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The Dynamics of Intense Work Groups:  
A Study of British String Quartets

*J. Keith Murnighan*  
*Donald Conlon*

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J. Keith Murnighan  
Department of Business Administration  
University of Illinois at Urbana-Champaign

Donald Conlon  
Department of Business Administration  
University of Delaware

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The Dynamics of Intense Work Groups:  
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Abstract

This paper focuses on the effects of internal group dynamics on the effectiveness of intense work teams, in this case, professional string quartets in Great Britain. In particular, we studied the effects of a group's strategies for coping with four important paradoxes: Leadership versus democracy, the paradox of the second violinist, the means for conflict resolution, and similarity versus diversity. Qualitative and quantitative data differentiated clearly between the the more and less successful quartets. In general, more successful groups recognized the leader/democaracy paradox but continued to espouse democracy; they provided strong emotional support for their second violinists; they avoided majority rule and unnecessary, emotionally based conflict; they benefited from similarities in their educational backgrounds, gender, and age. They were obsessed both with quartet music and with playing it. And they looked upon each other as friends. The discussion focuses on the nature of intense work groups and the fact that our observations conflict with much of the conventional wisdom on group dynamics.



The Dynamics of Intense Work Groups:  
A Study of British String Quartets

Groups are an elemental force for organizational action. Surprisingly, we understand few of the dynamics and little in the way of optimally structuring organizational groups. Although research on the sociology and the social psychology of groups reached its apex in the late 1950's and early 1960's (e.g., Cartwright and Zander, 1968; Hare, Borgatta, and Bales, 1965), application of the principles of group dynamics to actual work situations has been minimal.

This paper focuses on the dynamics within intense work groups as they relate to group effectiveness. We studied a particular form of work group, the string quartet, through interviews, archival analysis, and limited observation. In particular, we identified four important paradoxes within all string quartets and addressed whether group members recognized these paradoxes. If they did, we pursued how they dealt with them within the group. Following Smith and Berg (1987), we suggest that string quartets (and possibly other work teams) must address inherent contradictions in organizing themselves and functioning effectively. We show that, in this context, the resolution of these contradictions and the effective balancing of the group's similarities and complementarities are the basis for achieving success.

#### The String Quartet

A string quartet is composed of two violinists, a viola player, and a cellist; their collective task is to reach a high level of coordinated sound. Two labels can characterize the different styles of string quartet performance: the European style is achieved when the quartet sounds like a single voice; the American style is achieved when the quartet sounds like four

voices, combined harmoniously. With the European style, sound comes from the quartet as a single, unified musical source. With the American style, the quartet members retain their individuality but relate to each other's sound in an organized way.

Most quartets choose most of their material from the traditional repertoire, which includes 16 Beethoven quartets, 84 Haydn's, and numerous pieces by Mozart, Schubert, Brahms, and others. Groups increasingly play the modern composers from the early and recent 20th century, including Bartok, Tippett, Simpson, etc. Each group tries to achieve a unique interpretation and a forceful presentation of each piece. Any composition can be played an infinite number of ways, varying speed, emphasis, rhythm, balance, and phrasing. Thus, a quartet can stamp any piece with its own character and style, within the American or European traditions. The groups rehearse as long as six hours a day seven days a week, in addition to individual practice, for years. Rehearsals are typically split between playing and discussing the interpretation of a piece. Over the years quartets attempt to expand their repertoire and refine the pieces they are currently playing.

The different positions within the quartet have different musical responsibilities. The first violinist is the musical leader of the quartet. Much of the traditional quartet music, particularly Haydn, asks him/her to play the tune, often referred to as the "top." The first violinist's part is usually the most difficult. Among the four players, s/he gets the most attention and acclaim; many quartets are named after their first violinists.

Traditional string quartet pieces demand that the first violin dominate the music; they also require a distinctive, engaging sound from the second violinist. For a quartet to do well, the second violinist cannot get lost in the background. Since s/he plays the same instrument as the first fiddle and

often must play on the instrument's weaker strings (often as an echo of the first), the task is more than doubly difficult. A second violinist has few leads and is rarely the center of the music. S/he must blend, but must at the same time be more than a second fiddle.

The viola teams with the second violin to form the "middle" of the quartet. The instrument has a distinctive, melancholy sound, and finds its place in the string quartet: nowhere else (e.g., orchestral or solo work) does it play such a strong part. Thus, viola players are dependent on quartets as the main outlet for their musical expression. Most viola players began playing the violin; the larger physical size of the instrument makes it difficult for young players, so musicians typically move to it later in their training. Often it provides a player with more opportunities for advancement: competition among violin players is typically much fiercer.

The cellist is literally and figuratively the base of the group, laying the foundation above which the tonally higher strings can shine. The cellist follows the first violinist in the number of leads, and forms the "bottom" of the quartet with the second violin and viola.

Along with the musical requirements of the players, different personal and professional attributes seem to be required of the different players. For instance, many quartet members feel that the second violinist should be a better player than the first. Playing the weaker parts of the music well requires strong technical skill. On the other hand, strong musicianship is required of the first violinist: s/he may not be the best player, but s/he must have audition (i.e., musical vision). The cellist must be completely dependable: without a solid base, the quartet simply cannot function effectively. The viola player has the fewest requirements, but viola players themselves require that they produce a lovely sound. The best quartets ask

each player to have a soloist's skills but not his/her temperament: the ability to listen and work with the other players is essential in successful string quartets.

#### British String Quartets

During the time of this study, at least 21 professional string quartets lived and worked in Great Britain. Many were young, averaging 30 years of age or less. Many met in school and many of the younger quartets had recently graduated from London's Royal Academy of Music. The quartet instructor there encouraged his best groups to continue playing professionally after graduation. Thus, almost every recent year introduced a new quartet.

This burgeoning of the quartet population led to an increase in the variance of experience, pay, number of concerts played, and ability. A competitive atmosphere developed among the younger quartets as they recognized that not all of them could survive. (This expectation was borne out, as over half of these quartets has folded.) The younger quartets could not make a living simply playing quartets. Most lived in London and worked other musical jobs at least part of the year to supplement their income. (As one violinist said, after playing for a film score, "This is where we earn our filthy lucre.") Others solved their financial problems through university positions, where quartets could depend on a fixed income ("being paid to rehearse") for teaching, orchestral direction, and a few concerts each year.

Many local music clubs are active in Great Britain and provide a major source for concerts and income for both young and older quartets. All the quartets sought international recognition, especially in the United States and Germany. Other than normal concerts, quartets also played live on the BBC and did smaller, informal concerts for local schools and other organizations. The

most prestigious of concerts were in London, where a quartet could expect to be reviewed by one or more of the major newspapers and trade journals.

The younger quartets typically handled all of their own business affairs, dividing the duties of concert scheduling, accounting, travel planning, and rehearsal coordination amongst themselves. As they prospered, they often hired a manager or agent for booking and scheduling. Overseas concerts were almost always handled by an agent.

