

# Gender Differences and Similarities in Dominance Hierarchies in Same-Gender Groups Based on Speaking Time<sup>1</sup>

Marianne Schmid Mast<sup>2</sup>

Northeastern University, Boston

*This study aimed at investigating whether all-women and all-men groups differed in their hierarchical organization and stability of their rank orders across time. One hundred and sixteen European, middle-class, noncollege women and men (average age: 38) participated in small-group discussions twice within a week with the same group members. Speaking time served as the behavioral dominance indicator on which group hierarchies were based. Additionally, group members rank ordered each other on dominance after each interaction. In the first session, all-men groups were more hierarchically structured than all-women groups. During each session, all-women and all-men groups showed a similar significant increase in hierarchical structuring. For both women and men, rank orders remained stable during interactions and from the first to the second session. Results are discussed in terms of three theoretical models describing dominance hierarchies.*

## INTRODUCTION

Dominance is an important dimension of social interactions (Gifford, 1991; Wiggins, 1979) and the emergence of dominance hierarchies in small groups is well documented (e.g., Bales, 1950; Berger, Fisek, Norman, & Zelditch, 1977). Research has mainly focused on how dominance hierarchies are formed (Mazur, 1985; Ridgeway & Berger, 1986) and much less research effort was invested in the question of *gender differences* in the

<sup>1</sup>Parts of the reported data has been presented at the Annual Meeting of the Eastern Psychological Association, EPA, Baltimore, 2000.

<sup>2</sup>To whom correspondence should be addressed at Department of Psychology, Northeastern University, 125 Nightingale Hall, Boston, Massachusetts 02115; e-mail: MMAST@neu.edu.

formation of dominance hierarchies. Are men and women equally prone to build dominance hierarchies or are men more likely to organize themselves in a hierarchical way compared to women? This investigation aimed to shed light on the potential gender differences and similarities of dominance hierarchy structures in same-gender groups. Because conversational cues play an important role in dominance processes in face-to-face interactions (Mazur, 1985; Ridgeway & Berger, 1986), speaking time served as the behavioral cue to capture exhibited dominance in this study. Time talked is a widely used and validated indicator of dominance (Mullen, Salas, & Driskell, 1989; Schmid Mast, 2001; Stein & Heller, 1979). Nevertheless, group members' reports about how dominant they perceived each other were collected as well.

### **Origins of a Gender-Stereotypical View About Dominance Hierarchies**

Dominance is a concept that has been used in a number of different ways (Ellyson & Dovidio, 1985). In this study, dominance is understood as the extent of influence and control one person exerts in a group interaction. Hierarchy stands for the relative dominance difference among group members. If one person is more dominant than another person, they are in a hierarchical relationship. The stereotypical view of men being inclined to form dominance hierarchies and women building egalitarian structures is widely accepted (e.g., Bakan, 1966; Moskowitz, Suh, & Desaulniers, 1994). Although it has never been empirically tested whether women are organized in a more egalitarian way than men, there is some *indirect* evidence that seems to bolster this stereotypical belief. Men, for instance, are more successful than women in gaining high-dominant positions in direct opposite-gender encounters and emerge as leaders more often than women do even if women are more dispositionally dominant (e.g., Golub & Maxwell Canty, 1982; Hegstrom & Griffith, 1992; Megargee, 1969; Megargee, Bogart, & Anderson, 1966). And, research on leadership style showed that women possess a more democratic or participative leadership style whereas men use a more autocratic or directive style (Eagly & Johnson, 1990; Troemel-Ploetz, 1994). Furthermore, men showed a stronger motivation to lead than women did, at least in the context of competitive games and assertive situations (Eagly, Karau, Miner, & Johnson, 1994), and have been found to be more competitive and dominant than women in general (e.g., Adams & Landers, 1978; King, Miles, & Kniska, 1991; Knight & Chao, 1989; Walters, Stuhlmacher, & Meyer, 1998). Men being more motivated and successful in competitive encounters than women seems to suggest that they are more prone to form dominance hierarchies than women. This, however, remains to be tested. The only research that looked at gender differences in terms of *hierarchies* is research concerned with social dominance orientation (Pratto, Sidanius,

Stallworth, & Malle, 1994). Social dominance orientation describes an individual's preference for inequality among social groups. Men are higher in social dominance orientation than women (Pratto, Stallworth, & Sidanius, 1997). However, the *preference* for a hierarchical or egalitarian social structure does not imply that people necessarily also *form* hierarchical or egalitarian structures on a *behavioral level*. This investigation focused on the formation of dominance hierarchies based on behavioral observation.

### **The Formation of Dominance Hierarchies: Why There Might Not Be a Gender Difference**

As will be demonstrated, the stereotypical belief that men are more likely to form dominance hierarchies than women not only stands in striking contrast to the relative paucity of research addressing this particular question, but also contradicts indications that are available from two theoretical perspectives, Mazur's biosocial model of status in face-to-face interactions (Mazur, 1985) and expectation states theory (Ridgeway & Berger, 1986).

Mazur's model posits that the allocation of ranks in newly formed groups proceeds through face-to-face competition between members of the group (Mazur, 1985). In a competitive encounter, individual A begins the aggression that elicits stress in the recipient. The recipient can submit to or revoke the aggression that elicits stress in A. The individual who fails to sustain the stress engages in a deferent act to relieve stress. This is at the same time the signal of acceptance of the lower rank.<sup>3</sup> There is no evidence suggesting that the described mechanism should be different for men and women. Consequently, Mazur expects that the process of hierarchy formation described by his model is similar in women and men (p. 378).

