The Relationship of Social Power to Visual Displays of Dominance Between Men and Women

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Two studies, with undergraduate subjects, investigated how sex and situation-specific power factors relate to visual behavior in mixed-sex interactions. The power variable in Study 1 was expert power, based on differential knowledge. Mixed-sex dyads were formed such that members had complementary areas of expertise. In Study 2, reward power was manipulated. Consistent with expectation states theory, both men and women high in expertise or reward power displayed high visual dominance, defined as the ratio of looking while speaking to looking while listening. Specifically, men and women high in expertise or reward power exhibited equivalent levels of looking while speaking and looking while listening. High visual dominance ratios have been associated with high social power in previous research. Both men and women low in expertise or reward power looked more while listening than while speaking, producing a relatively low visual dominance ratio. In conditions in which men and women did not possess differential expertise or reward power, visual behavior was related to sex. Men displayed visual behavior similar to their patterns in the high expertise and high reward power conditions, whereas women exhibited visual behavior similar to their patterns in the low expertise and low reward power conditions. The results demonstrate how social expectations are reflected in nonverbal power displays.

Social power in face-to-face encounters depends not only on what a person knows or can do but also on how a person is perceived by others. These perceptions are often affected by social stereotypes. For example, sex is a characteristic that is related to actual and perceived social dominance, power, and status (Henley, 1977). Other bases for social power are situation specific, such as the power accorded to individuals with special knowledge or control over resources. Our research examined how sex and situation-specific power differences relate to nonverbal displays of dominance. The central questions of this research were the following: (1) When power differences are defined by situation-specific factors (e.g., based on differences in resources or on role definitions), are men and women equally likely to display power nonverbally? (2) When the bases of power are not designated by situational features, are men and women equally likely to exhibit nonverbal power cues?

In their expectation states theory, Berger and his associates (e.g., Berger, Rosenholtz, & Zelditch, 1980; Berger, Wagner, & Zelditch, 1985) proposed that social interactions are accompanied by differential expectations about the status of men and women because sex is systematically associated with prestige and status in everyday life. These expectations generalize and affect power-related behavior and perceptions of power across a variety of social contexts (Berger et al., 1985; Eagly, 1983; Lockheed & Hall, 1976; Meeker & Weitzel-O'Neill, 1985). Furthermore, according to expectation states theory, more direct information about competence or status has a greater impact on expectations and behavior than do inferences based on diffuse status characteristics. Specifically, when unambiguous cues about status or competence on a particular task are available, these cues take precedence over diffuse status characteristics and primarily determine power-related behaviors and impressions of ability and influence. When cues are ambiguous or indicate equivalent status or competence among interactants, diffuse status characteristics affect expectations, behaviors, and interaction outcomes. Thus, sex and task-relevant information may combine to produce outcomes according to a weighted averaging model (Berger et al., 1985; Hembroff & Myers, 1984). For example, Wood and Karten (1986) found that when no information about task-relevant ability was made available to in-

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teractants, men engaged in more task-oriented behaviors than did women, and that, perhaps because of these behavioral differences, men were perceived as being more competent than women. When information (actually false feedback) about task-relevant ability was provided to mixed-sex groups, however, sex differences did not occur, but individuals presumed to be high in ability made more task-oriented contributions than did interactants presumed to be low in ability.

Henley's (1977) review of the literature on communication in mixed-sex interaction, however, suggests that even when explicit power roles exist, women in positions of power may be less likely than men to exhibit nonverbal power displays. Henley presented evidence of parallel patterns of behavior between high- and low-power interactants and between male and female interactants. According to Henley (1977; Henley & Harmon, 1985), traditional power differences are perpetuated through socialized patterns of verbal and nonverbal behavior displayed by men and women. Our two studies related nonverbal behavior to social expectations of sex differences in power when power roles were both structured and unstructured.

Because of the importance of visual behavior in establishing and maintaining dominance in humans and other primates (Ellyson & Dovidio, 1985) and the role that visual interaction is hypothesized to play in perpetuating power differences between the sexes (Berger et al., 1985; Henley, 1977), the dependent measure in our research was visual dominance behavior. Exline, Ellyson, and Long (1975) defined the *visual dominance ratio* as the ratio of the percentage of looking in two modes: the percentage of looking while speaking relative to the percentage of looking while listening. Exline et al. demonstrated that relatively high social power is reflected in a relatively high visual dominance ratio.

The association between social power and visual dominance behavior in same-sex dyads is robust. The results have been consistent regardless of whether social power has been operationalized by personality variables (Ellyson, Dovidio, Corson, & Vinicur, 1980; Exline et al., 1975), military rank (Exline et al., 1975), expert power (Ellyson, Dovidio, & Corson, 1981), or educational attainment (Ellyson et al., 1980). Across all of these studies of same-sex interaction, high-power persons displayed higher levels of looking while speaking or equivalent levels of looking while speaking and looking while listening (producing visual dominance ratios of 1.00 or greater), whereas low-power persons looked significantly more while listening than while speaking (see Dovidio & Ellyson, 1985).

In two studies we investigated how situation-specific power factors and the diffuse status characteristic of sex influence a nonverbal power-related display, visual dominance behavior. French and Raven (1959; Raven, 1974) identified several sources of social power: informational power, related to the quality and amount of information a person possesses; expert power, based on the belief that a person is knowledgeable; legitimate power, based on the shared recognition of an authority structure; and reward and coercive power, related to the ability to mediate positive and negative outcomes. Although most of the work on expectation states theory has focused on actual and perceived competence, and hence mainly informational and expert power, other sources of power seem to operate in similar ways. With respect to legitimate power, military rank (Berger, Cohen, & Zelditch, 1972) and professional status on a hospital ward (Caudill, 1958) systematically affect expectations and behavior on relevant tasks. In addition, there is some evidence that reward power and coercive power are related to expectation states. Webster (1969) and Webster and Sobieszek (1974) reported that an evaluator has relatively high status in an interaction by virtue of his or her structural position and may become the source of status expectations among interactants through differentiated appraisals of others' performances.

