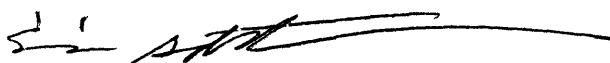


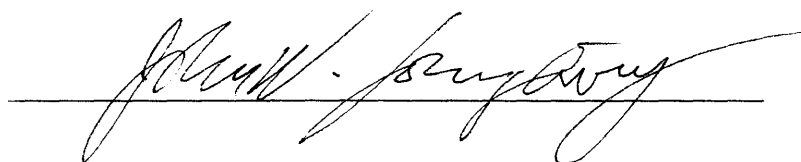
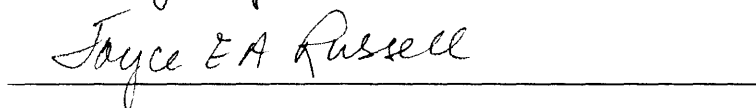
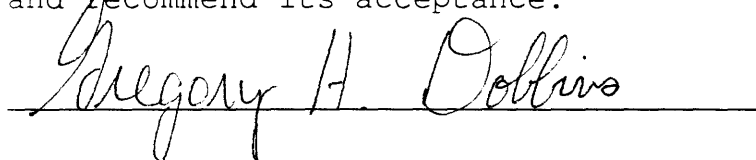
To the Graduate Council:

I am submitting herewith a dissertation written by Marilyn Ann Perkins entitled "Team Member Implicit Theories of Team Development: Relationships with Team Member Behavior, Team Viability and Team Performance". I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial and Organizational Psychology.



Eric Sundstrom, Major Professor

We have read this dissertation
and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor
and Dean of the Graduate School

TEAM MEMBER IMPLICIT THEORIES OF TEAM DEVELOPMENT:
RELATIONSHIPS WITH TEAM MEMBER BEHAVIOR,
TEAM VIABILITY, AND TEAM PERFORMANCE

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Marilyn Ann Perkins

December 1991

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DEDICATION

To Mikey, Danny, Ryan, Sarah, Stephen, Justin, and Nicholas -- future stewards of this planet. I trust the knowledge and wisdom of future generations will ensure the survival of our home, despite the ignorance of those who have gone before.

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ABSTRACT

This study examined the relationship of team effectiveness and members' implicit theories of team development. Implicit theories are individuals' preconceptions of the relative importance of team development variables associated with team effectiveness. Team development variables assessed in this study were communication, cohesion, norms, role clarity, conflict, and participation.

The first hypothesis predicted a direct relationship between implicit theories of team development and behavior. Hypothesis one also predicted this relationship would be enhanced by convergence of individual implicit theories with remaining team members' implicit theories. It was also hypothesized that there is a positive relationship between convergence of implicit theories among team members and team viability (hypothesis 2) and team performance (hypothesis 3).

Participants were 224 upper-level management students, representing 50 teams, enrolled in a business policies course at a major university. At the beginning of the school term team member implicit theories were measured using a survey questionnaire. Students, divided into teams, completed a naturally occurring team project during the

term. At the end of the term, team member behavior and team viability were measured using survey questionnaires and team performance was evaluated by the course instructor.

Convergence of implicit theories among team members was calculated using a profile similarity measure.

The perceived relative importance of team development dimensions for the participants were as follows (from most to least important): participation, communication, roles, norms, cohesion, and conflict avoidance. Females rated team development dimensions more important than did males.

Results of simple correlation analyses suggest a direct relationship between individual implicit theories of team development and behavior on a global level and for specific team development dimensions (communication, cohesion, norms, roles, conflict, and participation). Regression analyses indicate that convergence of individual implicit theories with team members' implicit theories was a moderating variable between implicit theories and behavior for global implicit theories as well as for the norms, roles, and conflict dimensions.

Significant relationships were identified between convergence of role clarity implicit theories and team viability. Convergence of implicit theory profiles and role clarity implicit theories were significantly correlated with team performance. No other significant relationships between convergence of implicit theories (communication,

cohesion, norms, conflict, participation) and team outcomes were found.

This study provides empirical support for the notion that cognitive structures guide behavior. The link between implicit theories and team outcomes also has major practical implications by identifying an important antecedent to team effectiveness.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
II. LITERATURE REVIEW.	5
Definition of Cognitive Structures.	5
Cognitive Structures for Guiding Behavior	10
Definition of Work Teams.	17
Effect of Implicit Theories on Team Effectiveness.	20
Purpose of Research	26
III. STUDY ONE: CONSTRUCTION OF MEASURES	30
Purpose	30
Method.	30
Results	34
IV. STUDY TWO: METHOD	42
Research Design	42
Setting	42
Participants.	43
Procedure	45
Variables	47
Measures.	49
Summary of Variables.	56
V. RESULTS.	59
Data Analysis	59
Descriptive Statistics and Psychometric Properties of the Measures	60
Research Question	75
Hypotheses Testing.	80
H1	80
H2	101
H3	108
Post Hoc Analyses	115

TABLE OF CONTENTS

CHAPTER	PAGE
VI. DISCUSSION	129
Measure of Implicit Theories of Team Development.	130
Hypotheses.	131
Post Hoc Analyses	142
Theoretical Implications.	144
Practical Implications.	145
Limitations and Unanswered Questions	147
Future Research	151
Conclusion.	152
LIST OF REFERENCES.	154
APPENDIXES.	165
A. Implicit Theories of Team Development Survey .	166
B. Team Behavior Survey	171
C. Informed Consent Form.	175
D. Cover Sheet -- Team Behavior Survey.	177
E. Team Viability Survey.	179
F. Team Performance Survey.	181
VITA.	185

LIST OF TABLES

TABLE		PAGE
3.1	Internal Consistency Estimates: Implicit Theory of Team Development and Team Member Behavior Surveys	38
3.2	Test-Retest Reliability and Stability Estimates Implicit Theory of Team Development Survey	40
5.1	Summary of Sample Sizes	61
5.2	Descriptive Statistics and Reliability Estimates: Implicit Theory of Team Development Survey	63
5.3	Correlation Matrix for Sub-Scale and Point Distribution Implicit Theory Scores.	64
5.4	Descriptive Statistics: Individual Deviation Scores	66
5.5	Descriptive Statistics and Reliability Estimates: Team Member Behavior Survey	67
5.6	Profile Convergence Scores and Sub-scale Convergence Scores: Means and Standard Deviations	71
5.7	Descriptive Statistics and Reliability Estimates: Team Viability Survey	72
5.8	Summary Sample Sizes, Means and Standard Deviations for Performance Measures.	74
5.9	Implicit Theories of Team Development	76
5.10	Implicit Theory of Team Development Survey Gender Differences.	78
5.11	Simple Correlation Between Implicit Theories and Behavior.	82
5.12	Regression Analyses of Behavior on Implicit Theories, Individual Deviation, and the Corresponding Interaction Term Global Scores.	87

LIST OF TABLES

TABLE		PAGE
5.13	Regression Analyses of Behavior on Implicit Theories, Individual Deviation, and the Corresponding Interaction Term Scale Scores	88
5.14	Regression Analyses of Behavior on Implicit Theories, Individual Deviation, and the Corresponding Interaction Term Point Scores	94
5.15	Summary of Significant Relationships - Hypothesis 1	100
5.16	Correlation Matrix for Team Viability and Convergence of Implicit Theories among Team Members Scale Scores.	103
5.17	Hierarchical Stepwise Regression of Team Viability and Convergence of Implicit Theories among Team Members Scale Scores . .	105
5.18	Summary of Significant Relationships - Hypothesis 2	107
5.19	Correlation Matrix for Team Performance and Convergence of Implicit Theories among Team Members Scale Scores.	110
5.20	Hierarchical Stepwise Regression of Team Performance and Convergence of Implicit Theories among Team Members Scale Scores. .	112
5.21	Summary of Significant Relationships - Hypothesis 3	114
5.22	Interrater Reliability of Implicit Theories Means and Standard Deviations.	117
5.23	Summary of the Correlations between Convergence of Implicit Theories and Team Performance by Task.	121
5.24	Correlation Matrix for Team Viability and Team Behavior Scale Scores	123

LIST OF TABLES

TABLE		PAGE
5.25	Hierarchical Stepwise Regression of Team Viability and Team Behavior Scale Scores . .	124
5.26	Correlation Matrix for Team Performance and Team Behavior Scale Scores	125
5.27	Regression Analysis of Team Members' GPA and Convergence of Implicit Theories and Team Performance	127

LIST OF FIGURES

FIGURE		PAGE
2.1	Overview of Proposed Relationships.	28
3.1	Implicit Theory of Team Development Survey Sub-Scale Dimensions.	35
3.2	Team Member Behavior Survey Sub-Scale Dimensions	37
4.1	Team Viability Survey Items	55
4.2	Summary of Variables and Measures Used.	58
5.1	Most Convergent and Least Convergent Teams Actual Scale Scores.	69
5.2	Most Convergent and Least Convergent Teams Actual Point Distribution Scores	70
5.3	Hypothesis 1.	81
5.4	Hypothesis 2.	102
5.5	Hypothesis 3.	109

CHAPTER I

INTRODUCTION

To be more competitive, organizations are moving towards more creative means of increasing productivity. The trend in progressive business is toward major restructuring of the organizational hierarchy. Examples of such interventions include participative management (Harrison, 1987), employee ownership (Conte & Tannenbaum, 1978), and self-directed work teams (Pearce & Ravlin, 1987). These changes not only affect the structure of an organization, they also affect every employee in the organization.

Organizational change can threaten the way employees perceive their role in an organization. In the workplace, fairly stable cognitive schemata develop for how organizations operate. These schemata provide guidance for interpreting the work environment, determining priorities, and allocating resources (Bartunek & Moch, 1987). To facilitate information processing, individuals develop implicit theories to help organize perceptions, make predictions and possibly specify appropriate behavior (Phillips & Lord, 1986).

A review of the literature on cognitive structures shows that implicit theories of leadership influence perception and evaluation of leadership behavior (Rush,

Thomas, & Lord, 1977). The literature also suggests that implicit theories of team effectiveness influence the perception and evaluation of team performance based on cues of team development (Staw, 1975).

Some cognitive structures (schemata and implicit theories) have been presented as a means of understanding the behavior of others. Other cognitive structures (scripts) have been shown to guide behavior (Gioia & Poole, 1984).

Goal theory provides a mechanism by which cognitive structures guide behavior. Goals are conceptualized as cognitive structures involving multiple levels in a hierarchy, not simply the outcome of a single task (Lord & Kernan, 1987). Cognitive structures are goal oriented and goals guide behavior (Locke, Frederick, Lee & Bobko, 1984). By providing guidance and meaning, cognitive structures enable individuals to set goals and choose appropriate behaviors for attaining these goals (Bartunek & Moch, 1987).

Implicit theories have the potential to either constrain or guide behavior (Phillips & Lord, 1986); for this reason, it is critical that researchers understand the role of implicit theories in organizations. This is particularly true during times of organizational change such as the implementation of self-directed work teams.

The implementation of self-directed work teams may represent a major restructuring of an organization. When

changing from the traditional, hierarchical workforce to self-directed work teams, the entire schemata is changed for how an individual performs his or her job in an organization. No longer should employees operate from an individual worker schemata which focuses on the individual in terms of task, rewards, discipline, productivity, etc. A worker must make a cognitive shift to a work team schemata in which team members make decisions together, are responsible for their teams' productivity, and share the rewards and discipline.

Prior to implementation of self-directed work teams, each team member has his or her own preconceptions of what constitutes an effective team. These preconceptions may determine the behaviors team members will use in performing their jobs. The relative success of implementing an intervention such as self-directed work teams may depend on this process, consequently, it would be important to understand the current preconceptions or implicit theories of potential work team members (Bartunek & Moch, 1987).

Implicit theories of team development can relate to team outcomes on an individual level or on a team level. On an individual level, implicit theories of team development can affect individual team member behavior. Team development variables of interest are those variables which individual team members' have the most control over such as communication among team members, cohesion among the team,

team norms, role clarity within the team, conflict avoidance, and participation among all team members.

On a team level, implicit theories of team development can affect team viability and team performance. The relationship between implicit theories and team outcomes is based on the level of convergence of implicit theories among team members. Teams with similar preconceptions of a situation make quicker decisions and have less conflict among team members than do teams with dissimilar preconceptions (Bettenhausen & Murnighan, 1985).

The present study attempts to determine the link between implicit theories of team development and team outcomes for self-directed work teams by first investigating the link between individual implicit theories and team member behavior, and second, investigating the link between convergence of implicit theories and team outcomes (team viability and team performance). Prior to the statement of hypotheses, a review of relevant literature will discuss the definition of cognitive structures, cognitive structures for guiding behavior, work teams, and the effect of implicit theories on work teams.

CHAPTER II

LITERATURE REVIEW

To support the hypotheses presented in this study, two general areas of theory and research are reviewed -- cognitive structures and work teams. The first area, cognitive structures, is divided into two sections:

(1) definition of cognitive structures and (2) cognitive structures for guiding behavior, which provides theoretical and empirical support for the link between cognitive structures and behavior.

The second relevant research area, work teams, is also divided into two sections: (1) definition of work teams, which presents the current literature on self-managed work teams and (2) effect of implicit theories on team effectiveness, which provides theoretical and empirical support for the cognition-behavior link in work teams. The final section reviews the purpose of the study and presents the hypotheses tested.

Definition of Cognitive Structures

The cognitive structures addressed in this study are schemata, scripts, values, attitudes, beliefs, and implicit

theories. This section will provide definitions for these cognitive structures.

Schemata

Gioia and Poole (1984) provide a comprehensive definition of schema: "A schema is some generalized cognitive framework that an individual uses to impose structure upon, and impart meaning to, social information or social situations in order to facilitate understanding. A schema provides a knowledge base that serves as a guide for the interpretation of information, actions and expectations" (p.451). Schemata are not stagnant. Schemata direct exploratory behavior, continually accepting new information which ultimately modifies existing schemata (Neisser, 1976).

Schemata is considered an umbrella term for more distinct cognitive structures such as stereotypes, prototypes, implicit theories, causal schemata, and frames (Gioia & Manz, 1985; Mitchell & James, 1989).

Scripts

A script is a hypothesized cognitive structure that organizes the understanding of events (Abelson, 1981), describes appropriate sequencing of events in normal situations (Schank & Abelson, 1977), and specifies behavior appropriate in a particular situation (Gioia & Poole, 1984).

Scripts may help interpret the behavior of others and aid in generating one's own behavior (Abelson, 1981).

Scripts can be described on a continuum from strong to weak (Lord & Kernan, 1987). A strong script not only includes expectations for the occurrence of an event, but also specifies a progressive sequence of that event. In contrast, a weak script is very similar to the definition of a schema in that it organizes expectations about an event but does not specify an exact sequence of behavior. This continuum has also been described as a hierarchical order ranging from generic or abstract to more specific or concrete scripts (Ashforth & Fried, 1988). The organizational functions of scripts will be discussed later in this paper.

Metascripts. Scripts can be grouped into larger cognitive systems called metascripts (Gioia & Poole, 1984). Metascripts are abstractly stated scripts with a minimum of specification. Metascripts facilitate generalization of scripts from familiar to unfamiliar situations (Lord & Kernan, 1987).

Values, Attitudes, and Beliefs

Values are defined as generalized attitudes which provide a broad orientation for interacting in and understanding one's world (Stagner, 1961). Allport, Vernon, and Lindzey (1951) identified six basic values: theoretical

(love of truth), economic (practicality), aesthetic (love of beauty), political (love of power), social (humanitarian), and religious.

Attitudes are more specific than values having more specific frames of reference. Fishbein and Ajzen (1975) define an attitude as a "learned predisposition to respond in a consistently favorable or unfavorable manner in respect to a given object" (p.6). Attitudes have 3 attributes: (1) an object; (2) a direction; and (3) intensity. Unlike traits, which generally have a subjective, internal reference, attitudes and values have a more objective reference to external concepts of a less immediate nature (Stagner, 1961).

Beliefs provide the basis for the formation of attitudes. Beliefs explain the "subjective probability of a relation between the object of the belief and some other object, value, concept, or attribute" (Fishbein and Ajzen, 1975, p.131). Beliefs deal with one's understanding of him or herself and his or her environment. Beliefs can be descriptive (direct experience), informational (acceptance of information), or inferential (prior inference).

Implicit Theories

Early research on cognitive inferences was conducted on traits, examining the interrelationship among various traits (Fishbein & Ajzen, 1975). Implicit theories were first used

to describe assumed relationships among attributes of personality (Bruner & Tagiuri, 1951). Implicit personality theories explain the naive beliefs individuals have concerning the covariance among traits and behaviors. People seem to have a clear idea of which traits are closely related to other traits (Schneider, 1973).

Conceptually, an implicit theory can be considered a "lay theory" of a phenomenon such as personality structure, leadership, or work team effectiveness. Although, the origin of implicit theories is not certain it is likely that the acquisition of implicit theories are learned throughout the socialization process (Schneider, 1979).

Implicit theories are preconceptions of how things are "supposed" to be. "Implicit theories are inevitable consequences of our needs as perceivers to make sense of the world" (Schneider, 1979, p. 172). Implicit theories may not represent reality; they may be ideal representations of a group of traits or characteristics (Hastorf, Schneider, & Polefka, 1970).

The structure of implicit theories consists of an ideal prototype. A prototype consists of three basic factors: a focal concept, behaviors, and traits (Pavitt & Sackaroff, 1990). The focal concept identifies the prototype in question, such as an effective team; behaviors represent what the prototype actually does, (e.g. an effective team clarifies members' roles); traits represent characteristics

of the prototype, (e.g. an effective team is clear about each team members' role within the team).

An individual's implicit theory of team development provides a template for how successful teams should operate. An example of an implicit theory of work team development is that team members must all participate, communicate openly, and clarify team member roles for the team to be effective. Another example would be that success is primarily contingent upon team rewards, feedback, and organizational support.

Cognitive Structures for Guiding Behavior

Current approaches to organizational behavior can be classified into two categories: understanding behavior and influencing behavior (Gioia & Manz, 1985). Most cognitive schemata, such as stereotypes, prototypes, implicit theories, and causal schemata have been studied as systems for classifying information. They are considered frameworks for understanding behavior and typically not considered to influence behavior, as such they are construed as relatively "static" in nature (Gioia & Manz, 1985).

Understanding Behavior

Schemata typically do not direct individuals to a specific course of action. However, they do guide and give

meaning to behavior, enabling people to set goals and enact behaviors to achieve those goals (Bartunek & Moch, 1987).

Scripts. Scripts also provide a basis for understanding behavior. Most actors in familiar situations read from the same script, which facilitates agreement of action, organizes behavior, and provides understanding (Ashforth & Fried, 1988). Scripts provide normative standards to be used in evaluating events and behaviors (Ashforth & Fried, 1988). People in organizations know how to act appropriately because they have a working knowledge of their organizational world. Employees enact correct behaviors most of the time, in part because they retain a cognitive repertoire of scripts which fit organizational settings (Gioia & Poole, 1984).

Metascripts also influence behavior but in a more general sense, serving as an overall guide or implicit theory which is used to "deduce" the appropriate behavior for a given situation (Gioia & Manz, 1985). In a study conducted to discover and record sales scripts, Leigh and McGraw (1989) referred to general scripts as mini-theories. These mini-theories were typically strategic and broad, defining generic norms or role expectations including general objectives and activities. This allowed for a range of behavior rather than specific prescribed micro-behaviors.

Implicit Theories. In the leadership literature, implicit theories are considered perceptual filters which guide attention and storage processes such that theory-consistent behavior is more likely to be observed and encoded in long term memory (Larson, 1982). Individuals respond to the task of rating leader effectiveness either by selectively recalling pertinent leader behavior information or reconstructing the information based on their implicit leadership theories (Larson, 1982).

Rush, Thomas, and Lord (1977) reported that implicit leadership theories are related to the perception and evaluation of leadership behavior. In the absence of actual leadership information, performance cues affected the rating of behavior. Subjects seemed to rely on their implicit leadership theories to organize perceptions and evaluate leader behavior. Rush et al. (1977) conclude: "leadership behaviors are 'meaningful' in part because of implicit theories specifying the relations among behaviors as well as the levels of behaviors appropriate to particular situations (cue conditions)" (p. 106).

In an attempt to define the structure of implicit leadership theory among group members, Pavitt and Sackaroff (1990) developed a list of behaviors and traits that "good" group leaders should possess. They concluded that groups having no prior experience working together relied on their

implicit theories of leadership to evaluate leadership behavior more often than did groups having prior experience.