Research focusing on the formation of hierarchies within adult groups was founded by Bales and his colleagues (Bales, 1950; Bales, Strodtbeck, Mills, & Roseborough, 1951). They reported that in small discussion groups, participation was unequally distributed among group members producing a hierarchy. Subsequently, expectation states theory (Berger et al., 1977) investigated how external status characteristics (e.g., age, gender, competence) influence the hierarchy formation in face-to-face task groups. In heterogeneous groups, these culturally based status characteristics lead to differential expectations about how much each group member contributes to solve the task (performance expectation). People with high performance expectations

<sup>3</sup>One important component in Mazur's model, is that the motive to dominate and the final rank order position are associated with the level of testosterone. Mazur's model seems to be more functional for men because a study by Cashdan (1995) showed that androgens were not related to status in women. In general, however, little is known about the formation of dominance hierarchies and the relationship between androgens and dominance in women.

are given more opportunities to contribute, their contributions are more valued, and they finally gain more influence in the group decision.

But how can power hierarchies develop in homogeneous groups (in the absence of external status characteristics)? This question is relevant to this investigation, which is concerned with same-gender peer groups (homogeneous groups). Expectation states theorists (Ridgeway & Berger, 1986; Johnson, Clay-Warner, & Funk, 1996) suggest that during a face-to-face interaction, group members differ in how much dominance behavior they exhibit. As soon as such an inequality develops, it affects how group members accept each other's contributions resulting in differential expectations for future contributions. Behaviorally dominant individuals are expected (and given the chance) to influence the group more than less dominant individuals do. Because in same-gender groups gender does not work as an external status characteristic any more, the formation of dominance hierarchies is expected to be based on individual differences and should not differ for all-men in comparison to all-women groups (Johnson et al., 1996). Some of the existing empirical evidence seems to support this prediction (Johnson et al., 1996; Ridgeway & Diekema, 1989).

### **Additional Evidence About Hierarchies in All-Women in Comparison to All-Men Groups**

Some indications about how women might organize themselves in face-to-face interactions come from the area of developmental psychology. The findings, however, are controversial. Some studies find no gender difference in the extent of hierarchical organization in same-gender groups (Carlson Jones, 1984; Parker & Omark, 1980). There is, however, also evidence for all-girl groups to be more hierarchically structured than all-boy groups. Charlesworth and Dzur (1987) observed 3- to 5-year-old girls and boys in same-gender groups. Results revealed that girl groups tended to be dominated more by a single individual than did boy groups. Boy groups built more democratic structures. With regard to adolescents, Savin-Williams (1979) observed all-boy and all-girl groups in a summer camp over a period of 5 weeks and concluded that both girls and boys form hierarchical structures as time goes by, but the hierarchies in all-boy groups remained more stable over time than those in all-girl groups.

### **Three Models of Within-Group Dominance Organization**

Savin-Williams' study emphasizes an important distinction between the *degree of hierarchical organization* and the *rank order stability across time* (Savin-Williams, 1979), both distinct characteristics of dominance hierarchies.

The degree of hierarchical organization describes the extent to which rank order positions differ from each other in dominance, in other words, how polarized in terms of dominance a group structure is. In a newly formed group, an increase in hierarchical organization within the group is an indicator of the formation of a hierarchy. Rank order stability over time indicates whether the individuals maintain their rank order positions at different points in time. Not many studies investigated stability of speaking time rank orders across time. In a study by Aries (1976), all-men groups showed more stable speaking time rank orders than all-women groups did over five 90-min sessions. In contrast to this study, Aries neither explored the formation of rank orders nor investigated the degree of hierarchical organization.

The degree of hierarchical organization and rank order stability across time are independent of each other and different combinations of the two have been discussed in the literature. First, the formation of a stable, linear hierarchy has been called *pecking order* (Schjelderup-Ebbe, 1922). In pecking orders, a hierarchy that remains stable over time has been formed (Table I). In contrast, the *egalitarian structure* is characterized by an absence of hierarchy formation and, as a consequence, rank order stability either does not play a role because the differences in dominance between the individual rank order positions is so small that we can hardly talk about a rank order at all; or, because of the lack of dominance differentiation between the rank order positions, these positions are supposed to switch quickly among individuals so that they are completely unstable (Table I). These two models fit well with the stereotypical gender difference in dominance hierarchies: Men are thought to be organized according to pecking orders and women are said to build egalitarian structures. However, a third possibility arises. What about a structure that is characterized by a hierarchy formation but with changing rank orders over time? Such a model has been proposed by Bischof-Köhler (1990, 1992): the *crab basket structure*. A basket full of crabs does not need a lid to prevent the crabs from crawling out. Why? Because they crawl over each other all the time making it impossible for even one to escape. Bischof-Köhler suggests that the behavior of those crabs is an analogue to female

**Table I.** Three Models Describing Within-Group Dominance Organization

Characteristics of dominance organization	Pecking order	Egalitarian structure	Crab basket structure
Hierarchy formation	Yes	No	Yes
Rank order stability	stable	(unstable) <sup>a</sup>	unstable

<sup>a</sup>In an egalitarian structure, the differences in dominance between the rank order positions are small and therefore expected to change quickly so that they can be regarded as completely unstable; or, one could argue that it does not make sense to talk about rank order stability at all since no hierarchy has been formed.

dominance hierarchies: Each time one crab tries to crawl higher than the others, they will hold her back by crawling over her, meaning that there is always one crab in a higher position than the others—like in an established dominance hierarchy—but the structure is completely unstable (Table I). The goal of this study was to test whether all-women as opposed to all-men groups differ in how hierarchically organized they are and how stable their rank orders are over time. This would allow one to decide which of the three models most adequately describes female and male dominance organization.

### **Assessing Behavioral Dominance**

Because speaking time is a well-established measure of emitted dominance behavior (Mullen et al., 1989; Schmid Mast, 2001; Stein & Heller, 1979), it has been used to assess group dominance hierarchies (Bales et al., 1951; Kalma, 1991; Lamb, 1980). In this study, speaking time was selected as the behavioral dominance measure on the basis of which dominance hierarchies were assessed. It has to be kept in mind that there are social interactions in which dominance is not necessarily related to talking much. In an interview situation, for instance, the interviewee usually talks more than the interviewer and therefore their relative dominance positions are not reflected by the amount of talk. To control for such potential influences and to validate speaking time as a dominance indicator, an additional sociometric peer measure of dominance was collected (see Method section).