We studied the effects of two types of social power. The situation-specific power variable in Study 1 was expert power; the power variable in Study 2 was reward power. In Study 1, which used a procedure similar to that of Ellyson et al. (1981), male and female subjects were selected on the basis of their responses to a questionnaire that asked them to identify areas in which they were high or low in expertise. Mixed-sex dyads were formed such that the area in which one individual was high in expertise was an area in which the other individual was low in expertise. The visual behavior of each subject was then observed under three conditions: discussion of a topic of high male expertise, discussion of a topic of high female expertise, and a control discussion that involved a topic that was unrelated to either member's expertise.

Using the expectation states model (Berger et al., 1985), we predicted that in the conditions in which expertise was varied, expertise would primarily determine patterns of visual behavior. That is, when men were expert, they were expected to show an equivalent or a higher level of looking while speaking compared with looking while listening (i.e., display a high visual dominance ratio), whereas women were predicted to look more while listening than while speaking (i.e., display a low visual dominance ratio). When women were expert, they were predicted to exhibit an equivalent or higher level of looking while speaking compared with looking while listening, whereas men were expected to look more while listening than while speaking. In the condition in which the topic was unrelated to either member's expertise, it was hypothesized that sex, operating as a diffuse status characteristic (Berger et al., 1985), would relate to visual patterns: Men were expected to show higher levels of looking while speaking relative to looking while listening than were women.

Whereas the expertise variable in Study 1 was an individual-differences variable (and thus could have various correlates), reward power in Study 2 was experimentally manipulated. During the study, mixed-sex dyads discussed three topics that were not gender related. The first discussion was a control: There was no imposed power distinction between the dyad members. For the second discussion, one member was assigned to evaluate the other member's contribution and was given the power to reward the other person with extra laboratory credit. The roles were reversed for the third discussion topic. On the basis of the assumption that reward power is conceptually comparable to expert power, the patterns of results for visual interaction that were hypothesized for Study 2 were analogous to those hypothesized for Study 1.

Study 1

Method

Subjects. At the beginning of a semester, 192 male and 245 female introductory psychology students at a western state university com-

pleted a packet of questionnaires and surveys that included a personal history questionnaire. This questionnaire was composed of questions about 56 activities or hobbies. Respondents were asked to rate their expertise for these activities on 7-point scales. Twenty mixed-sex dyads of unacquainted men and women were then selected such that members had complementary areas of expertise and inexpertise. That is, the area in which one member felt expert (an expertise rating of 7, *very much above average*, or 6, *much above average*) was the area in which the other dyad member felt inexpert (an expertise rating of 1, *very much below average*, or 2, *much below average*). The topics for discussion included basketball, board games, bowling, cards, cross-country skiing, diving, downhill skiing, Frisbee, ice skating, roller skating, sailing, swimming, and video games.

Design. This experiment involved a 3 × 2 × 2 factorial design. The first variable was expertise. Each subject had the opportunity to discuss one topic in which the man felt expert (high expertise/male condition), one topic in which the female felt expert (high expertise/female condition), and one topic that was unrelated to either person's expertise (control condition). The second variable was subject sex. As Glass and Stanley (1970) and Page (1975) noted, the individual should not be used as the statistical unit of analysis when a treatment is applied to a group. The assumption of independence of observations, which is important for most conventional statistical procedures, is likely to be violated when subjects receive a treatment as a group. Violation of this assumption generally produces an underestimation of the Type I error probability. In this study, therefore, the dyad was used as the unit of analysis. Because all dyads were composed of a man and a woman, sex (within dyad) was a repeated measure. Finally, as the third independent variable, two theoretically different modes of visual behavior were examined: (1) while the subject was speaking and (2) while the subject was listening. The dependent measure was the percentage of time spent looking at the other dyad member from the total possible time. With respect to the speaking mode, the dependent measure was the percentage of the time the subject looked directly at his or her partner while the subject spoke relative to the total amount of time the subject talked. With respect to the listening mode, the measure of visual behavior was the percentage of time the subject looked directly at his or her partner while the partner spoke relative to the total amount of time the partner spoke.

Procedure. As subjects arrived for the study, they were escorted into the experimental room and were seated on opposite sides of a table (88.9 cm in width). The experimenter, who was blind to the subjects' areas of expertise, then introduced the research as a study of first impressions and the acquaintance process. Subjects were told that in order to promote the interaction necessary in getting to know one another, they would be asked to arrive at a mutually agreeable solution to each of three 3-min discussion tasks (the period used in previous research of this type; see Dovidio & Ellyson, 1985) and would be given an opportunity to read and sign an informed consent statement. The tasks were introduced individually by the experimenter, and the subjects were told to record their mutual answer at the end of each discussion session. Subjects were not given any information about the relative expertise of the dyad members. After introducing each task, the experimenter answered any questions and left the room, signaling the beginning and end of each session with a buzzer. At the conclusion of the study, all subjects were debriefed.

Two of the three discussion tasks were designed to address the subjects' areas of expertise and inexpertise. We attempted to select discussion tasks that were not strongly gender linked. We had a separate pool of subjects (n = 40) rate each activity and hobby from 1 (*highly female*) to 7 (*highly male*). There was no significant difference in the average gender linkage of the tasks chosen for male (M = 4.32) and female (M = 4.19) dyad members in Study 1. In the first and the third period, subjects were asked to consider the following: "Many college students spend much of their time _____. What are the benefits and rewards of _____?" The activity that completed the statement was an area of expertise for one subject and an area of inexpertise for the other. Subjects were not informed that the topics were selected on the basis of their personal areas of expertise and inexpertise. During 3-min discussion periods, each subject talked about one area in which he or she felt expert and inexpert. In half of the sessions, the first topic was related to the man's expertise; in the other half, the first topic concerned the woman's expertise. The second task was always the neutral task, unrelated to either subject's expertise. It involved a discussion of human nature ("How many people would stop to pick up what they thought was a quarter?") and had been used in previous research of visual interaction (Ellyson et al., 1981; Exline et al., 1975). Pilot research showed that men and women did not perceive that they had different levels of expertise on this topic.