The relationship between implicit theories and perception has also been suggested by Gladstein (1984) in a study of work team effectiveness. In this study, implicit theories of work team effectiveness were suggested as an explanation for the low correlation between self-rating of performance and hard criteria. In initial interviews, group members discussed their implicit theories of team effectiveness and group process. These implicit theories may have influenced group members' perceptions of group process and/or group outcomes.

Individuals make inferences about groups based on their implicit theories of group process combined with outcome cues (Staw, 1975). More specifically, implicit theories and negative information affect one's evaluation of group performance (Guzzo, Wagner, Maguire, Herr & Hawley, 1986).

Guiding Behavior

Most existing approaches to the study of cognitive schemata involve classification systems, trait associations, or some prototype against which incoming information is compared. This facilitates understanding and evaluation of behavior, but does not indicate whether cognitive systems affect actual behavior (Bartenuk & Moch, 1987). The same cognitive structures used to interpret, organize, and store

information for understanding can also be used to guide purposeful behavior (Lord & Kernan, 1987). For instance, scripts provide a dual role for workers. They enable the understanding of on-going organizational events, and they provide a guide to appropriate behavior (Gioia & Poole, 1984). Scripts can be considered behavioral schemata. Scripts not only direct selective attention, they direct action (Neisser, 1976).

In a study of organizational script development, Poole, Gray, and Gioia, (1990) provide evidence that the interaction within an organization results in the "development of knowledge structures (cognitive scripts) that provide members of the organization with a basis for making sense of situations and for enacting patterns of behavior for achieving organizational goals (behavioral scripts)" (p.228). Their conclusions provide support for the link between cognitive structures and behavior.

We have seen that under limited information, implicit leadership theories are used to evaluate the behavior of others by fabricating behaviors that are congruent with behaviors of real leaders (Lord, Foti & Phillips, 1982). A logical extension of this concept would be that individuals also use implicit theories to guide their own behaviors.

Schemata, scripts, and implicit theories have the cognitive strength to influence behavior. By providing guidance and meaning in situations, schemata enable

individuals to set goals and choose appropriate behaviors for attaining these goals (Bartunek & Moch, 1987). Script-based models relate to behavior that is directed partially toward attaining either a conscious goal or a series of goals. The objective of a cognitive script is goal attainment (Poole, et al., 1990).

Goal theory provides a mechanism by which cognitive structures guide behavior. Goals are conceptualized as cognitive structures involving multiple levels in a hierarchy, not simply the outcome of a single task (Lord & Kernan, 1987). Cognitive structures are goal oriented.

Goal Theory. To understand how cognitive structures such as scripts and implicit theories guide behavior, it is important to understand how goals influence behavior. Goal setting is a motivational mechanism which affects motivation directly by influencing persistence, level of effort, and direction of behavior (Locke, Frederick, Lee & Bobko, 1984). Goals also guide behavior indirectly through strategy development (Locke & Latham, 1984).

Once goals are internalized, individuals are persistent in reaching those goals (Ryan, 1980). By making self-satisfaction contingent upon attainment of a goal, individuals persist in their efforts throughout their performance (Bandura, 1976). The amount of effort exerted in attaining a goal will differ depending upon the difficulty level. Difficult goals produce higher

performance (Locke, Shaw, Saari & Latham, 1981). Higher goals produce higher performance simply because people work harder for more difficult goals than they do for easier goals (Locke, et al., 1981).

Specific goals identify the target of intended behavior and enable an individual to attend to specific aspects of performance (Latham & Lee, 1986). Goals direct behavior by bringing order to previously ambiguous situations (Campbell, 1971).

Goal setting requires development of a strategy. The more specific and difficult a particular goal, the more likely it is that people will devise specific techniques to achieve them. When people contemplate a goal, they also must consider the means of attaining that goal (Locke & Latham, 1984). It is the planning mechanism of goal setting which translates the goal into action. The process of internalizing a goal enhances performance by providing a clearer understanding of a particular task. Campbell, Dunnette, Lawler and Weick (1970) explain that the effects of goal setting may be due to its "task definition component." In other words, goal setting provides information on how to go about performing a task and what the end product is to be.

The influence of schemata, scripts and implicit theories on behavior follow the same logic. Cognitive schemata can be broken down into discrete events using a

"plan schema" (Brewer and Dupree, 1983). The plan schema provides structure for goal-directed action by ordering events into an anticipated causal sequence (Pool, et al., 1990). Therefore, cognitive structures such as implicit theories of work team development may have the strength to guide team member behavior and ultimately affect team performance.

Definition of Work Teams

Shea and Guzzo (1987) state: "A formal group, more specifically a work group, consists of three or more people employed by an organization who see themselves as a group, are seen by others in the organization as a group, and who depend on each other for resources to accomplish a task or set of tasks" (p. 327).

In reference to work teams, there has been some confusion over the phrase "self-directed." "Self-directed work teams" is synonymous with "self-directed workforce," "autonomous work teams," and "self-managed work groups." Hackman (1987) addresses the definition of self-managed teams by outlining the distribution of authority in these teams. In self-managed work teams, group members are responsible for monitoring and managing their own performance processes, as well as executing the assigned team task. Management is responsible for the organizational

context and for the design of the group as a performing unit. Effectiveness of the team depends on the team design, the organizational context, and the competence of the group in managing and executing its task.

The primary difference between self-directed work teams and traditional, management-directed work teams is the responsibility of monitoring and managing the performance process. Other differences include the organizational focus, locus of control, task structure, and autonomy. In self-directed work teams, the organizational focus is on interrelated tasks rather than on individual jobs; the locus of control is within the work team rather than external to it; task structure is interdependent among team members completing a whole task; and the "whole task" provides a boundary within which team members are autonomous (Cummings & Griggs, 1977).

For on-going self-directed work teams, work-team effectiveness is not limited to productivity. Work-team effectiveness includes both performance and team viability (Sundstrom, DeMeuse & Futrell, 1990). Viability is considered the team's capacity to continue operating as a cohesive work-unit. Hackman and Oldham (1980) point out that a team can "burn itself up" performing its task, leaving members unwilling to work together in the future. In contrast, members of a viable team are satisfied to

belong, are active participants and are willing to continue working as part of the team.

The traditional focus in organizations has been on the individual and his or her role within the organization (Shea & Guzzo, 1987). Human resource management has developed around the individual as the unit of analysis. Performance appraisal, selection, training, compensation, rewards, and recognition all focus on the individual as opposed to the team. With the role of the individual employee historically being the focal point of organizations, implicit theories of an individual's place in an organization are likely to be firm.

However, as evident by the description of self-directed work teams, there are significant differences between the role of the worker in a self-directed workforce and a traditional workforce. In a self-directed workforce, team members become responsible for the division of labor among team members, planning and organizing their work, resolving personnel problems such as absenteeism and tardiness, maintaining their equipment, resolving conflict, scheduling vacations, and in some cases selecting and terminating members. To perform these tasks, traditionally performed by managers, communication, cohesion, and cooperation among individual members of a team become important for team effectiveness, along with team norms, role clarity of

members, and participation of all members (Sundstrom, Perkins, George, Futrell & Hoffman, 1990).

Effect of Implicit Theories on Team Effectiveness

In order for work teams to be effective, implicit theories of effectiveness must shift from the individual as the basic building block of organizational success, to the work team as the major contributing unit. An example of this is a shift from employees being primarily concerned with their own production to concentrating on production of the entire work team.

Determinants of team effectiveness can be evaluated at three levels: the individual level, the team level and the organizational level (Hackman & Morris, 1978). Implicit theories of team development influence team effectiveness at both the individual level and the team level. An individual's implicit theory of team development is considered an individual level factor; other such factors include member skills, attitudes, and personality characteristics. The convergence of implicit theories among team members is considered a team level factor; other team level factors include team structure, size, and cohesion.

Individual Level Factors

On the individual level, implicit theories of team development held by team members may guide team members' behavior. In assessing the relationship between implicit theories and subsequent team member behavior, it is logical to assess those factors over which team members have control. Interaction patterns conducive to team effectiveness include open communication, group norms or shared rules of conduct, and specialized roles that allow members to divide their work efficiently (e.g., Beer, 1980), as well as sufficient group cohesion to provide a basis for these processes (McGrath, 1984). Team member cooperation and participation also facilitate effective internal team development. In a longitudinal study of self-directed work teams, characteristics that separated high performing teams from lower performing teams included team development factors such as high communication, cohesion, role clarity, norms, and participation (George, Perkins, Sundstrom & Myers, 1990). Teams whose members exhibited these behaviors had higher performance than teams not exhibiting these behaviors.

The relationship between team members' implicit theories and behavior is contingent upon the extent of agreement between an individual's implicit theory and the implicit theories held by the remaining team members. A team member exhibiting behavior that is consistent with

preconceptions held by other team members will be reinforced and continue exhibiting the behavior. The more congruent an individual's implicit theories are with those of other team members, the more congruent the members' behavior.

Results of a study conducted on the emergence of norms in competitive decision-making groups indicate that the more similar an individual's script of the decision making situation was with other members of the group, the more successful that member was in the negotiation. When a team member's script was incongruent with other members, the non-congruent member often revised their interpretation of the situation (Bettenhausen & Murnighan, 1985).

Team Level Factors

Most of the variation in team performance can be controlled by three general summary variables: (1) the amount of effort used by team members to accomplish the task, (2) the task performance strategies used by team members in completing the task, and (3) the knowledge and skills of the team members (Hackman & Morris, 1978). There is potential for the interaction among team members to affect each of these variables, both positively and negatively. The decrease in productivity due to the task of coordinating individual team member efforts is considered process loss (Steiner, 1972). Process gain is defined as increase in productivity due to the process of individual

team members sharing ideas, skills and knowledge in a synergistic manner (Hackman & Morris, 1978). On the team level, implicit theories are expected to influence team effectiveness by increasing team member effort through coordination of the task, clarifying the performance strategies of the team, and facilitating the early processes of team development.

Convergent Implicit Theories

Whenever a task calls for a coordination of effort, there will always be some slippage in productivity, or process loss (Steiner, 1972). Any efforts to coordinate a team's activity will minimize the process loss inherent in coordinating a team effort. Teams having convergent implicit theories can begin efficiently working together more quickly than teams with divergent implicit theories. Greater convergence of implicit theories among team members is more likely to result in process gain.

The more unified the individual goals for the group, the more unified and efficient the group goal becomes. Lord and Kernan (1987) suggest that if common scripts exist among team members, coordination inherent in script structures will facilitate the integration of activities.

Bettenhausen and Murnighan (1985) proposed that if all team members use similar scripts in defining a novel situation, interaction in the team will be more efficient.

However, if team members do not have common scripts, they will spend time developing a common understanding of the situation. In their study, Bettenhausen and Murnighan (1985) found that teams having incompatible scripts not only spent considerably longer time to make decisions than teams with compatible scripts, incompatible teams also had considerably more conflict among team members.

Work groups with group goals display cooperative behavior. On the other hand, groups with individual goals display more competitive behaviors (Mitchell & Silver, 1990). Group goals influence members to engage in goal-directed behavior. Matsui, Kakuyama and Onglatco (1987) determined that group goal setting led to higher group performance than did individual goal setting. It was suggested that groups set higher goals than individuals and acceptance of goals was enhanced by group goal setting.

Work teams usually operate using performance strategies. These strategies become well-learned and automatic (Hackman & Morris, 1978). Team members rarely discuss the performance strategies they use to complete a task (Hackman, 1968). They typically assume that all other group members are operating from the same implicit theory of group process. This may or may not be the case.

Team members may differ in their implicit theories of team development. Variations in cognitive structure result from different experiences and learning processes (Gioia &

Manz, 1985). This cognitive conflict can be described using social judgment theory (Brehmer, 1976). The parties involved may share the same organizational purpose and the same ultimate goal, but the underlying judgment patterns may be different. For example, team members may want to increase their performance ratings. To achieve this goal, one team member may focus solely on increasing productivity, another team member may be concerned with quality, while a third member may focus on compliance with regulations. They all have the same final goal, but their methods of achieving it are very different. This may lead to diffused and inconsistent efforts toward team performance, resulting in decreased productivity and dissatisfaction with the team.

Convergent implicit theories of team development among team members may facilitate the preliminary stages of team development. Team development refers to the emergence over time of interaction patterns within a group (e.g., Tuckman & Jensen, 1977). In most theories of team development (e.g. Bales, 1950; Heinen & Jacobson, 1976; Tuckman, 1965), there is a critical point where effective teams decide on how the group will operate. Diversity in preconceptions or implicit theories among team members can be more difficult than necessary. Valuable time and energy is spent planning, organizing, and determining what the rules are as opposed to task related activities. The result is increased process loss.

Measurement of Convergence. The combination of implicit theories of team development can be considered a profile of implicit theories. "A common criteria for similarity between profiles is the distance between them" (Van de Geer, 1971, p. 244). According to Nunally (1978), the most appealing measure of profile similarity is Cronbach and Glesers' (1953) D . The primary advantage of D is that it takes into consideration profile level, dispersion and shape when calculating profile similarity.

D is based on Pythagorean's Theorem and is considered the distance between two points in Euclidean space. The distance D between two profiles is equal to the square root of the sum of squared differences in the profile variables.

Purpose of Research

Although schemata, scripts, and implicit theories provide a logical explanation for how cognitive structures guide behavior, there is a lack of empirical research supporting these models (Ashforth & Field, 1988; Gioia & Poole, 1984; Lord & Kernan, 1987; Zalesny & Kirsch, 1989). The purpose of this research was to first determine what implicit theories of team development are currently held, and second, to investigate how team member implicit theories of team development influence the team. This research assessed implicit theories on individual level factors and

team level factors. It has been shown that positive team development (communication, cohesion, norms, roles, conflict resolution, and participation) is correlated with higher performance. On the individual level, I investigated whether implicit theories held by individuals are positively related to critical behaviors such as communication, cohesion, norm setting, role clarification, conflict resolution, and participation. On the team level, I investigated whether convergence of implicit theories among team members is positively correlated with high performing, viable work teams. See Figure 2.1 for an overview of the proposed relationships.

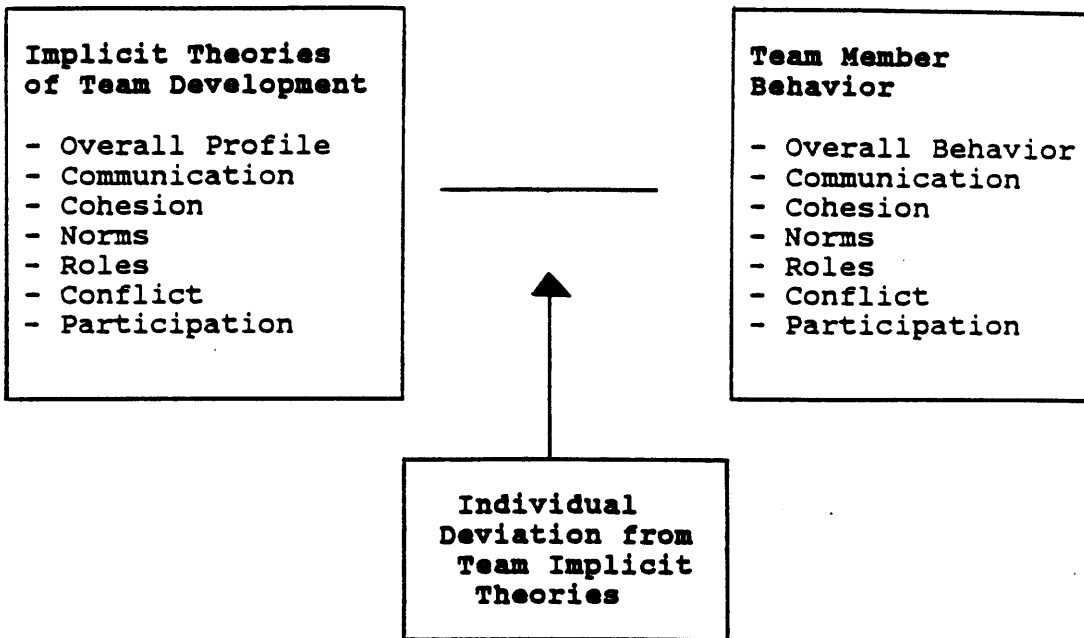
To assess the arguments stated above, the following research question and hypotheses were postulated:

Research Question:

What implicit theories do individuals have concerning team development?

H1: A positive relationship exists between team members' implicit theories of team development and subsequent team members' behavior. This relationship will be strongest for individuals whose implicit theories are more consistent with implicit theories held by other team members.

INDIVIDUAL LEVEL (H1)



TEAM LEVEL (H2, H3)

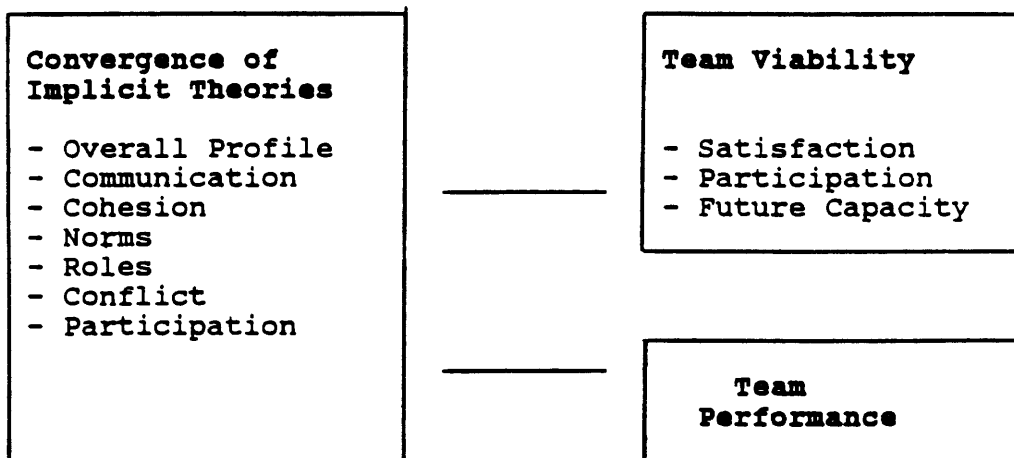


Figure 2.1
Overview of Proposed Relationships

- H2: A positive relationship exists between team viability and the level of convergence of implicit theories among team members.
- H3: A positive relationship exists between team performance and the level of convergence of implicit theories among team members.

CHAPTER III

STUDY ONE: CONSTRUCTION OF MEASURES

Purpose

An essential component of the study of the relationship between implicit theories of team development and team outcomes is the reliable measurement of implicit theories of team development, team member behavior, and team viability. The work teams literature offers a reliable measure of team viability (Sundstrom, et al., 1990). However, there are no such measures for implicit theories of team development or team member behavior. The purpose of this study (Study One) was to develop psychometrically sound measures of implicit theories of team development and team member behavior.

Method

The measures of implicit theories of team development and team member behavior were rationally constructed instruments. The process and participants used to assess the reliability and stability of these instruments are discussed below.

Procedure

The items included in the initial implicit theory of team development survey were based on the following team development dimensions: communication, cohesion, norms, role clarity, conflict and participation. These dimensions were based on a recent model of work team effectiveness presented by Sundstrom, DeMeuse and Futrell (1990), and subsequent research of the model (Sundstrom, et al., 1990).

The objective of the implicit theory survey was to measure an individual's implicit theory of team development. In the survey, respondents were asked to convey how important they perceived each item to be for team effectiveness using a five-point Likert-type response. An example item would be "Talking openly about differences and conflict." The response anchors were: 1=critical, 2=very important, 3=important, 4=not very important, 5=not important at all.

Once the initial survey was constructed (29 items), the survey was pilot tested using a series of focus groups that completed the survey and made comments concerning completeness and understandability. Internal consistency of the instrument was assessed by administering the survey to a large group of respondents. Test-retest reliability and stability of the instrument were evaluated by administering the survey to a small group of individuals each month for five months.

The items included in the final survey resulted from the pilot tests. Many items on the final survey are the same as in the original pilot survey. There were several items that were reworded for understandability. Some items were deleted and some were added, resulting in 31 final items.

Construction of the team member behavior survey began by assessing the items ultimately included in the final implicit theory survey (31 items) and rewording them to reflect behavioral items. Instead of assessing the perceived level of importance for each item, the respondent assessed the actual behavior of another team member using a five-point Likert-type response. An example item would be "Team member talked openly about differences and conflicts." The response anchors were: 1=always, 2=often, 3=neutral, 4=rarely, 5=never.

The team member behavior survey was reviewed for completeness and understandability by the same focus groups used to evaluate the implicit theory survey (at different times). The team member behavior survey was also administered to a large group of undergraduates to assess the internal consistency of the measure. In the pilot study respondents were allowed to select the team member they wished to evaluate.

Participants

All participants volunteered to take part in Study One. There were no negative consequences for any person choosing not to participate.