### **Specific Aims of This Research**

This research aimed to investigate whether all-men and all-women groups differed in the degree of hierarchical organization and rank order stability over time based on the observation of individual speaking time as a dominance-related behavior during interactions. An emphasis was put on potential changes in hierarchical organization during an interaction (by comparing beginning and end of a session) and between two interaction sessions that lay a week apart. To maximize the ecological validity of the study, a special effort in recruiting a community sample rather than college students was undertaken.

## **METHOD**

### **Participants**

Fifty-eight adult women and 58 adult men, all parents of at least one child aged between 4 and 6 years, participated in the study. Participants had

on the average 2.1 children (range: 1–4) and were recruited from an unrelated investigation about the cognitive development of 4-year-olds. The study was conducted at the Department of Psychology at the University of Zurich in Switzerland. Women were on average 36.2 years old (range: 27–47 years) and men 38.8 years (range: 28–63 years). Five participants lived together with their partner without being married, all other participants were married (average 9 years, range: 2–20 years). One man and one woman separated; she was in a new relationship and he was single. One participant was Dutch, two were Germans, and all others were Swiss. Non-Swiss participants were all fluent in Swiss German. All participants were middle-class Europeans.

Participants formed 14 all-women and 14 all-men groups ranging in group size from 3 to 5. Group sizes of all-men and all-women groups were comparable (1 three-person all-men and 3 three-person all-women groups, 10 four-person all-men and 6 four-person all-women groups, 3 five-person all-men and 5 five-person all-women groups). For most of the participants (76%), their spouse participated in the study as well; the other 24% were married men and women who participated without their partner. Within gender, groups were randomly composed and none of the group members was acquainted with each other.

It was crucial for this study to bring back the same groups for a second session, thus necessary to recruit highly motivated participants. Self-selection<sup>4</sup> and no reward for participation were the measures taken to ensure high ego involvement. The few dropouts (three late arrivals for the first session, three participants missing for the second session) imply that this goal was successfully achieved, and that the discussion topic was interesting for parents with children of this age. Participants were not paid for their participation. The high compliance rate is even more remarkable taking into account that all participants had to provide a baby sitter for their children or at least coordinate their visit in our lab so that their spouse could look after the children.

### Procedure

Groups were scheduled by telephone in the evening or on weekends. Participants had to commit to two prescheduled sessions within a week to guarantee that group sessions were repeated with the same members after

<sup>4</sup>Self-selection usually increases the motivation to participate in a study but it might also produce interaction behavior that is not entirely representative for small groups in general, thus potentially reducing external validity of the study. Because the focus of this study was bringing back the same groups for a second session, it was necessary to recruit highly motivated participants via self-selection despite the possible drawbacks of self-selection.

1 week. At the beginning of the first session, some sociodemographic variables were assessed. Each group session took place according to the same pattern both times. A 45-min group discussion was followed by a group decision task of about 30 min (not reported in this paper because it proved to be poorly related to the concept of dominance). At the end of the session, participants were asked to fill in a sociometric questionnaire about the other group members.

Upon arrival at the lab, participants were seated in a waiting room. Group discussions took place in a separate room. Participants sat around a table in a semicircle facing a two-way mirror. Microphones were installed above the table. Participants' consent to videotape the discussion from behind the two-way mirror was obtained. The discussion topic was "How to bring up children nowadays?" Some input questions on a sheet of paper were handed out at the beginning of each group discussion and read aloud. In the two sessions, the input questions were different but all focused on the topic of child rearing. For instance, input questions or statements during the first session comprised: "What do I consider important in bringing up my child/my children? It is important to me that my child has table manners, that my child is polite, that my child does not make too much noise, that my child can defend him- or herself, that my child can play alone," "If my child/my children don't behave like I want them to, how do I try to influence their behavior?" "Is punishment a successful child rearing strategy?" And if yes, "in what kind of situations?" "Is letting my child/my children do what they want to a successful child rearing strategy?" And if yes, "in what kind of situations?" During the second session, input questions comprised: "What do I consider important in bringing up my child/my children? It is important to me that my child is autonomous, that my child obeys his or her mother/father, that my child is open toward others, that my child adapts in a group, that my child is not aggressive," "What do I want to avoid in my child rearing strategies that my parents did to me?" "Did I have ideas about how to bring up children before I had them?" "If I show my child/my children that I am hurt, is this punishment for him or her/them?" and "How important is it to be consequent in punishing?"

The experimenter left the room and returned after 45 min elapsed. The group proceeded to solve the decision task during the next 30 min (not reported here). To fill out the sociometric questionnaire, participants were guided to a classroom where they sat in a circle. Each participant's seat had a random letter attached, visible for all other group members. Participants were then asked to fill out the sociometric questionnaire by rank ordering all other group members with respect to different adjectives, using the anonymous letters as identifiers.