Three assistants, blind to the subjects' areas of expertise, viewed the interaction through one-way mirrors and recorded the visual behavior and speaking behavior of the subjects by using microswitches connected to an Esterline Angus (Model 190M) event recorder. The two assistants who coded visual behavior were positioned so that each could observe when one of the subjects was looking at the other subject. The coder who recorded the speaking behavior of both interactants was located such that both subjects could be observed simultaneously. The measure of speaking behavior was the percent of time each interactant controlled the floor (totaling 100%). Reliability ratings for recording visual and speaking behavior in this study were determined prior to testing subjects. Using the method suggested by Exline (1963), each assistant viewed the visual or verbal behavior of a confederate engaged in three 4-min discussions with another confederate in a situation that was parallel to the experimental conditions. We compared the eye contact and speaking recording of the assistant with a similar recording made by the confederate whose behavior was being monitored. Both the assistant who observed the confederate and the confederate who was observed activated microswitches that deflected pens on the event recorder. Reliability was based on the proportion of agreement between the two recorders. Reliability ratings of visual behavior for the two assistants were .98 and .92. The reliability of the assistant who coded speaking behavior was .97.

Results

A 3 (high expertise/male, high expertise/female, and control) × 2 (subject sex) × 2 (looking while speaking and looking while listening) repeated measures analysis of variance (ANOVA) was performed on the percentages of time spent looking at the other dyad member.[1] The analyses revealed main effects for condition, $F(2, 38) = 8.37$, $p < .001$; for sex, $F(1, 19) = 21.60$, $p < .001$; and for mode, $F(1, 19) = 73.49$, $p < .001$. With respect to condition, the highest percentage of looking was in the high expertise/male condition (55.1%), followed by the control condition (54.7%) and the high expertise/female condition (48.1%). With respect to sex and mode, women exhibited higher percentages of looking than did men (57.6% vs. 47.6%),[2] and

[1] Preliminary analyses revealed no significant effects associated with order, regardless of whether in the first topic the man or the woman was high in expertise. Thus, this variable was not included in subsequent analyses.

[2] It should be noted that the main effect for sex in this analysis does not necessarily mean that women gazed more than men overall; the percentage of gaze, averaged over listening and speaking, may or may not correspond to an overall gaze sex difference because the actual amounts of listening and speaking were not considered in this analysis.

Table 1
Percentages of Looking While Speaking and Looking While Listening for Men and Women as a Function of Expertise

Condition	Percentage looking	
	While speaking	While listening
High expertise/male condition		
Men	52.9	54.1
Women	39.8	73.6
High expertise/female condition		
Men	29.5	48.9
Women	57.6	56.1
Control condition		
Men	47.2	53.1
Women	41.1	77.3

the subjects looked less while speaking than while listening (44.7% vs. 60.5%). A three-way interaction, $F(2, 38) = 76.56$, $p < .001$, was also obtained. The means associated with the three-way interaction are presented in Table 1.

To evaluate the three-way interaction, simple Sex × Mode interaction analyses were performed separately for the high expertise/male, high expertise/female, and control conditions. In the high expertise/male condition, there was, as expected, a Sex × Mode interaction, $F(1, 19) = 76.58$, $p < .001$ (see Table 1). Men demonstrated an equivalent level of looking while speaking and looking while listening; women looked more while listening than while speaking, $F(1, 19) = 71.06$, $p < .001$. In the high expertise/female condition, there was also a Sex × Mode interaction, $F(1, 19) = 24.23$, $p < .001$ (see Table 1). In this condition, women exhibited equivalent levels of looking while speaking and looking while listening, whereas men had a higher percentage of looking while listening relative to looking while speaking, $F(1, 19) = 30.36$, $p < .001$. In the control condition, a Sex × Mode interaction was again obtained, $F(1, 19) = 88.20$, $p < .0001$ (see Table 1). Women showed a strong effect for mode, $F(1, 19) = 148.59$, $p < .0001$, and displayed a relatively low visual dominance ratio, much like their ratio in the high expertise/male condition: Women looked substantially less while speaking than while listening (36.2% difference). For men, the effect of mode was weaker (a 5.9% difference), $F(1, 19) = 5.80$, $p < .026$, producing a higher visual dominance ratio.

According to expectation states theory, in the absence of situation-specific status differences, sex is likely to be a status cue for interactants. With respect to Study 1, expectation states theory would suggest that in the control condition, women's patterns of looking while speaking and looking while listening should more closely resemble their patterns in the high expertise/male than in the high expertise/female condition; men's looking while speaking and looking while listening patterns should also be more similar to their patterns in the high expertise/male than in the high expertise/female condition. To evaluate these hypotheses directly, 2 (condition) × 2 (mode) analyses were performed that separately compared men's and women's looking while speaking and looking while listening behavior with the control condition and with each of the expertise conditions. The Condition × Mode interaction term was an index of how different the visual patterns were across the conditions. The findings are generally consistent with expectation states theory. Women's patterns in the control condition were more similar to their pattern when they were relatively low in expertise, interaction $F(1, 19) = 0.53$, $p < .48$, than when they were relatively high in expertise, interaction $F(1, 19) = 96.39$, $p < .001$. Men's patterns of looking while speaking and looking while listening in the control condition more closely resembled their pattern when they were relatively high in expertise, interaction $F(1, 19) = 3.53$, $p < .08$, than when they were relatively low in expertise, interaction $F(1, 19) = 10.77$, $p < .004$.