Two focus groups were used in the initial construction of the implicit theory of team development survey and the team member behavior survey. The first focus group consisted of 14 students enrolled in an undergraduate human resource management course at a local community college. The course was held in the evening and most participants worked full time in professional positions. The second focus group consisted of nine degreed researchers who conduct research and consulting in the human resources arena.

After construction of the implicit theory survey 84 undergraduates enrolled in undergraduate personnel management courses at a major state university completed the survey. The team member behavior survey was completed by 56 undergraduates enrolled in the same courses at the same university later in the term. Participants in this phase of Study One received extra credit for their participation.

The test-retest and stability study included 22 individuals with diverse educational backgrounds, age, and occupation. Subjects for the stability study were colleagues and friends, chosen on the basis of their willingness to participate in the longitudinal study.

Results

Implicit Theory of Team Development Survey

The final Implicit Theory of Team Development Survey includes 40 items; 31 items represented six team development dimensions (communication, cohesion, norms, role clarity, conflict, and participation) (Appendix A). Using a five-point Likert-type response, participants were asked how important they perceive certain items to be for effective team performance.

Each team development dimension was measured using 4-6 items each. The survey yielded sub-scale dimension scores for each factor represented. Sub-scale items for each dimension are shown in Figure 3.1.

The remaining items (9 of the 40) were considered filler items that have not been linked to effective team performance based on existing literature. An example item would be "Having the same number of males and females on each team."

In addition to the 40 Likert-type response items, respondents were asked to convey their implicit theories of work team development using a point distribution exercise. Based on team characteristics believed to be most important, respondents were asked to distribute 100 points to the following categories: having effective communication,

Communication

- 1.) Having excellent communication among team members
- 2.) Team members openly communicating their differences
- 3.) Team members being willing to listen to the views expressed by other team members
- 4.) Taking all member's ideas into account when making decisions
- 5.) Team members talk openly about the team's project
- 6.) All team members communicating their opinions on the project

Cohesion

- 1.) Team members getting along very well with each other
- 2.) Having a cohesive team
- 3.) Having team members enjoy working together
- 4.) Everyone on the team getting along with each other
- 5.) Team members feeling comfortable working with each other
- 6.) Having a tight-knit team

Norms and rules

- 1.) Team having agreed upon rules for working together
- 2.) Having agreed upon rules that facilitate efficient team meetings
- 3.) Having informal rules about how team members behave toward one another
- 4.) Team members knowing what types of behaviors are appropriate
- 5.) Team members knowing the quality of work that is acceptable

Roles

- 1.) Team members knowing what is expected of them
- 2.) Team members understanding their role in the team project
- 3.) Dividing up the task so that all team members have a task to do
- 4.) Everyone knowing what his or her role is
- 5.) Team members knowing what everyone is supposed to do

Avoiding Conflict

- 1.) Keeping conflict to a minimum
- 2.) Not having any personal conflict among team members
- 3.) Team members not contradicting or questioning decision made by other team members
- 4.) Team members avoiding conflict with one another

Participation

- 1.) Full participation by all team members in team project
 - 2.) All team members pulling their own weight
 - 3.) All team members doing his or her share of the work
 - 4.) All team members willing to contribute to the team's success
 - 5.) Everyone participating in completing the task
-

Figure 3.1
Implicit Theory of Team Development Survey
Sub-Scale Dimensions

having a cohesive team, having agreed upon norms/rules, having clear roles for team members, keeping conflict to a minimum among team members, and participation by all team members.

Team Member Behavior Survey

The final Team Member Behavior Survey includes 31 items which were based on the items used in the Implicit Theory of Team Development Survey described above (Appendix B). Using a Likert-type response, respondents rated the behavior of fellow team members as it relates to communication, cohesion, role clarity, norms, avoiding conflict and participation within the team.

This survey yielded sub-scale behavior scores for each dimension represented (communication, cohesion, norms, role clarity, avoiding conflict, and participation). Survey items are included in Figure 3.2. Prior to completing the survey, participants were instructed to evaluate only those behaviors that were exhibited while performing team tasks.

Reliability Estimates

Table 3.1 shows the internal consistency estimates (coefficient alpha) for each sub-scale dimension included in the Implicit Theory of Team Development Survey and the Team Member Behavior Survey. Both measures are considered to be

Communication

1. Communicated very well with other team members
2. Talked openly about differences and conflicts
3. Listened to views expressed by other team members
4. Considered everyone's ideas when making decisions and encouraged the team to do the same
5. Talked openly about the team project
6. Expressed his/her opinions and encouraged all team members to do the same

Cohesion

1. Got along very well with other team members
2. Was instrumental in our team being cohesive
3. Made working on the team a more enjoyable experience
4. Made sure that everyone on the team got along well
5. Made others feel comfortable working together
6. Was influential in us having a tight knit team

Norms and rules

1. Followed our agreed upon rules for working together
2. Followed agreed upon rules for team meetings
3. Helped establish working rules for the team
4. Exhibited behaviors acceptable to the team
5. Performed work of acceptable quality

Roles

1. Was clearly aware of his/her role in the team project
2. Helped clarify what everyone's role was in the project was
3. Helped divide the task so that all teams members had a task to do
4. Was clearly aware of which tasks everyone was supposed to do
5. Knew what was expected of him/her in completing the project

Conflict

1. Helped keep conflict to a minimum
2. Kept personal conflicts with other team members to a minimum
3. Contradicted or questioned decisions made by other team members (-)
4. Avoided conflict with other team members

Participation

1. Participated fully in team assignments
 2. Pulled his/her own weight throughout the term
 3. Performed his or her share of the work
 4. Contributed to the team's success
 5. Encouraged full participation by all team members
-

Figure 3.2
Team Member Behavior Survey
Sub-Scale Dimensions

Table 3.1
Internal Consistency Estimates:
Implicit Theory of Team Development
and Team Member Behavior Surveys

Dimension	Implicit Theory Survey	Team Member Behavior Survey
	N=84	N=56
Communication	.70	.73
Cohesion	.84	.87
Norms	.73	.87
Roles	.74	.86
Avoiding Conflict	.76	.74
Participation	.85	.98

Note: Internal consistency estimates represent Cronbach's coefficient alpha.

reliable based on the reported estimates of internal consistency.

Test-Retest and Stability Estimates

To assess test-retest reliability and stability of the Implicit Theory of Team Development Survey, Pearson correlation coefficients were calculated for each dimension. Data was collected 5 times at one month intervals. Test-retest reliability was assessed between time 1 and time 2, time 2 and time 3, time 3 and time 4, and time 4 and time 5. Stability of the instrument was assessed over a 5 month period (between time 1 and time 5). Sample sizes for the correlations ranged from 16 to 21.

As Table 3.2 shows, test-retest correlation coefficients for the Likert-type scale are adequate, ranging from .59 to .93, with a mean correlation of .79 across all dimensions and all time periods. The increase in test-retest reliability over the 5 month period (T1-T2, $r=.71$; T2-T3, $r=.78$; T3-T4, $r=.80$; T4-T5, $r=.89$) may be due to the familiarity of the instrument.

Test-retest reliability for the point distribution exercise was marginal with reliability coefficients ranging from $r=.02$ to $r=.81$, with a mean correlation of $r=.63$. Participation (mean $r=.74$) and cohesion (mean $r=.70$) were fairly reliable. The role clarity dimension was clearly not reliable with a mean $r=.35$.

Table 3.2
Test-Retest Reliability and Stability Estimates
Implicit Theory of Team Development Survey

	Test-Retest Reliability					Stability
Dimension	T1-T2 (n=21)	T2-T3 (n=19)	T3-T4 (n=17)	T4-T5 (n=16)	Mean r	T1-T5 (n=18)
Scale Scores:						
Communication	.83**	.59**	.71**	.86**	.75	.60**
Cohesion	.73**	.80**	.89**	.93**	.84	.72**
Norms	.63**	.84**	.86**	.87**	.80	.46*
Roles	.60**	.80**	.90**	.96**	.82	.65**
Conflict	.74**	.74**	.59**	.92**	.75	.77**
Participation	.71**	.93**	.82**	.80**	.82	.67**
Mean Correlation	.71	.78	.80	.89	.79	.65
Point Distribution:						
Communication	.64**	.26	.81**	.80**	.63	.43
Cohesion	.50*	.67**	.80**	.82**	.70	.40
Norms	.48*	.70**	.83**	.76**	.69	.62**
Roles	.02	.46*	.50*	.42	.35	.14
Conflict	.61**	.68**	.65**	.62**	.64	.57*
Participation	.59**	.82**	.80**	.76**	.74	.65**
Mean Correlation	.47	.60	.73	.70	.63	.47

* p < .05

** p < .01

Note:

T1 - Time 1

T2 - Time 2

T3 - Time 3

T4 - Time 4

T5 - Time 5

As Table 3.2 also shows, stability correlation coefficients (Time 1 to Time 5) are adequate for the Likert-type scale, ranging from .46 to .77, with a mean rating of .65. Stability coefficients for the point distribution exercise are lower than the Likert-type scores with a mean of .47.

CHAPTER IV

STUDY TWO: METHOD

Research Design

Participants were upper level management students enrolled in a management course at a major university. Team member implicit theories were assessed at the beginning of the school term. Students, divided into teams, then completed a naturally occurring team project during the term. At the end of the term, team member behavior, team viability and team performance were measured.

Implicit theories of team development, team member behavior, and team viability were measured using survey questionnaires. Team performance was evaluated by the course instructor. Convergence of implicit theories among team members was calculated using Cronbach and Gleser's (1953) profile similarity measure.

Setting

The setting was a major university located in the Southeast. Participants were students enrolled in a business policies course at the university, which is a

required course for all graduating business majors. Class size ranged from 24 to 39 students. Each class required a team project. The number of teams per class ranged from 5 to 7. The class structure consisted of lecture, discussion, presentation of business cases, and presentation of various team projects. Team work was typically conducted in meetings outside the classroom, without the presence of the course instructor.

Participants

Participants (n=224) representing 50 teams were undergraduates enrolled in a business policies course (8 classes) at the university. Participants were either assigned to teams or allowed to select their own teams depending on the instructor. The size of each team ranged from 4 to 7 members. Most participants were in their senior year at the university (96%), remaining participants were in their junior year. Sixty-one percent of the participants were male and 39% were female. Participants' self reported grade point average (GPA) ranged from 2.00 to 4.00, with a mean of 3.14 (4.00 scale).

There were 263 students enrolled in the 8 classes surveyed. The difference between the sample (n=224) and the population (n=263) was due to absences during data collection and people choosing not to participate.

The majority of participants reported receiving no prior formal training in team development (83%), whereas 74% reported having had previous informal team training. The majority of participants (96%) reported having some prior experience with being a team member.

Self Managed Teams

The groups of students working on team projects in this course represented self-managed work teams. Team members were responsible for monitoring and managing their own performance processes, as well as executing the assigned task. In completing the task, team members were responsible for the division of labor within the team. They had control over the energy expended by team members and their use of external resources, and were responsible for the internal processes of the team. The assigned task relied on interdependence among members for effective completion.

There were also major consequences of the teams' actions. The course surveyed in this study is required for all graduating business students and team projects are a substantial part of a student's overall grade in the course (30% to 50%). In addition, most team members rated the class as important (58%) or very important (25%) on a five-point Likert-type scale with anchors of 1=not important at all, 2= not very important, 3=neutral, 4=important, and 5=very important.

Procedure

Seven instructors in the business policies course volunteered their classes (8 classes) for inclusion in this study. Participants were then recruited to take part in the study. Participation was voluntary, there were no negative consequences for instructors or students who chose not to participate, and no extra credit was given for participation. Instructors had no knowledge of which students chose not to participate.

The data collection proceeded as follows:

- (1) Prior to working in teams, team members completed the Implicit Theory of Team Development Survey. The implicit theory survey was distributed in the classroom, completed during class period and collected. Instructors did not have access to the completed surveys. Students signed an informed consent form prior to completing the surveys (Appendix C).
- (2) The team then completed the assigned team project(s) during the term. Team projects were a natural component of the course and not introduced by the study. The project task and length varied depending on the requirements of each class.

- (3) After completing the task(s), team members were asked to complete the Team Member Behavior Survey which rated the behavior of two fellow team members as it related to completion of the team project. Team members also completed the Team Viability Survey which evaluated their teams' viability. Participants were instructed verbally and in writing (Appendix D) that the ratings are confidential, for research purposes only, and in no way would affect the individual's grade, their team's grade, or the grade of their fellow team members. The time between the first and second data collection ranged from 11 weeks to 14 weeks depending on the class syllabus.
- (4) After completing the required team project(s), the course instructor evaluated each team's performance.

Team Task

The task(s) required of the teams varied by course instructor. In all cases, the team project was a significant portion of the team members' course grades, ranging from 30% to 50%. Team tasks included written case studies, oral case studies, business game simulations, and term projects.

Written Case Studies. Some teams were responsible for developing written case studies of real companies. The principle objectives of the case studies included the

development of strategic decision making, integration of knowledge derived from functional courses, and providing experience in dealing with unstructured problems, conflicting goals, and ethical dilemmas.

Oral Case Studies. Some teams were responsible for preparing and presenting recommendations for selected case studies. The objective of the oral presentation was to give each team the opportunity to evaluate an industry, formulate a strategy for a business, and to present logically the strategic plan.

Business Game Simulation. Some teams participated in "The Business Strategy Game" (Thompson & Stappenbeck, 1990). The computerized case consists of a company that has been operating for 10 years. The teams then simulate on-going operations of the organization by developing a business strategy based on decisions made by the team. Each team competes against other teams in the course.

Term Project. Similar to the written case study, term projects require students to critique an organization's business strategy and develop an alternative business strategy.

Variables

This study looks at the relationship between implicit theories of team development and team member behavior, team

viability, and team performance. The operational definition of implicit theories of team development is an individual's perceptions of the relative importance of specific team development factors (communication, cohesion, norms, roles, conflict, and participation) associated with team effectiveness. The correlation between implicit theories and team effectiveness can be an individual phenomenon as well as a team phenomenon.

Individual Level Variables

The first hypothesis (H1) evaluated implicit theories of team development on the individual level. The variables included in this analysis are (1) an individual's implicit theory of team development, (2) the extent to which an individual's implicit theory of team development is consistent with the implicit theories held by other team members (individual deviation scores), and (3) an individual's team related behavior. Implicit theories, individual deviation scores, and team member behavior have been operationalized as global scores and team development dimension scores (communication, cohesion, norms, roles, conflict, and participation).

Team Level Variables

The remaining hypotheses (H2 and H3) evaluated implicit theories of team development on the team. The variables

included at the team level are (1) the team's convergence of implicit theories among team members, (2) team viability, and (3) team performance. Team viability is operationalized as total viability and viability dimensions of satisfaction, participation, and capacity for future interaction. Team performance is operationalized as performance rating, performance ranking, and performance grade.

Measures

Implicit Theory of Team Development Survey

Team members' implicit theories were measured using the rationally constructed survey described in Study One (Appendix A). Using a five-point Likert-type response, participants were asked how important they perceive certain items to be for effective team performance. The response anchors are: 1=critical, 2=very important, 3=important, 4=not very important, 5=not important at all.

The survey includes 40 items; 31 items represented six team development variables (communication, cohesion, norms, role clarity, conflict, and participation). The remaining 9 items were considered filler items and not included in the analyses.

In addition to the 40 Likert-type response items, respondents were requested to convey their implicit theories of team development using a point distribution exercise.

Based on the team characteristics that respondents believed to be most important, they were asked to distribute 100 points to the following categories: having effective communication, having a cohesive team, having agreed upon norms/rules, role clarification for team members, keeping conflict to a minimum among team members, and participation by all team members.

Demographic items included in the survey were gender, self-reported GPA, year in school, and self-reported importance of the course (Likert-type items, 1-5). Participants were also asked whether they have had prior team experience (yes/no), prior formal team training (yes/no), and prior informal team training (yes/no).

Individual Deviation Scores

Individual deviation scores were calculated for each team member representing the extent to which an individual's implicit theory of team development differs from the implicit theories held by the remaining team members. Deviation scores were determined by (1) calculating the difference between an individual's score for the overall implicit theory of team development profile and the average score for the overall profile of the remaining team members, and (2) calculating the difference between an individual's score on each implicit theory dimension and the average dimension scores of the remaining team members. The team

development dimensions assessed were communication, cohesion, norms, roles, conflict, and participation.

Individual deviation scores were calculated using the actual differences and the absolute value of the differences between each team member and the mean implicit theory of the remaining team members. This was done for both the scale scores and the point distribution scores. Lower scores indicate higher convergence of an individual's implicit theory with remaining team members' implicit theories.

Team Member Behavior Survey

The Team Member Behavior Survey was based on the items used in the Implicit Theory Survey described above. Instead of assessing the perceived level of importance for each item, the respondent assessed the actual behavior of another team member. Team members evaluated fellow team member behaviors related to communication, cohesion, roles, norms, conflict avoidance and participation within the team. Participants were instructed to evaluate only those behaviors that were exhibited while performing team tasks. This measure yielded sub-scale behavior scores for each dimension represented (communication, cohesion, norms, roles, avoiding conflict, and participation).

An example item would be "Team member talked openly about differences and conflicts." The response anchors are: 1=always, 2=often, 3=neutral, 4=rarely, 5=never.

Each team member's behavior was to be evaluated by two fellow team members with the individual behavior score being the mean of the two ratings. Most of the participants were evaluated by two raters (79%). The remaining 21% were rated by only one member. This was due to some participants being absent from class during the second data collection.

Convergence of Implicit Theories among Team Members

The relationship between convergence of implicit theories of team development among team members and team viability and team performance may be due to convergence of the overall implicit theory profiles or due to convergence of each implicit theory dimension (communication, cohesion, norms, roles, conflict, and participation). For this reason, convergence of implicit theories was measured in two ways.

Profile Convergence. The measure of implicit theories of team development yields scores for each individual on six team development dimensions (communication, cohesion, roles, norms, avoiding conflict, and participation). These scores form a profile of team development implicit theories for each team member. Each profile is defined by three measures: (1) profile level, which is the mean score of all variables in the profile, (2) profile dispersion, which relates to the standard deviation of the variables, and (3)

profile shape, which is a rank ordering of variables within the profile.

The profile convergence for each team was calculated using Cronbach and Gleser's (1953) *D*. The primary advantage of *D* is that it takes into consideration profile level, dispersion, and shape when calculating profile similarity.

The resulting measure of convergence of implicit theories among team members is the root-mean-square distance between observations for each team. The smaller the *D*, the more convergent the implicit theories of team development among team members. Profile convergence was calculated for both scale profiles and point distribution profiles.

Dimension Convergence. The convergence of implicit theories for each dimension was also measured using Cronbach and Gleser's (1953) *D*. The distance measure was calculated for each dimension using the same procedure as the profile convergence measure -- by calculating the root mean square distance between observations for each team. When calculating *D* for only one variable (i.e. communication or cohesion, etc.), level (mean) and dispersion (standard deviation) are the only factors taken into consideration. Shape is not considered in the calculation of dimension convergence because only one variable is considered at a time. Lower *D* scores indicate higher convergence of implicit theories among team members. Dimension convergence

was calculated for scale dimensions and point distribution dimensions.

Team Viability Survey

Team members evaluated their team viability using a rating scale adapted from the Work Team Survey developed by Sundstrom, et al., (1990). Team viability includes member satisfaction, member participation, and capacity for future interaction. An example item would be "All team members participated in the team project." The response anchors are: 1=agree strongly, 2=agree slightly, 3=neutral, 4=disagree slightly, 5=disagree strongly. Survey items are included in Figure 4.1. See Appendix E for complete survey.

Each team received a total team viability score as well as sub-scale dimension scores (satisfaction, participation, capacity for future interactions) based on the mean rating among team members.

In completing the Team Viability Survey, participants were asked to rate their perceived compatibility among team members (Likert-type response, 1-5) and perceived effectiveness of their team (Likert-type response, 1-5). Participants were also asked what grade they would give their team on a scale from 0-100%.

Satisfaction

- 1.) I found it personally satisfying to be a member of my team.
- 2.) I am pleased to be a member of this team.
- 3.) All in all, I find it a pleasure to be a member of this team.

Participation

- 1.) All team members participated in the team project.
- 2.) All team members pulled their own weight.
- 3.) All team members did his or her share of the work.
- 4.) All team members were willing to contribute to the team's success.