## Measures

### *Behavioral Dominance Assessment*

Based on findings indicating speaking time as a reliable indicator of dominance, sequences of 8 min at the beginning and at the end of each 45-min discussion interval were selected for the registration of the time talked. One rater coded speaking time for all participants and a second rater coded 20% of all tapes. The interrater reliability was  $r = .99$ ,  $p < .0001$ . There were two reasons to select 8-min segments at the beginning and the end of the interaction for the analysis. First, Kalma (1991) could show that rank orders with respect to speaking time emerged after 1 min of interaction time in dyads and triads and that those rank orders remained stable over the whole observation period of 8 min. This is an indication that a hierarchical structure forms quickly in newly formed groups. However, a 1- or 2-min observation period seemed very short for groups of 3–5 participants. An inspection of the videotapes indicated that with two exceptions (2 participants out of 116) each group member of the three- to five-person groups spoke at least once during the first 8 min. This was the second reason why 8 min were chosen. In general, studies measuring speaking time vary considerably in how long group members interact and in the length of the time interval chosen for coding speaking time. For instance, 7 min of a 40-min discussion session were coded for speaking time in a five- to six-group member interaction (Aries, Gold, & Weigel, 1983), or speaking time was measured during the entire 8 min of a four-person group interaction (Ginter & Lindskold, 1975), or 4 min of a 4-1/2-min interaction were coded with respect to speaking time in dyads (Kimble & Musgrove, 1988). In yet another study, the entire 20-min interaction was coded for speaking time in five-person groups (Ruback, Dabbs, & Hopper, 1984).

In this study, coding of speaking time duration by registering speaking on- and offsets was performed with an event recorder. Speaking onset (or offset) was coded when a person started (or stopped) vocalizing without taking into account one-word sentences and laughter.

### *Degree of Hierarchical Organization and Rank Order Stability*

A group would be organized very equally if all group members were to speak for about the same amount of time. On the other hand, a group can be described as being very polarized if some group members talk much more than others. Differences in individual speaking time within a group is labeled “degree of hierarchical organization.” As an indicator of the degree

of hierarchical organization, any measure of variance is appropriate. In this study, the degree of hierarchical organization within a group was defined as the average absolute deviation of each group member's speaking time from the group mean.<sup>5</sup>

Stability of hierarchies across time refers to the degree to which participants maintain the same rank position over the course of time. Within-group Spearman rank-order correlations were calculated for the comparison of the beginning and the end of each session and the transition of the first to the second session. For all-women and all-men groups these correlations were pooled separately (Rosenthal, 1991), and combined probabilities according to the Stouffer method (Mosteller & Bush, 1954) were calculated. The within-group correlations are based on 3–5 participants and the mean *r*s are based on 28 groups for overall results and on 14 all-women and 14 all-men groups if results are reported for each gender separately. The emergence of gender differences was tested by applying the standard contrast equation (Rosenthal, 1991; Rosenthal & Rubin, 1982). Note that the degree of hierarchical organization as well as the stability over time are characteristics describing the group as a whole. Therefore, the level of analysis in this study is the group and not the individual.

#### *Sociometric Assessment*

After each group discussion, a sociometric peer measure was administered. Participants were asked to rank order all group members except themselves with respect to different characteristics. Each group member received an average rank order position within his or her group. Based on this measure, an *overall perceived dominance scale* consisting of the adjectives dominant, assertive, attracting attention, committed, make suggestions, push through own arguments, have a different opinion than the group, interesting, and competent ( $\alpha = .93$ ,  $\alpha = .94$ , first and second session, respectively), and an *overall perceived social positivity scale* consisting of the adjectives nice, friendly, pleasant, supportive, considerate, and adaptable ( $\alpha = .86$ ,  $\alpha = .87$ , first and second session, respectively) were constructed.

To assess the relationship between perceived dominance, perceived social positivity, and speaking time, the three variables were all correlated with each other for each group separately. For each of the three relationships (speaking time and perceived dominance, speaking time and perceived social positivity, and perceived dominance and perceived social positivity),

<sup>5</sup>  $\frac{\sum |\bar{X} - X|}{N}$  where  $\bar{X}$  is the group mean,  $X$  the individual value, and  $N$  the number of group members.

within-group correlations<sup>6</sup> were pooled to obtain an overall mean  $r$ , as well as a mean  $r$  for all-women and all-men groups separately (Rosenthal, 1991). Combined probabilities and gender differences were calculated in the same manner as for rank order stability.

## RESULTS

### Speaking Time as a Dominance Indicator

The dominance hierarchy assessment can only be based on speaking time if we make sure that speaking time indeed is an appropriate measure of dominance.<sup>7</sup> In order to externally validate whether speaking time functions as a dominance indicator, the sociometric peer measure of dominance was correlated with individual speaking time within each group (see Method section, for detailed description). In all-women and all-men groups speaking time showed significantly positive associations with being perceived as dominant during both sessions (Table II and Table III). For the social positivity scale, men showed negative associations between floor holding and being perceived in a positive way during both sessions whereas women showed a slightly negative association between speaking time and social positivity only during the first session (Table II and Table III). This gender difference was significant during the second session (Table III).

### Degree of Hierarchical Organization

Because speaking time proved to be highly positively correlated with the group members' dominance ratings of each other, it is reasonable to assume that within-group differences in time talked indeed reflect *dominance* differences. The unequal shares of floor holding of all group members can therefore be considered as indicative of a group's dominance hierarchy structure. As explained in the Method section, the average absolute deviation of each group member's speaking time from the group mean described the degree of hierarchical organization.

<sup>6</sup>Because the perceived sociometric measures were aggregated rank order positions within each group and therefore continuous rather than rank-order data and because speaking time was a continuous variable, Pearson's correlations were calculated. Calculating Spearman rank-order correlations yielded the same results.

<sup>7</sup>No gender difference emerged with respect to the average time talked per person (first session:  $t(26) = 0.67$ , *ns*,  $t(26) = -0.11$ , *ns*; second session:  $t(26) = 0.16$ , *ns*,  $t(26) = -0.46$ , *ns*, beginning and end of session, respectively). Because the groups were given 45 min to discuss they probably simply talked during the time available, thus no gender difference emerged.