### Effectiveness

This paper considers some of the intragroup factors that may contribute to a quartet's success. Assessing success or effectiveness is not an easy task: Measures such as concert fees and the number of concerts played in a year are inexact indicators of success, and say even less about a group's effectiveness. Trying to assess ability and expertise is even more difficult. Thus, this investigation used a variety of performance measures. No purely objective measures of productivity were possible. As nine years have passed since the data were collected, mortality is an additional indicator of success.

Smith and Berg (1987) suggest that all groups face but must not try to resolve several inherent paradoxes. We focused on four paradoxes: leadership versus democracy, the paradox of the second fiddle, the means for conflict resolution, and similarity versus diversity. A review of the groups literature e.g., McGrath, 1984) offered little in the way of empirical efforts or conceptual structure to guide our research. Role theory, models of conflict resolution, and theories of similarity provide only a general background which is insufficient for strong a priori hypotheses. No focused theory exists for intense work groups, for the paradoxes they face, or for

string quartets in particular. Thus, although we address rather simply derived hypotheses about second violinists, conflict, and similarity, our efforts are meant to be primarily inductive. We did expect that more and less successful quartets would systematically vary their handling of internal group dynamics. How quartets could effectively handle the opposing forces of these four paradoxes, however, was an open question.

#### The Leader versus Democracy Paradox

All string quartets face two conflicting facts: (1) Quartet music typically gives the lead (i.e., most of the good music) to the first violinist; and (2) most string quartet members have joined the group to have a voice in how they play. Members of orchestras, for instance, are bound by the conductor's decisions. Each member of a string quartet, however, can (theoretically) have one-fourth of the input in musical and business decisions. They share equally in their concert fees and expect to share equally in intragroup influence as well. At the same time, the first violinist has most of the musical responsibility in most quartet compositions. This also extends to the group's everyday business interactions. Since first violinists are the most well known and recognized member of each quartet, they are often pressed to act as the group's primary speaker and public relations person.

Smith and Berg (1987) predict that groups will do best when they avoid conscious consideration of their paradoxes. For string quartets, players might enact both aspects of the paradox, subjectively perceiving that they have input (espousing democracy and the right to voice) while objectively giving the first violinist more influence in the group. This paper addresses this paradox by investigating how groups resolved these inherent



contradictions and, in particular, how more and less successful groups dealt with this and other paradoxes.

#### The Paradox of the Second Fiddle

As we have noted, second violinists have unique task/role problems: They must have consummate ability that rarely finds complete expression; they must always play the role of supporter during a performance, even if the first violin seems wrong; they get little attention but nevertheless provide one of the most salient bases for evaluating the quartet as a whole. ("They're only as good as their weakest link.")

Some second violinists may be serving their time as a second (like an apprenticeship) until the opportunity arises to be a first. Does this interfere with their effectiveness? This is an open question. Indeed, the general issue of talented but subordinate professionals has received almost no study. This research explores the simple hypothesis that second violinists who have accepted their subordinate role should contribute more to the success of their quartet (Kahn et al., 1964).

#### The Means for Conflict Resolution

Conflict is inevitable in groups (Ury, Brett, and Goldberg, 1988). With limited time to prepare for concerts, determining how a quartet will play and present every minor nuance of a composition opens the door for considerable discussion if not outright conflict. Because they are so closely connected, how quartets resolve their conflicts should have a tremendous impact on their success and continued existence. To avoid open disputes and hope that they will go away invites all of the side effects of repressed conflict (e.g., personal frustrations, shorter tempers, etc.). A reliance on compromise, on

the other hand, may only produce mediocre performance. Yet constantly confronting their differences could completely engulf a group. Walking the fine line between the active confrontation of musical conflict and the avoidance of compromise and destructive interpersonal conflict should provide a quartet with creative payoffs. Thus, we expected more successful groups to eschew avoidance and compromise in favor of an active, collaborative approach that focused primarily on musical rather than interpersonal conflicts.

### Similarity versus Diversity

Diversity, like conflict, is also inherent in groups: Everyone in a group is different enough to ensure that the members are at least somewhat dissimilar. Increasing diversity generates increased conflict--but heterogeneity can also be functional: In decision making groups, for instance, raising different opinions can stimulate group members to discover creative solutions to their problems (cf., Janis, 1970; March, 1980). When taken too far, however, discussions can wander and decisions become rare or ineffective.

String quartets that play the American style acknowledge each of their member's individuality and try to take advantage of heterogeneity to produce a richly layered sound. Quartets who follow the European tradition also depend on heterogeneity for richness as they attempt to meld their ideas prior to performance. An evolutionary approach asks whether groups select (and are selected for) on the basis of productive heterogeneity or whether they must limit their diversity to be able to function effectively.

In string quartets, similarity of philosophy may provide a group with a common basis for communication so they can interact easily in rehearsal when they determine how they will interpret a piece, as well as in concerts.

Having the same teacher, preferring the same composers, using the same conflict resolution techniques, and being the same age and/or the same gender may foster productive interaction and expression.

Heterogeneity can contribute to effectiveness when members take advantage of the divisible aspects of the group's task (e.g., one person paying attention to intonation, another focusing on speed; Steiner, 1972). Group members can also hold different ideas about the value or purpose of the entire enterprise (e.g., White, 1974) and simultaneously achieve each of their different goals, without adversely affecting their performance.

Smith and Berg (1987) again provide a counterpoint: Explicit identification of each other's disparate goals may generate unnecessary conflict. In addition, an explicit identification of the group's mission may generate constraints to creativity and lose some of the value of the inherent ambiguity of the task (March, 1980). This may be why superordinate goals (Bass, 1985) are so effective: They neither specify particulars which group members might disagree with nor do they constrain different means for implementing the goal.

Finally, the basic similarity of a quartet's demographic characteristics should contribute to their long term success. If group members' ages vary widely, younger players may question whether their older compatriots have the fire to succeed and move up in status in the musical community. In addition, the prospect of one member's retirement casts the spectre of a necessary, potentially difficult change in the quartet's membership and character. Such concerns should not contribute favorably to a group's performance.

Similar difficulties may arise when quartets include members of both sexes. In addition to scandalous folklore, the simple coordination necessary for efficient travel may be more cumbersome when groups mix genders. More

importantly, all male or all female groups may be able to identify with each other more deeply and, therefore, coordinate themselves more effectively.

### Summary

A perfectly functioning quartet is not one that faithfully plays all the notes of a piece, in the correct order, at the right speed and pace. Indeed, there is no one correct speed and pace. Instead, a perfectly functioning quartet must play the piece well (i.e., in tune), but it must also do more. The ultimate quartet plays the same piece differently every time and astounds its listeners with each new interpretation and performance.

Temperament, conflict resolution strategies, decision making styles, and basic interpersonal skills can vary tremendously within a four-person group. The finest groups must achieve the best balance of diversity and similarity so that group members are familiar and sympathetic with each other's points of view, yet different enough to be fresh.

Our starting point in this research was to identify these paradoxes and explore how different string quartets dealt with them. Our expectations were that groups who tolerated their inherent paradoxes would also be most successful.

### Methods

#### Subjects

Eighty professional string quartet musicians responded to semi-structured interviews lasting between 45 minutes and 4 hours. All were active members of one of 20 professional string quartets. We also interviewed two additional experts: One was the first violinist of a quartet whose other

members could not participate during the time of the study; the other was a retired first violinist and an active teacher of string quartets.