Capacity for Future Interaction

- 1.) Most everyone on my team would want to work together in the future.
 - 2.) I would like to continue working with this team.
 - 3.) Nobody on my team wanted to switch to another team because they didn't like this team.
-

Figure 4.1
Team Viability Survey Items

Team Performance Survey

Team performance was measured using (1) ratings of teams within each class, (2) rank ordering of teams within each class, (3) project course grades, and (4) objective scores on business game simulations (where applicable). The performance rating used a 7 point Likert-type response with norm referenced anchors (best project in class = 1, above average compared to class = 2, slightly above average compared to class = 3, average project = 4, slightly below average compared to class = 5, below average compared to class = 6, and poor project compared to class = 7). See Appendix F for Team Performance measure.

Due to the varied team projects among the 8 classes surveyed, possible performance scores are: rating scores for written case studies, oral cases studies, and business game simulations; ranking scores for written case studies, oral cases studies, term projects, and business game simulations; and course grades for written case studies, oral cases studies, term projects, and business game simulations. Objective scores for the simulations were provided where applicable.

Summary of Variables

This study assessed implicit theories of team development on an individual level and a team level. The

individual and team level variables included in this study are summarized in Figure 4.2 along with the instruments used to measure the variables.

Variable	Measure
<u>Individual Level Variables</u>	
Implicit Theories - Profile - Dimensions	Implicit Theory Survey
Individual Deviation - Profile - Dimensions	Implicit Theory Survey
Team Member Behavior - Profile - Dimensions	Team Member Behavior Survey
<u>Team Level Variables</u>	
Convergence of Implicit Theories - Profile - Dimensions	Implicit Theory Survey
Team Viability - Satisfaction - Participation - Future Capacity	Team Viability Survey
Team Performance - Ratings - Rankings - Course Grades	Team Performance Survey

Figure 4.2
Summary of Variables and Measures Used

CHAPTER V

RESULTS

Preliminary analyses on the descriptive statistics and psychometric properties of the measures are presented in this chapter. The results of the tests of hypotheses and research question are then reported. Additional relationships among the variables in this study will also be included.

Data Analysis

Regression analysis was used to determine whether a direct relationship between member implicit theories and team member behavior existed, and whether convergence of individual implicit theories with team members' strengthened the relationship. Simple correlation analysis and hierarchical regression analysis were used to determine whether convergence of implicit theories is positively related to team viability and team performance.

Descriptive Statistics and Psychometric Properties of the Measures

Prior to testing the proposed hypotheses, the descriptive statistics and psychometric properties of the surveys will be reported. Included in this section are the final sample sizes for each variable, estimates of reliability for each of the measures used, means and standard deviations for each of the variables, and appropriate correlations among variables included in this study.

Sample Sizes

Data was collected twice from the participants, with 11 to 14 weeks separating the first and second data collections. Sample sizes for all measures were not the same due to students dropping the course or being absent at time one or time two. Table 5.1 provides a summary of sample sizes.

Implicit Theory of Team Development Survey

A total of 224 team members representing 50 teams completed the implicit theory survey. Table 5.2 shows (1) the internal consistency estimates (coefficient alpha) for each sub-scale, (2) the number of items for each sub-scale, and (3) the means and standard deviations for the sub-scales

Table 5.1
Summary of Sample Sizes

Measure	Member N	Team N
<u>Individual Level Variables</u>		
Implicit Theories	224	50
Individual Deviation	224	50
Member Behavior	204	49
<u>Team Level Variables</u>		
Convergence of Implicit Theories	224	50
Team Viability	176	44
Team Performance	224	50

included in the Implicit Theory Survey. The point distribution means and standard deviations are also included in Table 5.2. Estimates of internal consistency are adequate, ranging from .62 (conflict) to .84 (participation).

As the correlation matrix in Table 5.3 shows, the scale scores for each team development factor are significantly correlated with the corresponding point distribution score for each team development factor at $p < .001$ (scale to point correlations are underlined). Most sub-scale dimension scores are positively correlated with each other. Most point distribution dimension scores are negatively correlated with each other. The negative correlations are expected due to the task of distributing a limited number of points to the variables in question.

Individual Deviation Scores

The individual deviation variable was calculated and analyzed 3 ways. First, the actual individual deviation score for each dimension (communication, cohesion, norms, roles, conflict, and participation) was used in the regression equation. This analysis took into consideration the direction of the deviation. In a separate analysis, the absolute value of the individual deviation for each variable was used. This assumed that the magnitude of the deviation was of primary concern, as opposed to the direction of the

Table 5.2
Descriptive Statistics and Reliability Estimates:
Implicit Theory of Team Development Survey

Dimension	# of Items	Alpha	Mean	sd
Sub-Scales:*				
Communication	6	.72	4.06	.46
Cohesion	6	.78	3.24	.54
Norms	5	.70	3.27	.52
Roles	5	.79	4.00	.56
Avoiding Conflict	4	.62	2.72	.58
Participation	5	.84	4.21	.57
Point Distribution:**				
Communication			30.58	12.2
Cohesion			12.60	5.8
Norms			10.17	5.1
Roles			14.48	6.2
Avoiding Conflict			9.19	5.0
Participation			23.03	10.2

* Means range from 1 to 5

** Means range from 0 to 100

Table 5.3
Correlation Matrix for Sub-Scale and Point Distribution
Implicit Theory Scores

	1	2	3	4	5	6	7	8	9	10	11
Sub-Scale Scores:											
1. COMM	--										
2. COH	.22**	--									
3. NORMS	.33**	.26**	--								
4. ROLES	.38**	.14*	.58**	--							
5. CONF	-.07	.49**	.19**	.08	--						
6. PART	.44**	.27**	.41**	.57**	.02	--					
Point Distribution Scores:											
7. COMM	<u>.24**</u>	-.01	-.09	-.20**	-.07	-.13*	--				
8. COH	-.21**	<u>.22**</u>	-.03	-.21**	.07	-.11*	-.36**	--			
9. NORMS	-.11*	-.22**	<u>.25**</u>	.01	-.08	-.24**	-.29**	.09	--		
10. ROLES	-.05	-.18*	.08	<u>.32**</u>	-.17*	.03	-.42**	-.06	-.13	--	
11. CONF	-.22**	.14*	-.07	-.14*	<u>.40**</u>	-.26**	-.25**	.05	.08	-.08	--
12. PART	-.02	-.04	-.02	.21**	-.01	<u>.44**</u>	-.48**	-.16*	-.32**	.11	.20*

* p < .05

** p < .01

COMM - Communication Implicit Theories
COH - Cohesion Implicit Theories
NORMS - Norms Implicit Theories
ROLES - Role Clarity Theories
CONF - Avoiding Conflict Theories
PART - Participation Theories

Note: Underlined correlations represent correlations between scale scores and point distribution scores for each variable.

deviation. Finally, the absolute value of the individual deviation for the entire profile was evaluated.

Individual deviation scores ranged from -2.58 to 2.19 for implicit theory sub-scales scores, and from -40.00 to 46.25 for implicit theory point distribution scores. The means of the individual deviation scores (absolute value) and the standard deviations (actual value) for the implicit theory sub-scale dimensions and point distribution dimensions are in Table 5.4.

Team Member Behavior

A total of 204 team members representing 49 teams were evaluated based on their team related behavior. Table 5.5 shows (1) the internal consistency estimates (coefficient alpha) for each sub-scale, (2) the number of items for each sub-scale, and (3) the means and standard deviations of the sub-scales included in the Team Member Behavior Survey. The point distribution means and standard deviations are also included in Table 5.5.

Convergence of Implicit Theories

Convergence of implicit theories among team members is measured using the profile similarity measure D^2 . D^2 was calculated using the following formula:

$$D^2_{(ab)} = (X_{a1} - X_{b1})^2 + (X_{a2} - X_{b2})^2.$$

Table 5.4
Descriptive Statistics:
Individual Deviation Scores

Dimension	Mean Absolute Value	sd Actual Value
Sub-Scales:		
Communication	.42	.52
Cohesion	.45	.58
Norms	.46	.58
Roles	.50	.63
Avoiding Conflict	.54	.66
Participation	.48	.63
Point Distribution:		
Communication	9.57	12.97
Cohesion	5.04	6.37
Norms	4.28	5.58
Roles	5.25	6.58
Avoiding Conflict	4.09	5.36
Participation	8.36	11.17

Table 5.5
Descriptive Statistics and Reliability Estimates:
Team Member Behavior Survey

Dimension	# of Items	Alpha	Mean	sd
Sub-Scales:*				
Communication	6	.87	4.12	.69
Cohesion	6	.92	4.03	.78
Norms	5	.85	4.16	.65
Roles	5	.87	3.98	.73
Avoiding Conflict	4	.68	3.77	.68
Participation	5	.93	4.28	.77
Point Distribution:**				
Communication			19.85	9.5
Cohesion			15.63	7.2
Norms			18.80	9.5
Roles			15.14	8.3
Avoiding Conflict			15.19	8.6
Participation			15.46	6.4

* Range is from 1 to 5

** Range is from 0 to 100

Using CLUSTER analysis in SAS, the square root of D^2 was calculated by:

- (1) Calculating the absolute difference between profiles for every possible pair of individuals in the team resulting in squared distances between observations.
- (2) Calculating the mean square distance between observations for each team (sum of all possible distances divided by the number of possible distances).
- (3) Calculating the square root of the calculated mean square distance between observations.

Figure 5.1 illustrates convergence of implicit theories by showing the scores for the most convergent teams and the least convergent teams for the scale scores ($D = .90$ and $D = 3.47$). Figure 5.2 illustrates the minimum and maximum convergence of the point distribution scores ($D = 9.13$ and $D = 45.81$). Table 5.6 contains the means and standard deviations for convergence of implicit theories among team members.

Team Viability

A total of 176 team members, representing 44 teams evaluated their team's viability. Table 5.7 shows (1) the internal consistency estimates (coefficient alpha) for each sub-scale, (2) the number of items for each sub-scale,

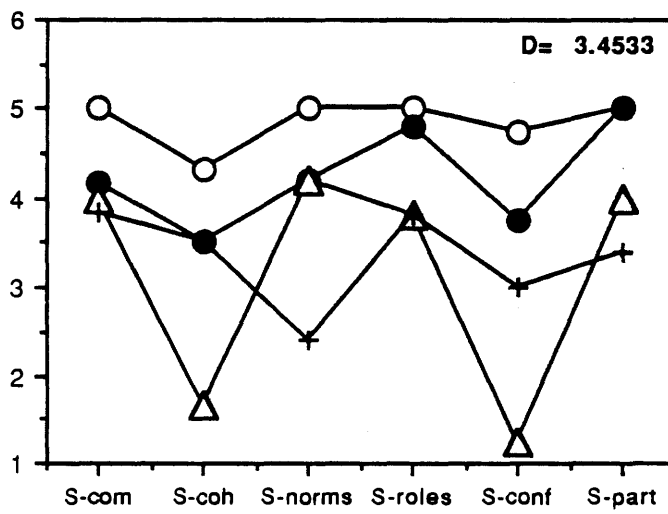
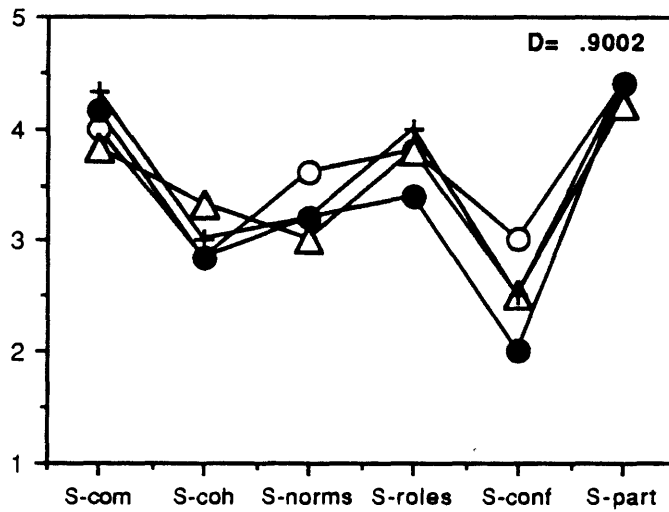


Figure 5.1
Most Convergent and Least Convergent Teams
Actual Scale Scores

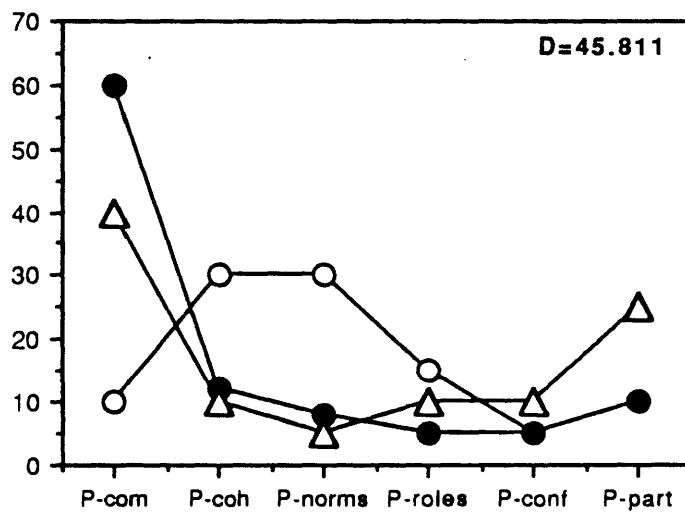
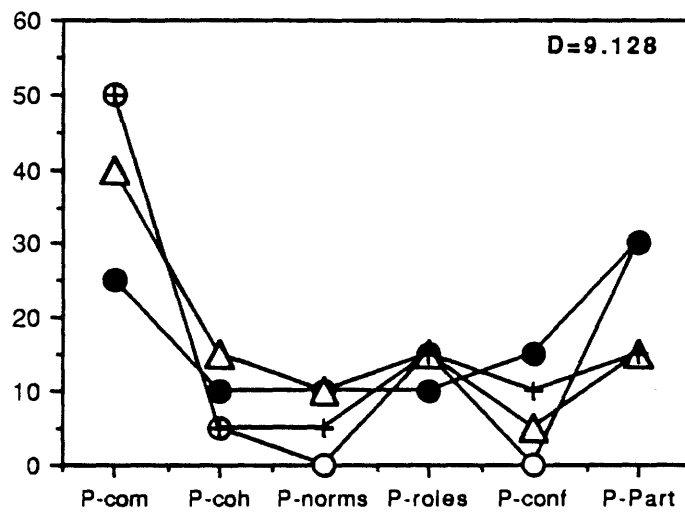


Figure 5.2
Most Convergent and Least Convergent Teams
Actual Point Distribution Scores

Table 5.6
Profile Convergence Scores and Sub-Scale Convergence Scores
Means and Standard Deviations

Dimension	Mean	sd
Scale Profile	1.80	.40
Sub Scale Scores:		
Communication	.61	.21
Cohesion	.66	.28
Norms	.67	.25
Roles	.73	.28
Avoiding Conflict	.78	.29
Participation	.71	.35
Point Distribution Profile	24.37	7.71
Point Distribution Scores:		
Communication	13.99	7.74
Cohesion	7.17	3.36
Norms	6.13	2.82
Roles	7.78	3.66
Avoiding Conflict	5.90	3.05
Participation	11.95	6.52

Note: Scale Convergence Scores ranged from 0.00 to 3.45
Point Distribution Convergence Scores ranged from
0.00 to 45.81

Table 5.7
Descriptive Statistics and Reliability Estimates:
Team Viability Survey

Dimension	# of Items	Alpha	Mean	sd
Total Scale	10	.95	3.76	.84
Sub-Scales:				
Satisfaction	3	.95	3.88	.82
Participation	4	.94	3.65	1.04
Future Capacity	3	.89	3.78	.90

Note: Means range from 1-5

and (3) the means and standard deviations for the sub-scales included in the Team Viability Survey.

Viability scores for each team were calculated based on the mean rating among team members. The majority of the teams (89%) had 3 to 6 team members evaluate their teams' viability. Three teams had 2 members evaluate viability and only 2 teams had 1 member evaluate team viability. Team viability was not significantly correlated with class or whether team members were assigned or self-selected their fellow team members.

Interrater reliability among team members was calculated using James, et al., (1984). The mean interrater reliability for overall viability was acceptable at $r = .94$ (satisfaction - $r = .92$, participation - $r = .86$, future capacity - $r = .88$).

Team Performance

Although each class surveyed required a team project, the specific project varied from class to class. Table 5.8 provides a summary of sample sizes for each team task (written cases, oral cases, term projects, and computer simulation) and the type of measure used to evaluate team performance. All team tasks were evaluated using both Likert-type rating and rank ordering. Actual grades

Table 5.8
Summary Sample Sizes, Means and Standard Deviations
for Performance Measures

Dimension	Sample Size	Mean	sd
Scale Scores:*			
Total Performance	50	3.46	1.53
Written Cases	27	3.33	1.71
Oral Cases	39	3.28	1.67
Simulation	11	3.00	1.41
Rank Order Scores:*			
Total Performance	50	3.36	1.50
Written Cases	27	3.22	1.60
Oral Cases	39	3.60	1.71
Term Project	17	3.35	1.69
Simulation	11	3.27	1.70
Team Grades:**			
Total Performance	39	87.81	8.05
Written Cases	22	86.55	5.45
Oral Cases	34	91.06	5.73
Term Project	17	89.29	5.27
Simulation	5	86.00	4.08

* Scale from 1 to 7

** Scale from 0 to 100

received for team projects were provided at the discretion of the instructor. Two instructors chose not to provide actual grades.

Table 5.8 shows the means and standard deviations for team performance as measured by each evaluation method (rating, ranking, and team grade). Means and standard deviations for each team task (written cases, oral cases, term projects, and simulations) are also included.

Research Question

RQ1: What implicit theories do individuals have concerning team development?

Table 5.9 provides an overview of respondents' implicit theories of team development. Based on the responses to the Likert-type scale included in the Implicit Theory of Team Development Survey, participation received the highest mean rating of 4.21, which was significantly higher ($t=4.04$, $p<.01$) than communication which is the next highest rating. There was not a significant difference between communication (mean = 4.06) and role clarity (mean = 4.00). Role clarity was rated significantly higher ($t=20.47$, $p<.01$) than norms which received a mean rating of 3.27. Cohesion (mean = 3.24) received a significantly lower rating ($t=2.03$, $p<.05$) than role clarity. Avoiding conflict received the lowest mean rating of 2.72 which was .52 less than cohesion ($t=13.72$, $p<.01$).

Table 5.9
Implicit Theories of Team Development

Dimension	Mean	sd	Mean Difference	t
Sub-Scales:^a				
Participation	4.21	.57		
			.15	4.04**
Communication	4.06	.46		
			.06	1.55
Roles	4.00	.56		
			.68	20.47**
Norms	3.27	.52		
			.08	2.03*
Cohesion	3.24	.54		
			.52	13.72**
Avoiding Conflict	2.72	.58		
Point Distribution:^b				
Communication	30.50	12.2		
			7.47	5.89**
Participation	23.03	10.2		
			8.85	10.32**
Roles	14.18	6.2		
			1.58	3.24**
Cohesion	12.60	5.8		
			2.43	4.99**
Norms	10.17	5.1		
			.98	2.14*
Avoiding Conflict	9.19	5.0		

a: Range is from 1 to 5
b: Range is from 0 to 100

* p < .05
** p < .01

When implicit theories were measured using the point distribution exercise, the rank ordering of dimensions was slightly different. Communication was allocated a mean of 30.58 points which was significantly higher ($t=5.89$, $p<.01$) than the 23.03 points allocated to participation ($t=10.32$, $p<.01$). Role clarity received the next highest point allocation with a mean of 14.48 points ($t=3.24$, $p<.01$), followed by norms (mean = 10.17, $t=4.99$, $p<.01$). Again, avoiding conflict received the lowest points with a mean of 9.19 points, which was significantly lower ($t=2.14$, $p<.05$) than points allocated to norms .

The resulting rank ordering of team development dimensions was the same for males and females on both the scale scores and the point distribution scores. However, as Table 5.10 shows, females rated participation, role clarity, norms and avoiding conflict higher on the Likert-type scale than did their male counterparts. Female respondents also allocated participation more points than did male respondents.

There were no differences in implicit theories based on the respondents' year in school or their prior team experience. Team members with prior formal team training rated norms higher (3.50) than team members with no prior formal training (3.29) ($F=5.26$, $p < .05$). Team members with prior informal team training rated communication more important (mean=4.11) than respondents with no prior

Table 5.10
Implicit Theory of Team Development Survey
Gender Differences

Dimension	Male N=208	Female N=143	t
Sub-Scales:^a			
Participation	4.11	4.37	3.47**
Communication	4.02	4.12	1.50
Roles	3.93	4.11	2.52**
Norms	3.26	3.42	2.43*
Cohesion	3.19	3.32	1.69*
Avoiding Conflict	2.64	2.85	2.66**
Point Distribution:^b			
Communication	30.96	30.03	.55
Participation	21.75	25.06	2.40**
Roles	14.94	13.75	1.41
Cohesion	12.95	12.07	1.11
Norms	10.25	9.98	.39
Avoiding Conflict	9.27	9.00	.40

a: Range is from 1 to 5

b: Range is from 0 to 100

* $p < .05$

** $p < .01$

informal training (mean = 3.92) ($F=7.04$, $p < .01$). There were no other differences between team members with and without prior formal training or with and without prior informal team training.

