ABSTRACT

Title of Document:	TEAM COGNITION IN GROUP INTERVENTIONS: THE RELATION BETWEEN CO-LEADERS' SHARED MENTAL MODELS OF THE GROUP AND GROUP CLIMATE
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The relation between convergence in group co-leaders' schemas, or mental models, of their groups and group members' perceptions of group climate was examined. Co-leaders of eight inter-group dialogue groups provided paired comparison ratings of the similarity of group members, and group members provided group climate ratings, following each of seven sessions. Paired comparison ratings were analyzed using Pathfinder Network Analysis (Schvaneveldt, 1990) to examine the structure of each co-leader's mental model of her or his group, and to compare these mental models within co-leader pairs to determine degree of match in co-leaders' mental models for each co-leader pair, for each week (i.e., how similarly co-leaders of a group view their group). Cross correlations and growth curve analyses of the match and group climate data showed an increase in match of co-leaders' mental models across sessions, and that match in co-leader mental models was related to group climate.

TEAM COGNITION IN GROUP INTERVENTIONS: THE RELATION
BETWEEN CO-LEADERS' SHARED MENTAL MODELS OF THE GROUP AND
GROUP CLIMATE

By

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CHAPTER I

Introduction

Co-leadership is not only a common practice in group interventions, it may actually be the preferred method for leading psychotherapy groups (Yalom, 1995). This is because the use of co-leaders in group interventions has many assumed benefits. For example, the use of co-leaders has practical advantages for the administration of the group itself (i.e., groups can still meet when one therapist is unavailable, training and supervision of therapists is more efficient; Dies, 1994). It may also have direct benefits for both the group members. For example, the co-leader relationship (i.e., the relationship between the two leaders) can provide a model of healthy interpersonal interaction to group members (Dies, 1994). Co-leaders can also provide support to each other, and help one another to maintain objectivity, and the presence of a co-leader may also lessen anxiety, especially that of beginning therapists (Dies, 1994). Co-leaders also provide each other with different insights and perspectives on the group and the group members, and can help each other to work through countertransference reactions that may arise (Yalom, 1995).

Despite the widespread use of co-leadership in group interventions, and the widely held belief in its benefits, little research has actually examined the co-leader relationship itself (Riva, Wachtel, & Lasky, 2004). Specifically, little is known about how the co-leader relationship itself may affect the dynamics of a group. However, an understanding of how the co-leader relationship relates to the dynamics of the group, specifically group climate, may be important for understanding how co-leadership relates to group member outcomes.

Group Climate and Group Member Outcomes

MacKenzie (1983) suggested that group climate, which includes those aspects of the therapeutic environment that "encourage compatible types of interpersonal events [,] may be directly related to the process of change in psychotherapy groups" (p. 159). In addition, Yalom (1995) stated that group cohesiveness, one aspect of group climate, is analogous to the therapist-client relationship in individual psychotherapy, which has been shown to be a mediating factor to successful therapy. Because the climate of the group is believed to be so important in the process of change in group psychotherapy, an examination of the factors related to the development of the group climate, for example the co-leader relationship, may be useful in understanding how change occurs in group interventions.

A commonly used measure of group climate is the Group Climate Questionnaire-Short Form (GCQ-S; MacKenzie, 1983). MacKenzie's factor-analysis of the GCQ-S showed the items to load on three scales: *engaged*, *avoiding*, and *conflict*. MacKenzie said that the engaged factor of group climate includes the importance of the group to the group members, the closeness between the group members,, and group cohesion. The avoiding factor refers to the avoidance of responsibility for change by the group members. And the conflict factor includes the level of conflict and distrust within the group.

Research using the GCQ-S has shown a relationship between group climate and group member outcome in group interventions. For example, Ogrodniczuk and Piper (2003) examined the relation between group climate and group member outcome in both

interpretive (having the goal of enhancing clients' insight on repeated problems) and supportive (having the goal of improving clients' adaptation to life situations) types of short-term psychotherapy groups for psychiatric outpatients with severe grief. Clients' were administered the GCQ-S after every fourth session for 12 weeks. In addition, clients were assessed through questionnaires and interviews prior to the first meeting of the psychotherapy groups, and following the twelfth session to assess change, if any, in group member outcome variables such as general symptoms, grief symptoms, and life dissatisfaction. Orgroduniczuk and Piper found that the engagement aspect of group climate was significantly related to positive group member outcomes on general symptoms, grief symptoms, and life dissatisfaction, suggesting that there is a relationship between an engaging group climate and group member outcome.

Other researchers have suggested that not only is group climate related to group member outcome, but it actually serves as a mediator between the group leadership and group member outcomes. In a study of semi-structured, single-therapist-led groups for adolescents in state custody, Kivlighan and Tarrant (2001) found therapist intentions to be related to the climate of the group. Specifically, therapist intentions that related to therapeutic work (i.e., exploration, insight, action, etc.) were negatively related to an active and engaging group climate, as rated by the group members. They also found that therapist intentions to work on the structure of the group itself were related to decreased perceived conflict within the group. Additionally, they found that an active and engaging group climate was associated with positive group member outcomes. Based on these findings, Kivlighan and Tarrant suggested that group climate mediates the relationship between group leadership and group member outcomes in group interventions.

Other research by Kivlighan and Lilly (1997) examined the relationship between group climate development (i.e., change over time) and group member outcome. They found the both the level of engagement and the pattern of engagement development over time were related to group member outcome. For example, a "U" shaped pattern of development on engaged was related to better group member outcome. Therefore, they concluded, group leadership may be related to both the level of group climate and the pattern of group climate development.

Although research has shown group climate to be related to group member outcomes, and that group climate serves as a mediator between group leadership and member outcomes in single-therapist groups, research has not examined how specific aspects of the co-leadership relationship are related to group climate and group member outcomes. Therefore a greater understanding of the processes involved in co-leadership may be useful in understanding how the climate of a group, and thus group member outcomes, develop.

Co-leader Teams and Team Cognition

One way to better understand the processes involved in the co-leader relationship may be to conceptualize the co-leader pair as a "team" and to examine the literature on teams. Teams have been characterized as "individuals working interdependently toward a common goal" (Rentsch and Woehr, 2004, p. 16), a definition that clearly holds true for the co-leader team. Because co-leaders working together in the leadership of a group intervention can be conceptualized as a "team," the concept of *team cognition*, borrowed from organizational research, may be useful in examining the processes involved in co-leadership of group interventions.

Team cognition refers to how a team functions to process and use information in a situation (MacMillan, Entin, & Serfaty, 2004). More specifically, it refers to the shared information and knowledge structures (i.e., schemas or mental models) held by members of a team, and how the team uses these mental models. Research on team cognition suggests that shared mental models can exist in at least four domains: equipment, task, team processes (such as teamwork), and team members; and can be assessed in a variety of ways, including Pathfinder Network Analysis (Schvaneveldt, 1990), multidimensional scaling, and cognitive mapping (Mohammed, Klimoski, and Rentsch, 2000). Shared mental models may hold value as an explanatory mechanism (they help to explain team performance by explaining team member interactions), as a predictive variable (they make it possible to predict team performance), and as a means for providing insight on a team's problems and how to solve them (Cannon-Bowers & Salas, 2001).

For example, knowing the degree of similarity among team members' mental models may be useful in explaining and predicting the amount of participation of team members on a given task. Bonito (2004) showed that similarity among team members' mental models of an ideal team member (i.e., how similarly team members conceptualize what makes an ideal team member) moderates the relationship between the amount of knowledge team members hold and their substantive participation on the team. When the degree of similarity among team members' mental models of an ideal team member is low, those with a higher amount of information show more substantive participation on a team's task. However, when there is high similarity among team members' mental models of an ideal team member, the difference in the rate of participation between team members with a low amount of information and team members with a high amount of

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information is less. That is, when team members think more similarly (about what an ideal team member is), the amount of knowledge team members hold matters less in determining how much team members participate, than when team members think more differently.

In addition to its usefulness in prediction, team cognition can also help to explain the effectiveness of a team. For example, Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) examined the relation between the degree of similarity in team members' mental models (of what constitutes a "team" and of the task assigned to them, a computer flight simulation), and the processes and outcomes of the task. They found that more similar mental models of what constitutes a "team" were significantly related to team performance, and that this relationship was mediated by team processes (e.g., cooperation, communication, and coordination). Shared mental models of the task itself were not correlated with team performance, but indirectly had an effect through team processes. These results suggest that the processes and outcomes of a team task may be affected by the degree of similarity among the team members' mental models.

Although an examination of teams' shared mental models has proven useful for evaluating and predicting team performance in industrial-organizational research, the concepts from the team cognition literature have not been applied to the co-leader teams that often lead group interventions, such as psychotherapy groups. Although one of the many perceived benefits of co-led group interventions is that the co-leaders can provide one another with different insights and perspectives on the group members and the group itself (Yalom, 1995), research has not specifically looked at the degree of match in co-

leaders' conceptualizations of their group (i.e., mental models), and how this relates to other variables such as group climate.

Description of the Current Study

The current study borrowed the concept of team cognition from the organizational literature and applied it to co-leader "teams" of group interventions. Specifically, it examined the degree of match in co-leaders' mental models of their groups, and if and how the degree of match in co-leaders' mental models of their group changed across sessions (e.g. Do the co-leaders' mental models of their group converge or diverge across the duration of the group?). In addition, this studied examined how this match influenced the important process variable group climate.

CHAPTER 2

Review of the Literature

Co-Leadership of Group Interventions

The co-leadership of group interventions (e.g., psychotherapy groups) has been a common practice since the 1960s, and has many assumed benefits (Dick, Lessler, and Whiteside, 1980). Dick et al., for example, point out that the advantages of co-leadership often cited include the cognitive, emotional, and physical support co-leaders can provide to one another; the ability to have a multiplicity of leadership roles within the group (e.g., the "good guy" and the "bad guy"); the training benefits afforded by having a novice therapist lead a group alongside of a more expert therapist; the multiple and new perspectives that are provided by having more than one leader; and the continuity that is possible, should one leader have to miss a session. However, Dick et al. also highlight two main criticisms of the co-leadership model that often arise: its inefficiency (i.e., the use of two therapists on a single group) and its complex and, sometimes, troublesome nature. However, the pros and cons of the use of the co-leadership model in group interventions remain subjective, due to the lack of empirical research on the co-leader relationship (Dick et al., 1980).

Effectiveness of the co-leadership model. Although empirical research on the co-leader relationship remains sparse, some literature does exist that examines the effectiveness of the co-leadership model in group psychotherapy (LoPiccolo, Heiman, Hogan, & Roberts, 1985; Hendrix, Fournier, & Briggs, 2001), and importance of the development of the co-leader relationship itself (Dick et al., 1980; Dugo & Beck, 1991; Dugo & Beck, 1997).

The use of the co-leader model in interventions has been shown to be at least as effective as interventions led by a single leader. For example, LoPiccolo et al. (1985) examined the hypothesis that co-leader led sex therapy for sexually dysfunctional couples is more effective than sex therapy with a single therapist. In this study, 81 couples were treated for a wide range of sexual dysfunctions. Of these couples, 65 met the inclusion criteria (i.e., they completed all measures, they did not face imminent divorce, they did not have any psychosis, depression, or clear physical problems that could explain their sexual dysfunction), and were included in the final analyses. Couples were randomly assigned to a single female therapist, a single male therapist, or a male-female co-leadership team; and each couple received 15 one-hour weekly therapy sessions.

LoPiccolo et al. (1985) administered participants a battery of instruments at five points (intake, after a two-month waiting period, prior to the first therapy session, at post-treatment, and three months after termination). The battery included a measure of sexual satisfaction and functioning, a measure that discriminated between happily and unhappily married couples, and a sexual history form. LoPiccolo et al. found that overall, sex therapy was effective, with couples reporting significantly higher ratings of global sexual and marital satisfaction at post-treatment than at intake or pre-treatment. Additionally, none of the interactions involving treatment type (i.e., single male therapist, single female therapist, or male-female co-therapy team) and global ratings of sexual and marital satisfaction across time reached significance, suggesting that there were no differences in outcomes based on the type of treatment provided. The same pattern of results was found involving the interactions of treatment type with sexual interactions and sexual history.

That is, co-leader led sex therapy was found to be equally as effective as sex therapy led by a single male or female therapist.

Overall, these results suggest that the use of a co-leader team in sex therapy with sexually dysfunctional couples is at least as effective as a single male or female therapist. While these results provide support for the contention that co-led therapy is an effective treatment modality, they do not strongly endorse the use of a co-leader team, or help explain what it is about co-leadership that contributes to positive outcomes. In addition, because no significant difference in effectiveness existed between the use of a single therapist and the use of a co-leader team, it could be argued that the use of a single therapist would be desirable, as it is a more efficient use of resources.