Quartets were contacted first by letter and then by telephone. All of the members of 20 of the 21 quartets participated. The sample was meant to be exhaustive; almost all of the professional string quartets in England and Scotland were contacted. To our knowledge, only two quartets, both very young and not known to the authors at the start of the study, were not invited to participate.

Individual interviews were conducted in the spring of 1981. Most quartet members were interviewed one after the other over the course of a day or two. One married couple asked to be and was interviewed together. The interviews were conducted by the first author in a variety of locations, ranging from the individual's home to their car or a local pub. Almost all of the interviews were audio tape-recorded. All participants were assured of personal confidentiality; all were promised and received a preliminary report from the project.

### The Interview

Each interview included a structured set of questions; additional questions depended on the respondent's interests and inclinations. All queries can be roughly categorized into either individual or quartet questions. The individual questions addressed issues surrounding each person's musical history (always the first elements in the interviews), demographics, extra-quartet activities, feelings and behaviors before, during, and after concerts, how they related to their instrument, identification of exceptionally good and particularly bad concerts, favorite pieces and composers, what it took to be a great quartet musician, and why music was so

motivating. Quartet questions included the circumstances of their joining their current quartet, their history of playing quartet music, the informal roles held by quartet members, their approach to leadership and democracy within the group, details about rehearsals, the group's goals, conflict resolution, consistent behaviors displayed by quartet members, friendship within the group, and what constituted a great quartet.

Questions were also designed for each position within the quartet. First violinists were asked if they would ever play second violin and why there had been no switches in this quartet. Second violinists were asked if they would like to be a first violinist and how they handled the dilemmas of being second. Viola players were asked if they still played the violin and what they would do if the quartet folded. Cellists were asked whether they heard better than the other quartet members (since their instrument is not right next to their ear), what they listened for, and whether they drank more than the other quartet members (an in-group stereotype of cellists).

#### Archival Data

Additional data was obtained from newspapers and trade magazines. We searched the Times, the Financial Times, the Guardian, the Telegraph, the Observer, and the Strad during the six months surrounding the interviews for concert reviews. The evaluative phrases in each review were combined into an abstract that included only positive or negative phrases. A set of 12 independent evaluators, all of whom had played quartets in concert, rated a subset of these abstracts and rated them on their overall favorability, their own positive or negative feelings if they themselves had played the concert and received this review, and the success of the quartet. Each abstract was independently evaluated by two or three judges.

Data on records in print were obtained from Gramophone's June, 1981, issue. Information on record sales and concert attendance was not available.

### Strategies of Analysis

Success measures included concert fee, the number of albums recorded, the number of mentions by members of other quartets, the number of newspaper and magazine reviews in that six month period, the number of concerts in the last year, and the ratings of the abstracted reviews (see Table 1).

Possible predictors of success were numerous, including answers from the interviews and the concordance of member responses within a quartet on a series of issues. The data were analyzed to test several simple predictions and to present a picture of the important dynamics within string quartets.

### Findings and Observations<sup>1</sup>

The correlations among the six measures of quartet effectiveness showed significant correlations among concert fee, albums, mentions, and number of reviews (see Table 2). Thus, these four measures were standardized and summed to form a general success score for each quartet (coefficient alpha = .86). The non-significant correlation for number of concerts may be due to a natural reaction by the more successful quartets to cut back their performance schedules. The non-significant correlation for performance ratings may be due to reviewers' prior expectations: they typically exerted more stringent criteria on the performances of well known, successful quartets.

Two intragroup variables, age and the stability of the group, also showed positive relationships with many of the general success measures. Quartets with older members earned more, recorded more albums, and were

mentioned more often; they were not reviewed more than younger quartets. Also, as might be expected, staying together longer was positively related to all of the four measures that were combined for our general success measure.

All but one quartet had at least one member change since 1981. Eight quartets folded, three due to a death or retirement. The other five were ranked among the least successful quartets (see Table 1).

Qualitative analyses focused particularly on the top seven and bottom seven quartets. Supplementary quantitative analyses divided the groups into more and less successful quartets (via a median split on general success) to identify potential predictors.

#### The Leader/Democracy Paradox

Most quartet members used the words "leader" and "first violinist" almost interchangeably. All of the top groups recognized that their task demanded a leader and that that person was naturally the first violinist. Many first violinists explicitly recognized the leader/democracy paradox. Two quotes from a successful quartet's first fiddle illustrate: "I shaped and molded this quartet. I make them play the way I want them to play." Later, he said: "In a quartet, everyone must be satisfied with what they are doing, because it's a life's work. You don't have majority decisions. A minority of one is enough to break up the whole thing. If he doesn't like it, he can just go. You must satisfy everybody." Another first violinist almost simultaneously expressed the two sides of this paradox, saying first that, "If there are any real problems in the quartet, I suppose I sort them out." Almost immediately after, he said: "It's very democratic."

Other members of the top groups either acknowledged both sides of the paradox or viewed the situation as being very democratic. One second fiddle



said, "He does dominate; he's an extrovert anyway. He likes central attention. And obviously that's very good for a first fiddle." A little later in the same interview he said, "We're fairly equal as far as decisions." A cellist described the paradox metaphorically, emphasizing democracy: "I'm sometimes the father and sometimes the son. I think we all are."

Another cellist denied any additional influence for the first fiddle: "How is he a leader? He's 1/4th of a quartet. It's no more than that." Yet observations of his quartet in several recording sessions showed that the first violin was clearly controlling the sessions: He stopped the group when he heard a wrong note or a wrong phrase; he was the one who had to be satisfied before they continued recording; he was totally in charge.

Only one successful group adopted a philosophy that the first violin was the group's singular leader. This was expressed most strongly (not surprisingly) by the first violinist, "I'm a bit of a dictator. It just seems logical that I decide." Later he added, "I don't think a democratic quartet can work." He also assumed that the group members (if not the entire quartet community) agreed with him: "I think everybody recognizes that." His cellist concurred: "You must go with the first."

The second violin was less convinced. He recognized the first violinist's influence and its limits: "The leader has a heavy responsibility. But we all have to turn up in the same place at the same time." Finally, the viola player, who had decided to leave the group, was clearly unhappy with their approach, "It's disturbing that people don't want equality," but he also acknowledged the requirements of the task: "Yes, firsts have to have more say in decisions."

The first violins in the bottom groups, on the other hand, tended to emphasize democracy and avoided acknowledging the group's strong task demands,

e.g., "Just because I'm leader doesn't make any difference." The other members of this quartet, however, wanted the first to take more authority and exercise stronger leadership. The second violinist said, "It would be better if he was more forceful." The viola player concurred, "He should take control in rehearsals. We're trying to push him that way."

The less successful quartets were concerned about both the ability and the personality of their first violinists. Some groups were uninspired by their leader's play, e.g., "He isn't producing the goods." Others thought that the first violinist did not have the personal power to effectively lead them: "Enthusiasm, yes, but he doesn't lead." Later the same person said, "He's a weak leader, no flair, not extroverted enough."