**Table II.** Correlation Matrix Between Speaking Time, Perceived Dominance, and Perceived Social Positivity During the First Session

	Dominance			Social positivity		
	Total	Women	Men	Total	Women	Men
Speaking time	-.51****	-.42*	-.59****	.35*	.32	.39*
Dominance				.51**	.73****	.19

*Note.* Entries are effect sizes, based on pooled within-group correlations. Because the perceived characteristics are rank orders (each individual received an average rank within his or her group) and speaking times were durations, negative correlations, mean positive associations, and positive correlations signify negative associations. No significant gender difference emerged for the association between dominance and speaking time ( $Z$  contrast = 0.43) and for the association between social positivity and speaking time ( $Z$  contrast = 0.61). A marginally significant gender difference concerning the relationship between dominance and social positivity emerged ( $Z$  contrast = 1.61,  $p < .10$ ).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . \*\*\*\* $p < .0001$ , two-tailed.

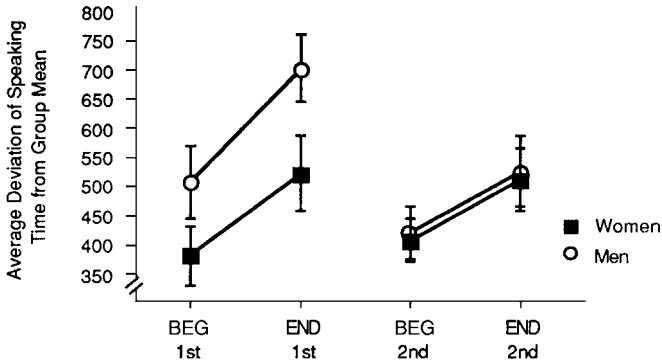
Performing a 2 (gender)  $\times$  2 (within-session: beginning vs. end of session)  $\times$  2 (between-sessions: first vs. second session) ANOVA with the two latter factors as repeated measures and the degree of hierarchical organization as the dependent measure, revealed a marginally significant main effect for gender,  $F(1, 26) = 3.47$ ,  $p = .074$ , indicating that men tended to form hierarchies to a greater degree than did women,  $M_s = 533.50$  versus 449.97, effect size  $r = .34$ . In addition, a main effect for the within-session variable,  $F(1, 26) = 17.32$ ,  $p = .0003$ , revealed that the hierarchical organization of the groups was stronger at the end of the sessions than at the beginning,  $M_s = 559.82$  versus 423.64, effect size  $r = .63$ . A marginally significant gender  $\times$  between-sessions interaction also occurred,  $F(1, 26) = 3.26$ ,  $p = .082$ , effect size  $r = .33$  (see Fig. 1).

**Table III.** Correlation Matrix Between Speaking Time, Perceived Dominance, and Perceived Social Positivity During the Second Session

	Dominance			Social positivity		
	Total	Women	Men	Total	Women	Men
Speaking time	-.66****	-.58**	-.74****	.26	-.04	.52*
Dominance				.32**	.46**	.16

*Note.* Entries are effect sizes, based on pooled within-group correlations. Because the perceived characteristics are rank orders (each individual received an average rank within his or her group) and speaking times were durations, negative correlations, mean positive associations, and positive correlations signify negative associations. There was one significant gender difference for the associations between social positivity and speaking time ( $Z$  contrast = 2.02,  $p < .05$ , two-tailed). No significant gender difference emerged for the dominance and speaking-time associations ( $Z$  contrast = 1.09) as well as for the dominance and social positivity associations ( $Z$  contrast = 0.95).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . \*\*\*\* $p < .0001$ , two-tailed.



**Fig. 1.** Degree of hierarchical organization within a group, based on average deviation of speaking time from group mean (in tenths of seconds), in same-gender groups, at the beginning (BEG) and at the end (END) of the first (1st) and the second (2nd) session.

All-men groups being more hierarchically organized than all-women groups was mainly due to the first session. A  $2 \times 2$  ANOVA for each session separately was calculated with gender as the between-group factor, beginning and end of the session as the within-group factor, and the degree of hierarchical organization as the dependent variable. During the first session, all-men groups were more hierarchically structured than all-women groups,  $M_s = 599.18$  versus  $446.18$ ,  $F(1, 26) = 5.57$ ,  $p = .026$ , effect size  $r = .42$ . However, during the second session, men were not more polarized in their access to speaking time than women,  $M_s = 467.81$  versus  $453.76$ ,  $F(1, 26) = 0.74$ ,  $ns$ , effect size  $r = .17$ . The separate ANOVAs also confirmed that all-women and all-men groups increased in hierarchical organization within each session,  $F(1, 26) = 10.41$ ,  $p = .0034$ , effect size  $r = .53$ ;  $F(1, 26) = 4.93$ ,  $p = .035$ , effect size  $r = .40$ ; first session and second session, respectively.

### Stability of Rank Orders Across Time

Dominance hierarchies are characterized not only by the degree of hierarchical organization within a group but also by how stable the rank orders are over time. Focusing on *stability of speaking time rank orders* across time (see Method section, for detailed description of the calculation), both women and men showed significantly stable rank orders. When the beginning and end of the first session were compared, individuals could be found in the same dominance positions: The mean  $r$  across all-women groups was  $.63$  ( $p < .01$ , two-tailed) and across all-men groups  $.68$  ( $p < .001$ , two-tailed;

no gender difference,  $Z$  contrast = 0.66). At the transition of the first to the second session, rank positions did not change for all-men groups (mean  $r$  across all-men groups = .54,  $p < .05$ , two-tailed) and also remained stable for all-women groups (mean  $r$  across all-women groups = .49,  $p < .05$ , two-tailed). No gender difference emerged ( $Z$  contrast = 0.15). For the comparison of beginning and end of the second session, all-men as well as all-women groups showed stable rank orders (mean  $r$  = .39,  $p < .05$ ; mean  $r$  = .74,  $p < .0001$ ; both two-tailed, all-women and all-men groups, respectively; no gender difference,  $Z$  contrast = 1.41).