In addition, there were several limitations to this study that should be taken into account when interpreting these data. First, the sample in the LoPiccolo et al. (1985) study was sexually dysfunctional couples in sex therapy. It may be the case that the presence of a co-leader team is differentially effective in different types of interventions (e.g., group psychotherapy). Also, the authors did not examine the process of the sex therapy itself. So, while the results suggest that both single-therapist-led and co-therapist-led sex therapy are effective, it remains unclear how either form of leadership affects particular elements of the therapy itself, such as the development of the group climate. An understanding of these elements is important in that it may help elucidate what it is about these forms of therapy that leads to positive outcomes for the clients.

Hendrix, Fournier, and Briggs (2001) also examined the effectiveness of co-leader teams on client outcomes and therapist training outcomes. However, unlike LoPiccolo et al. (1985), Hendrix et al. used both qualitative and quantitative methods to examine the

use of different pairings of co-leader teams (i.e., teams varying in experience levels), in 402 cases seen by 33 student therapists in a marriage and family therapy clinic. The cases represented a mixture of individual, couple, and family therapy; and presenting problems ranged from an individual's depression and/or anxiety, to a couple's communication or violence issues, to family issues revolving around parenting, child abuse. Hendrix et al. assigned each of the cases to an individual therapist, a low experience co-leader team, a mixed experience co-leader team, or a high experience co-leader team. Assignments were made based on "a number of factors" (p. 69), including therapist caseload, training needs, experience, and overall difficulty of the case.

Clients filled out measures at the beginning of the first session, including a background questionnaire (containing items about severity of the presenting problem and the likelihood that the problem would change), a couple or family cohesion and adaptability scale, a relationship satisfaction scale, and a communication scale. At the end of third session or at drop out the therapist made a diagnosis, including an global assessment of functioning, which was checked by a supervisor. Hendirx et al. (2001) used the number of therapy sessions attended and reason for termination (as determined by the client and therapist) as the primary outcome variables in their study. In addition, they conducted focus groups with the therapists in their study to gather qualitative data on the experiences of individual therapists and co-leader teams.

Like LoPiccolo et al. (1985), Hendrix et al. (2001) found no significant difference among the use of individual therapists versus co-leader teams, or among the types of pairings of co-leaders. In contrast, their qualitative results suggested that there were perceived benefits to the co-leaders with the use of a co-leader team. For example, some

benefits of co-leadership reported by co-leaders were the increased knowledge and additional insight provided by the presence of another therapist, and the sharing of responsibility that allowed them to be more willing to take risks. However, co-leaders also reported challenges that co-leadership posed. These included control issues and the necessity to develop an increased awareness of the therapeutic system. While this study supports LoPiccolo et al. (1985) in their assertion that no significant difference exists between the use of single therapists and co-leader teams, it also suggests that there are benefits of the co-leadership experience that are experienced by the co-leaders themselves, such as a willingness to take risks, which might affect aspects of the group such as group climate.

However, the Hendrix et al. (2001) study has several major limitations. First, the outcome variables selected by the researchers were the number of therapy sessions prior to termination, and reason for termination (as determined by the therapist and supervisor). This is problematic in that it addresses only the length of therapy, and not specific client outcomes. Also, all therapists (both low- and high-experience therapists) were student therapists, with low experience characterized as having less than 276 days of experience, and high experience as having over 276 days of experience. It may be that this amount of time is not enough to sufficiently distinguish between experienced and inexperienced therapists. A final limitation is that cases were assigned based on variables such as experience, training needs, and difficulty of the case, which may be confounding variables considering that the authors were examining experience level and training.

While the above research suggests that the use of co-leader teams is at least as effective as the use of single therapists, it is not clear what it is about the co-leader model

that makes it an effective treatment modality, or how it contributes to client outcomes. In addition, research has not specifically addressed how the co-leader relationship itself develops and operates within the context of a group intervention to affect important variables, such as group climate.

Development of the co-leader relationship. Though there is not much empirical research on the co-leadership of group interventions (Riva, Wachtel, & Lasky, 2004), there is theoretical literature on the development of the co-leader relationship based on personal experiences of co-leaders with extensive experience co-leading groups. For example, Dick, Lessler, and Whiteside (1980) proposed a developmental framework of the co-leader relationship based on their own co-leading experiences, and their experiences observing or supervising other co-led group interventions over a six-year period. In describing the co-leader relationship, they employed an analogy of the co-leadership relationship as a marriage, suggesting that,

> Close friendship is not necessary at the beginning of either venture, and the long-term comfort and productivity of both are directly related to the development of open and efficient channels of communication and problem solving. Success in either relationship is strongly facilitated by mutual openness, honesty, and directness in the here-and-now about thoughts and feelings, leading to a satisfying, productive balance between separateness and togetherness (p. 275-276).

Dick et al. (1980) described a four-stage model of development of the co-leader relationship, which included *formation*, *development*, *stabilization*, and *refreshment* stages. These stages provide a framework to view both the positive and negative influences that may occur at each phase of the co-leadership, and point out areas that may need to be addressed in supervision. In the first stage, formation, the co-leaders' main focus is on his or her own intrapsychic issues, such as feelings of competency or anxiety.

In addition, during the formation stage, basic structural and interpersonal issues are addressed, such as the co-leaders' relationship outside of the psychotherapy group, the treatment goals for the psychotherapy group, and the theoretical frameworks of each of the co-leaders. Dick et al. suggested that during this phase, co-therapy is not beneficial to the group members, and that to move beyond the formation stage, co-leaders must communicate their thoughts and feelings between sessions. The focus of supervision during this stage is on each individual therapist's own issues that are hindering the co-leader relationship, and any interpersonal problems between the two co-leaders.

By the second stage, development, structural issues have probably been addressed and the focus becomes more interpersonal. Co-leaders begin to support each other and to use each other's strengths to help make up for their own deficits. Supervision at this stage is focused on the interpersonal relationship between the co-leaders. The third stage, stabilization, focuses on the relationship between the clients and the co-leaders, and the therapeutic tasks at hand. Dick et al. (1980) claimed that by this stage, "Each therapist has a clear view of reality and has adjusted and dealt with distortions, fears, and expectations he/she brought to the partnership . . . the organizational process of running a therapy group has become natural and automatic" (p. 279). Outside supervision is less important at this stage, as the co-leaders monitor and learn from one another.

Dick et al. (1980) referred to the final stage, refreshment, as the "stage of effortless cotherapy" (p. 280). This stage may be reached "if both therapists actively continue to strive for increased therapeutic skill and personal growth" (p. 280). It is marked by "growth, excitement, and creative innovation" and effective treatments "flourish almost without effort" during this stage (p. 280).

Dugo and Beck (1991, 1997) also outlined a stage model of the development of the co-leader relationship, based on the assumption that "like all living systems, co-therapy relationships evolve," (p. 294, 1997). Their nine-stage model of the development of the co-therapy relationship is based on systems and developmental theories, and "addresses specific tasks and goals along with structural, stylistic, and qualitative dimensions of the co-therapy relationship" (p. 294, 1997). The nine stages in the Dugo-Beck model of the development of the co-leader relationship include: creating a contract, forming an identity as a team, building a team, developing closeness, defining strengths and limitations, exploring possibilities/reworking the original contract, supporting self-confrontation, deciding on whether or not to continue to work together, and closing. This model of the development of the co-leader relationship in group psychotherapy highlights the importance of the development of a team identity. This identity as a team is important, as the co-leaders need to work together toward a common goal, namely positive group member outcomes. Because of this, Dugo and Beck suggested that the co-leaders need to pass through these three team-identity-building stages prior to meeting with the psychotherapy group.

Wheelan (1997) supported Dugo and Beck's (1997) assertion that these team-building stages of the development of the co-leader relationship are important and need to be addressed prior to the meeting of the group itself. In addition, Wheelan pointed out that co-leaders can play pivotal roles in the development of the group, and that the leadership needs of a group change as the group itself develops. Specifically she suggests, based on studies of leadership in work groups, that newer groups require a greater focus on the task dimensions of the group, whereas more mature groups require

leadership more attuned to the relationship dimensions of the group. Because of the changing needs of groups, Wheelan suggested that co-leaders should be flexible enough to adapt to these changing role demands. The presence of two leaders may also be useful as the group develops, as each of the co-leaders may possess their own unique strengths (e.g., strength in being task-oriented and directive, or in facilitation the development of the relational aspects of the group) that are useful at different points in the group's development.

Wheelan (1997) also addressed the question of whether co-leaders of psychotherapy groups must work collaboratively in order to create positive group member outcomes. In considering this question, Wheelan drew on the parallel between the co-leader relationship and the relationship between parents. Specifically, she suggested that just as two-parent families require effort and communication, co-leader teams need communication, clarity, and a shared plan of action to effectively promote the development of the group.

While these stage models are useful in conceptualizing the development of the co-leader relationship, particularly the development of open communication, togetherness and separateness (Dick et al., 1980), and a team identity (Dugo & Beck, 1997), research has not examined these stage models, or other specific aspects of the co-leader relationship.

Compatibility. One empirical study of the co-leader relationship in group psychotherapy groups focused on the compatibility of the co-leaders. Based on anecdotal reports, Bernard, Drob, and Lifshutz (1987) suggested that co-leader experiences can range from very positive, "growth-producing" experiences, to experiences that are

"uncomfortable or even traumatic, for patients and therapist trainees alike" (p. 96), and

that the compatibility of the co-leaders is a major factor contributing to these experiences.

In order to further explore the range of experiences within co-leader relationships,

Bernard et al. examined the perceived compatibility of 22 co-leader dyads.

The 42 therapists that composed the dyads were psychiatric residents, psychology

interns, and one social worker (with some of the therapists co-leading more than one

psychotherapy group). "In most cases" the co-therapy dyads were assigned (rather than

chosen by the therapists themselves), and most of the partners within each dyad had not

met prior to this assignment (Bernard et al., 1987, p. 98). All of the co-leaders were

inexperienced therapists, supervised by experienced faculty members. The psychotherapy

groups consisted of outpatients and were conducted at one of three locations: a private

hospital, a municipal hospital, or a VA hospital. Most of the groups were long-term and

time unlimited (though some lasted as few as 10 sessions), and were "insight oriented and

focused on the here-and-now process" (p. 99).

Bernard et al. (1987) designed three instruments for this study. The first, the

Therapist Self-Description Questionnaire (TSDQ) contained 24 items that asked each of

the co-leaders to provide demographic information, as well as information regarding their

theoretical orientation, personal temperament, and therapeutic style. The TSDQ was

found to have relatively low inter-item correlations ranging from $r = -.29$ to .53. A factor

analysis on this instrument revealed theoretical, temperamental, and stylistic factor

groupings. The second instrument, the Cotherapy Relationship Questionnaire (CTRQ),

which was designed to have a narrower focus on the co-therapists' perceived

compatibility, consisted of 15 items that asked participants to rate their compatibility with

their co-leader along personal, behavioral, and theoretical dimensions. The CTRQ, was found to have significant inter-item correlations at the .05 significance level, ranging from $r = .40$ to .70, and Cronbach's alpha was .94. A factor analysis on this measure revealed three factors: concrete behaviors of the therapists, theoretical orientations, and co-leaders' personal relationships. The last instrument, the Cotherapy Relationship Questionnaire-Supervisor's Form (CTRQ-SF), was a replication of the CTRQ, given to the co-leaders' supervisors. At the time the instruments were administered, the co-leader relationship had already ended, with the time between the end of the co-leadership experience and the administration of the measures varying from a few months to about a year.

Bernard et al. (1987) found that, in general, the co-leaders felt compatible with their co-therapist. Scores on the CTRQ, which have a possible range of 15 to 90, with 52.5 representing the neutral point (co-leaders felt that they were neither compatible nor incompatible with one another), ranged from 33 to 90, with a mean of 70.5. Co-leaders were generally in agreement about their level of compatibility, with the correlation between therapists and their co-therapist at .67, however the correlation between therapists and their supervisors' ratings of compatibility did not correlate significantly.

Bernard et al. (1987) then correlated the difference between the co-leaders' scores for each item in the TSDQ and the mean scores on the CTRQ, and found that these correlations reached or approached significance. The correlation of the difference scores on two items on the TSDQ, self-disclosure and level of directiveness, with the scores on the CTRQ reached or approached significance. In both cases, co-leaders who rated themselves most similarly on these variables were more likely to perceive that they were

compatible as co-leaders. Drawing on these results, the authors suggested that therapeutic style is a useful indicator of the quality of the co-leader relationship, more so than theoretical orientation or personal temperament.