In Study 1 the Condition × Sex × Mode analysis was selected as the primary analysis, rather than the Condition × Sex analysis on each subject's visual dominance ratio, because it was more comparable to previous research (see Dovidio & Ellyson, 1985) and provided information about both the relative levels and the absolute levels of looking while speaking and looking while listening. The visual dominance ratio only provided information about the relative amount of looking while speaking to looking while listening. A supplementary analysis of the relationship of visual dominance ratio to condition and sex supported the primary analysis. The Condition × Sex interaction was significant, $F(2, 38) = 72.21$, $p < .001$. Men had a higher visual dominance ratio than women in the high expertise/male (ratio of aggregated *m*s = 0.98 vs. 0.54) and the control (0.89 vs. 0.53) conditions, whereas women had a higher visual dominance ratio than men in the high expertise/female condition (1.03 vs. 0.60).

A one-way repeated measures ANOVA for condition on the percent of actual discussion time that male interactants held the floor (which was the complement of women's percentages) revealed a significant effect, $F(2, 38) = 7.52$, $p < .01$. Men held the floor longer in the high expertise/male (55.1%) and the control (57.0%) conditions than in the high expertise/female (47.7%) condition. Men held the floor disproportionately more than women (i.e., comparing their percent to 50%) in the high expertise/male condition, $t(19) = 1.73$, $p < .10$, and in the control condition, $t(19) = 2.75$, $p < .02$. Women held the floor slightly but not disproportionately more than men in the high expertise/female condition.

Study 2 was designed to conceptually replicate Study 1 using experimentally manipulated reward power instead of expertise as a variable. The purposes of Study 2 were (a) to investigate whether reward power would be related to visual interaction as expertise had been in Study 1 and (b) to determine whether the different patterns of visual behavior displayed by men and

Nevertheless, a supplementary analysis of the overall number of seconds men and women gazed, by condition, also indicated a main effect for sex, $F(1, 19) = 25.99$, $p < .001$. Across the three conditions, on the average, men looked at female interactants for 85.3 s, whereas women looked at male interactants for 106.2 s. A Condition × Sex interaction was also obtained, $F(2, 38) = 5.96$, $p < .006$. Women gazed more than did men in all three conditions, but the difference was least pronounced in the condition in which women were low in expertise (*M*s = 105.3 vs. 95.3 s), moderately pronounced in the control condition, (*M*s = 110.3 vs. 90.0 s), and most pronounced in the condition in which women were relatively high in expertise (*M*s = 102.9 vs. 70.7 s).

women when expertise was controlled could be replicated in a different experimental context.

Study 2

Method

Subjects. Twenty-four male and 24 female undergraduates from a northeastern liberal arts college participated in partial fulfillment of their introductory psychology course requirements. Subjects, who were unacquainted, were paired in mixed-sex dyads.

Design. Across the three topics that each dyad discussed, the roles of participants were systematically varied across three conditions. In the first condition, always a control topic, there was no power differentiation between dyad members; in the second condition, one dyad member evaluated and could reward the other member; and in the third condition, the roles were reversed. For half of the dyads, the high power/male condition (i.e., a man with reward power) occurred before the high power/female condition (i.e., a woman with high power). For the other half of the dyads, the order of these two conditions was reversed. In addition to the variations in roles across conditions, other variables were subject sex (a man and a woman within each dyad) and visual mode (looking while speaking and looking while listening). The dependent measure was the percentage of time (in speaking and listening modes) spent looking at the partner.

Procedure. Each dyad discussed three topics that were selected on the basis of pilot research. The purpose of the pilot work was to identify topics that were not gender linked, because differential expertise (Study 1) and familiarity can systematically affect visual interaction (Heltman, Keating, Dovidio, Brown, & Ellyson, 1986). In the pilot study, 46 male and 48 female undergraduates were asked to rate their expertise (from 0 indicating *no expertise* to 10 indicating *a great deal of expertise*) and familiarity (from 0 indicating *no familiarity* to 10 indicating *a great deal of familiarity*) with 17 activities. Respondents were instructed that expertise should be "based on your personal ability or skill with respect to these activities" and that familiarity should be "based on your personal experience; interactions with others who have engaged in the activities; or from what you learned from reading, watching television, et cetera." The three topics chosen for the main study were (a) eating lobster, (b) writing a research paper, and (c) taking a photograph with a 35-mm camera. There were no significant differences between men and women in their ratings of expertise (E) or familiarity (F) on these topics: (a) eating lobster (for males and females, respectively, M_E = 6.4 vs. 6.4; M_F = 7.3 vs. 7.9); (b) writing a research paper (M_E = 6.9 vs. 6.2; M_F = 8.4 vs. 8.1); (c) taking a photograph (M_E = 4.6 vs. = 5.1; M_F = 6.0 vs. 6.8).[3]

During the main experiment, the male and female members of a dyad were escorted separately by a female experimenter to an experimental cubicle. Because even brief nonverbal interaction can establish dominance relations (Rosa & Mazur, 1979), we attempted to limit verbal and nonverbal interaction between dyad members only to the discussion periods. After one member of the dyad was seated behind a removable partition (centered on a table 1 m in width) blocking visual contact, the other member of the dyad was brought to the cubicle and seated at the table directly across from the first participant. Thus, dyad members had no contact before their first discussion task. The removable partition was kept in place at all times except during the 3-min discussions. The unconcealed videocameras that recorded the interactions were situated behind each subject and were directed at eye level over the shoulder of one participant toward the other participant. The interactions were recorded using a split-screen image on black and white videotape.