In terms of stability of the *perceived dominance rank order*, all-women and all-men groups again showed stable rank orders across time, meaning that individuals were perceived in the same rank positions in the first and the second session (mean  $r$  across all-women groups = .75,  $p < .0001$ , two-tailed; mean  $r$  across all-men groups = .78,  $p < .0001$ , two-tailed; no gender difference,  $Z$  contrast = 1.07). How socially positive group members were perceived relative to each other also remained the same for the first and the second session, for both all-women groups (mean  $r$  = .62,  $p < .001$ , two-tailed) and all-men groups (mean  $r$  = .80,  $p > .0001$ , two-tailed; no gender difference,  $Z$  contrast = 0.27).

### **The Relationship Between Perceived Dominance and Perceived Social Positivity**

The relationship between perceived dominance and perceived social positivity was different for women and men. Within-group correlations between perceived dominance and perceived social positivity showed a positive association between the two variables for all-women groups but not for all-men groups (Table II and Table III). This gender difference was marginally significant only during the first session and nonsignificant during the second session (Table II and Table III). Bolstering this finding, a principal components analysis of the perceived dominance and perceived social positivity composite for the first and second session revealed a two-factor solution for all-men groups and a one-factor solution for all-women groups (factors with eigenvalue  $> 1$ ). Taken together, these results show that perceived dominance is unrelated to perceived social positivity in all-men groups. Conversely, in all-women groups, these two variables converge.

## **DISCUSSION**

This investigation compared the emergence of dominance hierarchies in all-women and all-men groups with respect to the degree of hierarchical

organization and stability of rank orders over time. This comparison allows us to draw some conclusion as to which one of the three models introduced for describing dominance hierarchies (pecking order, egalitarian structure, and crab basket structure, see Table I) is best suited to describe all-women groups and which one is most adequate to characterize all-men groups.

Results indicated that in informal all-men and all-women face-to-face group gatherings, hierarchical organization regarding speaking time showed an increase from the beginning to the end of each session (Fig. 1). The results for stability of hierarchies showed that for both women and men, on average, rank orders remained stable over the course of the interactions as well as between the first and the second session. This rank-order stability could not only be found for hierarchies based on speaking time but also for hierarchies based on perceived dominance. Based on the results about the formation and stability of the rank orders across time, it can be concluded that male as well as female dominance hierarchies are best described by the pecking order model. In other words, women and men tend to form stable dominance hierarchies during same-gender interactions. The absence of a gender difference in the formation of dominance hierarchies confirms the predictions made by Mazur's biosocial model of status (Mazur, 1985) and expectation states theory (Ridgeway & Berger, 1986) suggesting that mechanisms at work while dominance hierarchies are formed are the same for women and men.

If hierarchy formation only occurred in areas that are relevant to group members, it could be argued that all-women groups formed rank orders in this investigation only because of the discussion topic being more relevant, interesting, and familiar<sup>8</sup> to women. If this were the case, the results may have to be qualified; women may only form hierarchies within a context that is familiar to them. Future research in this area might pursue this avenue and explore how topic familiarity affects the formation of dominance hierarchies in both genders separately.

Although women and men formed hierarchical structures, there was a significant gender difference for the first session indicating that all-men groups were more hierarchically organized than all-women groups (Fig. 1). All-women and all-men groups increased in hierarchical structuring within each session to the same extent but men had more pronounced hierarchies to begin with. If strangers meet for the first time, there appears to be a substantial gender difference in the initial hierarchical organization within

<sup>8</sup>It is possible that the subject of child rearing was more relevant for mothers than for fathers simply because they spent more time with their children. Only some of the mothers worked in a paid job usually for less than a day per week whereas almost all fathers worked in a paid job 5 days a week (significant gender difference in the amount of time spend working in a paid job,  $t(110) = 15.47, p < .0001$ ).

the groups that confirms the stereotypical belief that many people have about dominance hierarchies and gender. It is remarkable, though, that despite women being less hierarchically organized at the beginning of an initial encounter, they also start *forming* a hierarchical structure comparable to the one in men. All-women groups have the potential to form hierarchies to the same extent as all-men groups (their increase in hierarchical structuring is the same, see Fig. 1) and the characteristics of their hierarchies, like stability of their rank orders, are comparable to those of all-men groups. In light of the initial gender difference one might speculate that it just takes women longer to start the hierarchy-forming process but once started it progresses equally for women and men.

Why are men more hierarchically organized than women during the first session? One possible explanation might be that men organize themselves in a much more hierarchical way during a first encounter like a “default” mechanism. The fact that men are found to be more competitive and dominant than women (Adams & Landers, 1978; King et al., 1991; Knight & Chao, 1989; Walters et al., 1998) could be responsible for men forming a hierarchical structure instantly, or at least much quicker than women.

Between the sessions the level of hierarchical organization was not maintained. It seems as if the hierarchical structure was built anew in each encounter in both all-women and all-men groups. In stable pecking orders, one would not necessarily expect the degree of hierarchical organization to drop from one encounter to another. This might, however, be explained by the fact that one entire week without any contact among group members lay between the two sessions. But why was the overall degree of hierarchical organization in all-men groups lower during the second session if compared to the first one (Fig. 1)? Maybe men realized that the nature of these encounters was noncompetitive and informal once they went through an entire first session. Additionally, men of this age might be less competitive than college students according to Cashdan (1998) who found that men decrease in competitiveness with age. These two factors combined might be the reason why all-men groups started the second interaction less hierarchically structured than the first one. In sum, these latter findings show that men are prone to organize themselves in a hierarchical way as soon as they gather together, much more so than women. However, the conclusion that men are *always* more hierarchically organized than all-women groups can be questioned based on the results reported. The lack of research looking at the formation of dominance hierarchies over different points in time might have contributed to the dichotomized view of male and female dominance hierarchies. This study made it clear that it is important to apply a more “long-term” perspective when investigating dominance hierarchies.