While the results of this study help to highlight factors that contribute to compatible co-leader relationships in group interventions, the study has several limitations. First, the co-leader relationship is not examined within the context of the group itself, so it is not known how co-leader compatibility related to group member outcomes. Without a measure of some outcome measure on the group member level, for example group climate, it is hard to interpret the clinical significance of the data. Also, data were collected several months to a year after the co-leader relationship had been dissolved. It may be that perceived compatibility is higher or lower after the co-leader relationship has ended, and the therapists are no longer in contact with one another.

Generosity and envy. Berger (2002) suggested that a unique aspect of the co-leader relationship is that co-leaders can "*use* each other without feeling *abused*" (p. 112). Specifically, they have faith in their own and their co-leader's abilities, and they feel comfortable openly exploring feelings that arise within their relationship. Berger suggested that in doing so, the co-leaders provide a model of "mutuality and interdependence" and "productive cooperation" (p. 113).

However, Berger (2002) also suggested that envy enters into the co-leader relationship, as the relationship contains the dynamic aspects of self and other. Specifically, co-leaders are vulnerable to all sorts of comparisons, from both each other and from the group members. For example, the group may cast each therapist into a specific role, often the "good" one and the "bad" one, which can exacerbate the

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experience of envy on the part of the co-leaders. While this work by Berger (2002) does not include an empirical study of the constructs of generosity and envy within the co-leader relationship, she emphasized the importance of attending to both of these aspects within the co-leader relationship. Berger (2002), Dugo and Beck (1997), and Wheelan (1997) all highlight the importance of the development of a team-like co-leader relationship, characterized by open communication and clarity regarding both the plans and goals for the group intervention, but also for the co-leader relationship itself. However, these authors do not discuss how these aspects of the co-leader relationship translate into positive or negative outcomes for the group members themselves.

Group Climate and Group Member Outcomes

While the literature on the co-leader relationship provides some insight into efficacy of co-leadership, how this relationship develops, and the factors that may contribute to the development of a good co-leader relationship, the literature does not explore specifically how the co-leader relationship relates to the group itself. For example, how does the co-leadership of a group intervention relate to group member outcomes? That is, what are the processes involved in group interventions that are affected by group co-leaders that have a bearing on the group member outcomes? One answer to this question may be found in the climate of the group that the group co-leaders help to create.

According to Mackenzie (1981), *group climate* refers to the observed behavior within a group that reflects the impact of group norms, or the "implicit rules of behavior that have been accepted as legitimate by members of a group" (p. 287). In other words, group climate is "a property or attribute of the environment that facilitates or impedes"

the progress of group members, and it takes into account the behavior of all members in the group (p. 287, Mackenzie, 1983).

MacKenzie (1983) points out that data on the group climate can come from a variety of sources, including therapists, observers, and trained raters, or from the group members themselves through the use of the Group Climate Questionnaire (GCQ; MacKenzie, 1981) and the Group Climate Questionnaire Short Form (GCQ-S; MacKenzie, 1983). The GCQ-S, a shortened version of the GCQ, is a measure of group members' perceptions of the interpersonal environment that exists in the group therapy session. The GCQ-S consists of 12 items that participants rate on a 7-point Likert scale, ranging from 1 (*not at all*) to 7 (*extremely*). The 12 items on the GCQ-S comprise three scales: *engaged* (the working atmosphere; the importance of the group to the members, sense of closeness, etc.), *avoiding* (the extent to which group members are avoiding dealing with their own problems and other group members), and *conflict* (interpersonal conflict and distrust).

Several studies have used the GCQ-S to examine group climate and its relationship to group member outcomes. For example, Ogrudniczuk and Piper (2003) used the GCQ-S to explore the relation between group climate and group member outcomes. Specifically, they examined the relation between the early group climate and group member outcomes with two different forms of psychotherapy for patients that met criteria for complicated grief. In addition, they examined whether it was changes in group climate across the duration of the groups or average group climate across sessions that accounted for any observed relationship.

Ogrodniczuk and Piper (2003) randomly assigned 107 psychiatric patients to one of two types of psychotherapy groups: interpretive or supportive. Interpretive therapy was defined as having the primary objective of enhancing insight related to the patients losses. As such, the therapist had the goal of "[creating] a climate of tolerable tension and deprivation wherein conflicts can be examined through the use of the here-and-now experience" (p. 67). The authors described the therapists' role in this type of therapy as "active, interpretive, and transference focused" (p. 67). In contrast, supportive therapy was defined as having a primary objective of "improv[ing] the patients' immediate adaptation to their life situations" (p. 67). In order to do so, the therapists "create[d] a climate of gratification wherein patients can share common experiences and receive praise . . . for their efforts at coping" (p. 67). The authors described the therapists' role in the supportive therapy as "active, noninterprtive, and other focused" (p. 67). Each of the types of groups met for 90 minutes per week for 12 weeks, and were led by one of three experienced (i.e., ten years or more of experience leading therapy groups) therapists.

Prior to inclusion in one of the groups, Ogrodniczuk and Piper (2003) had patients complete assessments of pathological grief, impact of events, and social adjustment. Group climate was assessed using the GCQ-S after each fourth session, so that a measure of group climate was obtained for the beginning, middle, and termination phases of the therapy. Fourteen outcome measures (given pre- and post-therapy) assessed 15 variables including grief symptoms, impact of events, social adjustment, distress, and life satisfaction. Factor analysis on these 15 variables revealed three factors: general symptoms, grief symptoms, and target objective severity and life satisfaction. Their results suggested that group climate was significantly related to positive group member

outcomes in terms of both grief and general symptoms. Specifically, it was the engagement aspect of the climate, as opposed to the avoidance or conflict aspects, that was related to positive outcomes, both when measured early on in therapy (i.e., after the fourth session), and when averaged across sessions. Change in levels of engagement within a group across the duration of the therapy was not related to group member outcomes.

Ogrodniczuk and Piper (2003) hypothesized that a possible explanation for the relationship between an engaging climate and positive member outcomes is that when the climate is engaging, group members are better able to engage in the actual tasks of the group. This study provides evidence of a relationship between group climate and group member outcomes, highlighting the importance of an understanding of the factors that may contribute to the climate of a group. However it has several limitations. First, the results are correlational, so it is not possible to identify a causational relationship between group climate and group member outcomes. In addition, this study did not examine the role that the therapists played in the development of the group climate.

Kivlighan and Lilly (1997) also examined the relation between group climate and group member outcomes using the GCQ-S. However, in addition to examining the levels of group climate variables at a limited number of specific points in treatment like Ogrodniczuk and Piper (2003), they examined the development of the group climate over time, across all sessions. Participants were 84 undergraduate and graduate students, participating in one of 14 "interpersonal process groups" (p. 210) as part of a group theories course. The groups were led by graduate students in counseling psychology,

most of whom were characterized as having "minimal group facilitation experience" (p. 211). Groups met twice weekly for 14 to 26 weeks.

Kivlighan and Lilly (1997) asked group members to complete an assessment of their personal goals regarding their participation in the group after the first and last group meetings. In addition, participants completed the GCQ-S at the end of each session. Group climate data was aggregated across participants by group, to provide an overall rating of group climate for each group. Kivlighan and Lilly then used hierarchical linear modeling to analyze the growth curves of the aggregated GCQ-S data, and related these growth curves to therapeutic gains made over the course of the groups.

Kivlighan and Lilly (1997) found that the mid-treatment levels on the engaged (i.e., group cohesion) and avoiding subscales were significantly related to therapeutic gain. In addition, they found that a "U" shaped pattern (i.e., high-low-high) of engaged development, an inverted "U" pattern (i.e., low-high-low) of conflict development, and a cubic pattern (i.e., high-low-high-low) of avoiding development; and therapeutic gains were significantly related. While these results suggest that both the mid-treatment levels and patterns of development of group climate variables are related to group member outcomes (i.e., therapeutic gains), and highlights the importance of examining the development of the group climate in group psychotherapy, this study does not address the role that the therapist or co-therapists play in the development of the group climate.

Group leadership, group climate, and group member outcomes. An understanding of the climate of the group and the factors, such as the co-leadership, that may affect the climate of the group is important because the group climate is related to the outcomes for the group members. Yalom (1995) hypothesized that group climate mediates the

relationship between group leadership and group member outcome, and recent research using the GCQ-S has found a relationship between group climate and group member outcome.

Kivlighan and Tarrant (2001) further examined the relationship between group climate, leadership, and outcomes. Based on Yalom's (1995) hypothesis that group climate mediates the relationship between group leadership and group member outcomes, they hypothesized that therapist intentions (which they categorized into four dimensions: therapeutic work, safe environment, interpersonal, and group structure) would be related to levels of engagement and conflict within the group climate, which in turn would be related to group member outcome. When group climate is controlled, they hypothesized, there would be no relationship between leader intentions and group member outcome.

To test their hypotheses, Kivlighan and Tarrant (2001) administered the Group Climate Questionnaire-Short Form (GCQ-S) to 233 youths (mean age of 14.5 years), following each of eight, two-hour weekly meetings of semi-structured intervention groups for youths in Department of Family Services custody. They also administered the TSI to the 41 adults who led the groups, after each session. The TSI is a measure that examines how much each of 19 different therapist intentions was focused on in the session. In addition, at the termination of the eighth week, the youths completed the Youth Client Satisfaction Questionnaire (YCSQ) about their experience in the group.

In their analyses, the Kivlighan and Tarrant (2001) found the found GCQ-S to have two factors, which they labeled "active engagement" and "conflict-distance." In addition, an exploratory factor analysis on the TSI revealed four factors (intentions): therapeutic work, group structure, interpersonal, and safe atmosphere. Group climate data

were aggregated across group members, as were outcome measures. Results showed that an active and engaged climate was positively related to group member outcome, and that decreased conflict-distance predicted group member feelings about the leader. Kivlighan and Tarrant suggested that an engaging and active climate encourages task-oriented roles, while decreased conflict-distance encourages socio-emotional roles. Intentions of therapeutic work were negatively related to an active and engaging climate, where as focus on a safe environment was positively related. A focus on group structure was significantly related to decreasing climate of conflict.

Overall, the Kivlighan and Tarrant (2001) suggested that group climate mediates the relationship between group leadership (as measured by intentions) and group member outcomes. However, this study had several limitations. First, the leaders of the groups comprised a wide range of ages (from 16-52), and varied in terms of educational backgrounds. It is presumable that group leader age had an impact on the group member-leader relationship (i.e., some of the leaders may have been only one year older than the group members, and having a leader near the same age may affect how the outcome group members report). In addition, as the authors point out, the education of the leaders ranged from a high school degree to a master's degree, with most participants holding a bachelor's degree as the highest degree. It may be that leader education level is also related to group leadership style and intentions (the training to be a group leader consisted of only two, eight-hour days). Despite these limitations, the findings are important in that they suggest that group leader intentions are related to group member outcomes through the group climate that they create.

While group climate appears to be related to group member outcomes (Kivlighan & Lilly, 1997; Ogrodniczuk & Piper, 2003), it is not clear how the co-leader relationship may contribute to the development of group climate. An understanding of how co-leadership contributes to a favorable group climate (and hence, favorable group member outcomes) is important because co-leadership is so often the treatment modality employed in group interventions (Yalom, 1995).

Team Cognition

In order to provide the supportive and engaging group climate that is associated with positive group member outcomes, co-leaders must work together as a team toward this goal (e.g., Dugo & Beck, 1997). For this reason, an examination of the literature on teams might shed light on the process of co-leadership of group psychotherapy, and the co-leader relationship. Specifically, examining the research on team cognition may provide an understanding of how two co-leaders conceptualize the same group, and how the level of similarity between these conceptualizations operates on the group climate and the outcomes of the group members.

Defining "team cognition." Cognitive processes in teams and groups are assumed to operate similarly to those that operate within individuals (Klimoski & Mohammed, 1994). Specifically, individuals create knowledge structures from the information they take in, which they use to make sense of their surroundings (Klimoski & Mohammed, 1994). These knowledge structures, or mental models, in turn "aid interpretive processes by enabling individuals to screen out information in order to prevent information overload and intolerable levels of uncertainty" (Klimoski & Mohammed, 1994, p. 405).

Team cognition, then, involves the same sort of development and use of knowledge structures (i.e., mental models) to organize information, but on a group, rather than individual, level. Just as mental models operate within individuals to screen out and organize information (Klimoski & Mohammed, 1994), and allow individuals to operate more effectively in their environments, team mental models involve the structuring of knowledge on a group level, allowing teams to function more effectively.

There has been some debate about how best to operationalize this kind of team mind (Klimoski & Mohammed, 1994). In fact, that the idea of a "group mind" has been around at least since the 1920s and 1930s, but lost favor because of the difficulties researchers had in conceptualizing just what a "group mind" is (Klimoski & Mohammed, 1994). Recently, there has been a renewed interest in this concept, as organizations increasingly depend on groups and teams to complete tasks.