Once subjects were seated, they were given the following information through written and tape-recorded instructions: "This study concerns how people communicate information about tasks. During this session, you will be given a series of tasks to discuss. You will have three minutes to cover the materials, steps, and problems involved with each of these tasks." Subjects were also told that their interactions would be videotaped. Next, the experimenter asked subjects to read and complete an informed consent form and a video release form. The video release form indicated that subjects retained the right to erase the record of their interaction after participating in the session. All subjects signed both forms, and no subject requested that the record of the interaction be erased.

Prior to the first discussion, subjects were each given an index card indicating the topic to be discussed and emphasizing the points to be covered: materials needed, steps, and potential problems. Subjects were allowed to study the card for 30 s before the experimenter removed the partition, signaling for the discussion to begin. The experimenter left the room and did not return until a tape-recorded signal indicated the end of the discussion period. The experimenter then returned, replaced the partition, and administered a discussion questionnaire to the subjects. The questionnaire contained items asking them to rate their expertise on and familiarity with the topic (prior to their discussion in the study) on the same 0- to 10-point scales used in the pilot study. Subjects were also asked to rate their behavior and their partner's behavior during the discussion on 7-point bipolar scales. Five items were included because of their relevance to power and dominance: confused–confident, controlling–controlled, powerless–powerful, submissive–dominant, and supervisor–subordinate role. In addition, there were three items that related to affective reactions: anxious–calm, relaxed–tense, and at ease–embarrassed. The affective items were included because Hall and Halberstadt (1986) concluded that some gender differences in nonverbal behavior that are often attributed to differential social power may be due to differences in social tension.

Subjects followed this task procedure for three separate discussion periods. (Subjects were given no prior information about how many discussion periods there would be.) The first discussion was always the control condition (described earlier); power was not manipulated. In the next two discussion periods, however, reward power (French & Raven, 1959; Raven, 1974) was manipulated. Prior to the second discussion, one of the dyad members was chosen publicly to evaluate his or her partner's "contributions, insights, and effort during the task." Thus, subjects were aware of their relative power positions before the interaction began. They were told that the assignment of roles was made randomly. At the end of the discussion, the designated dyad member, the "high-power" person, rated the other member, the "low-power" person, on value of contribution, novelty of insight, degree of effort, and contribution to a positive atmosphere. The intervention relating to reward power occurred when the evaluator was given an opportunity to determine whether the other dyad member would earn an extra credit (i.e., two credits instead of the usual one) toward the completion of his or her six-credit laboratory participation requirement. In pilot research, 20 subjects who were presented with a written description of the situation rated the evaluator as being in a more supervisory (versus subordinate) role than the person who was being evaluated ($p < .01$). Subjects in Study 2 were told that their evaluations would be confidential and that the other member of their dyad would not be informed about extra credit until later in the semester. The evaluator placed his or her evaluation and recommendation in an envelope, which the experimenter sealed and removed from the experimental cubicle. Although subjects

[3] The list also included activities that were intended to be traditionally female related (e.g., sewing a clothing pattern) or male related (e.g., changing the oil in a car), as well as activities intended not to be gender linked. Women, relative to men, reported being more expert on and familiar with sewing a pattern ($ps < .001$); men, compared with women, indicated that they were more expert on and familiar with changing oil ($ps < .001$).

were given no previous indication, the subjects' roles were reversed for the third discussion. Topic order and sex of the first evaluator were counterbalanced across dyads. At the end of the third task, subjects were debriefed. All subjects were given two credits for participation by the experimenter. Male evaluators actually gave two credits 100% of the time; female evaluators gave two credits 83% of the time.

Visual dominance behavior was measured after all of the dyads were run. The tapes were reviewed by three female raters who were blind to the hypotheses and the specific conditions for each session. Two of the raters recorded visual behavior. Each of these raters coded the looking behavior for one dyad member. The third rater coded the verbal behavior of the interactants. The information on visual and verbal behavior was stored for later analysis using a Radio Shack TRS-80 Model 4 microcomputer. The interrater reliabilities of visual behavior for the two coders were .91 and .90. Reliability for the rater who recorded verbal behavior was .94.

Results

Ratings of expertise and familiarity. To determine whether the discussion tasks were perceived as gender linked, 3 (task) × 2 (subject sex) repeated measures ANOVAs (using the dyad as the unit of analysis) were performed on the subjects' ratings of task expertise and familiarity. The results suggest that the topics selected for the main study were not gender linked, which supported the pilot research. The main effect for subject sex and the Sex × Task interaction were nonsignificant for both expertise ($ps > .23$) and familiarity ($ps > .19$). A main effect for task, however, was obtained both for expertise, $F(2, 44) = 10.18$, $p < .001$, and familiarity, $F(2, 44) = 8.66$, $p < .001$. Overall, subjects felt the most expert on and familiar with writing a research paper ($M_E = 6.8$, $M_F = 7.7$), followed by eating a lobster ($M_E = 6.0$, $M_F = 6.7$) and taking a photograph with a 35-mm camera ($M_E = 4.4$, $M_F = 5.2$).

Self-reports of power and affect. To evaluate the effect of the explicit manipulation of reward power, a series of 3 (high power/male, high power/female, control) × 2 (subject sex) repeated measures analyses was performed on the subjects' self-reports of their behaviors during the interactions. The item most directly relevant to the role manipulation in this study was that of the supervisor–subordinate role. There were no significant main effects on this item, but the Condition × Sex interaction was marginally significant, $F(2, 46) = 2.06$, $p < .14$. Planned comparisons revealed that, as expected, women felt more subordinate than men in the high power/male condition, $Ms = 4.58$ vs. 3.62, $F(1, 23) = 5.97$, $p < .03$; there was no difference associated with sex in the control condition. Inconsistent with expectations, however, men did not report feeling more subordinate than women in the high power/female condition ($p > .75$). There were no significant Condition × Sex interactions or main effects for sex or condition for the subjects' ratings of their power, control, confidence, or dominance. Thus, although the manipulation of the opportunity to reward the other person did not systematically influence self-reports of power-related personality traits or interaction style (i.e., confidence, dominance, power), it did tend to affect perceptions of the role relationship between subjects (i.e., the supervisor–subordinate role). The effect on perceived role, however, mainly occurred when men occupied the high-power position.