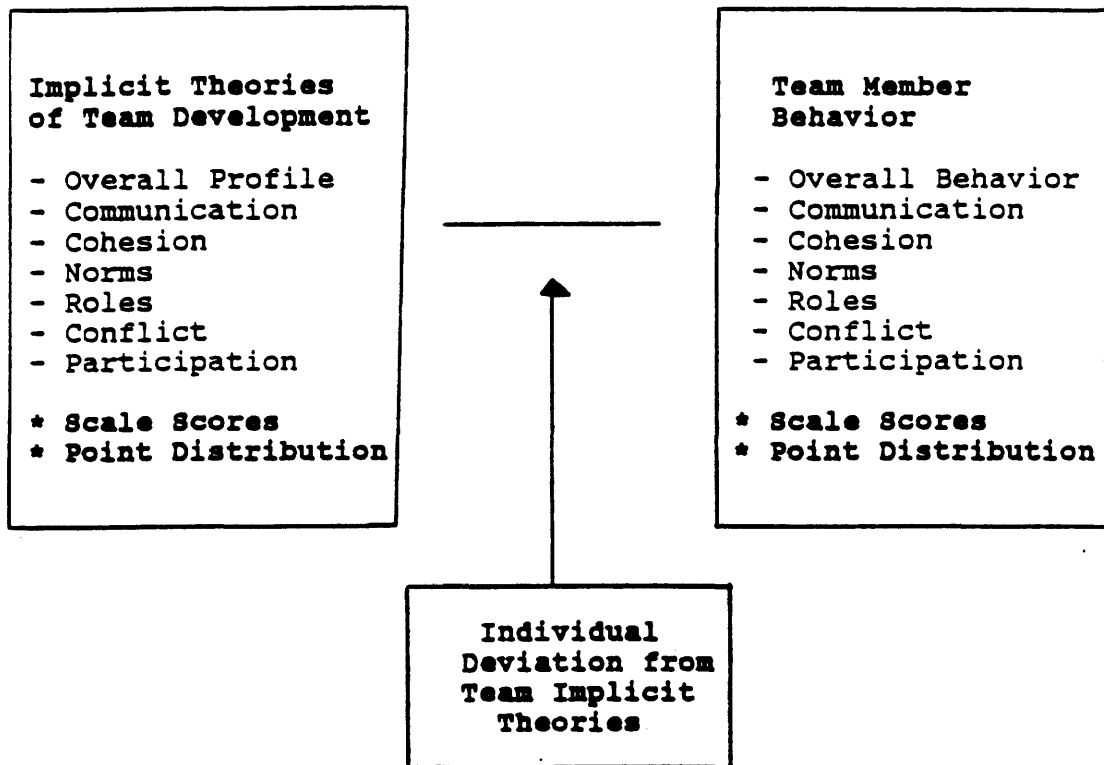
Self-reported GPA was not correlated with implicit theories of team development. There were significant correlations between respondents' perceived importance of the class and implicit theories of most team development dimensions measured by scale scores (communication $r=.23$, $p < .001$; cohesion $r=.25$, $p < .001$; norms $r=.20$, $p < .001$; roles $r=.12$, $p < .05$; and participation $r=.28$, $p < .001$). Based on a series of oneway ANOVAs there were significant differences between groups of respondents rating the class "very important", "important", "neutral", "not very important", and "not important at all" for communication ($F=4.71$, $p < .01$), cohesion ($F=3.76$, $p < .01$), norms ($F=3.05$, $p < .05$), conflict ($F=2.83$, $p < .05$), and participation ($F=10.62$, $p < .001$). In most cases (communication, cohesion, norms, and participation) the team members that rated the class "very important" also rated the team development dimensions higher than other groups. However, those team members who rated the class "not important at all" rated conflict avoidance higher than the remaining groups.

Hypotheses Testing

H1: A positive relationship exists between team members' implicit theories of team development and team members' behavior. This relationship will be strongest for individuals whose implicit theories are more consistent with implicit theories held by other team members.

The relationship between implicit theories and individual member behavior is an individual phenomenon; therefore, hypothesis 1 (H1) was tested using the individual as the unit of analysis. To adequately test the relationship between implicit theories and behavior, each team development factor was assessed independently. For instance, the relationship between implicit theories of communication and communication behavior was assessed independently of the relationship between implicit theories of cohesion and cohesion behavior. The relationships between implicit theories of team development, individual deviation scores, and team behavior were assessed using both implicit theory scale scores and implicit theory point distribution scores.

Figure 5.3 shows the relationships which were investigated in H1. To assess the direct relationship between implicit theories and team member behavior, simple regression of the specific behavior (communication, cohesion, norms, roles, conflict, or participation) onto the specific implicit theory (communication, cohesion, norms, roles, conflict, or participation) was used (Table 5.11).



- a.) Actual Individual Deviation
- b.) Absolute Individual Deviation
- c.) Individual Deviation of Entire Profile

Figure 5.3
Hypothesis 1

Table 5.11
Simple Correlation Between Implicit Theories and Behavior

Variable	Simple Correlation (r)
<u>Scale Scores:</u>	
Communication	.00
Cohesion	.19**
Role Clarity	.23**
Norms	.14**
Conflict Avoidance	.14**
Participation	.18**
<u>Point Distribution Scores:</u>	
Communication	.15**
Cohesion	.08
Role Clarity	.03
Norms	.01
Conflict Avoidance	.15**
Participation	.15**

* $p < .05$

** $p < .01$

There were direct relationships between scale implicit theories and team member behavior for cohesion ($r=.19$), norms ($r=.23$), roles ($r=.14$), conflict ($r=.14$), and participation ($r=.18$). There were also direct relationships between point distribution implicit theories and team member behavior for communication ($r=.15$), conflict ($r=.15$) and participation ($r=.15$):

The second analysis was multiple regression of team member behavior on implicit theories and individual deviation scores. The individual deviation variable was calculated and analyzed 3 ways: (1) the actual individual deviation score for each dimension, (2) the absolute value of the individual deviation for each variable, and (3) the absolute value of the individual deviation for the entire implicit theory profile.

The results of the multiple regression of team member behavior on implicit theories and individual deviations show significant results for the following:

- (1) Normative behavior on scale implicit theories of norms and actual deviation ($R^2=.13$, $F=14.77$, $p<.01$).
- (2) Role clarity behavior on scale implicit theories of roles and profile deviation ($R^2=.05$, $F=5.18$, $p<.05$)
- (3) Conflict avoidance behavior on point implicit theories of conflict and absolute deviation ($R^2=.05$, $F=3.27$, $p<.05$).

- (4) Participation behavior on scale implicit theories of participation and actual deviation ($R^2=.04$, $F=3.75$, $p<.05$); absolute deviation ($R^2=.05$, $F=5.30$, $p<.01$); and profile deviation ($R^2=.07$, $F=7.18$, $p<.01$).

The final analyses added the interaction term of implicit theories $\times$ individual deviation scores to the regression equation. A significant increase in R^2 when the interaction term is entered into the regression equation indicates the presence of a moderator variable. This would demonstrate that the more consistent an individual's implicit theories are with the remaining team members, the stronger the relationship between implicit theories and subsequent team member behavior.

The reported change in R^2 represents the additional variance accounted for when adding the interaction term of implicit theories $\times$ deviation score into the multiple regression model which includes implicit theories and deviation scores. The results of the moderated regression analysis show significant results for the following interactions:

- (1) Scale implicit theories of norms $\times$ absolute deviation ($R^2_{change}=.05$, $F_{change}=10.66$, $p<.01$).
- (2) Scale implicit theories of roles $\times$ profile deviation ($R^2_{change}=.02$, $F_{change}=4.29$, $p<.05$).

- (3) Point implicit theories of roles X absolute deviation ($R^2_{change}=.03$, $F_{change}=6.84$, $p<.01$).
- (4) Point implicit theories of conflict X actual deviation ($R^2_{change}=.02$, $F_{change}=4.12$, $p<.05$).

Analysis of Global Dimensions

In addition to the assessment of the specific implicit theory dimensions and behavioral dimensions, I assessed the direct relationship between global implicit theories of team development and global team development behavior, as well as the moderating relationship of individual global deviations from the team's implicit theories. Individual global scores are considered the mean of the team member's implicit theory scores, behavior scores, and individual deviation scores using both the actual deviation and the absolute deviation. Global scores were calculated for scale scores only as the global point distribution score for each person would be 17 for each dimension (100 points divided by 6 dimensions).

The results indicate a direct relationship between global implicit theories of team development and global team development behavior ($R^2=.04$, $F=8.39$, $p <.01$). The results of the multiple regression of global behavior on global implicit theories and individual deviations show significant results for global scale implicit theories and actual global deviation scores ($R^2_{model}=.09$, $F_{model}=9.82$, $p <.001$).

A significant moderating relationship also exists between the global scale implicit theories and global team development behavior (change in $R^2 = .02$, $F_{change} = 3.98$, $p < .05$).

Summary of Hypothesis One

Results of the test of hypothesis one indicate that there is a direct relationship between individual implicit theories of team development and team member behavior for global implicit theories and behavior. Direct relationships between implicit theories and behavior also exist for all team development dimensions (communication, cohesion, norms, roles, conflict, and participation). Convergence of individual implicit theories with remaining team members' implicit theories was considered a moderating variable between implicit theories and behavior for global implicit theories as well as for norms, roles, and conflict.

Composite results for global implicit theories are shown in Table 5.12. Tables 5.13 a-f (scale scores) and Tables 5.14 a-f (point scores) provide composite results for implicit theories of team development dimensions (communication, cohesion, norms, roles, conflict, and participation). Table 5.15 provides a summary of the significant relationships identified in testing hypothesis one.

Table 5.12

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Global Scores

Variable	Model R ²	Model F	Change R ²	Change F
<u>Global Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.04	8.39**		
Step Two: IT and DEV	.09	9.82***	.05	10.86***
Step Three: IT, DEV and IT X DEV	.10	7.51***	.01	2.72
<u>Absolute Deviation:</u>				
Step One: IT	.04	8.39**		
Step Two: IT and DEV	.05	5.81**	.01	3.16
Step Three: IT, DEV and IT X DEV	.07	5.25**	.02	3.98*

* p < .05
 ** p < .01
 *** p < .001

Note:

IT - Implicit Theory
 DEV - Individual Deviation
 IT x DEV - Interaction Term of Implicit Theory x Individual Deviation

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>a. Communication Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.00	.00		
Step Two: IT and DEV	.02	1.88	.02	.82
Step Three: IT, DEV, IT X DEV	.02	1.25	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.00	.00		
Step Two: IT and DEV	.01	.69	.01	1.37
Step Three: IT, DEV, IT X DEV	.01	.56	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.00	.00		
Step Two: IT and DEV	.01	1.38	.01	.03
Step Three: IT, DEV, IT X DEV	.01	.93	.00	.00

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R ²	Model F	Change R ²	Change F
<u>b. Cohesion Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.04	7.67**		
Step Two: IT and DEV	.04	3.98*	.00	.00
Step Three: IT, DEV and IT x DEV	.04	2.79*	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.04	7.67**		
Step Two: IT and DEV	.04	3.94*	.00	.00
Step Three: IT, DEV and IT x DEV	.04	2.97*	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.04	7.67**		
Step Two: IT and DEV	.04	4.05*	.00	.00
Step Three: IT, DEV and IT x DEV	.04	2.95*	.00	.00

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>c. Normative Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.05	11.47**		
Step Two: IT and DEV	.13	14.77**	.07	17.11***
Step Three: IT, DEV and IT x DEV	.13	9.80**	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.05	11.47**		
Step Two: IT and DEV	.05	5.72**	.00	.00
Step Three: IT, DEV and IT x DEV	.10	7.56**	.05	10.66**
<u>Profile Deviation:</u>				
Step One: IT	.05	11.47**		
Step Two: IT and DEV	.06	7.06**	.01	2.53
Step Three: IT, DEV and IT x DEV	.08	5.52**	.02	2.33

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R ²	Model F	Change R ²	Change F
<u>d. Roles Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.02	4.29*		
Step Two: IT and DEV	.03	3.51	.01	2.67
Step Three: IT, DEV, IT x DEV	.04	2.88*	.02	1.58
<u>Absolute Deviation:</u>				
Step One: IT	.02	4.29*		
Step Two: IT and DEV	.03	2.66	.01	1.03
Step Three: IT, DEV, IT x DEV	.03	2.33	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.02	4.29*		
Step Two: IT and DEV	.05	5.18*	.03	5.97*
Step Three: IT, DEV, IT x DEV	.07	4.92*	.02	4.29*

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R ²	Model F	Change R ²	Change F
<u>e. Avoiding Conflict</u>				
<u>Actual Deviation:</u>				
Step One: IT	.02	4.24*		
Step Two: IT and DEV	.02	2.61	.00	.00
Step Three: IT, DEV, IT x DEV	.03	1.80	.01	.26
<u>Absolute Deviation:</u>				
Step One: IT	.02	4.24*		
Step Two: IT and DEV	.02	2.25	.00	.00
Step Three: IT, DEV, IT x DEV	.02	1.54	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.02	4.24*		
Step Two: IT and DEV	.02	2.12	.00	.00
Step Three: IT, DEV, IT x DEV	.02	1.52	.00	.00

Table 5.13

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Scale Scores

Variable	Model R ²	Model F	Change R ²	Change F
<u>f. Participation Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.03	6.82**		
Step Two: IT and DEV	.04	3.75*	.01	7.36**
Step Three: IT, DEV and IT x DEV	.04	3.06*	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.03	6.82**		
Step Two: IT and DEV	.05	5.30**	.02	10.48**
Step Three: IT, DEV and IT x DEV	.05	3.73*	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.03	6.82**		
Step Two: IT and DEV	.07	7.18**	.04	14.21***
Step Three: IT, DEV and IT x DEV	.07	5.13**	.00	.00

* p < .05
 ** p < .01
 *** p < .001

Note:

IT - Implicit Theory
 DEV - Individual Deviation
 IT x DEV - Interaction Term of Implicit Theory x Individual Deviation

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>a. Communication Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.02	4.86*		
Step Two: IT and DEV	.02	2.59	.00	.00
Step Three: IT, DEV, IT X DEV	.02	1.73	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.02	4.86*		
Step Two: IT and DEV	.02	2.44	.00	.00
Step Three: IT, DEV, IT X DEV	.03	2.00	.01	1.13
<u>Profile Deviation:</u>				
Step One: IT	.02	4.86*		
Step Two: IT and DEV	.03	2.66	.01	1.25
Step Three: IT, DEV, IT X DEV	.03	2.19	.00	.00

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>b. Cohesion Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.01	1.26		
Step Two: IT and DEV	.01	.64	.00	.00
Step Three: IT, DEV and IT x DEV	.01	.71	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.01	1.26		
Step Two: IT and DEV	.01	.75	.00	.00
Step Three: IT, DEV and IT x DEV	.01	.57	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.01	1.26		
Step Two: IT and DEV	.01	.78	.00	.00
Step Three: IT, DEV and IT x DEV	.01	.67	.00	.00

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>c. Normative Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.00	.16		
Step Two: IT and DEV	.00	.28	.00	.00
Step Three: IT, DEV and IT x DEV	.00	.20	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.00	.16		
Step Two: IT and DEV	.00	.08	.00	.00
Step Three: IT, DEV and IT x DEV	.00	.34	.00	.00
<u>Profile Deviation:</u>				
Step One: IT	.00	.16		
Step Two: IT and DEV	.01	.76	.01	1.35
Step Three: IT, DEV and IT x DEV	.01	.56	.00	.00

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>d. Roles Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.00	.01		
Step Two: IT and DEV	.01	.98	.01	1.94
Step Three: IT, DEV, IT x DEV	.01	.96	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.00	.01		
Step Two: IT and DEV	.00	.13	.00	.00
Step Three: IT, DEV, IT x DEV	.03	2.39	.03	6.84**
<u>Profile Deviation:</u>				
Step One: IT	.00	.01		
Step Two: IT and DEV	.00	.07	.00	.00
Step Three: IT, DEV, IT x DEV	.00	.11	.00	.00

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>e. Avoiding Conflict</u>				
<u>Actual Deviation:</u>				
Step One: IT	.02	4.78*		
Step Two: IT and DEV	.03	2.83	.01	.89
Step Three: IT, DEV, IT x DEV	.05	3.27*	.02	4.12*
<u>Absolute Deviation:</u>				
Step One: IT	.02	4.78*		
Step Two: IT and DEV	.03	3.33*	.01	.00
Step Three: IT, DEV, IT x DEV	.05	3.40*	.02	3.38
<u>Profile Deviation:</u>				
Step One: IT	.02	4.78*		
Step Two: IT and DEV	.03	3.21*	.01	1.62
Step Three: IT, DEV, IT x DEV	.03	2.17	.00	.00

Table 5.14

Regression Analyses of Behavior on Implicit Theories,
Individual Deviation, and the Corresponding Interaction Term
Point Scores

Variable	Model R^2	Model F	Change R^2	Change F
<u>f. Participation Behavior</u>				
<u>Actual Deviation:</u>				
Step One: IT	.02	4.67*		
Step Two: IT and DEV	.03	3.57*	.01	2.44
Step Three: IT, DEV and IT x DEV	.03	2.40	.00	.00
<u>Absolute Deviation:</u>				
Step One: IT	.02	4.67*		
Step Two: IT and DEV	.02	2.49	.00	.00
Step Three: IT, DEV and IT x DEV	.04	2.59	.02	2.74
<u>Profile Deviation:</u>				
Step One: IT	.02	4.67*		
Step Two: IT and DEV	.02	2.59	.00	.00
Step Three: IT, DEV and IT x DEV	.04	2.78*	.02	3.11

* $p < .05$

** $p < .01$

*** $p < .001$

Note:

IT - Implicit Theory

DEV - Individual Deviation

IT x DEV - Interaction Term of Implicit Theory x Individual Deviation

Table 5.15
Summary of Significant Relationships - Hypothesis 1

Relationship	Variables	Measure
Communication Behavior:		
Simple Regression	Communication IT	Point Score
Cohesion Behavior:		
Simple Regression	Cohesion IT	Scale Score
Normative Behavior:		
Simple Regression	Norm IT	Scale Score
Multiple Regression	Norm IT and Actual Deviation	Scale Score
Moderated Regression	Norm IT x Absolute Deviation	Scale Score
Role Clarity Behavior:		
Simple Regression	Role IT	Scale Score
Multiple Regression	Role IT and Profile Deviation	Scale Score
Moderated Regression	Role IT x Profile Deviation	Scale Score
Moderated Regression	Role IT x Absolute Deviation	Point Score
Conflict Avoidance Behavior:		
Simple Regression	Conflict IT	Scale Score
Simple Regression	Conflict IT	Point Score
Multiple Regression	Conflict IT and Absolute Deviation	Point Score
Moderated Regression	Conflict IT x Actual Deviation	Point Score
Participation Behavior:		
Simple Regression	Participation IT	Scale Score
Simple Regression	Participation IT	Point Score
Multiple Regression	Participation IT and Actual Deviation	Scale Score
Multiple Regression	Participation IT and Absolute Deviation	Scale Score
Multiple Regression	Participation IT and Profile Deviation	Scale Score
Global Behavior:		
Simple Regression	Global IT	Scale Score
Multiple Regression	Global IT and Actual Global Deviation	Scale Score
Moderated Regression	Global IT x Absolute Global Deviation	Scale Score

H2: A positive relationship exists between team viability and the level of convergence of implicit theories among team members.

The relationship between implicit theories and team viability is a team phenomenon; therefore, the team was the unit of analysis for hypothesis 2 (H2). To evaluate the relationship between convergence of implicit theories and team viability, simple correlation analysis was used.

Figure 5.4 shows the relationships addressed in H2.

Table 5.16 shows the correlation matrix for team viability and convergence of implicit theories among team members. There were no significant relationships identified between overall profile similarity and team viability dimensions (total team viability, satisfaction, participation, and future capacity).