An important question, then, in attempting to operationalize team cognition becomes "what is the content of these shared mental models?" In answering this question, the recent team cognition literature has focused on shared mental models in four domains: task-specific knowledge, task-related knowledge, knowledge of teammates, and attitudes and beliefs (Cannon-Bowers & Salas, 2001). Cannon-Bowers and Salas suggested that shared knowledge of how to complete a specific task, of task-related concepts like *teamwork* (e.g., Rentsch & Klimoski, 2001), of fellow team members' and one's own strengths and weaknesses, and shared beliefs and attitudes in a broader sense (i.e., not task-specific or task related) allow for coordination with one another, compensation for one another, and consensus across a team.

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Typically, research on team cognition involves the hypothesis that the extent to which mental models are shared among members of a team will be related to the effectiveness of this team or organization (Rentsch & Woehr, 2004). That is, if the knowledge structures held by individual members of a team are similar within that team, the team may be more effective than if each team member had unique knowledge structures. As Cannon-Bowers and Salas (2001) pointed out, an understanding of the degree to which a team shares various mental models also holds great potential in terms of understanding the functioning of the team, and the relationships between team members. Specifically, knowledge of the degree of similarity in team members' mental models can have value as an explanatory mechanism, as a predictive variable, and as a means of diagnosing and solving a team's problems. And, understanding the degree of similarity in a team's cognitions can help explain team performance by explaining how effectively team members interact with one another. This same knowledge may be used to predict the performance of a given team a priori, and may aid in team problem diagnosis and problem solving (Cannon-Bowers & Salas, 2001).

Measurement of team cognition. Mohammed et al. (2000) suggested that, as the trend in organizations has increasingly emphasizing the use of teams, interest in the study of team cognition has also increased. They also, however, pointed out that while there have been several theoretical papers written on the impact of shared mental models, there has been relatively little empirical research on the topic. They suggested that the lack of conceptual development of the construct of *team mental models*, and the lack of understanding about the methodology have lead to a dearth of empirical research. Rentsch and Klimoski (2001) also pointed out that, due in part to a lack of agreement as

to how to measure team cognition, there is less empirical work on team cognition than theoretical work.

In order to address these concerns, Mohammed et al. (2000) identified and discussed four different techniques for the measurement of team mental models, with the goal of promoting empirical research on this topic. Based on the work of Klimoski and Mohammed (1994), they conceptualized team mental models as "team members' shared, organized, understanding and mental representation of knowledge or beliefs about key elements of the team's relevant environment" (p. 125). Mohammed et al. suggested that the concept of team mental models should include both belief and knowledge structures, but that team mental models of structures should be distinguished from their cognitive processes. Teams members can have very similar mental models, but have very different ways of processing this information, so measures of shared mental models, they said, should include belief and knowledge structures but not cognitive processes.

Because measures of team mental models should measure the degree of convergence of mental models, Mohammed et al. (2000) suggested that measures should include both *elicitation* and *representation*, where elicitation determines the content of the mental model, and representation determines the structure of the mental model. They suggested four techniques for measuring team mental models that measure beliefs and knowledge structures but not processes, and that include both elicitation and representation. These four techniques include: Pathfinder Analysis (Schvaneveldt, 1990), multidimensional scaling, interactively elicited cognitive mapping, and text-based cognitive mapping.

Pathfinder analysis. Pathfinder Network Analysis (Schvaneveldt, 1990) is a technique that uses paired-comparison data to create a network representation of the team's mental model of a construct, and is often used in educational and psychological research (Mohammed et a., 2000). Specifically, 15-30 concepts related to the construct are created, using textbooks or subject matter experts, and are then presented in all possible pair combinations to team members. Team members "are generally asked to make quick, intuitive judgments of similarity between pairs of concepts on 5- to 9-point rating scales [and] respondents use their own internal standards [to make the similarity judgments] and are generally not asked to specify their definition of similarity" (Mohammed et al., 2000, p. 135). A network representation is then created from this paired-comparison data, which shows the relatedness of the concepts as links between nodes. Paired-comparison ratings of this sort have the advantage of simplicity and high validity, and is often used in educational and psychological research (Mohammed et al., 2000).

Multidimensional scaling (MDS). Like Pathfinder Network Analysis (Schvaneveldt, 1990), MDS is often used in psychology and educational research settings, and shares many of the same procedures. Specifically, MDS also uses relatedness judgments of pairs of concepts created from relevant literature and/or subject matter experts, and team members are asked to make "quick, intuitive judgments of the similarity between pairs of concepts on 5- to 9-point rating scales" (Mohammed et al, 2000, p. 135). However, unlike Pathfinder Network Analysis (Schvaneveldt, 1990), MDS provides a geometric model of the data in a multidimensional space, where the geometric space represents similarity between concepts. Mohammed et al. suggest that MDS is

useful when the number of dimensions is unknown, as it determines the number of

dimensions used to cognitively organize data spatially.

Cognitive mapping. The last two methods of measuring team mental models that

Mohammed et al. (2000) discussed are both types of cognitive mapping. According to

Mohammed et al, cognitive mapping provides "graphic representations of both content

and structure of individuals' idiosyncratic belief systems in a particular domain" (p. 132).

Different types of cognitive maps are used extensively in organizational behavioral

research, strategic management, and political science. Different types of maps exist

(concepts can be linked by different types of relations—e.g., causal relations). Data can

be interactively requested from participants (e.g., through interviews or questionnaires),

or through post hoc analysis of data (e.g., coding transcripts). The authors refer to the

former as interactively elicited cause mapping (IECM) and the latter as text-based cause

mapping (TBCM).

According to Mohammed et al. (2000), cognitive mapping relies "on terms,

language, and concepts used by the people being studied" (p. 136). Unlike Pathfinder

Network Analysis (Schvaneveldt, 1990) and MDS analyses where the researchers

provide the content to be mapped (based on statements created from textbooks and

subject matter experts), cognitive mapping requires the participants themselves to provide

content to be mapped, with a common method for this being through interviews. Once

constructs are obtained from the participants, they are asked whether one construct

influences the other and if so, the direction and strength of this relationship, for each pair

of concepts. Cognitive mapping methods provide a great deal of flexibility in the number

and type of variables contained in the maps. However, because the content comes from

the participants themselves, there is no straightforward way to determine the number of constructs to include.

In a study on the effect of experience in teams on teamwork knowledge structures, Rentsch, Heffner, and Duffy (1994) compared two of the above methods, specifically MDS and cognitive mapping of the concept of "teamwork." Participants for this study were 23 individuals: four research assistants and 19 undergraduate psychology students, who at the time of the study, were all a member of at least one team.

Rentsch et al. (1994) had participants complete a measure of team experience. Following the completion of this questionnaire, participants' teamwork knowledge structure was assessed through both MDS and free-hand cognitive mapping. For the MDS assessment, participants were given 100 teamwork-related adjectives on index cards, and were told to think about the meanings of the words, and then to sort the cards into as many categories as they desired. They then selected one adjective from each of the categories as the label for that category. These labels were then placed on the side and bottom of a matrix, on which they were asked to rate the similarity of the meanings of the adjectives within each pair of categories. These similarity ratings were then analyzed using MDS. For the free-hand cognitive maps, participants were instructed to take their piles of cards and sketch the relationships between the categories using circles around the categories and lines showing the relatedness of the categories. The researchers then had 12 raters judge the similarity between the MDS solutions and cognitive maps.

Rentsch et al. (1994) found that participants with higher levels of experience on teams had more concise structures of teamwork than did lower experience participants, as they used fewer defining dimensions. They were also found to have more abstract

knowledge structures. The authors point out that this finding is consistent with expert-novice literature. Interestingly, the knowledge structures created by the two methods were more similar (between individuals) for the high experience participants, suggesting that they were more able to consistently represent their knowledge structure of "teamwork."

Shared mental models and team performance. Empirical research has begun to examine shared mental models in the four domains suggested by Cannon-Bowers and Salas (2001). For example, Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) examined task-specific and task-related team mental models. The authors hypothesized that teams with highly similar mental models will be better able to work towards common goals, will be more *in sync,* and will therefore show better performance.

To test this hypothesis, 112 undergraduate students were randomly assigned to 56 teams of two people each. The teams were given the task of "flying" an F-16 fighter aircraft using a computer-generated simulation. The simulation was described as extremely low-grade (as compared to actual flight, or commercial/military simulations), as well as very detailed and complex. The experiment was conducted in a 2.5-3 hour session, which included three phases: an overview and demonstration of the task, a hands-on training program, and a sequence of surveys followed by "flying" two ten-minute "missions" (for a total of three completed surveys and 6 "missions").

Team performance was measured as it related to the goals of the mission (surviving, reaching waypoints, and shooting down enemy planes), and team process was rated by two independent raters on three dimensions: strategy formation and coordination, cooperation, and communication. Participants were also given two matrices

that included attributes for describing each of these mental models. The first assessed

mental model of the task, and the second assessed mental model of a team. The attributes

included in the task mental model matrix were predetermined through the use of subject

experts and technical documentation, and the attributes for the team mental model matrix

were preselected from a literature review on teamwork. Participants were asked to rate

each task or team attribute with respect to its relation to every other attribute. A network-

analysis program was then used to analyze participants task and team mental models

based on these matrices.

Results suggested that team performance did not change significantly across times

(from one set of missions to the next), however there was significant change in process

over time. Mental models did not change significantly across time. Shared mental models

of "team" were significantly related to team performance, and this was mediated by team

process. Shared task mental model was not correlated with team performance, but

indirectly had an effect through team process.

The findings of the study provided empirical support for the importance of task-

specific and task-related shared mental models on team effectiveness. However, one of

the major threats to external validity in this study comes from the fact that the study used

fabricated teams in a laboratory setting and an artificial task. In addition, team members

were separated by a divider, and communicated with one another via a microphone and

headset. This is presumably represents a novel and artificial experience for undergraduate

psychology students, so it brings into question the generalizability of the findings. A

replication of this study, using different types of teams and different types of tasks would

greatly add support to the assertion that shared mental models contribute to team effectiveness.

In another example of empirical research on team cognition in one of the four domains suggested by Cannon-Bowers and Salas (2001), Rentsch and Klimoski (2001) sought to examine the extent to which task-related shared mental models, specifically of the concept of *teamwork*, relate to group outcomes. In addition, they examined the antecedents of team cognition; that is, they examined what characteristics of team members are related to a team with high levels of agreement of the concept of teamwork. Specifically, the authors hypothesized that team demographics, team experience, the mode of team member recruitment, and team size are all antecedents of team member schema agreement for the concept of teamwork, and will therefore have indirect effects on team effectiveness.

A pilot study was conducted in which 54 individuals from 21 different teams provided descriptions and examples of teamwork, resulting in a list of descriptors of teamwork and behavioral examples, which were then used to develop 15 statements about teamwork. These statements were then paired with one another for presentation, so that each statement was presented once in a pair with each other statement.

The pairs of statements were then presented to 315 people on 41 existing work teams (ranging in size from 2 to 27 members) at the US Department of Defense. Participants rated the similarity between each of the pairs of statements, and were also given a scale containing nine questions measuring effectiveness of their team, and a seven-item questionnaire measuring team experience. Participants also indicated how

they became a member of their team, and provided demographic information. All of these measures took approximately 60-90 minutes.

Rentsch and Klimoski (2001) used multidimensional scaling to analyze the paired comparisons of teamwork statements to assess teamwork schema agreement for each team. The R square value for each team was operationalized as the teamwork schema agreement. Results team effectiveness measures correlated positively with teamwork schema agreement, and that similarity in education and organizational level of team members, and percentage of team members with high levels of experience on teams were significantly correlated with teamwork schema agreement. Percentage of team members recruited (as opposed to mandated or volunteered) was also significantly correlated with schema agreement, and team size was significantly negatively correlated with schema agreement.

Rentsch and Klimoski (2001) concluded that smaller teams, with similar life experiences, higher levels of team experience, and recruited members are more likely to have high team member schema agreement, which in turn is related to higher levels of team effectiveness. However, a possible complication is that, in using multidimensional scaling, the authors had to select a limited number of statements (15) about teamwork. While these were drawn from a pilot study with the same population, it may be the case that these statements do not fully represent the concept of "teamwork." This study may be improved by the use of a more inclusive conceptualization of the schema under consideration. Also, `while the authors used pre-existing teams in a naturalistic setting as participants, the types of teams varied. The teams had been together for varying lengths of time, and presumably they had very different functions, and therefore have different

criteria for team effectiveness. The use of teams that are more similar in terms of the length they have been together, functions, and goals may improve the validity of the findings.