The analyses of the three affective items did not show any Condition × Sex interactions but did reveal main effects for sex on the items relaxed–tense, $F(1, 23) = 4.64$, $p < .042$, and at ease–embarrassed, $F(1, 23) = 4.41$, $p < .047$. Women, compared with their male partners, reported being more tense ($Ms = 2.98$ vs. 2.40) and more embarrassed ($Ms = 3.01$ vs. 2.45).

Table 2
Percentages of Looking While Speaking and Looking While Listening for Men and Women as a Function of Reward Power

Condition	Percentage looking	
	While speaking	While listening
High power/male condition		
Men	50.7	47.0
Women	28.8	47.2
High power/female condition		
Men	35.6	42.3
Women	44.8	37.3
Control condition		
Men	45.0	36.5
Women	32.7	46.7

Visual behavior. A 3 (high power/male, high power/female, and control) × 2 (subject sex) × 2 (looking while speaking and looking while listening) repeated measures ANOVA was performed on the percentages of looking. The mean percentages of looking while listening and looking while speaking for each condition are presented in Table 2. The only significant effect was the Condition × Subject Sex × Mode interaction, $F(2, 46) = 4.33$, $p < .02$.[4]

Following the strategy used in Study 1, separate Sex × Mode analyses were performed within the high power/male, high power/female, and control conditions. The analysis of visual behavior in the control condition, in which there was no explicit manipulation of power, revealed a Sex × Mode interaction, $F(1, 23) = 6.38$, $p < .019$ (see Table 2). Men looked slightly more while speaking than while listening, a high visual dominance ratio, whereas women, looking less while speaking than while listening, $F(1, 23) = 5.92$, $p < .022$, displayed a lower visual dominance ratio. In the high power/male condition, a marginally significant Sex × Mode interaction was obtained, $F(1, 23) = 3.36$, $p < .08$. Planned comparisons demonstrated the predicted pattern (see Table 2): Men showed equivalent levels of looking while speaking and while listening ($p < .64$), whereas women looked more while listening than while speaking, $F(1, 23) = 6.25$, $p < .02$. In the high power/female condition, the pattern of means resembled the predicted pattern (see Table 2), but the Sex × Mode interaction was not statistically reliable ($p < .32$).

[4] In contrast to Study 1, a supplementary analysis of the overall number of seconds of direct gaze did not reveal a main effect for sex. A Condition × Sex interaction was, however, obtained, $F(2, 46) = 3.54$, $p < .037$. Women gazed less than men in the high power/male condition ($Ms = 62.1$ vs. 82.1 s), more than men in the high power/female condition ($Ms = 92.4$ vs. 83.5 s), and about the same as men in the control condition ($Ms = 70.7$ vs. 70.2 s).

Perhaps this effect was weaker than we anticipated in this condition because the manipulation had to overcome the power relationship that was initially established in the control condition, which was always the first interaction.

As in Study 1, supplementary 2 (condition) × 2 (mode) analyses were performed that separately compared men's and women's looking while speaking and looking while listening behavior between the control condition and each of the other two conditions (see Table 2). Supporting the findings of Study 1, men's patterns of looking while speaking and looking while listening in the control condition were more similar to their patterns when they were relatively high in power, interaction $F(1, 23) = 0.26, p < .62$, than when they were relatively low in power, interaction $F(1, 23) = 3.25, p < .09$. Women's patterns of looking while speaking and looking while listening in the control condition more closely resembled their patterns when they were relatively low in power, interaction $F(1, 23) = 0.21, p < .65$, than when they were relatively high in power, interaction $F(1, 23) = 8.69, p < .007$.

The overall patterns of visual interaction displayed in Study 2 as a function of sex and reward power closely resembled the patterns obtained in Study 1 as a function of sex and expertise. The supplementary Condition × Sex analysis of each subject's visual dominance ratio supported the primary analysis, which examined looking while speaking and looking while listening directly. A Condition × Sex interaction was obtained, $F(2, 46) = 2.84, p < .069$. When they were high in reward power, both sexes exhibited relatively high visual dominance ratios (ratio of aggregated *m*s = 1.08 and 1.20). When they were relatively low in reward power, men and women displayed lower ratios (0.84 and 0.61). When reward power was not manipulated, men and women again showed different visual patterns: Men had a high visual dominance ratio, 1.23, similar to their ratio when they were high in power; women had a relatively low ratio, 0.70, more like their ratio when they were low in power.

For Study 2, correlations were also performed between visual behavior (percentage looking while speaking, percentage looking while listening, and visual dominance ratio) and self-ratings and the perceptions of the partners. Within-cell correlations (i.e., within each of the six cells in the Condition × Sex design) between feelings of occupying a subordinate role and visual behavior were generally nonsignificant and weak. For the six cells, the average correlation was −.11 for looking while speaking, .12 for looking while listening, and −.18 for the visual dominance ratio. There were no consistent relationships between visual behavior and the other self-ratings or the partner's perceptions.

The context of the conditions in which reward power was manipulated in Study 2 was much different from the context in Study 1, more closely resembling an interview situation. The nature of the context was reflected in speaking behavior. The analysis of the percent of total interaction time that men held the floor (which was the complement of the percentage of time women held the floor) revealed a main effect for condition, $F(2, 46) = 7.19, p < .003$. Men held the floor most in the high power/female condition (63.1%), followed by the control condition (53.0%) and the high power/male condition (46.3%). Men spoke a significantly disproportionate amount of time (i.e., significantly different from 50%) only in the high power/female condition.