In addition to profile convergence, the relationships between convergence of specific team development dimensions (communication, cohesion, norms, roles, conflict, and participation) and viability dimensions (participation, satisfaction, and future capacity) were also assessed (Table 5.16). There were significant correlations between the convergence of role clarity implicit theories and total viability ($r = -.43$, $p < .01$), satisfaction ($r = -.42$, $p < .01$), participation ($r = -.36$, $p < .05$), and future capacity for team interaction ($r = -.43$, $p < .01$). Significant correlations between implicit theory convergence

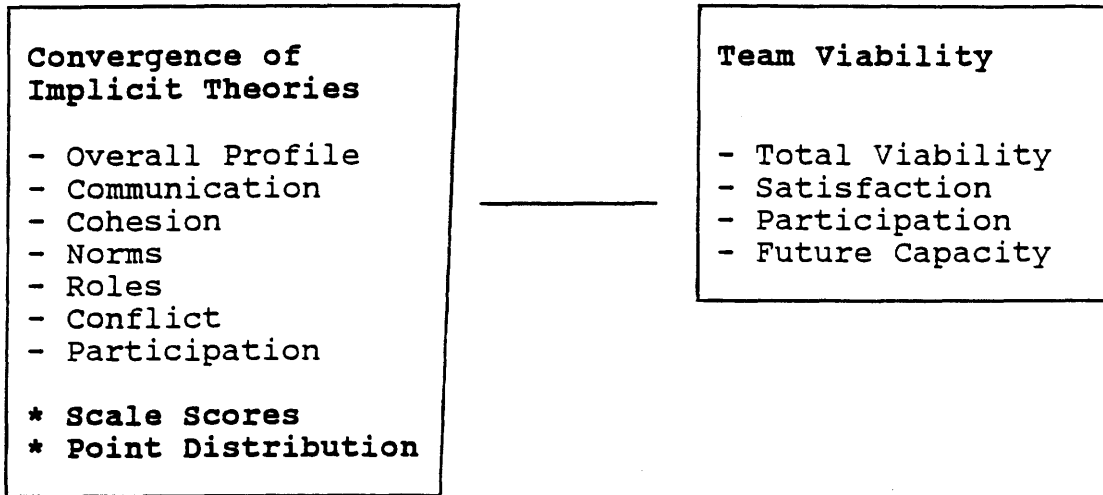


Figure 5.4
Hypothesis 2

Table 5.16
Correlation Matrix for Team Viability
and Convergence of Implicit Theories among Team Members
Scale Scores

	1	2	3	4	5	6	7	8	9	10
1. COMM	--									
2. COH	.09	--								
3. NORMS	.09	-.04	--							
4. ROLES	.07	.07	.41**	--						
5. CONF	.03	.43**	-.05	-.25	--					
6. PART	.16	.14	.26	.35**	.04	--				
7. PROF	.36**	.52*	.49**	.46**	.43**	.67**	--			
8. VIAB	.07	.05	.01	-.43**	.16	-.19	-.14	--		
9. SATIS	.07	.04	.13	-.42**	.19	-.13	-.17	.90**	--	
10. PART	.06	.13	.05	-.36**	.18	-.17	-.04	.92**	.68**	--
11. FUT	.07	-.03	.01	-.43**	.16	.19	.22	.98	.87	.72

* p < .05

** p < .01

COMM - Convergence of Communication Implicit Theories
COH - Convergence of Cohesion Implicit Theories
NORMS - Convergence of Norms Implicit Theories
ROLES - Convergence of Roles Implicit Theories
CONF - Convergence of Conflict Implicit Theories
PART - Convergence of Participation Implicit Theories
PROF - Convergence of Implicit Theories Profile
VIAB - Team Viability
SATIS - Team Satisfaction
PART - Team Participation
FUT - Future Capacity of the Team

and team viability are expected to be negative. The smaller the convergence score *D*, the more convergent the team. There were no significant relationships reported between the team development dimensions of communication, cohesion, norms, or conflict and viability dimensions (total viability, participation, satisfaction, and future capacity).

The above results represent convergence of implicit theories as measured by the Likert-type scale. There were no significant correlations between viability and convergence of implicit theories as measured by point distribution.

Table 5.17 reports the results of hierarchical stepwise regression analysis of total viability and specific viability dimensions on convergence of specific implicit theories of team development dimensions (communication, cohesion, norms, roles, conflict, participation). Convergence of role clarity implicit theories was selected as the first and only significant variable for total viability ($R^2 = .24$, $F=13.31$, $p < .001$), team satisfaction ($R^2 = .20$, $F=10.27$, $p < .05$), team participation ($R^2 = .20$, $F=10.44$, $p < .01$), and future capacity of the team ($R^2 = .23$, $F=12.44$, $p < .01$).

The hierarchical regression results represent convergence of implicit theories as measured by the Likert-type scale. Again, there were no significant relationships

Table 5.17
Hierarchical Stepwise Regression of Team Viability
and Convergence of Implicit Theories among Team Members
Scale Scores

Variable	R ²	F
Total Viability		
1. Role Clarity Convergence	.24	13.31***
Team Satisfaction		
1. Role Clarity Convergence	.20	10.27**
Team Participation		
1. Role Clarity Convergence	.20	10.44**
Future Capacity for Team		
1. Role Clarity Convergence	.23	12.44**

* p < .05
 ** p < .01
 *** p < .001

between team viability and convergence of implicit theories as measured by point distribution.

In addition to simple correlation and hierarchical regression analysis, multiple regression models of team viability (total viability, satisfaction, participation, and future capacity) with all team development convergence measures were evaluated. The models of total viability, satisfaction and participation with all team development convergence measures were not significant.

The multiple regression model of future capacity of the team and all team development convergence measures was significant with $R^2 = .32$ ($F=2.40$, $p < .05$). With all team development convergence measures in the model, 32% of the variance in a team's future capacity is accounted for.

Summary of Hypothesis Two

Results of the test of hypothesis two indicate that significant relationships were identified between convergence of role clarity implicit theories among team members and team viability. No significant relationships between convergence of remaining team development implicit theories (communication, cohesion, roles, conflict, participation) were found. Table 5.18 provides a summary of the significant relationships identified in testing hypothesis two.

Table 5.18
Summary of Significant Relationships - Hypothesis 2

Dimension	Simple Correlation	Hierarchical Regression
Profile Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns
Communication Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns
Cohesion Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns
Norms Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns
Role Clarity Convergence:		
Total Viability	$r = -.43^{**}$	$R^2 = .24^{***}$
Satisfaction	$r = -.42^{**}$	$R^2 = .20^{**}$
Participation	$r = -.36^*$	$R^2 = .20^{**}$
Future Capacity	$r = -.43^{**}$	$R^2 = .23^{**}$
Conflict Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns
Participation Convergence:		
Total Viability	ns	ns
Satisfaction	ns	ns
Participation	ns	ns
Future Capacity	ns	ns

* $p < .05$
 ** $p < .01$
 *** $p < .001$

H3: A positive relationship exists between team performance and the level of convergence of implicit theories among team members.

The relationship between implicit theories and team performance is also a team phenomenon; therefore, the team will be the unit of analysis for hypothesis 3 (H3). To evaluate the relationship between convergence of implicit theories and team performance, simple correlation analysis was conducted. Performance scores (rating, ranking, and grades) were standardized by class to avoid confounding the results with rater bias. Figure 5.5 shows the relationships addressed in H3.

Table 5.19 shows the correlation matrix for convergence of scale implicit theories of team development and team performance as measured by a Likert-type rating scale, team ranking, and team grade. Overall profile similarity was significantly correlated with team grades ($r = -.35$, $p < .05$). The negative correlation indicates that teams with more convergent implicit theory profiles received higher team grades. Profile similarity was not significantly correlated with team rating or team ranking.

In addition to profile convergence, Table 5.19 summarizes the relationships between convergence of specific team development dimensions (communication, cohesion, norms, roles, conflict, participation) and performance (rating, ranking, and grades). The only implicit theory convergence measure that was significantly correlated with performance

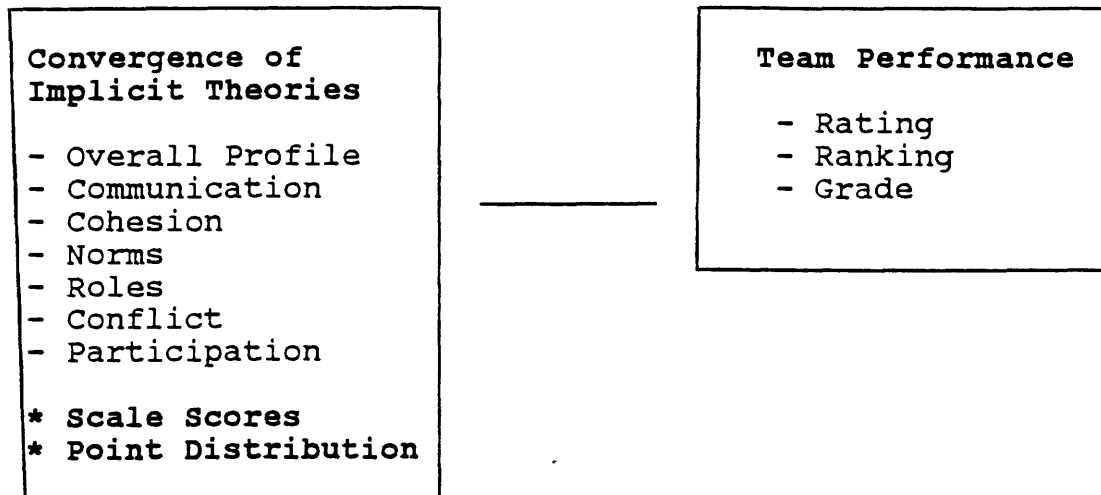


Figure 5.5
Hypothesis 3

Table 5.19
Correlation Matrix for Team Performance and
Convergence of Implicit Theories among Team Members
Scale Scores

	1	2	3	4	5	6	7	8	9	10
1. COMM	--									
2. COH	.09	--								
3. NORMS	.09	-.04	--							
4. ROLES	.07	.07	.41**	--						
5. CONF	.03	.43**	-.05	-.25	--					
6. PART	.16	.14	.26	.35**	.04	--				
7. PROF	.36**	.52**	.49**	.46**	.43**	.67**	--			
8. RATE	.07	.04	.05	.35*	.19	.00	.23	--		
9. RANK	.09	.06	.16	.33*	.16	.10	.29	.91**	--	
10. GRADE	-.22	-.14	-.03	-.31*	-.24	-.05	-.35**	-.88**	-.83**	--

* p < .05

** p < .01

COMM - Convergence of Communication Implicit Theories
COH - Convergence of Cohesion Implicit Theories
NORMS - Convergence of Norms Implicit Theories
ROLES - Convergence of Roles Implicit Theories
CONF - Convergence of Conflict Implicit Theories
PART - Convergence of Participation Implicit Theories
PROF - Convergence of Implicit Theories Profile
RATE - Performance Rating
RANK - Performance Ranking
GRADE - Performance Grade

was role clarity. Convergence of role clarity implicit theories was significantly correlated with team rating ($r=.35$, $p < .05$), team ranking ($r=.33$, $p < .05$), and team grades ($r= -.31$, $p < .05$).

Table 5.20 reports the results of hierarchical stepwise regression analysis of team performance on convergence of specific implicit theories of team development (communication, cohesion, norms, roles, conflict, and participation). Convergence of role clarity implicit theories was selected as the first and only significant variable for performance rating ($R^2=.12$, $F=6.54$, $p < .05$) and performance ranking ($R^2=.11$, $F=5.93$, $p < .05$). Profile convergence was selected as the first and only significant variable for team performance grade ($R^2 = .12$, $F=5.07$, $p < .05$).

In addition to simple correlation and hierarchical regression analysis, multiple regression models of team performance (rating, ranking, and grades) and convergence of implicit theories (communication, cohesion, norms, roles, conflict, and participation) were evaluated. The models of team rating and team ranking with all team development convergence measures were not significant. However, the multiple regression model of performance grade and all team development convergence measures was significant with $R^2 = .36$, ($F=2.55$, $p < .05$). With all team development

Table 5.20
 Hierarchical Stepwise Regression of Team Performance
 and Convergence of Implicit Theories among Team Members
 Scale Scores

Variable	R ²	F
<u>Performance Rating</u>		
1. Role Clarity Convergence	.12	6.54*
<u>Performance Ranking</u>		
1. Role Clarity Convergence	.11	5.93*
<u>Performance Grade</u>		
1. Profile Convergence	.12	5.07*

* p < .05

convergence measures in the model, 36% of the variance in performance grade is accounted for.

The above analyses were conducted with the Likert-type scale scores of implicit theories. The same analyses conducted with point scores yielded non-significant results for the relationship between team performance (rating, ranking, and grade) and convergence of implicit theories of team development.

Summary of Hypothesis Three

In summary, performance rating and performance ranking were significantly related to convergence of role clarity implicit theories. Performance grades were also significantly related to convergence of role clarity, as well as convergence of implicit theory profiles. No other significant relationships between convergence of implicit theories and team performance were identified. Table 5.21 provides a summary of simple correlation and hierarchical regression of team performance (rating, ranking, and grades) and convergence of implicit theories (profile, communication, cohesion, norms, roles, conflict, and participation).

Table 5.21
Summary of Significant Relationships - Hypothesis 3

Dimension	Simple Correlation	Hierarchical Regression
Profile Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	$r = -.35^*$	$R^2 = .12, F=5.07^*$
Communication Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	ns	ns
Cohesion Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	ns	ns
Norm Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	ns	ns
Role Convergence:		
Performance Rating	$r = .35^*$	$R^2 = .12, F=6.54^*$
Performance Ranking	$r = .33^*$	$R^2 = .11, F=5.93^*$
Performance Grade	$r = -.31^*$	ns
Conflict Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	ns	ns
Participation Convergence:		
Performance Rating	ns	ns
Performance Ranking	ns	ns
Performance Grade	ns	ns

* $p < .05$

** $p < .01$

Post Hoc Analyses

In addition the research question and the hypotheses presented, post hoc analyses were conducted.

Alternative Measures of Convergence of Implicit Theories

As an alternative measure of convergence of implicit theories among team members, interrater reliability for each team was calculated. In recent group-level literature (George, 1990; George & Bettenhausen, 1990; Schneider and Bowen, 1985), within-group interrater reliability has been calculated using a method suggested by James, Demaree, and Wolf (1984). As in the studies cited, the importance in this study is measuring within-group agreement as opposed to between-group differences. For this reason, interrater reliability was calculated using James, et al., (1984).

One of the concerns in assessing implicit theories of team development is that respondents will report that all factors are very important or critical, resulting in spuriously high interrater agreement. James, et al., (1984) suggest a method of correcting for response bias by estimating the skewed null distribution and correcting the interrater reliability equation for the skew. In this study, based on the reported scores of the Likert-type items, responses on the sub-scale scores are negatively skewed with the majority of respondents indicating that most

items are very important (score=4) or critical (score=5). Therefore, interrater reliability of team development dimensions was corrected for a moderately skewed distribution. The formula used to calculate interrater reliability, corrected for a moderately skewed distribution is as follows:

$$IRR_{\text{ (corrected for skew) }} = \frac{\# \text{ of items } (1 - \text{mean variance}/.90)}{\# \text{ of items } ((1 - \text{mean variance}/.90) + (\text{mean variance}/.90))}$$

Table 5.22 provides the means and standard deviations for interrater reliability of implicit theories of team development dimensions (overall profile, communication, cohesion, norms, roles, conflict, and participation), corrected for a moderately skewed null distribution. The mean interrater reliability for the overall profile is higher ($r=.92$) than the specific team development dimensions. This is primarily due to the greater number of items in the overall profile. Most dimensions have an interrater reliability ranging from .53 to .67, except for avoiding conflict ($r=.23$). The low interrater reliability for avoiding conflict may be due in part to the relatively low coefficient alpha for the conflict scale ($\alpha=.62$). Avoiding conflict is also the most controversial dimension included in the Implicit Theory of Team Development Survey. There is less agreement among team members for conflict avoidance as an effective team development strategy than other dimensions.

Table 5.22
Interrater Reliability of Implicit Theories
Means and Standard Deviations

Dimension	Mean	sd
Sub-Scales:		
Overall Profile	.92	.11
Communication	.67	.23
Cohesion	.56	.43
Norms	.53	.40
Roles	.60	.30
Avoiding Conflict	.23	.75
Participation	.63	.35

Interrater reliability was calculated for each dimension originally measured using the Likert-type scale included in the Implicit Theories of Team Development Survey. Standard deviations were used as an alternate method of calculating convergence of implicit theories as originally measured by point distribution.

Interrater reliability (scale scores) and standard deviations (point distributions) were compared with team viability and team performance to determine whether H2 and H3 are supported using alternative measures of convergence of implicit theories among team members.

Viability. Interrater reliability of the overall profile of implicit theories were significantly correlated with total viability ($r=.44$), satisfaction ($r=.35$), participation ($r=.45$), and future capacity of the team ($r=.41$). Interrater reliability of the specific role clarity implicit theories were also significantly correlated with total viability ($r=.46$), satisfaction ($r=.39$), participation ($r=.44$), and future capacity of the team ($r=.43$). Interrater reliability of cohesion implicit theories was also significantly correlated with total viability ($r=.31$). There were no significant correlations between the standard deviations of the implicit theories measured by the point distribution and team viability.

Performance. The only significant correlation between team performance and interrater reliability of implicit

theories was the relationship between performance grade and participation implicit theories. The more convergent the participation implicit theories, the higher the team grade. This was true for the scale scores ($r=.42$, $p < .05$) and the point distribution scores ($r=.37$, $p < .05$).

Analysis of Implicit Theory Convergence and Team Performance by Team Task

It is possible that the relationship between implicit theories and team performance is different for different team tasks. For this reason, convergence of team development dimensions were correlated with each specific task (written cases, oral cases, term projects, and computer simulations). In this analysis, mean standardized performance scores for team rating, team ranking, and team grade were calculated for each task (written cases, oral cases, term projects, and computer simulations). Standardizing task performance by type of measure holds type of measure constant. There were no significant correlations between convergence of implicit theories for team development dimensions (communication, cohesion, norms, roles, conflict, and participation) and performance by task (written cases, oral cases, projects, simulations).

A final analysis of simple correlation between convergence of implicit theories and task performance by task measure was conducted. Convergence of role clarity

implicit theories (scale scores) was significantly correlated with performance of oral cases measured by rating ($r=.34$, $p<.05$) and performance of oral cases measured by ranking ($r=.34$, $p<.05$). Performance ratings of simulations were significantly correlated with convergence of cohesion implicit theories ($r=.66$, $p<.05$), conflict implicit theories ($r=.65$, $p<.05$), and participation implicit theories ($r=.74$, $p<.01$). Performance grades for written cases were significantly correlated with convergence of implicit theories of norms ($r=.59$, $p<.01$). Table 5.23 provides an overview of the correlations between implicit theory convergence and team performance by task.

Analysis of Team Behavior

The hypotheses in the study compared individual implicit theories with individual behavior (H1), convergence of implicit theories among team members with team viability (H2), and team performance (H3). The third post-hoc analysis compared team behavior with team viability and team performance.

At time two participants rated the behavior of fellow team members (See Table 5.5). A mean team rating of behavior was calculated by taking the average behavior ratings of the members on each team. The team behavior rating was compared to team viability (total viability, satisfaction, participation, and future capacity) and team

Table 5.23
Summary of the Correlations between Convergence of Implicit
Theories and Team Performance by Task

Task	Implicit Theory	Correlation
Written Cases:		
Rating	ns	ns
Ranking	ns	ns
Grade	Norm Convergence	r=.59**
Oral Cases:		
Rating	Role Clarity Convergence	r=.34*
Ranking	Role Clarity Convergence	r=.34*
Grade	ns	ns
Term Project:		
Ranking	ns	ns
Grade	ns	ns
Simulation:		
Rating	Cohesion Convergence	r=.66*
Rating	Conflict Convergence	r=.65*
Rating	Participation Convergence	r=.74**
Ranking	ns	ns
Grade	ns	ns

* p < .05
** p < .01

performance (rating, ranking, and grade). The analyses of behavior and viability and performance was done using the Likert-type ratings of behavior from the Team Member Behavior Survey.

Viability. The correlation matrix in Table 5.24 shows significant Pearson r correlation coefficients for behavior and viability for all team development dimensions (communication, cohesion, roles, norms, conflict, and participation) and all viability dimensions (satisfaction, participation, future capacity, and total viability).

The results of hierarchical stepwise regression, conducted with viability on team development behavior (communication, cohesion, roles, norms, conflict, and participation), are summarized in Table 5.25. Cohesive behavior was selected as the first and only variable for team satisfaction ($R^2=.57$, $F=55.11$, $p < .001$) and future capacity of the team ($R^2=.66$, $F=81.04$, $p < .001$). Cohesive behavior was also selected as the first variable for total viability ($R^2=.60$, $F=62.26$, $p < .001$). Participation behavior was selected as the second and final variable in the equation for total viability (partial $R^2=.04$, model $R^2=.64$, $F=4.27$, $p < .05$). As expected, participation behavior was also selected as the first and only variable for participation of the team ($R^2=.45$, $F=34.33$, $p < .001$).