Bonito (2004) also examined how team members' shared mental models are related to group processes. Specifically, Bonito examined whether shared schemas of an "ideal" group member moderate the rate of participation among individuals in the group. Bonito hypothesized that individuals with more informational resources will participate more often in small groups, but that this effect is moderated when the group members hold similar expectations of an ideal group member. Bonito predicted that as the similarity of group member schemas for an ideal group member goes up, the number of speaking turns needed to work through a task goes down.

Bonito (2004) hypothesized that the amount of relevant information an individual has will be positively related to their amount of substantive (task-relevant) participation. In addition, information from others on a team will activate information within individuals, therefore an individual's substantive participation will be positively related to the amount of relevant information the other group members hold.

To examine these hypotheses, one hundred twenty-three undergraduate participants were individually given a list of behaviors for a fictitious person and were asked to write a psychological profile of this person. They were also asked to identify the characteristics that they felt characterize an ideal group member. Participants then worked in groups of three to discuss and come to a consensus about the psychological characteristics of the fictitious person. The individual responses regarding the ideal group

member were analyzed for similarity within groups, and the group discussions were broken into units and coded as either substantive or non-substantive by two coders.

Regressions were performed with the predictor variables being number of psychological attributions written by the individual (amount of information held by the individual), number of attributions written by the other two group members (amount of information held by others), and schema similarity; and the criterion variables being amount of substantive and non-substantive participation. Results suggested that the amount of information held by both the individual and the other group members were both positively related to substantive participation of the individual. Individuals with more information tend to substantively participate more often than those with less information, and this was particularly when the similarity in team mental models is low. The effect of the amount of information held by others on the team was also greater when similarity in mental models was low.

This study shows that a relationship exists between amount of individual and team information on levels of participation, and that this relationship is moderated by level of team mental model similarity. However, there are several limitations. One of the major limitations of the study, as pointed out by the authors, is that the order of the instruments given at the beginning of the task was not counterbalanced (i.e., everyone first wrote the psychological profile of the fictitious person, and then listed their attributions of an ideal group member). This presents threats to internal validity in that participants may have been primed in their answers about an ideal group member by completing the psychological profile of the fictitious person. Another threat to internal validity is that alternative explanations for rate of participation are not ruled out (for example, no other

demographic or personal data was collected about the participants, which may have affected their rate of participation). Despite these limitations, this study does highlight the importance of shared mental models in explaining group processes.

While it appears from the team cognition literature that it concept holds value as a predictive, explanatory, and diagnostic tool, the question remains of how best to measure shared mental models.

Team Cognition and Co-led Group Interventions

Taken together, the empirical literature on team cognition suggests that match in team members' mental models is related to effectiveness of the team (Bonito, 2004; Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers, 2000; Rentsch and Klimoski, 2001). Because the co-leadership relationship represents a type of team (Dugo & Beck, 1997), with the co-leaders working toward the common goal of positive group member outcomes, it may be useful to examine how the match in co-leaders' mental models of their group may contribute to their effectiveness toward this goal. Specifically, an examination of relation between match in co-leaders' mental models of their groups and the immediate outcome variable of group climate, which is related to other group member outcome variables (Kivlighan & Lilly, 1997; Ogrodniczuk & Piper, 2003), may help explain how co-leadership operates as an effective modality and may suggest ways in which co-leaders can help maximize favorable outcomes for their groups.

CHAPTER 3

Statement of the Problem

Although co-leadership is a common practice in group interventions, little research exists on how this relationship functions (Riva, Wachtel, & Lasky, 2004). Specifically, little is known about how the similarity with which the co-leaders conceptualize the group may be related to group processes. Dugo and Beck (1997) highlight the importance of the development of the co-leader relationship as a team, but the processes involved in this team collaboration throughout the duration of the group remain largely unexamined.

An understanding of the processes involved in co-leadership is important because group co-leaders are largely responsible for the development of the group climate. For example, Kivlighan and Tarrant (2001) found that group leader intentions relate to group member ratings of engagement and conflict within the group. Group climate was also found to be related to group member rated satisfaction with the group experience, suggesting that group climate mediates the relationship between group leadership and group member outcomes. Other studies have confirmed the relationship between group climate and group member outcomes (Ogrodniczuk & Piper, 2003). Although the relationship between group leadership and group climate, and ultimately group member outcome, has been well established, little research has been conducted on how the processes involved in co-leadership operate to affect group climate.

Because the co-leader relationship has been described as a *team* collaboration (Dugo & Beck, 1997), it seems that team-related research may help guide an exploration of the processes involved in the co-leading relationship. Specifically, the idea of team

cognition, largely an industrial-organizational concept, may provide a new perspective through which to view the co-leadership process and relationship. Research in team cognition assumes that cognitive processes in teams operate in much the same way as they do within individuals. For individuals, mental models "are postulated to aid interpretive processes by enabling individuals to screen out information in order to prevent information overload and intolerable levels of uncertainty" (Klimoski & Mohammed, 1994, p. 405). The concept of team cognition assumes that mental models shared by teams may also have the same utility.

Cannon-Bowers and Salas (2001) suggest that the concept of shared mental models holds value as an explanatory mechanism (helps understand performance by explaining interactions), as a predictive variable (makes it possible to predict performance), and as a means for providing insight on a team's problems and how to solve them. Studies have also shown that when team members hold similar mental models (of the task, or some team relevant concept such as "teamwork"), the team is more effective (Mathieu et al., 2000). Team cognition has also been shown to be related to participation in the group. Bonito (2004) found that, especially when group member schema similarity was low, group members with more informational resources had more substantive participation in the group. Higher levels of schema similarity moderated the relationship between informational resources and substantive participation.

Because team cognition has been shown to be related to aspects of group climate (i.e., group member participation, Bonito, 2004), and group outcome (effectiveness, Mathieu et al., 2000), and because the co-leader relationship can be characterized as a team, team cognition may be useful in gaining a better understanding of the processes

involved in co-leadership of group psychotherapy. A major aim of the current study is the application of the concept of team cognition, which has largely been used in industrial-organizational psychology, to counseling psychology and the co-leader relationship in group interventions. Specifically, the extent to which group co-leaders share mental models of the group was examined, and how this degree of match in co-leader mental models of the group affects group climate. As such, this study addressed the following research questions:

Research question 1: Does the degree of match in co-leaders' mental models of their group change over the course of the group?

Research question 2: How does the degree of match in co-leaders' mental models of their group affect group member outcomes (i.e., group climate) over the course of the group?

CHAPTER 4

Method

Participants

Groups. Groups for this study were *Words of Engagement* intergroup dialogue

groups (N = 8) at the University of Maryland College Park. Intergroup dialogues are

based on Allport's (1954) intergroup contact hypothesis, which stated that contact

between groups could help reduce prejudice. Intergroup dialogues involve alliance

building between groups in working towards social justice, engaging oneself in

interactions with others, critical self-reflection of one's own experiences, and

appreciating intergroup differences (Nagda, 2006). A recent meta-analysis, including 713

samples from 515 studies, found that intergroup contact typically does reduce prejudice

between groups (Pettigrew & Tropp, 2006).

The *Words of Engagement* program at the University of Maryland is an intergroup

dialogue program that "brings together groups of students from various social identity

groups with a history of tension or conflict between them . . . in order to build bridges

across groups" (University of Maryland, n.d.). Each group meets for two hours per week

for each of seven consecutive weeks. The intergroup dialogues seek to create a

"collaborative learning experience that leads to greater cross-group understanding and

communication . . . and a greater degree of equity and social justice."

The intergroup dialogue topics included an emergent themes group, an

interfaith/secular group, an intra-white (i.e., Caucasian) group, an LGBTQ/heterosexual

group, a men/women group, a people of color/white people group, a group on

socioeconomic class, and a U.S. born/foreign born group. The samples of both group

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members and group co-leaders represent convenience samples, as both group members and group co-leaders elected to participate in the intergroup dialogues, were allowed some flexibility in choosing their own intergroup dialogue group, and, as such, were not randomly selected or assigned to groups.

Group members. At the individual level, group members were 71 undergraduate students enrolled in one of the eight intergroup dialogues. The number of group members in each group ranged from five members to 13 members ($M = 8.88$ group members per dialogue group, $SD = 3.18$). Thirty-eight of the group members agreed to participate in the study and submitted useable data across the seven weeks. Of these participants, the age range was 18 to 35 years of age ($M = 21$ years old, $SD = 3.09$). Seventy-one percent of the participants were female and 29% were male. Forty-Five percent of the participants identified Caucasian/White, 26% identified as African American/Black, 11% identified as Asian American, 11% identified as "Other," and 8% did not specify their race or ethnicity.

Across the groups and weeks, there were 497 possible group member observations (71 possible group members, for each of the seven sessions). Ninety-eight observations were collected from these 38 participants, across groups and weeks, for a response rate of 19.72%.

Group co-leaders. Group co-leaders were 16 graduate students, faculty members, and University of Maryland affiliates, all of whom were "trained and experienced in the practice of dialogue facilitation and have impressive expertise in content areas" of the dialogues (University of Maryland, n.d.). The goal of facilitators in the *Words of*

Engagement intergroup dialogues is to create a "holding space that draws upon the experiences and voices of the group members."

As part of the *Words of Engagement* intergroup dialogue format, group co-leaders cultural identities were matched to those of the group members of the group they facilitate. The co-leaders ranged in age from 24 to 76 years of age ($M = 36.69$, $SD = 16.87$). The sample was 50% female and 50% male, with each co-leader pair consisting of one female co-leader and one male co-leader. Sixty-nine percent of the sample identified as Caucasian/White, 13% as African American/Black, 6% as Asian American, 6% as Latino/Latina, and 6% as Other. Sixty-nine percent of the co-leaders were graduate students, and 31% were faculty and affiliates of the University of Maryland. Forty-four percent of the sample indicated that their highest degree was a bachelor's degree, 44% indicated that their highest degree was a master's degree, 6% indicated that that their highest degree was a Ph.D., and 6% indicated that their highest degree was a J.D.

Across the groups and weeks, there were 112 possible group co-leader observations (2 co-leaders per each of 8 groups, for each of the seven sessions). For observations in a given week to be useable to compute the match in co-therapist mental model for that week, both co-leaders for a group needed to have completed the similarity ratings for that week. Seventy useable observations were collected from the co-leader pairs (i.e., 35 pairs of observations), across groups and weeks, for a response rate of 62.50%.

Measures

Demographics questionnaire. Both group co-leaders and group members completed a brief demographic questionnaire to assess age, ethnicity, gender, sexual

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orientation, education level, occupation/major in school, and years experience in current occupation/year in school. A copy of this questionnaire is included as Appendix A.

   Positive and Negative Affect Schedule (PANAS). The current study examined both cognitive (i.e., co-leaders' mental models) and behavioral (i.e., group climate) aspects of the group experience. In order to assess affective components as well, both group co-leaders and group members were administered the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item measure that examines both positive affect (i.e., " the extent to which a person feels enthusiastic, active, and alert" [p. 1063]) and negative affect (i.e., the extent to which a person feels "subjective distress and unpleasureable engagement" [p. 1063]). The instructions of the PANAS ask participants to rate how much they feel each of 20 positive and negative affect words on a five-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*). The instructions may be modified so that they ask about positive and negative affect at various points in time (e.g., "right now," "today," "generally," etc.; Watson, Tellegen, & Clark, 1988).

   The initial intent of the administration of the PANAS in the current study was to assess positive and negative affect immediately after each intergroup dialogue session. As such, the PANAS was administered with the instructions to "Indicate to what extent you feel this way right now, at the present moment"). However, due in order to reduce disruption to the intergroup dialogues and allow for more flexibility for participants, the participants completed the measures at their convenience via internet-based surveys. As such, participants completed the PANAS at various points in the week after their

intergroup dialogue session, and the "present moment" was not necessarily immediately following the sessions. Therefore the results of the PANAS were not interpreted.

Group Climate Questionnaire-Short Form (GCQ-S). The GCQ-S (MacKenzie, 1983), a shortened version of the Group Climate Questionnaire (MacKenzie, 1981), is a measure of group members' perceptions of the interpersonal environment that exists in the group therapy session. The GCQ-S consists of 12 items that participants rate on a 7-point Likert scale, ranging from 1 (*not at all*) to 7 (*extremely*). MacKenzie (1983) found that the 12 items on the GCQ-S comprise three scales: *engaged* (the "working atmosphere;" the importance of the group to the members, sense of closeness, etc.), *avoiding* (the extent to which group members are avoiding dealing with their own problems and other group members), and *conflict* (interpersonal conflict and distrust). The GCQ-S takes about five to ten minutes to complete, and was administered to group members following each session, in order to assess changes in group climate over time. The GCQ-S is included as Appendix B. Data from individual group members on the GCQ-S was aggregated by group, to obtain an overall measure of perceived group climate for each group.