Comparisons across studies. To assess the generalizability across conceptual replications of the same phenomenon, Keppel (1973) recommended, when possible, to combine all of the data and treat replications (i.e., different studies) as a between-groups independent variable. Interactions involving this variable would suggest limitations to the generalizability of our research. An overall 2 (study) × 3 (condition—relatively high power for the man or woman or the control condition) × 2 (sex) × 2 (mode) ANOVA did reveal a Condition × Sex × Mode interaction, $F(2, 84) = 19.70, p < .001$, of central importance. The study variable did not mediate this effect: The four-way interaction was nonsignificant ($p > .50$), and there were no other significant effects associated with the study variable. Furthermore, for the more detailed analyses, there were no Study × Independent Variable interactions that in any way qualified the findings, despite the mean differences between Tables 1 and 2. These analyses therefore indicate that our major findings are generalizable across the two studies.

Discussion

The major focus of this research concerned how sex and situational factors relate to visual power displays. During mixed-sex interaction in which dyad members did not possess differential expertise (Study 1) or power to mediate rewards (Study 2), women looked significantly more while listening than while speaking, whereas men displayed more equivalent levels of looking while speaking and looking while listening. The visual pattern exhibited by men has been described as a high visual dominance ratio (Exline et al., 1975) and in previous research involving same-sex interaction has been associated with high social power (Dovidio & Ellyson, 1985). The visual pattern displayed by women has been associated with lower power positions. Our research suggests that these sex differences in unstructured interaction are robust. The subject samples in Studies 1 and 2 were demographically different, and subjects were selected differently for participation in the research. Subjects in Study 1 were selected on the basis of complementary areas of expertise and nonexpertise that were not strongly gender linked; subjects in Study 2 were chosen randomly from a separate subject pool. Thus, there may have been differences in the overall degree of participants' gender typing between the studies. In addition, in Study 1 the unstructured situation always occurred after a discussion of one interactant's area of expertise, whereas in Study 2 it was always the first discussion. Nevertheless, the overall analysis combining all of the data did not reveal a difference in the pattern of visual interaction in the control conditions across the two studies.

The positions of Henley (1977) and Berger et al. (1985) suggest divergent patterns for situations in which task-relevant cues are present. Henley's view implies that sex is a very salient status cue despite the availability of situational cues. According to Berger et al.'s expectation states theory, however, task-relevant cues take precedence over sex and are the predominant determinants of power-related behavior when present. Consistent with expectation states theory, men and women high in expertise or reward power in our research displayed equivalent levels of looking while speaking and looking while listening (i.e., a high visual dominance ratio). Thus, when their high-power position

was well defined, women were as likely as men to display their power nonverbally. When men and women were relatively low in expertise or social power, they both looked more while they were listening than while they were speaking (a low visual dominance ratio). As the self-reports of Study 2 indicated, the effect of reward power on visual behavior could not readily be attributed to differences in social tension. In general, the visual behavior results are consistent with previous research of same-sex interaction demonstrating that higher visual dominance ratios are displayed by people higher in status (Ellyson et al., 1980), military rank (Exline et al., 1975), or the desire to control others (Ellyson et al., 1980; Exline et al., 1975).

Previous research demonstrates that task-relevant and diffuse status characteristics combine in a weighted-averaging fashion to affect behavior and perceptions (Hembroff & Myers, 1984). Other research indicates that direct competence information can entirely eliminate the effect of sex (Freese & Cohen, 1973; Wood & Karten, 1986). Our results are consistent with both positions. Across our two studies, high-power interactants, regardless of sex, displayed equivalent levels of looking while speaking and looking while listening, a relatively high visual dominance ratio. This finding supports Freese and Cohen's view that people rely on direct status information instead of sex when task-relevant information is available. The low-power conditions in our two studies, however, suggested a different conclusion. Although low-power interactants generally displayed a lower visual dominance ratio than did high-power interactants, in both studies low-power men showed more equivalent levels of looking while speaking and looking while listening than did low-power women. This result supports the position that interactants aggregate status information and diffuse status characteristics in forming an overall evaluation of the situation.

Hembroff and Myers (1984) concluded that in the weighted-averaging process for combining status information, greater weights are given to factors perceived to be more relevant to the situation. Perhaps because of pervasive gender stereotypes associating men with high-power and high-status positions (Deaux, 1984; Eagly, 1983; Williams & Best, 1986), men may discount information that they are in a low-power position, particularly in relation to a woman. Information that contradicts traditional sex roles is particularly threatening for men (Skrypnek & Snyder, 1982), and men seem reluctant to accept women as their supervisors (Dovidio & Gaertner, 1983). In support of this reasoning, the role manipulation in Study 2 was more effective in producing the expected self-reports in the high power/male condition than in the high power/female condition. Although men accepted their supervisory position relative to women in the high power/male condition, they did not report that they felt in a more subordinate role in the high power/female condition. Thus, the salience, and hence the factor weight, of status information may vary for men depending on whether it associates them with a high- or a low-status position. If the information is consistent with cultural stereotypes indicating a high-status position, it may be readily accepted and primarily determine evaluations and behavior. If the information contradicts the masculine stereotype and indicates low status, it may be weighed less heavily and thus allow other factors to demonstrate their effects.

French and Raven (1959; Raven, 1974) posited that expertise and control of positive outcomes are different sources of social power. Indeed, in our research, expertise and reward power had different effects on verbal behavior. In Study 1, consistent with a large body of research on task-oriented groups (see Berger et al., 1985), interactants relatively high in expertise tended to control the floor more than did people relatively low in expertise. In Study 2, in contrast, subjects who were relatively high in reward power held the floor less than did subjects who were being evaluated. This pattern, however, is similar to what occurs in interview sessions in which one person (the interviewer) controls positive outcomes (employment opportunity) over another person (the job applicant). In this type of situation, the high-power person generally speaks less than the low-power person. Patterns of visual behavior in our studies, however, were similar between variations in expertise and reward power. In previous research, comparable results for visual behavior have been obtained regardless of whether power has been operationalized in terms of experience (Efran, 1968), educational level (Fugita, 1974), or military rank (Exline et al., 1975). Perhaps because people have less control over their nonverbal and paralinguistic behavior than their verbal behavior (Ekman & Friesen, 1975), nonverbal behavior may provide more consistent cues of power relationships. Indeed, Linkey and Firestone (1986) found that visual dominance behavior was more strongly related to influence on a problem-solving task than was amount of speaking.