A less successful quartet that survived and is currently doing well responded in much the same way, but their tone was much more positive. The first violinist was egalitarian: "If you're going to get along...you have to recognize that you all have feelings about certain things." One group member saw him exerting influence unnecessarily: "He feels he is responsible for the quartet, and acts that way a lot, which is irritating." But another group member encouraged it: "We have to help him to do it exactly as he wants to."

At the same time, observations of this group's rehearsals were strikingly similar to our observations of the successful group's recording sessions (noted above). The first violin controlled almost all the starting and stopping, yet no one acknowledged that. The second violin said: "I don't think he has any more influence than anyone else." And, "We take turns leading in rehearsal." The cellist observed, "He doesn't direct the rehearsals."

Another less successful group combined democracy and leadership in the worst way. The first violin described the group as "very democratic." Yet he acknowledged taking control without their consent: "In concert, I do what I

want to anyway." The others were looking for more, saying that, "I want a first who will challenge me" or "The first needs inspiration." This group did not survive, and, before they folded, went through the trauma of firing their first fiddle.

#### The Paradox of the Second Fiddle

Second violinists' desires to be a first violinist appear to be unrelated to their quartet's success. Half of the second violinists in both the more and the less successful quartets expressed an interest in being a first fiddle; they also expressed reservations about their ability to succeed as a first. For this sample, having a second who wanted to be leader did not interfere with a group's performance.

Everyone felt that a second violinist was the most likely member to leave a quartet. Players assumed that the second had less to do, so they were frequently burdened with business responsibilities. While they did not often suffer in comparisons to their first violinist on technical ability, they did suffer in charismatic or inspirational comparisons (with some exceptions). First violinists were in the group's forefront in concert, at social gatherings, and during discussions of musical interpretation.

Most quartet players recognized and acknowledged the difficulties inherent in the second violinist's role. Among the more successful quartets, the first violinists attributed their position as first to personality and, less importantly, ability. As one first fiddle put it, "There are born leaders and born followers. However good he is, our second fiddle would never be a first--whatever he tells you." More importantly, successful second violinists were either content or resigned to their position on the basis of both personality and ability. One said, "I'm naturally a second fiddle. I

think it's a basic psychological difference." Another acknowledged that "six years ago you might have been able to persuade me" to play first. Many were proud of their position, e.g., "I don't mind saying I'm a good second fiddle."

The other members of successful quartets were often quite complimentary of their seconds: "Our second fiddle has a beautiful way of phrasing. Beautiful style." Only one--a member of the quartet that openly acknowledged that their first violin was their leader--attributed little value to the position, saying "he doesn't matter that much."

First violinists in less successful groups were less understanding. They recognized the personality differences between the two roles but were not often complimentary. One was almost insulting: "You shouldn't get away with anything if you're playing second, but you can."

In the less successful quartet that has continued to do well, the second violinist was very content with his position: "I always remember thinking I'd like to play second violin in a quartet--which must sound like a funny sort of ambition because most people think playing second isn't very ambitious, but somehow it appealed to me more than playing first." He also took great pride in his work, saying, "The actual depth of sound comes from the middle two parts and the cello." This reflected a famous second violinist's metaphor for a string quartet. In a BBC interview, he said that a quartet is like a bottle of wine. The first violin, who sits out front and gets everyone's attention, is the label. The cellist, who acts as the base for the group, is the bottle. The second violin and the viola are the contents.

Another less successful second violinist expressed more role conflict than anyone else. He stated that, "There are some quartets that swap the two fiddles quite regularly." We never saw or heard of this in any quartet--only when they played trios would the first violinist sometimes sit out. He

expressed aspirations: "Yes, I'd play first. I've never considered myself a very happy second... but I don't know if I'd be any good at playing first." He later repeated, "As an actual leader, I don't think I'd be very good." He didn't appreciate his task, especially in the traditional pieces: "When you get a subordinate part, you feel you could throttle the composer." He also got the story about the bottle of wine wrong: "the second fiddle is the wine." Finally, he was unhappy about his lack of social recognition: "It's a very important position but people never seem to know about it."

#### Means for Conflict Resolution

Many of the quartets' conflicts had little to do with their task even when the dispute was apparently focused on musical issues. As one second violinist put it, "Bad mood, trouble at home, and outside sources lead to arguments." People came ready to have an argument and then did, even when they had little disagreement within the group (cf., Smith, 1989). Many quartets adopted the maxim of leaving their personal lives at the door as they enter the rehearsal room. This was clearly easier said than done.

Unlike the recommendations of many conflict theorists (Pruitt, 1981; Thomas, 1976), quartets reported that they often decided to abandon discussion when they were mired in a troublesome dispute. They could return to it later—maybe. Another second violinist expressed it best: "If it's important, you can always bring it up another day." They used what Pruitt (1981) called a time-out (although they extended it for several days) or what Ury et al. (1988) called a cooling off period. This is a particularly effective strategy for resolving these kinds of irrelevant controversies: They simply disappear due to a lack of continuing import.

When a group experienced strong differences of opinion about how to play a piece--their primary task--they often decided to play it one way in one concert and the other way in the next. Playing the second interpretation, however, was rarely necessary, as the players typically incorporated in their play enough of each other's concerns when they played it the first time to satisfy the members who had held conflicting opinions.

Another popular strategy to resolve musical disputes gave precedence to the person playing the tune. Ironically, this strategy reinforced the philosophy that the first violinist was also the leader: as the primary tune-player, s/he then controlled most of the authority for musical decisions. Thus, groups were often effectively inconsistent, espousing democracy on the one hand, but giving the first fiddle, the player of most of the tunes, the authority to resolve their most important, musical disputes.

Successful quartets used five constructive strategies to deal with conflict: (1) They did not concede when they felt strongly about an issue. As one first violinist put it, "You must not compromise." (2) They played much more than they talked during rehearsals and realized that this was functional: "When you play, what is right and what is wrong emerges." Not only that, playing helped avoided disfunctional conflict: "We have a little saying in quartets--either we play or we fight." (3) They had well established, implicit rules concerning what could be said and what couldn't: "There are things you just don't talk about." They recognized that Pandora's box would open if they violated these unwritten rules: "Obviously you know where the sore points are. If you press on them, if you invite them, it's a massacre." (4) They also realized that they each shared the same superordinate goal: "No matter how many rows we have about the music, we know we're talking the same language. We know fundamentally we want the same things." Finally, (5) they had a

general feeling that conflict was good: "Tension is important." Only one member of a successful quartet, the second violinist in the only quartet that gave strong authority to the first violinist, disagreed: "Arguments rarely flare up. One sits stewing most of the time."