Group co-leader mental models of their group. Following each session, group co-leaders were asked to complete questionnaire on which every group member's name was paired once with every other group member's name. Based on their experiences leading their group, co-leaders were be asked to rate the similarity of each group member pair on an 7-point scale ranging from –3 (*very dissimilar*) to 3 (*very similar*). Co-leaders were explicitly not given criteria on which to make their similarity ratings so that a cleaner picture of how they uniquely organize information about their group into their mental

models. This is consistent with methodology for measuring team mental models described in the literature, in which respondents are asked to use their own internal standards to make similarity judgments (Mohammed et al., 2000). That is, because each co-leader in a co-leader pair may conceptualize their group and group members in different ways, they were free to judge the similarity of their group members using any criteria that they chose. Group co-leaders each responded individually to the questionnaire in order to assess each co-leader's unique mental model of their group separately. A sample version of this questionnaire is included as Appendix C. The data obtained from this questionnaire was used in a Pathfinder Network Analysis (Schvaneveldt, 1990) analysis to assess the similarity of group co-leaders' mental models of their group.

Procedure

As a requirement for EDPL338, group co-leaders participated in intensive two-day training lasting for eight hours on each of two days, one week apart, prior to the first group meeting. Groups meet weekly for two-hour sessions, for seven consecutive weeks.

In order to reduce disruption to the intergroup dialogue, themselves, and for ease of the participants, measures were not administered in the intergroup dialogues, but rather through internet-based surveys. Following each session, the group co-leaders were contacted via email, and were asked to complete the paired-comparison ratings of the group members in their group, and were provided with an internet hyperlink through which they could access the questionnaire on which to make their ratings. Co-leaders were asked to complete their paired-comparison ratings and the PANAS for each session, at their convenience, before the next meeting of their group. Also following each session,

the group members were contacted via email and asked to complete the GCQ-S and the PANAS, at their convenience, before the following session. An internet hyperlink was also included in this email through which they could access the GCQ-S from any computer connected to the internet. Group members were asked to complete the measures for a given session at their convenience before during the week before their next group meeting.

Group co-leaders and group members filled out informed consent forms, and the demographic questionnaire the first time they completed the survey, but were not required to complete these measures following successive sessions.

CHAPTER 5

Data Analyses

Group Climate Data

The overall mean scores (i.e., aggregated by group) for each of the scales of the GCQ-S (engaged, avoiding, and conflict) for each session are reported in Table 1. Correlations were calculated between the scales of the GCQ-S. The correlation between engaged and avoiding was -.36, the correlation between engaged and conflict was -.14, and the correlation between avoiding and conflict was .36. These correlations are similar to those observed by McKenzie (1983).

Reliability was calculated in two different ways for each of the three group climate scales of the GCQ-S, in order to examine both inter-item reliability and intra-class reliability. Chronbach's alphas for inter-item reliability for the engaged, avoiding, and conflict scales were .76, .50, and .69, respectively. Because the group climate data was gathered over time, a more appropriate measure of reliability of the group climate scales is the intra-class (i.e., intra-group) reliability estimates. At Lag 0, these estimates were .61, < .01, and .76 for engaged, avoiding, and conflict, respectively. At Lag 1, these estimates were .67, < .01, and .73, respectively; and at Lag 2, these estimates were .69, .65, and .58, respectively.

Mean scores for each scale of the GCQ-S were calculated for each group member, for each session. These mean group climate scores were then aggregated by group and session, to provide a single measure (i.e., mean) for each of the group climate variables for each group, for each session. These mean scores were used in the subsequent analyses.

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Co-Leader Data

Pathfinder network analyses. Both Pathfinder Network Analysis (Schvaneveldt, 1990) and multidimensional scaling (MDS) are techniques for modeling the structure of data. Both of these techniques take proximity or similarity data, and provide a graphical representation of underlying patterns in the data (Klimoski & Mohammed, 1994), and both are methods that have been used in the team cognition literature to examine mental models. However, because the number of members within groups was not consistent across sessions (due to group members joining the group late, leaving the group, or being absent from the group), MDS was not possible in the current study. Therefore, Pathfinder Network Analysis (Schvaneveldt, 1990) was chosen as the sole method through which to examine co-leaders' mental models of their groups.

Pathfinder Network Analysis (Schvaneveldt, 1990) reveals cognitive structure in the form of a network representation (PFnet), in which the most closely related concepts are linked (Mohammed et al., 1994), and as such may provide "a more accurate representation of local relationships than techniques such as multidimensional scaling" (Chen, 1997). For the current study, group members that were most closely related in a group co-leader's mental model of their group were directly linked in the co-leader's PFnet.

Two parameters, q and r, determine the properties of the PFnet. The q-parameter, an integer value between 2 and n-1 (where n is equal to the number of nodes in the PFnet, in this case group members), "constrains the number of indirect proximities examined" (Schvaneveldt, 1990) The r-parameter "defines the metric used for computing the distance of paths," and is a real number between 1 and infinity (Schvaneveldt, 1990). The

minimum-cost PFnet, or the network with the least number of links (i.e., the most parsimonious PFnet), is has a q-parameter of n-1, and an r-parameter of infinity (∞). The parameters for the current study were set to produce the minimum-cost PFnet for each co-leader, at each session.

Similarity data for each co-leader was placed into a separate matrix for each of the sessions their group met. The rows and columns of each matrix were labeled for the individual group members in the co-leader's group, and the cells corresponded to the co-leader's similarity rating of the group members in the row and column that intersected at that cell. Rows and columns corresponding to group members for which there was missing data for either or both co-leaders were removed from both co-leaders' matrices so the resulting Pathfinder networks for each co-leader pair would contain the same number of nodes, and could therefore be compared to one another.

The matrices of similarity data were entered into a Pathfinder Network Analysis (Schvaneveldt, 1990), and the Pathfinder networks (i.e., mental models) were derived for each co-leader for each session. Each resultant network contained nodes corresponding to each member in that co-leader's group, with links connecting group members viewed as highly similar by that co-leader. Each network represents each co-leader's mental model of their group for that particular session.

In order to examine how similarly co-leaders viewed their group each session, the Pathfinder networks (i.e., the mental models of their group) for each co-leader pair were compared for each session that data was available for both leaders. Pathfinder Network Analysis (Schvaneveldt, 1990) provides a measure of similarity for each pair of networks, defined as the number of links in common in the two networks being compared divided

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by the total number of links in both networks. This index of network similarity ranges

from 0 (indicating that the two networks share no links in common) to 1.0 (indicating that

the networks being compared share all possible links in common).

Similarity of co-leaders' mental models for each session ranged from .11 to 1.00

($M = .46$, $SD = .20$). This measure of similarity of co-leader mental models' for each

group for each session was used in the following analyses, and will be referred to as

"match" throughout the Results and Discussion sections.

Curve Fit Estimation

In order to examine if match and/or the group climate variables changed over the

course of the groups, curve-fit estimations were performed to look for linear and

nonlinear (quadratic and cubic) trends in the data.

Analysis of Concomitance

The time-series design of the current study allows for an analysis of concomitance

(Heppner, Kivlighan, & Wampold, 1999). That is, an analysis may be performed to

determine if changes in one variable (e.g., match) over time cause changes in another

variable (e.g., each of the group climate variables) over time.

In order to do this, cross-correlations are calculated. Cross-correlations involve

the correlation of two variables in a time-series, in which the values for one variable (the

lead variable) are correlated with values from the other variable that are shifted in time

(the lag variable). The resulting cross-correlation coefficients represent the correlation of

the lag variable with the lead variable at a preceding point in time, and provide an

estimate of the extent to which the lag variable is predictable from the lead variable

(Jones, Ghannam, Nigg, & Dyer, 1993).

Cross-correlations were run in which match served as the lead variable and each of the group climate variables served as lag variables. As such, these cross-correlations serve to show if the group climate at a given point in time is predictable by match at a preceding point in time.

Growth Curve Analysis

Growth curve analysis was used to assess if and how match and each of the group climate variables vary as a function of time, and if match could be used to predict any or all of the group climate variables. Growth curve modeling is an appropriate analysis to address changes in match and the group climate variables over time because it "is an application of HLM that is designed to handle repeated measures because it addresses the time-series relationships among the variables" (Meyers, Payment, & Feltz, 2004). Hierarchical linear modeling (HLM) is useful for the current data set because it allows for the testing of "hypotheses about how variables measured at one level affect relations occurring at another" (Raudenbush & Bryk, 2002). As such, it allows for the testing of how group level variables (i.e., match in co-leader mental models of their entire group) affect variables occurring on another level (i.e., individual group member perceptions of group climate). In addition, HLM allows for an examination of variance and covariance when is nested (Raudenbush & Bryk, 2002), such as the current data set in which group members are nested within groups. Growth curve analysis involves two steps: the fitting of a theoretical model to the individual group data, and the use of the parameters derived from this first step as the dependent variables onto which the other variables are regressed (Kivlighan & Lilly, 1997). Growth curve analysis has previously been used to assess group climate change over time and its effect on "group success" (Kivlighan & Lilly,

1997); and the effects of collective efficacy beliefs of hockey team members on performance in consecutive hockey games (Meyers, Payment, & Feltz, 2004).

For the current study, three separate sets of growth curve analyses were run using HLM 6.0 (Raudenbush, Bryk, & Congdon, 2005). The first set was run with no time lag between match and each of the group climate variables. That is, match in co-leaders' mental models after a given session was examined as a predictor of the group climate variables during that same session. These analyses served to examine whether each of the dependent variables changed over time, and whether session number and/or match after a given session could predict the group climate variables *for the same session*. Because these analyses examined match in mental models after a given session and each of the group climate variables during the same session (i.e., there was no lag between the variables), these analyses are referred to as "Lag 0."

The second set of growth curve analyses examined whether match after a given session could predict the group climate variables during *the next session*. These analyses are referred to as "Lag 1," indicating that the group climate variables lagged match, the lead variable, by one session.

The final set of growth curve analyses examined whether match after a given session could predict the group climate variables *two sessions later*. These analyses are referred to as "Lag 2," indicating that the group climate variables lagged match by two sessions.

Change in match over time. In order to determine whether match changed over the course of the groups, a growth curve analysis was run in which match served as the dependent variable and session served as the independent variable. A two-level,

completely unconditional model was used to partition the variance. The Level 1

conditional growth model for Group i at Time t was:

$$Y_{ti} = \beta_{0i} + \beta_{1i}(\text{Session}) + e_{0i}$$

where Y_{ti} is match for Group i at Time t, β_{0i} represents the mean level of match for Group

i, β_{1i} represents the linear rate of change in match for Group i, and e_{0i} represents error.

This level examined the within group variance in match.

The Level 2 unconditional growth model for match for Group i at Time t was:

$$\beta_{0i} = \gamma_{0o} + \upsilon_0$$

$$\beta_{1i} = \gamma_{1o}$$

where γ_{0o} represents the overall mean initial level of match for all of the groups, γ_{0o}

represents the overall mean linear rate of change in match for all the groups, and υ_0

represents error. This level examined the between groups variance in match.

Lag 0. In order to examine whether session and match after a given session could

predict each of the group climate variables during the same session, three separate growth

curve analyses were run, with each of the group climate variables (engaged, avoiding,

and conflict) serving as dependent variable once. Again, a two-level, completely

unconditional model was used to partition the variance. The Level 1 conditional growth

model for Group i at Time t was:

$$Y_{ti} = \beta_{0i} + \beta_{1i}(\text{Session}) + \beta_{2i}(\text{Match}) + e_{0i}$$

where Y_{ti} is the dependent variable (i.e., engaged, avoiding, or conflict) for Group i at

Time t, β_{0i} represents the mean level of the dependent variable for Group i, β_{1i} represents

the linear rate of change in the dependent variable by session for Group i, β_{2i} represents

the linear rate of change in the dependent variable by match, and e_{0i} represents error.

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This level examined the within group variance in the dependent variables (i.e., group climate).

The Level 2 unconditional growth model for the group climate variables for Group i at Time t was:

$$\beta_{0i} = \gamma_{0o} + \upsilon_0$$

$$\beta_{1i} = \gamma_{1o}$$

$$\beta_{2i} = \gamma_{2o}$$

where γ_{0o} represents the overall mean initial level of the group climate variable for all of the groups, γ_{1o} represents the overall mean linear rate of change in the group climate variable by session for all the groups, γ_{2o} represents the overall mean linear rate of change in the group climate variable by match for all groups, and υ_0 represents error. This level examined the between groups variance in the group climate variables.

Lag 1 and Lag 2. In order to examine whether session and match after a given session could predict each of the group climate variables during the next session (Lag 1) and/or in two sessions later (Lag 2), six separate growth curve analyses were run. Each of the analyses included as the criterion variable one of the group climate variables corresponding to either the next session (Lag 1) or two sessions after (Lag 2) match was computed. Again, a two-level, completely unconditional model was used to partition the variance. The growth models were the same as those described above for Lag 0, with the exception of the criterion variables.