Performance. As shown in Table 5.26, there were no significant relationships between team behavior and rating

Table 5.24
Correlation Matrix for Team Viability
and Team Behavior
Scale Scores

	1	2	3	4	5	6	7	8	9	10
1. COMM	--									
2. COH	.90	--								
3. NORMS	.90	.87	--							
4. ROLES	.88	.82	.92	--						
5. CONF	.72	.83	.77	.73	--					
6. PART	.87	.83	.94	.88	.71	--				
7. VIAB	.70	.77	.71	.70	.58	.75	--			
8. SATIS	.67	.75	.65	.64	.54	.66	.92	--		
9. PART	.57	.63	.61	.61	.48	.67	.93	.75	--	
10. FUT	.75	.81	.72	.71	.60	.78	.93	.92	.76	--

Note: All Values are significant at $p < .001$

COMM - Communication Behavior
COH - Cohesion Behavior
NORMS - Norm Behavior
ROLES - Roles Behavior
CONF - Conflict Behavior
PART - Participation Behavior
VIAB - Team Viability
SATIS - Team Satisfaction
PART - Team Participation
FUT - Future Capacity of the Team

Table 5.25
Hierarchical Stepwise Regression
of Team Viability and Team Behavior
Scale Scores

Variable	R ²	F
Total Viability		
1. Cohesion Behavior	.60	62.26***
2. Participation Behavior	.64 (model)	4.27*
Team Satisfaction		
1. Cohesion Behavior	.57	55.11***
Team Participation		
1. Participation Behavior	.45	34.33***
Future Capacity for Team		
1. Cohesion Behavior	.66	81.04***

* p < .05
 ** p < .01
 *** p < .001

Table 5.26
Correlation Matrix for
Team Performance and Team Behavior
Scale Scores

	1	2	3	4	5	6	7	8	9
1. COMM	--								
2. COH	.90**	--							
3. NORMS	.90**	.87**	--						
4. ROLES	.88**	.82**	.92**	--					
5. CONF	.72**	.83**	.77**	.73**	--				
6. PART	.87**	.83**	.94**	.88**	.71**	--			
7. RATE	-.15	-.13	.23	.21	.13	.21	--		
8. RANK	.04	.03	.06	.03	.00	.07	.83**	--	
9. GRADE	.27	.29	.36*	.33*	.41**	.32**	.84**	.64**	-.83**

* p < .05

** p < .01

COMM - Communication Behavior
COH - Cohesion Behavior
NORMS - Norm Behavior
ROLES - Roles Behavior
CONF - Conflict Behavior
PART - Participation Behavior
RATE - Performance Rating
RANK - Performance Ranking
GRADE - Performance Grade

of performance or ranking of performance. However, there are significant correlations for performance grades and normative behavior ($r=.36$, $p<.05$), role behavior ($r=.33$, $p<.05$), conflict avoidance behavior ($r=.41$, $p<.01$), and participation behavior ($r=.32$, $p<.01$).

The results of hierarchical stepwise regression, conducted with performance on team development behavior (communication, cohesion, roles, norms, conflict, and participation) indicated that conflict avoidance behavior was the first and only variable in the equation of team behavior and performance grades ($R^2=.17$, $F=7.47$, $p<.01$). There were no significant variables in the regression equation for rating of performance on team behavior or ranking of performance on team behavior.

Self-reported GPA and Performance

An important variable in predicting team performance is the average GPA of team members. GPA is significantly related to performance rating ($r=.29$, $p<.05$), performance ranking ($r=.31$, $p<.05$), and performance grades ($r=.40$, $p<.05$). To determine the variance in performance accounted for by team members' GPA, a separate regression analysis which held GPA constant was conducted for variables that were significantly related to performance (H3). Table 5.27 shows that with GPA held constant, convergence of implicit theories is still significantly related to performance

Table 5.27
Regression Analysis of Team Members' GPA and
Convergence of Implicit Theories and Team Performance

Variable	Model R ²	Model F	Change R ²	Change F
Performance Rating:				
Step One: GPA	.09	4.55*		
Step Two: GPA and ROLE CLARITY	.23	7.11**	.14	8.92**
Performance Ranking:				
Step One: GPA	.09	4.99*		
Step Two: GPA and ROLE CLARITY	.18	5.18**	.09	4.97*
Performance Grades:				
Step One: GPA	.16	7.17*		
Step Two: GPA and ROLE CLARITY	.25	5.86**	.09	3.98*
Step One: GPA	.16	7.17*		
Step Two: GPA and PROFILE	.33	8.71**	.17	8.76**

* p < .05

** p < .01

Note:

GPA - Average Team Members' Grade Point Average

ROLE CLARITY - Convergence of Role Clarity Implicit Theories

PROFILE - Convergence of Implicit Theory Profile

rating (role clarity $R^2_{\text{change}}=.15$, $F_{\text{change}}=8.92$, $p<.01$),
performance ranking (role clarity $R^2_{\text{change}}=.09$, $F_{\text{change}}=4.97$,
 $p<.05$), and performance grades (role clarity $R^2_{\text{change}}=.08$,
 $F_{\text{change}}=3.98$, $p<.05$; profile analysis $R^2_{\text{change}}=.17$, $F_{\text{change}}=8.76$,
 $p<.01$).

CHAPTER VI

DISCUSSION

This chapter discusses the development of the measure of implicit theories, and the results of hypothesis testing and post hoc analyses. Theoretical and practical implications of the study are presented, followed by limitations and proposed future research.

Overall, results only partially supported the hypotheses. A positive relationship was found between individual implicit theories and subsequent behavior for global implicit theories and all six of the team development dimensions. This relationship was strongest for individuals having implicit theories congruent with fellow team members for global implicit theories as well as norms, roles, and conflict dimensions.

Teams having convergent implicit theory profiles and convergent role clarity implicit theories received higher team grades. Teams having convergent role clarity implicit theories also reported higher satisfaction, participation, and a stronger capacity for future interaction. Convergence of remaining team development dimensions were not significantly related to team outcomes.

Measure of Implicit Theories of Team Development

A major contribution of the present study is the measurement of implicit theories of team development. With so much emphasis placed on team interaction in industry today, an accurate measure of agreement within teams is critical. In addition to directly measuring implicit theories, this study also sets a precedent for measuring convergence of team profiles using Cronbach & Gleser's (1953) profile similarity measure (D). The primary advantage of D is that it takes into consideration profile level (mean), dispersion (standard deviation) and shape (ranking) when calculating profile similarity.

Several authors have used implicit theories to explain their findings (Gladstein, 1984; Phillips, 1984; Rush, et al., 1977; and Staw, 1975). Without directly measuring implicit theories, Gladstein (1984) speculated that implicit theories of work team effectiveness were the cause of low correlations between self-rating of performance and hard criteria.

In Staw's (1975) study of alternative interpretations of correlational findings, he concluded that respondents used implicit theories of performance as opposed to actual information in responding to surveys. Implicit theories were not directly measured in Staw's (1975) study, they were inferred.

The present study provides a psychometrically sound method of measuring individual implicit theories. This study sets a precedent for measuring implicit theories directly, thus advancing cognitive research.

Hypotheses

Implicit Theories and Team Member Behavior (H1)

Results indicate a direct relationship between an individual's implicit theories and subsequent behavior. This is true for the link between global implicit theories and global behavior, as well as the link between implicit theories of six specific team development dimensions (communication, cohesion, roles, norms, conflict, and participation) and six types of behavior seen in teams (communication, cohesion, roles, norms, conflict, and participation). For instance, individuals who believed role clarity was important, tended to exhibit the corresponding role clarity behaviors, such as dividing the task so that all team members had specific duties.

Lord and Kernan (1987) offer theoretical support for the link between cognitive structures and behavior. They suggest that cognitive structures are related to individual goals, often incorporating multiple paths to goals, and can be easily applied to novel experiences. In essence, cognitive structures such as implicit theories "represent

possible behavior in terms of paths for reaching goals or subgoals" (Lord & Kernan, 1987, p. 273). Bartunek & Moch (1987) also imply that cognitive structures enable individuals to set goals and choose appropriate behaviors for attaining goals by providing guidance and meaning in new situations. The results of this research provide empirical evidence for the hypothesized link between cognitive structures and behavior suggested by Bartunek and Moch (1987) and Lord and Kernan (1987).

While statistically significant, the amount of variance in behavior accounted for by implicit theories was small, ($R^2 = .02$ to $.05$). However, if the unit of analysis is team member behavior, consider the vast number of behaviors enacted by each team member. Over the course of the team project, the relationship between implicit theories and team member behavior may indeed be practically significant. Given that the amount of variance accounted for is statistically significant, the cumulative impact of implicit theories on behavior is potentially great -- regardless of the size of the coefficient of determination (Abelson, 1985). For instance, a team member having a strong implicit theory of role clarity may continually enact that implicit theory by ensuring that everyone's role is clear and that team members are fulfilling their prescribed roles. This link between implicit theories and behavior may not be a

discrete event. The phenomenon may continually enter into the team process, thus having an impact on team outcomes.

Moderator: Convergence of Individual and Team Implicit Theories (H1). It was also hypothesized that the relationship between implicit theories of team development and subsequent behavior is stronger for individuals whose implicit theories are congruent with implicit theories held by remaining team members. This hypothesis was supported for global implicit theories. The relationship between global team development implicit theories and global team development behavior is stronger when an individual's implicit theories are similar to his or her fellow team members.

A team member exhibiting behavior that is consistent with preconceptions held by other team members will likely be reinforced and will continue to exhibit that behavior. For example, if one team member thought norms were important and remaining team members agreed, the individual would exhibit behaviors supporting group norms such as establishing and following agreed upon rules and encouraging others to do the same. If, however, the remaining team members did not think norms were important, they would not engage in establishing or following agreed upon rules. Even though the initial team member believed norms to be important, chances are he or she would not continue that behavior because the behavior would not be reinforced.

In addition to global implicit theories, implicit theory deviation scores were also identified as moderating variables for implicit theories of norms and normative behavior, implicit theories of role clarity and role clarity behavior, and implicit theories of conflict avoidance and conflict avoidance behavior. The relationship between implicit theories of norms and normative behavior is strengthened by convergence of individual norm implicit theories with remaining team members' implicit theories of norms. This is also true for role clarity convergence and conflict avoidance convergence.

No moderating relationships were found for communication, cohesion, and participation. For these variables, individual behavior is correlated with the respective implicit theories regardless of the convergence between individuals and remaining team members.

In some cases (global dimensions, norms, and role clarity) the magnitude of the deviation (absolute value) was more important than the direction of the deviation (actual value). In other cases (conflict avoidance) the direction of the deviation (actual value) was more important than the magnitude of the deviation (absolute value).

Results show that the relationship between implicit theories and behavior is stronger when individual implicit theories are congruent with fellow team members. This finding supports the notion that team members behave in

accordance with team norms when norms are congruent with personal beliefs and attitudes. When the behavior of an individual team member deviates from the norm, remaining team members attempt to bring the deviant behavior into conformity (Hackman, 1973).

When faced with incongruence of one's own implicit theories with remaining team members, the individual has the following choices: (1) conform to the team, (2) exhibit deviant behavior, (3) change the beliefs of other team members, or (4) leave the group (Hare, 1976). The decision to conform to the teams' expectations or to one's own implicit theories depends on the personality factors of the individual, situational factors of the team, the pressure to comply, and rewards for compliance (Shaw, 1976). This supports Bettenhausen and Murnighan's (1985) conclusion that when a team member's script was incongruent with other members, the non-congruent member often revised his or her interpretation of the situation.

Implicit Theories versus Norms. For this study, implicit theories of team development were defined as individual preconceptions of the relative importance of team development variables for team effectiveness. Implicit theories are an individual phenomenon.

On the other hand, norms are a team phenomenon. Crosbie (1975) defines norms as shared expectations of acceptable behavior. However, Hackman (1972) suggests that

norms apply only to the behavior of a team and not to the private thoughts of individual team members.

Norms develop gradually as members develop a shared understanding of what behavior is necessary for effective team performance. Norms may develop from a variety of sources -- explicit statements by supervisors or peers, critical events of the team, and prior experience of team members. Norms can also develop simply from primacy of behavior, meaning whichever behavior was exhibited first often establishes group expectations (Feldman, 1984). Bettenhausen and Murnighan (1985) state, "a critical element in norm development is the emergence of a generally held, group based understanding of expected and accepted behavior" (p.354).

Individual implicit theories may have an important role in developing team norms. Not only do they facilitate an understanding of behavior, but this study suggests they may even guide individual action. When a team is forming, team members may behave in accordance with their implicit theories. As Feldman (1984) stated, these initial behaviors can develop into team norms. Norms may form without convergent implicit theories among team members, but the norming phase of team development may be less efficient.

Having convergent implicit theories among team members may facilitate shared implicit theories becoming norms. The point at which shared implicit theories become norms is an

empirical question. Future research should determine the role of individual implicit theories in the development of team norms.

Conclusion (H1). In general, this study provides empirical support for the link between implicit theories of team development and team development behavior for global implicit theories and the six team development dimensions included in this study. There is partial support for the hypothesis suggesting the relationship between implicit theories and behavior is stronger for individuals whose implicit theories are consistent with implicit theories held by remaining team members.

Implicit Theories and Team Viability (H2)

It was hypothesized that convergence of implicit theories would be positively related to team viability (total viability, satisfaction, participation, and future capacity). This relationship was tested for convergence of implicit theory profiles as well as convergence of specific team development implicit theories (communication, cohesion, norms, roles, conflict, and participation).

Results only supported this hypothesis for one of the six dimensions -- role clarity. The more convergent the implicit theories of role clarity among team members, the more satisfied, the more participative, and the higher the capacity for future interaction.

This finding is congruent with prior research indicating that people are more attracted to individuals whose attitudes are similar to their own (i.e. Byrne, 1961; Heider, 1958; Newcomb, 1956; Newcomb, 1961). Team members with convergent implicit theories have similar attitudes and may develop more positive relationships than team members not having convergent implicit theories.

Bettenhausen and Murnighan (1985) state that having shared implicit theories may facilitate team development by providing a common understanding of the situation. Convergent implicit theories of role clarity may predispose the team to reach a quick understanding of their roles in the project. This may lead to a more efficient division of labor among team members.

No other relationships between convergence of implicit theories and viability were found. This suggests that convergence of role clarity implicit theories is the most critical implicit theory variable for team viability. Alternative explanations include restriction in range of convergence scores and team viability score and significant results due to chance. The data also suggests that convergence of other implicit theories of team development is not important for team viability. This is an important empirical question to be addressed in future research.

Conclusion (H2). Overall, the data did not confirm this hypothesis. Results only supported the relationship between convergence of role clarity and team viability.

Implicit Theories and Team Performance (H3)

The third hypothesis predicted that convergence of implicit theories would be positively related to team performance (performance rating, performance ranking, and performance grades). This hypothesis was supported for implicit theory profiles and for the role clarity dimension. However, the hypothesis was not supported for the remaining team development dimensions (communication, cohesion, norms, conflict, and participation).

The more convergent the implicit theory profiles and implicit theories of role clarity, the higher the performance grades. The more convergent the implicit theories of role clarity, the higher the performance ratings and performance rankings were.

Perhaps by having common views of team development in general and role clarity in particular, less time is spent developing a common understanding and the team can become more efficient (Bettenhausen & Murnighan, 1985). Teams members having convergent implicit theories may lead to team members being more attracted to one another (i.e. Byrne, 1961; Heider, 1958; Newcomb, 1956; and Newcomb, 1961). Prior research suggests that team members who are attracted

to the team work harder to achieve the goals of the group, leading to improved performance (Goodacre, 1951; Hemphill & Sechrest, 1952; and Shaw, 1976).

Lord and Kernan (1987) suggest that common cognitive structures may facilitate integrated action. The more unified the individual's goals for the group, the more unified and efficient the group goals may become. "For instance, if common scripts exist among workers, then coordination inherent in script structures may suffice to integrate these activities. Without scripts, however, explicit plans must be devised which may be a less efficient procedure for coordinating tasks" (Lord & Kernan, 1987, p. 274). Convergence of profile implicit theories and role clarity implicit theories may have resulted in a process gain. The increase in productivity could be due to the process of individual team members sharing ideas in a synergistic way (Hackman & Morris, 1978).

There were no other relationships between convergence of specific implicit theories and team performance (ratings, rankings, and grades). Again, it may be that role clarity is the most critical team development dimension for team performance, making convergence of role clarity more critical to team performance than convergence of other team development dimensions.

The nonsignificant results for the remaining team development variables may be due to the nonexistent

relationship between convergence of other implicit theory dimensions and team outcomes. For instance, in hypothesis one the data indicated that there was no relationship between communication implicit theories and communication behavior. In this case, convergence of communication implicit theories would have no relationship with team viability or team performance. Another explanation for the results could be insufficient variance in convergence of implicit theories between teams necessary to predict high performing, viable teams.

Research has suggested that regardless of the absolute time a project is scheduled for, team members are motivated by an awareness of time and deadlines (Gersick, 1988). Nonsignificant results for the relationship between convergence of implicit theories and team outcomes (H2 and H3) could also have been due to the timing of measurement. If implicit theories are most important at the very beginning of a new team, the relationship between implicit theories and team outcomes apparent early in the team may be minuscule by the end of the project. The results reported here may have been different given an intermediate measure of team outcomes.

Conclusion (H3). Convergence of implicit theory profiles was significantly related to team performance. One of six team development dimensions (role clarity) was also positively related to performance.

Post Hoc Analyses

Alternate measures of Convergence of Implicit Theories

Using interrater reliability as an alternative measure of convergence yielded mixed results. Convergence of role clarity was positively related to team viability when convergence was measured using both Cronbach's profile similarity measure (D) and interrater reliability. However profile convergence measured by interrater reliability was also correlated with viability, this was not the case with profile convergence measured by Cronbach's D.

Results using interrater convergence were different from results using Cronbach's D convergence when implicit theories were compared to performance. The more convergent participation implicit theories measured by interrater reliability, the higher the team's grade. This was not the case with the profile similarity measure of participation. On the other hand, profile similarity (D) convergence of role clarity and overall implicit theory profile were positively related to performance. This was not the case with the interrater reliability measure of convergence.

Different results between convergence measured via profile similarity (D) and interrater reliability indicate that these measures should not be used as substitutes for each other. Interrater reliability measures the dispersion of scores within the team. Cronbach & Gleser's (1953) D

measures the difference in mean and rank ordering in addition to dispersion. D was used as the primary measure of profile similarity in this study for this reason. According to Nunally (1978), the most appealing measure of profile similarity is Cronbach and Gleser's D.

Team Behavior and Team Outcomes

In addition to testing the relationships between implicit theories and team outcomes, the relationship between team behavior and team outcomes was also assessed. As expected, positive team development behavior was related to team viability. Cohesive behavior among team members was most predictive of total viability, team satisfaction and future capacity, whereas participative behavior among team members was most predictive of team participation.

Team behavior (norms, role clarity, conflict avoidance) was also positively related to team performance. Conflict avoidance behavior was most predictive of team grades. This result should be used with caution, it may be that different tasks are more suitable to conflict avoidance behaviors than others. Future research should continue to determine which behaviors are predictive of high team performance.

Theoretical Implications

The theoretical importance of this study is in providing an empirical link between cognitive structures and behavior. Significant correlations of implicit theories with team member behavior provides empirical support for Lord and Kernan's (1987) hypothesis that cognitive structures are determinants of purposeful behavior in organizations.

In addition, determining the correlation between implicit theories and work team performance and viability promotes Lord and Kernan's (1987) suggestion that common scripts facilitate the integration of team activities.

The link between implicit theories and team outcomes will also further the understanding of antecedents to effective self-directed work teams. Convergence of implicit theories may be a critical factor in future models of team effectiveness at both the individual and team levels.

Convergent implicit theories may make teams more efficient. Shared implicit theories can be converted into process gains by clarifying the performance strategies of the team and facilitating the early process of team development (Hackman & Morris, 1978; Hackman, 1987).

This study provides information on the process of team development. Implicit theories are most important during situations of limited information (Rush, et. al, 1977). In

novel situations, such as starting a new team, individuals may rely on their implicit theories of team development to guide their behavior. Once implicit theories are shared among all team members, teams begin to develop team norms based on shared individual implicit theories.