The less successful quartets also used five strategies, although their strategies are much less effective: (1) Many of them felt that conflict was bad. One experienced first violinist said, "There's nothing like a quartet to build tension. Things can start as a discussion and turn into an argument that can only be saved by having a stiff whiskey or something." (2) They realized that they should play more in rehearsals, but they ended up talking too much anyway. The viola player in one group said, "Yes, I think we argue too much and we should play more." This group's second fiddle went farther: "When we disagree, we play it one way and then the other. We still fight later--I don't think it ever gets resolved. There are quite a few unresolved issues." (3) They had different perceptions about the nature of their conflicts. One member of a married couple referred to the two of them as "more compromising." The viola player in the same group felt differently: "He makes the best case anyway, because he's insistent." More importantly, more than one first violinist indicated that they went along with the rest of the group on musical conflicts in rehearsal but played the tune their own way in concert. (4) They often compromised. One second violinist was unhappy about it: "People tend to give way. I don't know if we really satisfy anybody. I think we should have a walkout once in awhile." The viola player in the same quartet agreed: "The atmosphere isn't terribly nice. We never really argue fiercely about a piece." Finally, (5) important conflicts resurfaced (sometimes because of previous compromises), even after discussion had apparently resolved the issue.

The most open conflict among any of the groups occurred between two members of one group. One may have enjoyed it, saying. "I think people should argue and discuss all the time." When asked about the best thing about being in a quartet, he said, "Being able to tell someone what you think and not be sacked." The two less combative members recognized the extent of their group's conflict: "We have as much trouble as we ever had... Yes, we have quite a few differences to resolve."

The second combatant, the first violinist, had a strong self-focus: "It's a stable group I think. Resolve conflict? We often don't. I've come home in an absolute fury." He clearly identified how intense and frequent their conflicts were: "Occasionally we have a rehearsal without a row at all. It does happen." They estimated that they had only one rehearsal in ten that did not include a serious argument. The first fiddle acknowledged how wearing this was, saying, "Every rehearsal is like a lesson with 3 teachers who disagree with each other." He coped by being forceful: "If you continue screaming at every opportunity, you have a bloody good chance of persuading them." Somehow the news of this group's breakup was not surprising.

#### Similarity versus Diversity

Several quartet members described a string quartet as like a marriage, not to one person but to three, with the exception that there is no sex (which, of course, is not always true). Within the groups, the issues of similarity and diversity were clearly evident. Three of the members of one of the more successful quartets, for instance, were all students of the same violin teacher. Not surprisingly, they claimed that their similar learning experiences contributed significantly to their ability to play together as a group. Three of the four members of another successful quartet showed how



similarly their thinking was by independently (and accurately) explaining the metaphor of a quartet being like a bottle of wine.

The similarity of responses to questions about favorite composers was less revealing. Almost everyone mentioned Beethoven; Haydn, Mozart, Bartok, Britten, and Schubert were also mentioned very frequently. All four members of one group reported that they were perfectly suited for Shostakovich. This unusual response also revealed an important reason why many composers were mentioned: The players usually liked most what they were currently playing. Thus, composers who came to mind first may well have been the composers whose music they were playing at the time. Beethoven, however, seemed to hold a special place for almost everyone.

The members of the more successful quartets independently and almost unanimously described their incredible enthusiasm for quartet music as an obsession. They were unanimous (with one exception) in their opinion that the quartet repertoire represented each composer's greatest work.

They also saw each of their fellow group members as very similar "in all the important ways," i.e., with respect to the music. They frequently said that the reason they were together was to play this wonderful music and that everything else was secondary.

The members of successful groups also tended to be friends. As one viola player put it, "We are friends... To play chamber music with someone you don't like--I can't imagine that. How can I play with somebody I don't like? He can be a Paganini for all I care. I think we play more and more to each other." Table 3 displays a sample of some of their overwhelmingly positive comments about quartet music, quartet playing, and each other.

The less successful groups were much more negative about the music, their activities, and each other. The only less successful group that said

that they were friends was the group that has prospered and did not fold. Less successful groups often suggested that similarity was not beneficial: "We all have completely different personalities. I think this helps in a way... We come from different schools and we do sound different. I think it makes for an interesting sound to have four different styles... I think we all like the independent style."

They also reported feeling little inspiration. When the first violin of one quartet was asked about the best thing about being in a quartet, his answer was "It's the least boring." The viola player from the same group acknowledged that, "We'll never be one of the greats."

#### Predictors of Quartet Success and Stability

We conducted three regression analyses to identify the significant contributors to general success, stability (how long the current members had been together), and turnover (how many changes they had endured in the last nine years). Ten variables accounted for 44% of the variance in predicting general success (see Table 4A). Not being nervous before a concert, feeling that overrehearsal is possible, that it's important to interpret the composer's wishes, and having more similar school backgrounds were the strongest predictors; being supported in their pursuit of music at an early age, wanting to duplicate a rehearsal's musical ideas in concert, and not liking modern music were next in the line of predictors. School similarity and thinking that a piece could be overrehearsed also contributed to quartet stability, as did enjoying practice as a young musician, enjoying travel, and leaving business issues to others (a marginally significant predictor of general success; see Tables 4A and 4B).

Turnover was operationalized as the number of personnel changes within the quartet since 1981. The range was from 0 to 4; quartets that had folded (a more drastic change) were assigned a score of 5. Duplicating the technical aspects of rehearsal led to greater turnover, as did starting to play music at a younger age, being older at the time of this study, and avoiding the resolution of conflict (see Table 4C).

#### Quantitative Analyses Comparing More and Less Successful Quartets

A series of one-way analyses of variance, regressions, and simple contingency tables add confirmation to some of the qualitative differences we have noted among the groups. (See the Appendix; all results discussed below were significant at  $p < .05$  unless otherwise noted). Successful quartets stayed together longer than less successful groups. They reported more positive feelings when a concert was going well. They spent more time playing rather than talking in rehearsals; they felt a piece could be overrehearsed more than the less successful groups. They were more interested ( $p < .06$ ) in duplicating the musical rather than the technical aspects of their rehearsals in concert. And they described their conflict resolution strategies as more democratic than unsuccessful quartets ( $p < .06$ ). Members of less successful quartets were more tuned to their audience's reaction as a means of determining their success. Successful quartet players were less likely to have played another instrument. And, finally, members of less successful quartets mentioned other quartets more often and more favorably than the members of more successful quartets.

## Quantitative Analyses of Demographic Similarity

Quantitative analyses of gender, schooling, and age within each group indicated that similarity was positively related to effectiveness. Simple analyses of variance (see the Appendix) indicated that, compared to mixed-sex groups, quartets whose members were the same sex were: (1) more stable (a mean of 8.2 years together versus 2.0 for mixed sex groups); (2) didn't think a piece could be overrehearsed; (3) played more than they talked in rehearsal; (4) felt conflict was healthy; (5) thought that their quartet would remain together longer; (6) liked to travel; (7) didn't like modern music; (8) felt that their nervousness disappeared during a concert; and (9) came from less musical families. Marginally significant findings ( $p < .10$ ) indicated that their minds wandered less when they performed and that they would be friends with the other members of their quartet even if they didn't play together.

Analysis of similar school backgrounds divided groups on the basis of (1) zero or two members having attended the same school versus (2) three or four from the same school. (Almost no one attended the same school without attending it at the same time.) The significant results (see the Appendix) indicated that more similarity led to (1) greater success; (2) greater stability (10.6 versus 5.0 years together); (3) more positive feelings about quartet music; (4) predicting that the group would be together longer; (5) being surprised by the first violinist's play during concerts; and (6) not wanting to continue playing after concerts. A marginally significant effect suggested that similar groups perceived that their first violinist controlled how they played the music more than anyone else. Similar quartets also felt that their viola player and cellist contributed more to their interpretation and blending of the music. Finally, they had played in professional orchestras more often than the members of less similar groups.