CHAPTER 6

Results

Co-Leader Mental Model Similarity

Co-leaders' mental models of their groups were compared within co-leader pairs

for each week to determine the similarity using Pathfinder Network Analysis

(Schvaneveldt, 1990). Pathfinder Network Analysis provides a measure of similarity for

each pair of networks, calculated as the number of links in common in the two networks

being compared divided by the total number of links in both networks. That is, similarity

is the proportion of all of the links that are in either network that are shared by both

networks. This index of network similarity ranges from 0 (indicating that the two

networks share no links in common) to 1.0 (indicating that the networks being compared

share all possible links in common). This index of network (or mental model) similarity

will be referred to as "match" throughout the Results and Discussion sections. Match for

each session ranged from .11 to 1.00 ($M = .46$, $SD = .20$).

Curve-Fit Estimation

Match. Match was entered into a curve-fit estimation as the dependent variable,

and session as the independent variable. The linear regression model was significant, $F(1,$

$33) = 4.68$, $p < .05$, $R^2 = .12$, suggesting that Match increased over time. That is, there is

evidence that co-leaders come to see their groups more similarly to one another across

sessions.

Group climate variables. Each of the three group climate variables was entered as

the dependent variable in three separate curve-fit estimations, each with session as the

independent variable.

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The linear, quadratic, and cubic models were all significant when Avoiding was the dependent variable and session was entered as the independent variable, $F(1, 38) = 9.96$, $p < .01$, $R^2 = .21$; $F(2, 37) = 6.27$, $p < .01$, $R^2 = .25$; $F(3, 36) = 4.48$, $p < .01$, $R^2 = .27$; respectively. This suggests that the avoiding aspect of the group climate (i.e., the extent to which group members are avoiding dealing with their own and other group members' problems) goes down across sessions.

There were no other significant linear, quadratic, or cubic trends in the group climate data over time. However, because curve estimation does not take into account the nested nature of the data (i.e., individual group members are nested within groups), the relation between session and the group climate variables will also be examined in the growth curve analyses at Lag 0 to determine if and how these variables change over time.

Analysis of Concomitance

Missing values were interpolated and cross-correlations between match, session, and the group climate variables were calculated. The cross-correlations are listed in Table 2. The cross-correlation of match and engaged at Lag 1, that is the correlation between match after a given session and the level of engaged the following session exceeded the upper confidence limit, $r = .41$, indicating that as level of match after a given session increases, the level of engaged the following session increases. Although none of the cross-correlations of match and avoiding exceeded the confidence limits, there was a trend toward more negative correlations between match and avoiding at Lags 5, 6, and 7 (i.e. match after a given session and avoiding five, six, or seven sessions later). A similar pattern was seen with the cross-correlations of match and conflict, with the cross-correlation at Lag 5 falling below the lower confidence limit, $r = -.32$. Taken together,

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these data suggest that match at a given level has a more immediate effect on level of engaged, than on avoiding and conflict. However, level of match does tend to be related to a decrease in these variables later on in the course of the group.

Growth Curve Analyses

Coefficients, standard errors, and T-ratios for all of the growth curve analyses are provided in Table 3.

Change in match over time. A *t* test for the slope term, $t(7, 39) = 2.12$, $p = .06$, indicated there was a trend for match to increase across sessions.

Lag 0, engaged. Sigma-squared and tau were examined for each growth curve analysis to determine the proportion of within group (sigma-squared) and between groups (tau) variance. Sigma-squared for the analysis of engaged at Lag 0 was .28, indicating that the within group variance (i.e., between sessions) accounted for 52% of the total variance (percentage of within group variance accounted for is equal to sigma-squared divided by sigma squared plus tau). Tau for engaged at Lag 0 was .27, indicating that the between group variance accounted for 48% of the total variance in engaged at Lag 0 (percentage of between group variance is equal to tau divided by sigma-squared plus tau).

A significant *t* test for the slope term corresponding to session, $t(7, 38) = 14.94$, $p < .01$, indicated there was a significant relationship between session and engaged. That is, engaged increased across sessions. In addition, a significant *t* test for the slope term corresponding to match, $t(7, 38) = -3.82$, $p < .01$, suggesting that match after a given session is related to the level of engaged during the same session. As level of match after a given session increases, level of engaged decreases within the same session.

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Lag 0, avoiding. Sigma-squared for the analysis of avoiding at Lag 0 was .35, indicating that the within group variance (i.e., between sessions) accounted for 95% of the total variance. Tau for avoiding at Lag 0 was .02, indicating that the between group variance accounted for 5% of the total variance in avoiding at Lag 0.

A significant *t* test for the slope term corresponding to session, $t(7, 38) = -5.71$, $p < .01$, indicated there was a significant relationship between session and avoiding at Lag 0. That is, avoiding decreased across sessions. A *t* test for the slope term corresponding to match was not significant, suggesting that there is not a significant relationship between match and avoiding during the same session.

Lag 0, conflict. Sigma-squared for the analysis of conflict at Lag 0 was .34, indicating that the within group variance (i.e., between sessions) accounted for 65% of the total variance. Tau for conflict at Lag 0 was .18, indicating that the between group variance accounted for 35% of the total variance in conflict at Lag 0.

Neither the *t* test of the slope term corresponding to session, nor the *t* test of the slope term corresponding to match were significant for conflict at Lag 0, indicating that there was not a relationship between session and conflict, nor match and conflict in the same session.

Lag 1, engaged. The t tests for significance of the slope term corresponding to session are not meaningful in the Lag 1 and Lag 2 analyses (this slope would correspond to the linear rate of change in the level of the group climate variable by the session number one or two sessions prior, for Lag 1 and Lag 2, respectively), and will therefore not be interpreted.

Sigma-squared for the analysis of engaged at Lag 1 was .41, indicating that the within group variance (i.e., between sessions) accounted for 72% of the total variance. Tau for engaged at Lag 1 was .16, indicating that the between group variance accounted for 28% of the total variance in engaged at Lag 1.

A t test for the slope term corresponding to match reached significance, $t(7, 38) = 2.90$, $p < .01$, suggesting that match after a given session is related to the level of engaged during the following session. As level of match after a given session increases (i.e., the more similarly the co-leaders see their group), the level of engaged during the following session increases.

Lag 1, avoiding. Sigma-squared for the analysis of avoiding at Lag 1 was .40, and tau for avoiding at Lag 1 was $< .01$, indicating that the within group variance (i.e., between sessions) accounted for almost all of the of the total variance in avoiding at Lag 1.

A t test for the slope term corresponding to match did not reach significance, indicating that match during one session was unrelated to the level of avoiding the following session.

Lag 1, conflict. Sigma-squared for the analysis of conflict at Lag 1 was .42, and tau for conflict at Lag 1 was .20, indicating that the within group variance (i.e., between sessions) accounted for 68% of the total variance, and between group variance accounted for 32% of the total variance in conflict at Lag 1.

A t test of the slope term corresponding to match did not reach significance, indicating that match during a given session was related to level of conflict the following session.

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Lag 2, engaged. Sigma-squared for the analysis of engaged at Lag 2 was .56, indicating that the within group variance (i.e., between sessions) accounted for 63% of the total variance. Tau for engaged at Lag 2 was .33, indicating that the between group variance accounted for 37% of the total variance in engaged at Lag 2.

A *t* test for the slope term corresponding to match did not reach significance, suggesting that match during a given session is not related to the level of engaged during the session two sessions later.

Lag 2, avoiding. Sigma-squared for the analysis of avoiding at Lag 2 was .22, and tau for avoiding at Lag 2 was .09, indicating that the within group variance accounted for 71% of the total variance accounted for, and between group variance accounted for 29% of the total variance in avoiding accounted for at Lag 2.

A *t* test for the slope term corresponding to match reached significance, $t(7, 30) = -2.55$, $p < .05$, suggesting that match after a given session is related to the level of avoiding two sessions later. As level of match after a given session increases (i.e., the more similarly the co-leaders see their group), the level of avoiding two sessions later decreases.

Lag 2, conflict. Sigma-squared for the analysis of conflict at Lag 2 was .50 and tau was .17, indicating that within group variance accounted for 75% of the total variance accounted for and between group variance accounted for 25% of the total variance in conflict accounted for at Lag 2.

The *t* test of the slope term corresponding to match did not reach significance, indicating that match in a given session was unrelated to the level of conflict two sessions later.

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CHAPTER 7

Discussion

These data addressed two main research questions: (1) Does the degree of match in co-leaders' mental models of their group change over the course of the group? and (2) How does the degree of match in co-leaders' mental models of their group affect group member outcomes (i.e., group climate) over the course of the group?

In the current study, certain aspects of the group climate changed across sessions. Specifically, the curve fit estimation found that the level of avoiding decreased across sessions, but did not suggest change in either engaged or conflict. However, the growth curve analysis, which was used in order to take into account the nested nature of the data, found that engaged increased across sessions and avoiding decreased across sessions. These findings are similar to those of other studies of group climate that have found an increase in engaged (e.g., Ogrodniczuk & Piper, 2003; Tasca, Balfour, Ritchie, & Bissada, 2006), trends toward decreasing avoiding (Kivlighan & Lilly, 1997; Tasca et al., 2006), and stability in conflict (Kivlighan & Lilly, 1997; Ogrodniczuk & Piper, 2003). However, previous studies vary in the degree to which these patterns in group climate change are seen. For example, on the one hand, Kivlighan and Lilly (1997) found that no models (linear, cubic, or quadratic) fit the data for all groups, and found only a non-significant linear trend for the decrease in avoiding over time and no significant trends in either engaged or conflict. Ogrodniczuk and Piper (2003), on the other hand, found no significant changes in either avoiding or conflict across sessions. Tasca et al. (2006) offer a possible explanation for these discrepant findings across studies. Specifically, they examined the development of engaged, avoiding and conflict in two different types of

therapy groups: cognitive-behavioral (GCBT) and psychodynamic-interpersonal (GPIP). They found similar, but distinct patterns of development in group climate across sessions. Specifically, they found a linear increase in engaged for GCBT and a cubic pattern for GPIP. They found a linear model for avoiding held for both groups, with level of avoiding decreasing. And they found that a linear model for conflict (decreasing) fit for the GCBT, but a quadratic model best fit the GPIP. Given these findings that the type of group may make a difference in the development of group climate, the findings regarding the development of the group climate in the current study appear to make sense, and follow the general trends suggested in the literature.

In regards to the first research question, the findings suggest that match in co-leader mental models of their group increases across sessions. That is, group co-leaders came to see their groups in a more similar manner across sessions. This finding is consistent with theorizing in the team cognition literature (Rentsch & Hall, 1994), which suggests that similarity in mental models is the result of communication among team members. However, this finding of a convergence in co-leaders' mental models of their group over time differs from several empirical studies of the team cognition in the literature. Specifically, Mathieu et al, (2000) found no significant convergence in teams' mental models of the teams themselves or of the teams' task; and Levesque, Wilson, and Wholey (2001) actually found the degree of shared mental models to decrease over time. One possible explanation for the discrepancy between the current study and the prior team cognition research may be that both of these prior studies involved specialization by individual team members within a given team in order to complete the task. In contrast, each co-leader in the current study had the same general task of facilitating dialogue

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within their group, and as such, may have been organizing their mental models in a more similar way than if their tasks had been different from one another.

Another possible explanation may be related to the nature of the teams and tasks involved in each of the studies. Mathieu et al. used teams of undergraduate students in the performance of a computer flight simulation task, and Levesque et al. used software development project teams. The current study, by contrast, used teams analogous to group therapy co-leadership pairs in a task closely resembling the leadership of group psychotherapy. As Dick et al. (1980) and Dugo and Beck (1991, 1997) point out, the development of the co-therapy relationship requires negotiation and collaboration between the co-leaders both before the task of therapy begins, as well as throughout the course of the therapy group. Yalom (2005) suggests, "one essential ingredient of a good co-therapy relationship is discussion time" (p. 448). In the case of the current study, the pre-group preparation and necessary discussion between co-leaders outside of the group may have facilitated the development of more similar mental models over time. As Fiore and Schooler (2004) point out, the "act of making knowledge explicit facilitates the development of not only one's own mental model but also a shared mental model" (p. 144).

Studies examining cognitive models in educational settings suggest that students cognitive models tend to converge with the cognitive models of their instructors over time (e.g., Kivlighan et al., in press). In a study of group leader training, Kivlighan et al. found the cognitive model of group members derived from group trainees' ratings became more similar, over time, to the cognitive model of an experienced group leader.

Together with the results of the current study, it appears that leaders seem to arrive at a shared cognitive model that represents their mutual understanding of the group members.