Practical Implications

A cognitive perspective may help practitioners become more aware of the assumptions and preconceptions held by their workforce. The effectiveness of behavioral changes may be contingent on the effective alteration of cognitive structures (Gioia & Manz, 1985). Before attempting to change the cognitive structures of team members, it is important to determine the current implicit theories held (Bartunek & Moch, 1987). Practitioners may want to determine the level of agreement of implicit theories among team members prior to implementing team projects.

If implicit theories of team development affect the way team members behave, it may be helpful for practitioners to understand the role of implicit theories. For example, if convergence of role clarity implicit theories has a direct impact on team performance, it would be prudent for teams to assess role clarity implicit theories of team members. Also, if implicit theories guide behavior, accuracy of

implicit theories among team members may be of interest to practitioners.

The results indicate that preconceptions of effective work teams can have a positive influence on team outcomes when implicit theories are congruent among team members. Team members may assume their implicit theories are congruent with fellow team members (Bettenhausen & Murnighan, 1985). However, implicit theories that are not congruent among team members could hinder team outcomes. Team members may expend energy going in different directions and may ultimately be forced to negotiate a common understanding of the situation. For instance, if several team members believe roles are critical for team effectiveness, they will expend energy establishing and following agreed upon roles. If remaining team members disregard these roles, there will be process loss and conflict among team members. This will either take time to resolve or hamper the effectiveness of the team.

Convergent implicit theories may facilitate coordination of team member efforts and the development of effective performance strategies. Both of which might increase team performance.

Results suggest the importance of developing team training programs which focus on awareness of team members' implicit theories of team development. Team training could

also focus on the importance of developing unified team goals and strategies to fulfill stated goals.

Developing convergent implicit theories could provide a basis for effective team building. A team building exercise could begin with the assessment of team members' implicit theories. Team members can verbalize their own implicit theories while becoming aware of the implicit theories of fellow team members. Awareness of and attention to dissimilarities may lead to a reduction of anxiety (Poole, et al., 1990). Member implicit theories could be the springboard for negotiating team rules, norms, roles, etc. Norms develop gradually, but the process can be shortened by members explicitly determining team norms (Hackman, 1973). Convergence of team member implicit theories will correlate with the efficiency of this process.

Selection of team members may also be facilitated by assessing potential team member's implicit theories of team development. Awareness of cognitive structures for organizational situations may also facilitate the initiation and socialization of new team members (Poole, et al., 1990).

Limitations and Unanswered Questions

This study has several important limitations. Because of the number of statistical tests conducted in this study, the possibility of a Type I error occurring exists.

Interpreting the significant results presented in this study must be viewed with this in mind.

This study looked at implicit theories and individual deviation from the implicit theories of remaining team members. A possible limitation is that factors, other than individual deviation from team implicit theories, had a part in the relationship between implicit theories and subsequent behavior. Possible individual difference factors influencing member behavior include ability to exhibit behavior, opportunity to exhibit behavior, member competencies (i.e. leadership abilities, communication skills, negotiating skills), and personality variables (e.g. extroversion, self-monitoring). For example, an individual may believe that interpersonal communication is very important for team effectiveness but not have the interpersonal skills necessary to exhibit effective communication behavior.

The present study assumed that all team members are motivated to and capable of acting in accordance with their implicit theories. Having an effective team may not have been everyone's goal.

One might suggest that the results of hypothesis one and hypothesis two be considered an artifact of measurement due to common method variance. Multicollinearity exists among implicit theory sub-dimensions. Implicit theories, behavior, and team viability were all measured using a five-

point Likert-type rating scale with similar anchors, and implicit theories and behavior were measured using similarly worded instruments. To control for the possibility of common method variance, implicit theories were measured at least two months prior to measuring team member behavior and team viability. In addition, implicit theories were measured using individual self-ratings, while team behavior was measured using peer ratings.

The psychometric properties of the Likert-type scales for implicit theories, team member behavior, and team viability were acceptable for this study. However, the test-retest reliability and stability of the point distribution exercise was less than adequate. Any results from implicit theories or team behavior measured via point distribution should be regarded with caution.

Caution should be used in generalizing the results beyond the population and setting of the study. This study looks at start-up teams with little, if any, prior history. It is probable that the relationship between implicit theories and team outcomes is temporal and only occurs in the beginning stages of team development.

The type of participants used in the study suggest another limitation on generalizability. Students majoring in Business Administration at a major state university may have relatively uniform attitudes, experiences, values, and beliefs. Although the participants were involved in self-

managed teams, this study should be replicated in an organization with organizational constraints.

The measure was a general measure of implicit theories of team development. The results may have been different had the team setting been specified, for instance if the survey asked the respondents to indicate their implicit theories of team effectiveness for a team project in a college business course.

Another constraint of the present study is the small sample sizes for different team tasks. It is possible that the relationship between convergence of implicit theories and team outcomes may be different for different team tasks. While this study attempted to test the effect of convergence on various team tasks in post hoc analyses, the test may not have had enough power due to small sample sizes for each task.

Another potential limitation is that the relationship between convergence of implicit theories and team viability and performance may be contingent upon the accuracy of implicit theories. Poorly performing team members may have developed ineffective or inappropriate implicit theories. Team members may internalize a dysfunctional script based on prior preconceptions (Gioia & Manz, 1985). At best, internalizing inaccurate implicit theories as goals may contribute to unnecessary energy being spent on irrelevant concerns; at worst, following dysfunctional implicit

theories may actually hinder performance. The effect of accuracy of implicit theories may obscure a significant relationship between convergence and performance and should be investigated in further studies.

Future Research

Research should continue to refine the psychometric properties of the Implicit Theories of Team Development Survey. Based on the results of this study, the measure of role clarity should be expanded and refined. Further investigation of the most appropriate method of measuring agreement of implicit theories among team members should also continue.

The next step in this line of research is to replicate this study in an organizational setting with objective, accurate performance measures, collected at periodic intervals throughout the team project. As with any research on teams, adequate measures of performance is an issue. Future research should investigate objective, accurate measures of team performance.

Future research should attempt to determine how implicit theories are formed, how enduring they are, and which types of training are more effective in influencing implicit theories. Teams with prior history should be investigated to determine whether implicit theories are

related to team outcomes in long-standing work teams. Team outcomes should be measured periodically throughout the term of the project to help identify the developmental process of implicit theories and team norms.

Accuracy or appropriateness of implicit theories, and their outcomes should be investigated in the future. Additional research should also be conducted on other individual difference factors affecting the link between implicit theories and behavior.

Conclusion

This study offers a viable method of measuring implicit theories of team development directly, as well as measuring agreement among team members. Results show a positive association between implicit theories and team behavior, which is stronger for individuals who have implicit theories congruent with other team members.

Teams having convergent implicit theory profiles received higher team grades. Teams having convergent role clarity implicit theories received higher grades and reported higher satisfaction, participation, and a stronger capacity for future interaction.

This study provides empirical support for a connection between cognitive structures and behavior. The link between convergence of implicit theories (role clarity convergence

and profile convergence) and team outcomes also has major practical implications by identifying an important antecedent to team effectiveness. The results of this study should be viewed in light of the limitations of the methods and population.

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APPENDIXES

APPENDIX A
Implicit Theories of Team Development Survey

WHAT IS MOST IMPORTANT FOR EFFECTIVE WORK TEAMS

Instructions: Many things can influence a work-team's performance or effectiveness. As a team member, what do you consider most important for effective team performance.

	Not Important At All	Not Very Important	Less Important	Very Important	Critical
1. Having excellent communication among team members	1	2	3	4	5
2. Team members getting along very well with each other	1	2	3	4	5
3. Team members spending leisure time together outside the team	1	2	3	4	5
4. Team having agreed upon rules for working together	1	2	3	4	5
5. Team members knowing what is expected of them	1	2	3	4	5
6. Keeping conflict to a minimum	1	2	3	4	5
7. All team members willing to cooperate	1	2	3	4	5
8. Full participation by all team members in team project	1	2	3	4	5
9. Team members openly communicating their differences	1	2	3	4	5
10. Team members agreeing on all decisions made by the team	1	2	3	4	5
11. Having a cohesive team	1	2	3	4	5
12. Having agreed upon rules that facilitate efficient team meetings	1	2	3	4	5
13. Team members understanding their role in the team project	1	2	3	4	5
14. Everyone having similar background and training	1	2	3	4	5

	Not Important At All	Not Very Important	Less Important	Very Important	Critical
15. Talking openly about the team's project	1	2	3	4	5
16. All team members pulling their own weight	1	2	3	4	5
17. Taking all members' ideas into account when making decisions	1	2	3	4	5
18. All team members having equal intelligence and ability	1	2	3	4	5
19. Not having any personal conflict among team members	1	2	3	4	5
20. Having informal rules about how team members behave toward one another	1	2	3	4	5
21. Team members not contradicting or questioning decisions made by other team members	1	2	3	4	5
22. Dividing up the task so that all team members have a task to do	1	2	3	4	5
23. Having the same number of males and females on the team	1	2	3	4	5
24. Having team members enjoy working together	1	2	3	4	5
25. All team members doing his or her share of the work	1	2	3	4	5
26. Team members being willing to listen to the views expressed by other team members	1	2	3	4	5
27. Having one person in charge of the team	1	2	3	4	5
28. Being flexible about who will complete which tasks, not having specific tasks for each team member	1	2	3	4	5

	Not Important At All	Not Very Important	Less Important	Very Important	Critical
29. Team members knowing what types of behaviors are appropriate	1	2	3	4	5
30. Everyone knowing what his or her role is	1	2	3	4	5
31. Team members avoiding conflict with one another	1	2	3	4	5
32. Everyone on the team getting along with each other	1	2	3	4	5
33. All team members willing to contribute to the team's success	1	2	3	4	5
34. All team members communicating their opinions on the project	1	2	3	4	5
35. Team members feeling comfortable working with each other	1	2	3	4	5
36. Having a tight-knit team	1	2	3	4	5
37. Team members knowing the quality of work that is acceptable	1	2	3	4	5
38. Team members knowing what everyone is supposed to do	1	2	3	4	5
39. Everyone participating in completing the task	1	2	3	4	5
40. Having one team leader oversee the project and make final decisions	1	2	3	4	5

=====

Based on the characteristics of teams that you find most important, distribute 100 points to the following categories:

_____ Having Effective Communication

_____ Having a Cohesive Team

_____ Having agreed upon Norms/Rules

_____ Role Clarification for Team Members

_____ Keeping Conflict to a Minimum among Team Members

_____ Participation by all Team Members

100 TOTAL

Work Team Effectiveness

Page 4

Please Answer the Following Questions:

- 1.) Gender: (1) Male ____ (2) Female ____
- 2.) Year in School: (1) Freshman ____ (2) Sophomore ____
(3) Junior ____ (4) Senior ____
- 3.) Have you ever worked in a team? (1) Yes ____ (2) No ____
- 4.) Have you had formal training on group/team process?
(1) Yes ____ (2) No ____
- 5.) Have you had informal training on group/team process?
(1) Yes ____ (2) No ____
- 6.) On a scale of 1 to 5, how important would you say this class is to you?
(Please Circle)

1-not important at all 2-not very important 3-neutral 4-important 5-very important
- 7.) What is your GPA? _____

THANK YOU FOR TAKING PART IN THIS STUDY!

APPENDIX B
Team Behavior Survey

TEAM MEMBER BEHAVIOR

Instructions: During the term you have had to work closely with your fellow team members. Answer the following based on your perception of your team mate's behavior. The answers should be specific to the behavior of:

	Never	Rarely	Sometimes	Often	Always
1. Communicated very well with other team members	1	2	3	4	5
2. Helped keep conflict to a minimum	1	2	3	4	5
3. Followed agreed upon rules for working together	1	2	3	4	5
4. Got along very well with other team members	1	2	3	4	5
5. Was clearly aware of his/her role in the team project	1	2	3	4	5
6. Participated fully in team assignments	1	2	3	4	5
7. Talked openly about differences and conflicts	1	2	3	4	5
8. Contradicted or questioned decisions made by other team members	1	2	3	4	5
9. Followed agreed upon rules for team meetings	1	2	3	4	5
10. Avoided conflict with other team members	1	2	3	4	5
11. Listened to views expressed by other team members	1	2	3	4	5
12. Pulled his/her own weight throughout the term	1	2	3	4	5
13. Helped clarify what everyone's role was in the project	1	2	3	4	5
14. Kept personal conflicts with other team members to a minimum	1	2	3	4	5

	Never	Rarely	Sometimes	Often	Always
15. Helped establish working rules for the team	1	2	3	4	5
16. Helped divide the task so that all team members had a task to do	1	2	3	4	5
17. Made sure that everyone on the team got along well	1	2	3	4	5
18. Performed his or her share of the work	1	2	3	4	5
19. Contributed to the team's success	1	2	3	4	5
20. Was clearly aware of which tasks everyone was supposed to do	1	2	3	4	5
21. Exhibited behaviors acceptable to the team	1	2	3	4	5
22. Made others feel comfortable working together	1	2	3	4	5
23. Expressed his/her opinions and encouraged all team members to do the same	1	2	3	4	5
24. Made working on the team a more enjoyable experience	1	2	3	4	5
25. Talked openly about the team project	1	2	3	4	5
26. Considered everyone's ideas when making decisions and encouraged the team to do the same	1	2	3	4	5
27. Was instrumental in our team being cohesive	1	2	3	4	5
28. Performed work of acceptable quality	1	2	3	4	5
29. Knew what was expected of him/her in completing the project	1	2	3	4	5
30. Encouraged full participation by all team members	1	2	3	4	5
31. Was influential in us having a tight knit team	1	2	3	4	5

WHAT ROLE WOULD YOU SAY _____ PLAYED ON THE TEAM?

Distribute 100 points to the following categories based on his/her behavior:

_____ Facilitated Communication

_____ Instrumental in our Team Getting Along

_____ Developed and Followed agreed upon Norms/Rules

_____ Facilitated Role Clarification for Team Members

_____ Kept Conflict to a Minimum among Team Members

_____ Solicited Participation by all Team Members

100 TOTAL

THANK YOU FOR TAKING PART IN THIS STUDY!

APPENDIX C
Informed Consent Form

CONSENT TO PARTICIPATE

The purpose of this study is to investigate factors that individuals believe to be important for effective team performance. You will be asked to complete three surveys, one at the beginning of the term and two after completion of assigned team projects. The surveys will take approximately 10 minutes each to complete.

The information collected from this study is for research purposes only and will not be used for any other purpose. Participation in this study is voluntary and you may withdraw your participation at any point during the study.

Your identity and responses will be kept strictly confidential. Only the researcher will be able to link your name to your responses. The only reason this is necessary is to be able to match your responses at the beginning of the term with those at the end of the term. Your course instructor will not have access to your responses for any reason.

If you have any questions during or after this study, please contact either the researcher or project advisor below.

Researcher: Marilyn Perkins, Management Department, 974-3161

Advisor: Eric Sundstrom, Psychology Department, 974-6843

**I have read and understood the explanation of this study.
My signature below indicates that I agree to participate.**

NAME _____ DATE _____

SIGNATURE _____

APPENDIX D

Cover Sheet -- Team Behavior Survey

You are asked to answer several questions concerning your team and several questions concerning the behavior of 2 fellow team members.

These Ratings are for Research Purposes Only

The results of the surveys are completely confidential.

The Instructor or fellow teammates will not have access to your responses.

The results will in no way be used to evaluate the performance of students in this course.

APPENDIX E
Team Viability Survey

TEAM PROCESS

Instructions: Indicate the extent to which you agree with the following items.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I found it personally satisfying to be a member of my team.	1	2	3	4	5
2. All team members participated in the team project.	1	2	3	4	5
3. Most everyone on my team would want to work together in the future.	1	2	3	4	5
4. I am pleased to be a member of this team.	1	2	3	4	5
5. All team members pulled their own weight.	1	2	3	4	5
6. I would like to continue working with this team.	1	2	3	4	5
7. All in all, I find it a pleasure to be a member of this team.	1	2	3	4	5
8. All team members did his or her share of the work.	1	2	3	4	5
9. Nobody on my team wanted to switch to another team.	1	2	3	4	5
10. All team members were willing to contribute to the team's success.	1	2	3	4	5

Answer the Following:

- What grade would you give your team's project (between 0% and 100%)? _____
- How effectively did your team work together (between 1 and 5)?
1-not effectively at all 2-not very effectively 3-neutral 4-effectively 5-very effectively
- How compatible was the team in regards to the team members' preconceptions of what makes an effective team?
1-not compatible at all 2-not very compatible 3-neutral 4-compatible 5-very compatible

THANK YOU FOR TAKING PART IN THIS STUDY!

APPENDIX F
Team Performance Survey

TEAM PERFORMANCE EVALUATION

Instructions:

- (1) Evaluate the performance of each team using the attached Likert-type scale.
- (2) Evaluate the performance of each team by Rank Ordering teams based on team performance.
- (3) Provide Actual Team Grades. Team grades are not required and are provided at your discretion.

To accurately test my hypotheses it is imperative that the performance scores have as much variance as possible. Even when actual team grades reflect high team performance, there will be some team projects that are better or worse than others. Therefore, to ensure adequate variance, I am asking you to evaluate the team projects on a comparative basis, using the other team projects in the class as the norm.

Note: No one will have access to these evaluations, all responses will be strictly confidential.

Class Number = 2 - 9:40 Class

TEAM A: TEAM B:

TEAM C: TEAM D:

TEAM E: TEAM F:

IF YOU HAVE ANY QUESTIONS, CALL MARILYN PERKINS AT 637- 3016

TEAM PERFORMANCE EVALUATION

	Best Project in Class	Above Average Compared to Class	Slightly Above Average Compared to Class	Average Project	Slightly Below Average Compared to Class	Below Average Compared to Class	Poor Project Compared to Class
WRITTEN CASE REPORTS							
TEAM A	1	2	3	4	5	6	7
TEAM B	1	2	3	4	5	6	7
TEAM C	1	2	3	4	5	6	7
TEAM D	1	2	3	4	5	6	7
TEAM E	1	2	3	4	5	6	7
TEAM F	1	2	3	4	5	6	7
ORAL CASE REPORTS							
TEAM A	1	2	3	4	5	6	7
TEAM B	1	2	3	4	5	6	7
TEAM C	1	2	3	4	5	6	7
TEAM D	1	2	3	4	5	6	7
TEAM E	1	2	3	4	5	6	7
TEAM F	1	2	3	4	5	6	7
SIMULATION							
TEAM A	1	2	3	4	5	6	7
TEAM B	1	2	3	4	5	6	7
TEAM C	1	2	3	4	5	6	7
TEAM D	1	2	3	4	5	6	7
TEAM E	1	2	3	4	5	6	7
TEAM F	1	2	3	4	5	6	7

TEAM PERFORMANCE EVALUATION

RANK ORDERING BY TEAM

Rank order teams based on team performance (teams A, B, C, D, E, F listed on cover page). The best team is to be ranked 1, the second best team is to be ranked 2, etc.

	<u>Written Cases</u>	<u>Oral Cases</u>	<u>Industry Report/ Term Project</u>	<u>Simulation</u>
1.)	_____	_____	_____	_____
(Best)				
2.)	_____	_____	_____	_____
3.)	_____	_____	_____	_____
4.)	_____	_____	_____	_____
5.)	_____	_____	_____	_____
6.)	_____	_____	_____	_____

ACTUAL TEAM GRADE

	<u>Written Cases</u>	<u>Oral Cases</u>	<u>Term Project</u>	<u>Simulation</u>
Team A	_____	_____	_____	_____
Team B	_____	_____	_____	_____
Team C	_____	_____	_____	_____
Team D	_____	_____	_____	_____
Team E	_____	_____	_____	_____
Team F	_____	_____	_____	_____
SCALE	_____	_____	_____	_____

(ie. 100%, 50 points)

VITA

Marilyn Ann Perkins was born in Detroit, Michigan on August 13, 1957. She lived in Michigan until her 16th birthday when she moved to Florida. She graduated from Lake Weir High School in 1975 and worked as a secretary and bookkeeper until she entered the University of Florida in January of 1977. After receiving her Bachelors Degree in Accounting in 1980, she became a Certified Public Accountant and worked for Peat, Marwick & Mitchell, Co., in Fort Lauderdale, Florida.

In January 1985 Marilyn returned to the University of Florida and received a Masters Degree in Counselor Education and a Specialist Degree in Education in May 1987. During that time, she was the director of Alachua Associates Counseling Center and a volunteer at the Alachua County Crisis Center. After touring Europe for three months she entered the doctoral program in Industrial-Organizational Psychology at the University of Tennessee in fall of 1987, and received her Ph.D. in Industrial-Organizational Psychology in December 1991. During her graduate studies Marilyn provided research and consulting services to the U.S. Department of Energy through Oak Ridge Associated Universities. After touring Japan she will accept a consulting position in Washington, D.C.