The last analysis of similarity arbitrarily divided the groups into two groups on the basis of a 10-year difference in the range of their member's ages. When groups were similar in age, the analyses (reported in the Appendix) revealed (1) less agreement about how their concerts went, (2) perceptions of greater conflict within the group, and (3) feelings that the first violinist was more in control of the way they played. Similar age was also marginally related ( $p < .10$ ) to general success.

### Discussion

Successful quartets handled the leader/democracy, the second violinist, and the conflict resolution paradoxes much better than less successful quartets. They also were more similar and expressed more similarities among themselves. Thus, the results paint a picture of success and similarity going hand in hand, particularly with respect to the members' approaches to quartet music and to each other. Similarity in their age, gender, and schooling is related to many of the attributes of successful quartets. All of these results suggest that the quartets' internal organization matches their performance goal--to produce the integrated, unified European sound. In addition, they handled the other three paradoxes deftly: They did not try to eradicate these inconsistencies; instead, they recognized them, tolerated them, and didn't raise them for discussion. The combination of all these factors no doubt helped them stay together, another indicator of success.

Smith and Berg's (1987) predictions worked very well for the leader/democracy paradox. Members of more successful quartets attributed more influence to the first violin when they were asked directly about it; they also stressed that their group was democratic. They solved this paradox with inconsistent perceptions: By ignoring or distorting the objective reality of

the first violinist's influence, they could emphasize their potential for having an impact in the group. In the only rehearsals and recording sessions we observed, the first violinists always took complete control; two of these sessions were immediately followed by an interview with one of the other group members, who categorically denied that the first fiddle exerted any more influence than anyone else.

Another example of their efficient handling of the leader/democracy paradox was the rule adopted by many quartets that the person playing the tune should have ultimate control of the musical interpretation of that part of the composition. As this was most often the first violinist, the groups were essentially centralizing control. They acknowledged the influence this gave the first violinist--when they were asked. They also added that the rule was necessary if they were going to play well, and that each of them controlled the interpretation when the music gave them the lead. Knowing that they had the opportunity to contribute to the group's decision making and that they could exercise that opportunity occasionally may have been sufficient for many quartet members. In addition, thinking that they had this opportunity and actually knowing that they hadn't exercised it may well have led to exaggerated claims that their influence was strong (Festinger, 1957).

The ability to endure these paradoxes implies that groups like string quartets may do better if they avoid the formalization and discussion of many of the underlying lines of authority within the group. In addition, identifying and clarifying the logical, philosophical consequences and implications of important group policies may be counterproductive. Certainly they must establish intragroup policies when they first begin playing together. Once they have established themselves as an ongoing concern, however, they might do best to let their policies evolve as a reflection of

their actions, without raising issues explicitly unless their continued existence is threatened. Indeed, the long term nature of most successful groups mitigates against formal considerations of their potentially disparate means or ends, unless they are externally provoked.

First violinists in successful quartets clearly recognized and acknowledged the paradox. As a result, they had the opportunity to balance their implicit authority with other members' inputs. First violinists in less successful quartets emphasized democracy. When some groups' members were also unhappy with their first violinist's playing, it becomes clear that the group's basic structure was at threat. Although they might have been more successful with time, these groups appeared to be neither well arranged nor well tuned to their task's basic parameters<sup>2</sup>.

The paradox of the second fiddle was unaffected by whether a second violinist wanted to be a first. About half of the seconds dreamt of being a first violinist in both the more and less successful quartets--counter to prediction. Successful seconds, however, did differentiate themselves by being content with their position and, in some cases, quite proud of it. They did not suffer from much role conflict. Also, other members of their quartets not only treated them with much more respect, and were complimentary, understanding, and appreciative, but they also attributed their two violinists' positions to personality rather than ability. The stronger quartets seem to have acknowledged that (1) they are good enough to have done well and (2) their weakest link is critical to their success. Less successful quartets, who had more doubts about their own competence, gave much less credit to their least musically vocal member.

Almost all of the groups were able to let go of topics that caused unnecessary conflict. Withdrawal was a consistent, frequent, and effective

strategy for the resolution of essentially tangential conflicts. Successful groups experienced less conflict, understood how to handle their conflict, and understood each other's reactions when conflict surfaced. They also knew that properly handled conflict could contribute to their performances. All of the groups recognized that playing was more important than talking, but only the successful groups were able to put this knowledge into practice.

Members of the successful groups did not insist on getting their own way, but they also didn't settle for compromises or majority rule decisions. Rather than feuding over how to play a piece, they simply played it and played it and played it until they agreed how it should sound. They did not embark on unexpected individual forays in concerts; they knew what they were about and fulfilled each other's expectations--including musical surprises from the first violinist in the middle of a piece.

The more successful groups were conscious of each other's sensitive points and avoided trodding on them. They were also less likely to raise old issues that they had previously resolved. They often felt that conflict was counterproductive. They knew each other well enough to avoid unnecessary conflicts and get on with the music. Thus, for smoothly functioning task groups whose members are friends, conflict may be totally dysfunctional.

The less successful groups, on the other hand, sometimes used compromise and, possibly as a result, resurfaced old issues. Their relative lack of success may have altered how they perceived compromise: Rather than being a positive process of joint consensus (fed by success), they each may have viewed their personal compromises as individual concessions. The fact that they used the singular person pronoun, I, more than the plural, we, suggests that they viewed conflict resolution more like competitive negotiation than mutual problem solving. Future research might pursue whether a group's



conflict strategies contribute to success or whether success contributes to more effective conflict resolution.

The final set of results suggests that there was no tradeoff between diversity and similarity. Instead, similarity was consistently beneficial. Even when it did not contribute significantly to success (as it didn't for gender), similarity was related to constructive group action. Also, successful groups unanimously felt that being able to play the compositions for string quartet--their superordinate goal--outweighed almost all of their other concerns.

#### Generalizing to Other Work Teams

The nature of the string quartets' task differs in important ways from many work groups'. Manufacturing teams, for instance, usually do not have the luxury of trying one version of a product after another until they find one that works best. Service teams in a medical clinic, another example, can't experiment with different procedures until they find a patient who finally survives. Research and development groups, on the other hand, have more similar tasks. In addition, string quartets are unusual in that they are performing groups (Butterworth, Friedman, Kahn, and Wood, 1990): Their work is play.

Generalizability beyond this particular task or type of task, however, may still be possible. The quartets' consistent use of effective conflict strategies can be directly applied in many groups. These include: (1) leaving hot topics alone to give everyone a chance to cool off; (2) never settling for majority rule which, at a minimum, always engenders minority dissatisfaction; (3) knowing each other well enough to know what can't be said

to each of the others; and (4) understanding that many conflicts come from outside, not inside, the group.