If the assessment of dominance hierarchies is based on speaking time as in this study, it is important to address whether speaking time is used to convey dominance by women and men equally. Focusing on the meaning of the amount of time talked during an interaction, different uses of talk have been debated for women and men. Tannen (1990) reasons that men take up more speaking time than women in public situations whereas women talk more in private settings. Women use talk to establish and maintain relationships, to indicate participation and interest and men are supposed to use talk to convey dominance (Aries, 1976; Tannen, 1990). Results of this study showed that the amount of time talked was positively associated with being perceived as dominant in all-men as well as in all-women groups and those associations did not differ in all-men compared to all-women groups. However, during the second session, being nice, friendly, supportive, etc., was negatively associated with the amount of time talked in all-men groups only. It might be the case that speaking time is a more distinct indicator of dominance (positively related to dominance *and* negatively related to socially positive impressions) for men than for women, even more so if men are not complete strangers to each other as it was the case for the second interaction. Moreover, the relationship between perceived dominance and perceived social positivity were different for men and women. Dominance and social positivity were positively associated and loaded on the same factor for women. Conversely, the two variables were distinct for men. This might reflect the aforementioned gender difference in leadership style (Eagly & Johnson, 1990)—sometimes also referred to as socioemotional versus task-oriented leadership style—and might also explain why especially during the second session, speaking time was a distinct indicator of dominance in all-men groups only.

All in all, this study contributes to the understanding of the nature and development of hierarchical relationships in same-gender groups. Especially the nature of female–female hierarchical relations has not gained much research attention so far. An improved understanding is relevant, because hierarchical structures emerge or are imposed on people in various domains of their lives, most importantly in the workplace. It is foreseeable that in the future, more and more women will be entrusted with top leadership positions in our society and will collaborate with female as well as with male subordinates. The discovery of mechanisms and regularities of female dominance hierarchies is key in empowering women to take over high-dominant positions and in reducing conflicts and therefore increasing well-being for women in high and low dominance hierarchy positions. Results from this study suggest that despite men's initially more pronounced dominance hierarchy, confirming a widely held stereotype, women as well form dominance hierarchies in same-gender groups. Future research should test to what extent context (e.g., discussion topic, competitiveness of the setting), gender

composition of the group, group size, different durations of group interactions, and hierarchies based on other dependent variables (Schmid Mast, in press) moderate the formation of dominance hierarchies differentially for women and men.

### ACKNOWLEDGMENTS

This work was supported by a fellowship granted to the author from the Swiss National Science Foundation (No. 81ZH-56123). I thank Norbert Bischof and Doris Bischof-Köhler for supporting my work and for making it possible to collect the data at the Department of Psychology at the University of Zurich in Switzerland. I am especially grateful to Judith A. Hall for her most valuable suggestions concerning the data analysis and for her very helpful comments on earlier drafts of the manuscript. I thank C. Randall Colvin for his valuable suggestions concerning an earlier version of this draft and an anonymous reviewer for many greatly helpful suggestions to improve the manuscript. I am also thankful to Rainer Kirchhofer, Patrizia Rizzo, and Miriam Schirmer for their responsible help in data-coding.

### REFERENCES

- Adams, K. A., & Landers, A. D. (1978). Sex differences in dominance behavior. *Sex Roles, 4*, 215–223.
- Aries, E. J. (1976). Interaction patterns and themes of male, female and mixed groups. *Small Group Behavior, 7*, 7–18.
- Aries, E. J., Gold, C., & Weigel, R. H. (1983). Dispositional and situational influences on dominance behavior in small groups. *Journal of Personality and Social Psychology, 44*, 779–786.
- Bakan, D. (1966). *The duality of human existence*. Chicago: Rand McNally.
- Bales, R. F. (1950). *Interaction process analysis: A method for the study of small groups*. Cambridge: Addison-Wesley.
- Bales, R. F., Strodtbeck, F. L., Mills, T. M., & Roseborough, M. E. (1951). Channels of communication in small groups. *American Sociological Review, 16*, 461–468.
- Berger, J., Fisek, M. H., Norman, R. Z., & Zelditch, M. (1977). *Status characteristics and social interaction: An expectation states approach*. New York: Elsevier.
- Bischof-Köhler, D. (1990). Frau und Karriere in psychobiologischer Sicht [Woman and career in a psychobiological view]. *Zeitschrift für Arbeits- und Organisationspsychologie, 34*, 17–28.
- Bischof-Köhler, D. (1992). Geschlechtstypische Besonderheiten im Konkurrenzverhalten: Evolutionäre Grundlagen und entwicklungspsychologische Fakten [Gender-typical peculiarities in competitive behavior: Evolutionary basis and developmental-psychological facts]. In G. Krell & M. Osterloh (Eds.), *Personalpolitik aus der Sicht von Frauen. Was kann die Personalforschung von der Frauenforschung lernen?* (pp. 251–281). München: Rainer Hampp Verlag.
- Carlson Jones, D. (1984). Dominance and affiliation as factors in the social organization of same-gender groups of elementary school children. *Ethology and Sociobiology, 5*, 193–202.

