 94)	43.03 (N = 37)

The same pattern is seen for the conformity variable. Table 4 presents the interaction analysis of gender by managerial level on KAI conformity scores. The difference between high/medium vs. low managerial level is statistically significant ( $F = 3.04, P < 0.050$ ).

The interaction effect between gender and managerial level is at the same level as in the case of originality ( $F = 4.06, P < 0.018$ ).

With the efficiency subscale score, however, a different pattern emerges. A significant difference between high and low managerial levels was observed (19.92 high vs. 18.67 low,  $F = 3.16, P < 0.043$ ), as in the two previous cases. But here there was no significant gender by level interaction.

Control analyses for all the analysis of variance results of the subscale scores were performed through regression analyses, with the age variable as first entry. All the significant results presented above remained significant throughout these analyses, and no contamination effects of the age variable were observed.

## DISCUSSION

Three different hypotheses were introduced as alternative explanations of the observed differences in higher level leadership office for males and females. According to the stereotype theory, females are blocked from promotion to higher office levels by stereotypical schema-based perceptions of leadership qualities, due to a significant overlap in leadership and male schemas. Alternatively, it has been argued that no concept of stereotyped schemas has to be invoked to explain these differences. Gender differences in higher office levels are held to be the natural cause of the fact that females have not been in the workforce long enough to have gained the experience necessary to hold the highest level office of leader-

TABLE 4  
Mean KAI Conformity Scores Across  
Managerial Level by Gender

<i>Managerial Level</i>	<i>Gender</i>	
	<i>Males</i>	<i>Females</i>
High	37.43 ( <i>N</i> = 30)	44.00 ( <i>N</i> = 9)
Medium	39.10 ( <i>N</i> = 282)	38.65 ( <i>N</i> = 102)
Low	37.80 ( <i>N</i> = 93)	35.81 ( <i>N</i> = 37)

ship. A third possible interpretation introduced in the present article projects the differences to be the possible cause of genuine gender-linked personality differences that tend to favour males for the job functions that go with higher office levels.

The results of the present study clearly favour the stereotyped schema theory. A corollary of this theory is that females have to exhibit a higher level of presumed top-level leadership qualities than their male colleagues in order to be visible as leadership candidates. The innovator orientation, presumed to be particularly important for the leader function of managing change, was shown to be significantly positively correlated with managerial level, as premised in the hypothesis under scrutiny. The most important finding, however, is clearly the significant interaction effect observed between gender and managerial level on scores on the KAI measure of adaptor-innovator orientation. Most conspicuously, the strikingly large difference between females and males in the KAI at the executive level in favour of females may be argued to be consistent with a strong version of the theory of a gender-based "glass ceiling" effect in upper level management. Results indicate that the leadership qualities required for females to get entry to the upper level of management may need to be strikingly higher for females to become visible as candidates for higher level leadership office. Consistent with hypotheses emerging from the stereotype theory, these differences seem to be most clearly expressed in the originality and non-conformity dimensions, whereas the interaction of gender and level was not observed for the efficiency variable.

No support was found for the experience hypothesis that was tested here by holding age constant in a forced entry regression analysis, although it may be argued that age is a rather crude estimation of experience. Seen in conjunction with the results of other studies, however, where partialling out experience on the basis of several measures of experience leaves a clearly significant difference between males and females in committee membership at highest board level, the results observed here add force to the conclusion that experience alone cannot account for the significant differences observed between membership at upper level management between males and females.

The personality theory, as formulated here, does not receive any support either. No significant differences in KAI scores between males and females were observed, and the higher level of KAI scores for females at the executive level are clearly contrary to the hypothesis.

Several limitations of the present study have to be pointed out, however. The present data are basically correlational in nature and no clear causal inferences can be drawn from the results. Furthermore, the measurements are subjective reports on a questionnaire, and it could be argued that these differences do not reflect genuine differences in personality or style, but

rather project subjective expectations of how female leaders are *supposed* to be. The "glass ceiling" could be a myth that the female subjects project through distorted belief systems about differences between male and female top leaders.

Contrary to this interpretation, however, a large and consistent body of research documents quite clearly that KAI is a valid measure of performance (Kirton, 1988, 1989). Nevertheless, it is clearly necessary to validate further the implications of the results of the present study by objective, performance-based measurements of innovator-oriented problem solving.

If the results of the present study can be further replicated and validated along the lines suggested above, several interesting implications follow. Most importantly, perhaps, would be the point that there is a large amount of untapped leadership potential for upper level management among females. The challenge for members and practitioners is to develop valid methods for identifying and nurturing innovative potential in organizations.

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