A second direct application is the fostering of similarity within work groups. Any group of people may be different enough to contribute sufficient heterogeneity to ensure richness and life to their group. Similarity may lead to longer, more productive, and more successful group life.

In addition, for string quartets, especially successful string quartets, their task is so inspiring by itself that diversity and conflict become a secondary and relatively inconsequential interference. The fact that they never quite achieve their ultimate goal--to produce transcendent, glorious sound that is just beyond their reach--keeps them continuously striving to achieve it. Most of the players and most of the successful groups have had glimpses of this state of performance. Indeed, successful string quartet musicians have occasionally gone beyond what Csikszentmihalyi (1990) calls flow, "the state in which people are so involved in an activity that nothing else seems to matter." They achieve an exceedingly rare state that we might call group flow.

The final contribution that this picture of string quartets provides is the acceptance of the inevitability and the value of paradox within groups. This study presents a strong argument in favor of Smith and Berg's contention that paradoxes are inherent to groups. We shed less light on their hypothesis that concerted efforts to resolve these paradoxes can be disastrous. Rather, this study clearly shows that paradoxes are understood and accepted by many successful group members. In addition, the push by less successful quartets members for their leaders to take more authority suggests that groups realize that they must sit right on the fence, wavering between conflicting

paradoxical forces. Living with group paradoxes, as evidenced particularly by successful second violinists, may be an essential element for group success.

## Footnote

<sup>1</sup> Although many of the quotes in this paper use the male pronoun, "he," ten of our respondents were female. Although we recognize the sexist connotations implied by using the male pronoun, we are also obligated to our respondents to protect their anonymity. We felt uncomfortable using the mixed term "s/he" when we referred to actual individuals. We also rejected random usage of the male and female pronoun, an alternative solution to this problem, as it might have led to harmful misattributions.

<sup>2</sup> Puns intended.

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Table 1

Total Score on Six Success Measures for Pairs of Quartet<sup>1</sup>

Quartets	Albums	Fee	Concerts	Mentions	Reviews	Rating	Success	Changes
1 and 2	71	2800	175	22	29	28.9	17.7	1, Fold <sup>2</sup>
3 and 4	70	1300	115	3	20	23.4	5.5	2, Fold <sup>3</sup>
5 and 6	23	1700	205	6	10	26.5	2.9	2, 1
7 and 8	19	1000	180	5	9	36.1	.2	0, 1
9 and 10	0	850	130	2	13	30.6	-1.5	3, 4
11 and 12	8	800	220	4	4	29.3	-2.5	2, 1
13 and 14	2	1075	145	0	3	17.3 <sup>4</sup>	-3.4	1, Fold
15 and 16	2	750	85	0	6	31.8	-3.7	1, Fold
17 and 18	0	450	87	0	7	24.1	-4.4	Fold, Fold
19 and 20	0	560	38	0	0	-- <sup>5</sup>	-5.6	3, Fold <sup>2</sup>

Note: All entries are the total for the pair of quartets. Albums refers to the number of record albums they had recorded that were still in print at the time of the interviews. Fee for a concert is expressed in pounds sterling. Concerts is the number performed the previous year. Mentions refers to statements about the quartet by members of other quartets during their interviews. Reviews refers to the number of concert reviews published about the quartet in the surrounding six month period. Rating refers to the mean evaluation rating of the abstracted reviews. Success, the general success measure, is the sum of the standardized scores for albums, fee, mentions, and reviews. Changes refers to the number of members of the quartet who had left the group and been replaced since the interviews.

<sup>1</sup> Quartets are not listed individually to preserve their anonymity.

<sup>2</sup> These quartets folded due to the death of one member.

<sup>3</sup> This quartet folded due to retirement after many years together.

<sup>4</sup> No reviews were printed for one of the two groups.

<sup>5</sup> No reviews were printed for either group.

Table 2  
Correlation Matrix for the Various Outcome Measures

	1	2	3	4	5	6	7
(1) Fee							
(2) Albums	.80***						
(3) Mentions	.88***	.67***					
(4) Number of Reviews	.47*	.29	.45*				
(5) Concerts	.21	.05	.22	.26			
(6) Performance Rating	-.07	-.34	.08	-.05	.23		
(7) Age (Mean of Members)	.62**	.73***	.44*	-.01	-.10	-.25	
(8) Quartet Stability	.85***	.71***	.74***	-.40*	-.02	-.06	.49*

\* p < .05

\*\* p < .01

\*\*\* p < .001



Comments about Quartet Playing and Quartet Music  
by Members of the More Successful Quartets (arranged by groups)

First Violin: "My life is devoted to say that this music that we're playing is fantastic and my job is to show people how fantastic it is, how strongly I feel."  
--"During a concert I'm totally ensconced. I hardly ever think; I hardly ever become conscious."

--"I feel that my consciousness is in the whole hall, throughout."

--A great quartet? "The main thing is the sum of the four parts is five or six!"

--"We rehearse seven days a week."

Viola: "And when there is this magic going around in a concert somehow you know what's going to happen and you're there with it, almost there even before it, as if he will suddenly draw breath in a phrase and you will draw breath with it."

--"It's such a fantastic repertoire."

Cello: "If there is anything bad (about quartets), it is still marvelous."

--"I get terribly depressed if I'm not performing."

First Violin: "We have a tremendous relationship."

--"For a string player, the greatest music is in the quartet."

Viola: "We haven't ever had to work on it (friendship) consciously."

Second Violin: "I think we're lucky; we've got just the right blend of intuition and intellect. Like a marriage."

First Violin: "I'm insatiable about music."

Cello: "Giving a concert is the most exciting thing. Rehearsals can be the most interesting thing. There you come to a new, great work... and begin to explore it. It can be very, very satisfying. In fact, it's probably much more satisfying than the first performance you give of it."

--"The musical repertoire is fabulous."

--"I think we know what each other's trying to do."

Second: "The repertoire is fantastic."

Second Violin: "I'm still as thrilled about string quartets as I ever was. I just love it."

--"We have nothing in common, other than that. That's enough."

--"In the worst times of my life, the most comfort comes from music."

--"I just love string quartet playing."

--"Take away our gift and I would never talk to the viola and the cello."

First Violin: "To be great, you must make it your life's work. It must become an obsession. It is possible with Beethoven----it is worth a lifetime of hard work, study, practice, concerts, to learn how to play the quartets of Beethoven. If you have done that, it is worth having been alive. It is a true mirror of our life, of the spirit of our civilization. And this is Beethoven. In his subjectivity, he is universal. The late quartets go far beyond; they are pure spirit. They are the continuation of the Old and New Testament put to music. I want people to hear it, when I play it, when it comes out of me."

Viola: "I am in a very good position sitting in the middle, like the second violin. We are the quality of the whole thing."

--"I imagine when we're playing a Haydn quartet that I'm playing the first fiddle. I play my accompaniment as if I was playing it."

Cello: "If it's a spiritual experience or if people get a spiritual experience, which is the ultimate one can hope for, then it's an incredible bonus."