- Cashdan, E. (1995). Hormones, sex, and status in women. *Hormones and Behavior*, 29, 354–366.
- Cashdan, E. (1998). Are men more competitive than women? *British Journal of Social Psychology*, 79, 213–229.
- Charlesworth, W. R., & Dzur, C. (1987). Gender comparisons of preschoolers' behavior and resource utilization in group problem solving. *Child Development*, 58, 191–200.
- Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, 108, 233–256.
- Eagly, A. H., Karau, S. J., Miner, J. B., & Johnson, B. T. (1994). Gender and motivation to manage in hierarchic organizations: A meta-analysis. *Leadership Quarterly*, 5, 135–159.
- Ellyson, S. L., & Dovidio, J. F. (1985). Power, dominance, and nonverbal behavior: Basic concepts and issues. In S. L. Ellyson & J. F. Dovidio (Eds.), *Power, dominance, and nonverbal behavior* (pp. 1–27). New York: Springer.
- Gifford, R. (1991). Mapping nonverbal behavior on the interpersonal circle. *Journal of Personality and Social Psychology*, 61, 279–288.
- Ginter, G., & Lindskold, S. (1975). Rate of participation and expertise as factors influencing leader choice. *Journal of Personality and Social Psychology*, 32, 1085–1089.
- Golub, S., & Maxwell Canty, E. (1982). Sex-role expectations and the assumption of leadership by college women. *Journal of Social Psychology*, 116, 83–90.
- Hegstrom, J. L., & Griffith, W. I. (1992). Dominance, sex, and leader emergence. *Sex Roles*, 27, 209–220.
- Johnson, C., Clay-Warner, J., & Funk, S. J. (1996). Effects of authority structures and gender on interaction in same-gender task groups. *Social Psychology Quarterly*, 59, 221–236.
- Kalma, A. (1991). Hierarchisation and dominance assessment at first glance. *European Journal of Social Psychology*, 21, 165–181.
- Kimble, C. E., & Musgrove, J. I. (1988). Dominance in arguing mixed-sex dyads: Visual dominance patterns, talking time, and speech loudness. *Journal of Research in Personality*, 22, 1–16.
- King, W. C., Miles, E. W., & Kniska, J. (1991). Boys will be boys (and girls will be girls): The attribution of gender role stereotypes in a gaming situation. *Sex Roles*, 25, 607–623.
- Knight, G. P., & Chao, C. (1989). Gender differences in the cooperative, competitive, and individualistic social values of children. *Motivation and Emotion*, 13, 125–141.
- Lamb, T. A. (1980). Paralanguage hierarchies in dyads and triads: Talking first and talking the most. *Social Behavior and Personality*, 8, 221–224.
- Mazur, A. (1985). A biosocial model of status in face-to-face primate groups. *Social Forces*, 64, 377–402.
- Megargee, E. I. (1969). Influence of sex roles on the manifestation of leadership. *Journal of Applied Psychology*, 53, 377–382.
- Megargee, E. I., Bogart, P., & Anderson, B. J. (1966). Prediction of leadership in a simulated industrial task. *Journal of Applied Psychology*, 50, 292–295.
- Moskowitz, D. S., Suh, E. J., & Desaulniers, J. (1994). Situational influences on gender differences in agency and communion. *Journal of Personality and Social Psychology*, 66, 751–761.
- Mosteller, F. M., & Bush, R. R. (1954). Selected quantitative techniques. In G. Lindzey (Ed.), *Handbook of social psychology: Vol. 1. Theory and method* (pp. 289–334). Cambridge: Addison-Wesley.
- Mullen, B., Salas, E., & Driskell, J. E. (1989). Salience, motivation, and artifact as contributions to the relation between participation rate and leadership. *Journal of Experimental Social Psychology*, 25, 545–559.
- Parker, R., & Omark, D. R. (1980). The social ecology of toughness. In D. R. Omark, F. F. Strayer, & D. G. Freedman (Eds.), *Dominance relations: An ethological view of human conflict and social interaction* (pp. 415–426). New York: Garland.
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable relevant to social roles and intergroup relations. *Journal of Personality and Social Psychology*, 67, 741–763.

- Pratto, F., Stallworth, L. M., & Sidanius, J. (1997). The gender gap: Differences in political attitudes and social dominance orientation. *British Journal of Social Psychology, 36*, 49–68.
- Ridgeway, C. L., & Berger, J. (1986). Expectations, legitimation, and dominance behavior in task groups. *American Sociological Review, 51*, 603–617.
- Ridgeway, C. L., & Diekema, D. (1989). Dominance and collective hierarchy formation in male and female task groups. *American Sociological Review, 54*, 79–93.
- Rosenthal, R. (1991). *Meta-analytic procedures for social research* (Vol. 6). Newbury Park: Sage.
- Rosenthal, R., & Rubin, D. B. (1982). Comparing effect sizes of independent studies. *Psychological Bulletin, 92*, 500–504.
- Ruback, R. B., Dabbs, J. M., & Hopper, C. H. (1984). The process of brainstorming: An analysis of individual and group vocal parameters. *Journal of Personality and Social Psychology, 47*, 558–567.
- Savin-Williams, R. C. (1979). Dominance hierarchies in groups of early adolescents. *Child Development, 50*, 923–935.
- Schjelderup-Ebbe, T. (1922). Soziale Verhältnisse bei Vögeln [Social relationships among birds]. *Zeitschrift für Psychologie, 90*, 106–107.
- Schmid Mast, M. (2001). *Dominance expressed in speaking time and inferred dominance based on speaking time: A meta-analysis*. Manuscript submitted for publication.
- Schmid Mast, M. (in press). Female dominance hierarchies: Are they any different from males'? *Personality and Social Psychology Bulletin*.
- Stein, R. T., & Heller, T. (1979). An empirical analysis of the correlations between leadership status and participation rates reported in the literature. *Journal of Personality and Social Psychology, 37*, 1993–2002.
- Tannen, D. (1990). *You just don't understand: Women and men in conversation*. New York: Ballantine.
- Troemel-Ploetz, S. (1994). "Let me put it this way, John:" Conversational strategies of women in leadership positions. *Journal of Pragmatics, 22*, 199–209.
- Walters, A. E., Stuhlmacher, A. F., & Meyer, L. L. (1998). Gender and negotiator competitiveness: A meta-analysis. *Organizational Behavior and Human Decision Processes, 76*, 1–29.
- Wiggins, J. S. (1979). A psychological taxonomy of trait descriptive terms: The interpersonal domain. *Journal of Personality and Social Psychology, 37*, 395–412.