These data also addressed the question of how match in co-leaders' mental models of their groups effected the immediate outcome of group climate. The findings suggest that the similarity in how co-leaders see their group may be related to the development of an effective climate of their group. More specifically, match in how co-leaders see their groups was related to an immediate effect on engagement. That is, high match in co-leaders' mental models in after a given session related to higher levels of engagement in the following session. In addition, match in co-leaders' mental models of their groups had a more delayed effect on avoiding. Specifically, high match in co-leaders' mental models after a given session was related to lower levels of avoiding in their group two sessions later. There was also some evidence that higher levels of match after a given session are related to lower levels of conflict in later sessions (i.e., five sessions later, or toward termination of the group).

Another interesting finding was that level of match after a given session was related to lower levels of engaged during the same session. One possible explanation for this finding may be that when levels of engagement were low during a given session, group co-leaders spent more time discussing their group afterwards to determine was to improve engagement. As such, their mental models of their groups might be more similar after these sessions.

These results extend the findings from previous team cognition literature into the co-leadership literature in that they show that convergence in team mental models is related to the immediate outcome of group climate. This is particularly important because

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group climate has been shown to be directly related to group member outcomes. For example, Kivlighan and Lilly (1997) also found a relationship between group climate and group member outcomes. Specifically, they found that mid-treatment levels of engaged and avoiding were related to therapeutic gain during treatment, as rated by group members assessments of their goals at the beginning and end of treatment. Ogrodniczuk and Piper (2003) also found a direct relationship between early engagement levels in group psychotherapy for complicated grief and favorable outcomes in terms of both grief and general symptoms. They also found that the average level of engagement across sessions was related to favorable outcomes in terms of grief and general symptoms, target outcomes of the interventions, and life dissatisfaction. Kilvighan and Tarrant (2001) also found an active and engaged group climate was related to group member outcomes, operationalized as client satisfaction, in semi-structured youth intervention groups. Taken together, the results of previous research on group climate and group member outcomes suggests that there is a relationship between group climate and favorable outcomes for group members. As such, the findings of the current study that match in co-leaders' mental model was related to group climate may suggest that match in co-leaders' mental models is one factor that is related to group member outcomes.

Assuming that favorable group member outcomes are the desired goal of the co-leader team, and that group climate is related to group member outcome (e.g., Kivlighan & Lilly, 1997; Ogrodniczuk & Piper, 2003), the current study provides evidence that match in co-leader mental models of their group contribute to the effectiveness of the co-leader team in achieving the desired goal. Specifically, match in co-leader mental models of their groups was related to immediate increases in engagement (i.e., in the following

session), and relatively delayed decreases in avoiding (i.e., after two sessions). This finding is similar to previous findings in the team cognition literature that match in team mental models is related to team performance *(*Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers, 2000; Rentsch & Klimoski, 2001*)*. For example, Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) examined task-specific and task-related shared mental models of undergraduate student teams involved in a computer-simulated flight task. Mathieu et al. found that team mental models of the concept "team" were significantly related to team performance on the flight task. Rentsch and Klimoski (2001) also examined the relation between shared mental models and performance. They examined the degree to which pre-existing work teams shared mental models of the concept of "teamwork," and found that shared mental models of this concept were positively related to team effectiveness. In a similar way, match in co-leader mental models of their groups in the current study related to the desired outcome in terms of group climate.

Limitations

A strength of the current study is that group members completed group climate ratings and group co-leaders completed the similarity ratings. As such, the results are not affected by a mono-method bias. However, there are several limitations that should be noted. First, the response rate of the group members was low. It is possible that those group members who chose to participate reflect a population of group members who are not representative of the group as a whole. Future research should compare group members who elect to participate to group members who do not participate to determine differences between completers and non-completers, in order to interpret any biases in

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the data. Also, co-leaders' mental models were assessed in terms of their views of the similarity between group members in their group. It may be that co-leaders use different criteria for organizing information and conceptualizing their task and group than the similarity of their group's members. The current literature on team cognition has examined mental models in at least four different domains: task-specific knowledge, task-related knowledge, knowledge of teammates, and attitudes and beliefs (Cannon-Bowers & Salas, 2001). Similarly, future research might examine co-leader mental model similarity in different domains, for example knowledge and attitudes about co-leadership.

Team mental models have been examined using a variety of methodology (Mohammed et al., 2000). As such, future research might involve assessment of co-leaders' mental models through alternate methods than those used in the current study, for example through the use of the cognitive mapping method, in which the team members themselves, rather than the researchers, provide the content of their mental models (Mohammed et al., 2000).

Though the current study examined how cognitive components of the co-leader relationship (i.e., similarity in how co-leaders structure their knowledge of their groups into mental models) effect group climate, it was not able to address other aspects of the co-leader relationship that may have an impact on group member outcomes, such as emotion. While the PANAS was administered to group co-leaders and group members in the current study, the data was could not be interpreted because participants completed the measure at different points in time. The co-leadership literature suggests that the emotions may play a role in the functioning of the co-leader relationship (e.g., Berger, 2002). In addition, co-leader relationship has been compared to other close relationships

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(e.g., marriage, Dick et al., 1980) that are characterized by strong emotions. Berscheid (1983) points out that the valence of emotion experienced (positive or negative) within a close relationship has "critical implications for the survival of the relationship, as well as the behavior of the participants" (p. 149). As such, future research might examine the emotional components of the co-leader relationship to gain a better understanding of how the relationship functions.

Another limitation is that it is not clear if and how group climate in the intergroup dialogues specifically relates to group member outcomes. While group climate has been shown to be related to group member outcomes in other group interventions (Kivlighan & Lilly, 1997; Kivlighan & Tarrant, 2001; and Ogrodniczuk & Piper, 2003), there may be different ways to operationalize group member outcome (e.g., increased communication among groups, increased knowledge and understanding of different groups, grades) that may be important for this specific type of group intervention. Specifically, the current study assessed group member outcome indirectly through the immediate outcome of group climate, but more direct measurement of group member outcomes might provide additional information on the importance of match in co-leaders' mental models of their group.

Finally, while the current study provides evidence for a relationship between how similarly group co-leaders view their groups and group climate, and interesting question for future research would be to examine whether a similar relationship exists in other types of co-lead groups. The intergroup dialogues are interventions aimed at bringing together groups that have historically faced tension and conflict, with the aim of increasing understanding and communication between these groups (University of

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Maryland, n.d.). Future research might examine shared mental model congruence and outcomes in groups with different compositions and goals.

Implications for Practice

The findings of the current study could have important implications for the practice of co-leadership in groups designed to address intergroup differences and, by extension, co-led psychotherapy groups. Specifically, the current study provides empirical data on the relationship between the co-leaders, and suggests that similarity in how co-leaders see their group may facilitate positive group member outcomes through the creation of a favorable group climate. It may be that sharing a similar conceptualization of their group members allows co-leaders to coordinate their efforts and prevent them from working on opposing goals with a particular group member. For example, if both co-leaders see a group member as closed, they can both work together on the common goal of helping that group member open up in the group. However, if one co-leader sees a group member as closed and the other co-leader sees the same group member as open, the co-leaders may be working in opposition of each other toward different goals with the same member. As such, the findings of the current study suggest that co-leaders may need to work towards sharing a similar conceptualization of their group. Specifically, the findings suggest the importance of communication between co-leaders about how they are individually conceptualizing their group and why.

Table 1.

Means and Standard Errors for Group Climate Variables by Session

Week	Engaged		Avoiding		Conflict	
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error
1	4.61	0.20	3.58	0.18	2.11	0.20
2	4.40	0.33	3.91	0.30	2.29	0.34
3	5.50	0.33	2.66	0.30	2.96	0.34
4	5.09	0.21	3.33	0.19	2.30	0.21
5	4.86	0.29	2.75	0.27	2.13	0.30
6	5.36	0.28	2.75	0.26	2.15	0.29
7	4.76	0.28	2.93	0.26	2.12	0.29

Table 2.
Cross-Correlations of Match and Group Climate

	Engaged		Avoiding		Conflict	
	Cross	Standard	Cross	Standard	Cross	Standard
Lag	Correlation	Error	Correlation	Error	Correlation	Error
0	-0.11	0.14	-0.12	0.14	-0.11	0.14
1	0.41 *	0.14	-0.09	0.14	-0.10	0.14
2	0.01	0.15	-0.08	0.15	-0.14	0.15
3	0.52	0.15	-0.08	0.15	-0.11	0.15
4	0.05	0.15	0.20	0.15	-0.10	0.15
5	0.17	0.15	-0.25	0.15	-0.32 *	0.15
6	0.16	0.15	-0.17	0.15	-0.19	0.15
7	0.19	0.15	-0.19	0.15	-0.28	0.15

*$p < .05$

Table 3.
Coefficients, Standard Errors, and T-Ratios from Growth Curve Analyses

	Coefficient	Standard Error	T-Ratio
Change by Session			
Match	0.03	0.02	1.98
Engaged*	0.21	0.01	14.94
Avoiding*	-0.20	0.04	-5.71
Conflict	0.02	0.05	0.53
Change by Match			
Lag 0			
Engaged*	-1.77	0.46	-3.82
Avoiding	0.12	0.39	0.30
Conflict	-0.06	0.56	-0.11
Lag 1			
Engaged*	2.04	0.70	2.90
Avoiding	-0.13	0.49	-0.28
Conflict	-0.04	0.52	-0.08
Lag 2			
Engaged	-0.60	0.68	-0.88
Avoiding*	-0.59	0.23	-2.55
Conflict	0.05	0.60	0.08

*p < .05

Demographic Questionnaire

Age: ____

Gender:
    ____Female
    ____Male
    ____Transgender (F to M)
    ____Transgender (M to F)

Race/Ethnicity:
    ____African American/Black
    ____Asian American
    ____Caucasian/White
    ____Latino/Latina
    ____Native American/Alaskan Native
    ____Native Hawaiian/Pacific Islander
    ____Other (Please specify)_____

Current year in school:
    ____Freshman
    ____Sophomore
    ____Junior
    ____Senior
    ____Graduate student (Master's Program)
    ____Graduate Student (Ph.D. Program)
    ____Not Applicable

Highest degree held:
    ____High School Diploma
    ____Bachelor's Degree
    ____Master's Degree
    ____Ph.D.
    ____Other (Please specify)_____

Occupation (if not "student"): _____

Sexual orientation:
    ____Straight/Heterosexual
    ____Gay/Homosexual
    ____Bisexual
    ____Other (Please specify)_____

Group Climate Questionnaire - Short Form (GCQ-S)

Read each item and them mark the appropriate answer to the right of the item. Indicate the extent to which each statement reflects your experience of your EDPL338 class today, ranging from "1" for "not at all" to "7" for "extremely."

	Not at all						Extremely
1. The members liked and cared about each other.	1	2	3	4	5	6	7
2. The members tried to understand why they do the things they do, tried to reason it out.	1	2	3	4	5	6	7
3. The members avoided looking at important issues going on between themselves.	1	2	3	4	5	6	7
4. The members felt that what was happening was important and there was a sense of participation.	1	2	3	4	5	6	7
5. The members depended on the group leaders for direction.	1	2	3	4	5	6	7
6. There was friction and anger between the members.	1	2	3	4	5	6	7
7. The members were distant and withdrawn from each other.	1	2	3	4	5	6	7
8. The members challenged and confronted each other in their efforts to sort things out.	1	2	3	4	5	6	7
9. The members appeared to do things the way they thought would be acceptable to the group.	1	2	3	4	5	6	7
10. The members distrusted and rejected each other.	1	2	3	4	5	6	7
11. The members revealed sensitive personal information or feelings.	1	2	3	4	5	6	7

Note: The engaged scale consists of items 1, 2, 4, 8, and 11; the avoiding scale consists of items 3, 5, and 9; and the conflict scale consists of items 6, 7, 10, and 12.

Group Member Similarity Ratings

Read each pair of names, and based on your experience leading your EDPL338 group, please rate the similarity of each group member pair, ranging from "-5" for "very dissimilar" to "5" for "very similar."

Group Member Names	Very Dissimilar								Very Similar
Group Member A and Group Member B	-3	-2	-1	0	1	2	3		
Group Member A and Group Member C	-3	-2	-1	0	1	2	3		
Group Member A and Group Member D	-3	-2	-1	0	1	2	3		
Group Member A and Group Member E	-3	-2	-1	0	1	2	3		
Group Member B and Group Member C	-3	-2	-1	0	1	2	3		
Group Member B and Group Member D	-3	-2	-1	0	1	2	3		
Group Member B and Group Member E	-3	-2	-1	0	1	2	3		
Group Member C and Group Member D	-3	-2	-1	0	1	2	3		
Group Member C and Group Member E	-3	-2	-1	0	1	2	3		
Group Member D and Group Member E	-3	-2	-1	0	1	2	3		

APPENDIX C

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