It should be noted that differences in expertise in Study 1 were more strongly related to visual behavior than were differences in reward power in Study 2. The Condition × Sex × Mode interaction accounted for much more of the total variance in Study 1 (51%) than in Study 2 (6%). The way in which expertise was operationalized in our research may have made it more potent than reward power. In Study 1, participants were selected on the basis of their extreme ratings of feelings of expertise. These feelings may have been directly related to an individual's personal identity outside of the laboratory. Furthermore, other characteristics (e.g., familiarity) may have covaried with expertise and contributed to its impact. In contrast, the manipulation of reward power was temporary and context specific. Subjects' self-reports also indicated that this manipulation did not affect feelings of personal power but rather tended to primarily define the role relationship between interactants. Thus, differences in the impact of the independent variables could account for some of the difference across studies in the strength of the relationships to visual behavior.

Another factor that could explain some of the discrepancy in effect size between Study 1 and Study 2, which occurred to some extent even in the conditions in which expertise was irrelevant and reward power was not manipulated, involves another methodological difference. In particular, the raters in Study 1 coded visual behavior during live interaction, whereas the raters in Study 2 coded visual behavior from videotapes. Possibly as a consequence of the coding conditions, the reliability of coding was higher in Study 1 than in Study 2. The lower level of "noise," or error variance, in Study 1 could thus help account for the statistically stronger effects. In addition, during the actual interaction the presence of the cameras behind each person in Study 2 may have reduced looking behavior (Risser, Dovidio, & Faltot, 1977), particularly while listening when context factors seem to have their greatest impact (Dovidio & Ellyson,

1985). Thus, the presence of videocameras may have attenuated visual behavior differences in Study 2 compared with Study 1 (see Tables 1 and 2). Nevertheless, the fact that similar patterns were obtained across two studies that used different operationalizations of power and different methodologies suggests the robustness of the effects of power and sex on visual interaction.

Our studies also raise questions concerning how visual dominance behavior contributes to establishing and maintaining social power. Visual behavior of interactants and subjects' impressions of their partner's power were less directly related in our investigations than among observers in previous research. Dovidio and Ellyson (1982) found that when observers were asked specifically to make attributions based on the nonverbal behaviors displayed by a confederate during videotaped interactions, they systematically formed impressions of power as a function of the level of looking while speaking, the level of looking while listening, and the visual dominance ratio.

In Study 2, attributions of power and of the role relationship between interactants did not relate strongly to visual behavior. The general weakness of our manipulation of reward power could have been a contributing factor. However, significant relationships between attributions and visual behavior were not even obtained in the high power/male condition, where the manipulation was most effective. Thus, even though the research by Dovidio and Ellyson (1982) indicated that observers (noninteractants) can systematically form impressions of power as a function of visual patterns, this research shows that actual interactants, perhaps because of the heavy or varied cognitive demands of a situation, may not form these impressions as readily. Perhaps during ongoing interaction, visual behavior communicates power without the conscious awareness of a participant. Lee and Ofshe (1981) and Rosa and Mazur (1979), for example, suggested that a dominance display by one person can produce a deference reaction in another person without intervening complex cognitive activity and, consequently, often without the ability to verbalize the process. In addition, Berger et al. (1985) proposed that expectation states do not have to be conscious to shape power relations. The proposition that visual dominance behavior affects power during ongoing interactions is supported by Linkey and Firestone (1986), who found that the visual dominance ratio was a significant predictor of influence in a problem-solving situation. The role of conscious and nonconscious processes seems to merit further research.

An understanding of how visual behavior communicates power has important implications. If men typically assume a dominant visual display during mixed-sex interaction in situations in which status is ambiguous, then these nonverbal cues can contribute to the perpetuation of power differences between the sexes. Rosa and Mazur (1979) reported that patterns of visual interaction, specifically initial eye glances, not only reflected existing status differences between interactants but also produced deference responses and immediately defined the power relationship between individuals in ways that influenced the nature of later interaction. Furthermore, it appears that messages concerning dominance and relative power may be effective without the awareness of the sender or receiver (Lee & Ofshe, 1981; Rosa & Mazur, 1979). Because of the subtlety of the process, interactants may explain their behavior with self-attributions that are consistent with the emerging power relationship between interactants (Bem, 1972). This process could perpetuate traditional status differences between the sexes.

This research suggests several questions for future study. Because changes in both modes of visual interaction (looking while speaking and looking while listening) are involved in visual dominance behavior, do these modes have separate functions in establishing dominance and social power? The relatively low percentage of looking while listening exhibited by high-power interactants may communicate to their partners that they are disinterested and uninvolved in what is being said. This message, which may be received without conscious awareness, could then lead partners to terminate their speech prematurely and to yield control of the floor. The relatively high levels of looking while speaking displayed by high-power persons may allow them to closely monitor the responses of their partners and thus make effective adjustments that will enable them to maintain social control. Relatively high levels of looking while speaking may also more frequently create periods of mutual gaze. Interactants who maintain their gaze may then elicit submissive displays from their partners (Rosa & Mazur, 1979). Thus, further investigation of visual behavior in conjunction with other nonverbal forms of communication may contribute to an understanding of how social expectations produce social status and power differentiations during ongoing interaction.

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