Table 4A Regression Results for Predictors of General Success

Independent Variables	Beta	T	p <
Not nervous before a concert	.38	4.09	.001
Overrehearsal is possible	.35	3.81	.001
Important to interpret composer's desires	.31	3.16	.002
Similar School Background	.28	3.12	.003
Family supportive of music in youth	.27	2.87	.006
Duplicate rehearsals in concert, muscially	.25	2.74	.008
Dislike modern music	.25	2.67	.01
See audience during concert	.20	2.17	.03
Do not handle business	.17	1.90	.06
Liked to practice growing up	.16	1.74	.09
Multiple R	.72		
Adjusted R <sup>2</sup>	.44		

Table 4B Results for Predictors of Quartet Stability (Years Together)

Independent Variables	Beta	T	p <
Liked to practice growing up	.34	3.26	.002
Like to travel	.28	2.62	.01
School similarity	.23	2.31	.02
Piece can be overrehearsed	.24	2.26	.03
Do not handle busines	.22	2.13	.04
See audience during concert	.18	1.79	.08
Not nervous before concert	.18	1.79	.08
Multiple R	.58		
Adjusted R <sup>2</sup>	.27		

Table 4C Results for Predictors of Membership Turnover

Independent Variables	Beta	T	p <
Duplicate rehearsal in concert, technically	.45	4.36	.001
Age when they started music	-.34	-3.45	.001
Age (at the time of the study)	.29	2.73	.01
Tend to avoid and not resolve conflicts	.24	2.43	.02
Excelled at their instrument in youth	.20	1.93	.06
Make eye contact with others during concert	.18	1.86	.07
Multiple R	.59		
Adjusted R <sup>2</sup>	.30		

## Appendix

## Additional Results

1. Quartets were divided into more and less successful groups on the basis of a median split on the general success measure. We report the means of the individuals' responses for significant effects.

a. Significant one-way ANOVA results:

	Less Successful Quartets	More Successful Quartets	df	F	p <
Quartet stability (in years)	4.90	9.14	20	7.46	.03
How good do you feel when a concert is going well (1=fantastic, 3=OK)	2.04	1.67	49	5.97	.02
How is time spent in rehearsal (1= mostly play, 3=mostly talk)	1.85	1.36	49	5.87	.02
Can a piece be overrehearsed (1=never, 3=certainly)	1.71	2.43	26	4.35	.05
Duplicate rehearsal in concert, technically speaking (1=never, 3=always)	2.48	2.10	38	4.00	.05
Duplicate rehearsal in concert, musically speaking (1=never, 3=always)	1.52	1.87	34	3.90	.06
Audience provides feedback on our performance (1=no, 3=yes, that is how I judge our performance)	2.08	1.86	44	3.89	.05
Extent problems solved democratically (1=not at all, 5=very much)	3.12	3.71	48	3.66	.06
How nervous are you before a concert (1=very, 4=never)	2.27	2.74	51	3.35	.07

b: Significant  $\chi^2$  tests:

Ever play any other instrument in quartet?  $\chi^2(1) = 4.13, p < .05$

	Less Successful Quartets	More Successful Quartets
No	21	28
Yes	9	3

If other quartets were mentioned, how were they described?

$\chi^2(3) = 12.40, p < .006$

	Less Successful Quartets	More Successful Quartets
Negatively	4	5
Nonevaluatively	0	5
Positively	14	5
Both	1	0

## 2. Quartets divided into Mixed and Same-Sexed Groups

## a. Significant ANOVA analyses:

Variable	Same	Mixed	df	F	p <
How is time spent in rehearsal (1=mostly play, 3=mostly talk)	1.48	2.43	50	11.80	.01
Does nervousness disappear during concerts (1=never, 3 always)	2.78	1.67	38	11.62	.01
Quartet stability (in years)	8.23	2.00	76	11.11	.01
Like to travel (1=hate it, 3=love it)	2.03	1.30	44	7.69	.01
Like modern music (1=hate it, 3=love it)	2.09	1.33	41	7.03	.01
Can a piece be overrehearsed (1=never, 3=certainly)	1.75	2.75	28	5.85	.05
How long quartet will be together (1=not long, 5=forever)	3.62	2.63	53	5.18	.05
Is conflict healthy in quartet (1=no, 3=yes)	2.23	1.75	43	4.48	.05
Are adult members of your family musical (1=very much, 6=no)	3.75	2.81	73	3.88	.05
Does your mind wander during concerts (1=never, 3=always)	1.93	2.25	43	2.92	.10
Would you be friends if not in quartet (1=no, 4=yes, all of us)	2.35	1.80	41	2.78	.10

3. Quartets divided on the basis of a median split on the range of ages within each group (High = 10 years or more; low = less than 10 years)

a. Significant ANOVA Results:

Variable	Low	High	df	F	p<
How severe are conflicts in quartet (1=very, 3=seldom squabble)	1.93	2.46	55	11.04	.01
Extent 1st violinist has control over music played (1=always, 5=democratic)	2.12	3.00	53	7.24	.01
We often agree on how a concert went (1=never, 5=always)	2.56	3.50	47	6.60	.01
General success score	0.47	-1.33	75	3.52	.10

b: Significant  $\chi^2$  tests

Every play in an orchestra?

	Low	High
No	24	0
Yes	16	15

What is the cellist's most important contribution in rehearsal?  $\chi^2(4)=16.46$ ,  
p < .002

	Low	High
intonation	10	5
interpretation	15	0
speed & timing	1	0
rhythm	6	0
blending, ensemble	6	6

Did quartet members mention any other quartets?  $\chi^2(1)=5.38$ , p < .02

	Low	High
No	22	3
Yes	21	13

4. Quartets divided on the basis of a median split on the similarity of their school backgrounds (Low = 0 or 2 members attended the same school; High = 3 or 4 attended the same school)

a. Significant ANOVA results:

Variable	Low	High	df	F	p <
Quartet stability (years together)	4.96	10.59	75	12.81	.001
General success measure	-0.87	1.61	75	8.51	.01
Ever want to play more after a concert (1=no, 2=yes)	2.00	1.50	19	8.14	.01
How do you feel about quartet music (1=it's the best, 5=hate it)	1.49	1.15	57	6.97	.01
How long will you be together (1=not long, 5=forever)	3.18	3.95	51	5.69	.05
Does 1st ever surprise you in concert (1=no, 3=often)	2.27	1.67	19	4.68	.05
Extent first has control over music (1=always, 4=democratic)	2.55	2.00	53	3.46	.10

b: Significant  $\chi^2$  tests

Ever played professionally in orchestra?  $\chi^2(1)=7.34, p < .007$

	Low	High
No	11	13
Yes	25	6

What is the most important contribution for the viola player?  $\chi^2(4)=16.12, p < .003$

	Low	High
intonation	10	0
interpretation	6	4
speed & timing	0	1
rhythm	1	4
Blending, ensemble	9	9

What is the most important contribution for the cellist?  $\chi^2(4)=15.65, p < .004$

	Low	High
intonation	14	1
interpretation	7	8
speed & timing	1	0
rhythm	1	5
blending, ensemble	7	5

Did quartet members mention any other quartets?  $\chi^2(1)=11.48, p < .001$

	Low	High
No	10	15
Yes	28	6











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