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Understanding the Multidimensionality of Group Development

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This article presents a three-dimensional definition space of the group development literature that differentiates group development models on three dimensions: content, population, and path dependency. The multidimensional conceptualization structures and integrates the vast group development literature, enabling direct comparison of competing theories. The utility of this definition space is demonstrated by using the relative positioning of two seemingly competing group development models—the punctuated equilibrium model and the integrative model—to demonstrate their complementarity. The authors also show how organizational researchers and practitioners can use the three-dimensional definition space to select an appropriate theoretical model for the group or group process with which they are working.

Keywords: *group development; group processes; time; theory*

Group development research originated in the early 1950s, when both Bales (1950, 1953) and Bion (1948a, 1948b, 1961) observed similar basic issues facing different types of small groups and speculated about the temporal order in which these were resolved by group members. Interest in group development remained strong into the 1970s, producing methodological refinements and new theories (e.g., Bales & Strodtbeck, 1951; Bennis & Shepard, 1956; Borgatta & Bales, 1953; Duphy, 1968; Heinicke

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& Bales, 1953; Lundgren & Knight, 1978; Mabry, 1975; Mann, Gibbard, & Hartman, 1967; Mills, 1964; Schutz, 1958; Slater, 1966; Stock & Thelen, 1958; Tuckman, 1965; Tuckman & Jensen, 1977). Through the years, several attempts were made to summarize the vast group development literature, and by the late 70s, it was well recognized that common developmental trends can be observed across a wide range of groups (e.g., Braaten, 1974; Cissna, 1984; Hare, 1973; Lacoursiere, 1980; Tuckman, 1965; Tuckman & Jensen, 1977).

Despite the vast differences in methodological approaches and empirical findings, group development theories prior to the 1980s were largely "linear" in nature. That is, these models described developmental changes as small, gradual, and path dependent. They assumed that random events early in the evolution of an innovation get "locked in" forever, that is, that history matters. These linear models were challenged in the late 1980s when more studies of task-oriented groups (including decision-making groups, laboratory problem-solving groups, naturally occurring work groups, and organizational project teams) became prevalent (e.g., Gersick, 1988; Insko, Bilmore, Drenana, Lipsitz, & Moehle, 1983; Insko, Thibaut, Moehle, Wilson, & Diamond, 1980; Katz, 1982; Obert, 1983; Poole, 1983a, 1983b; Poole & Roth, 1989a, 1989b). The "nonlinear" models emerged out of this new group development literature (e.g., Gersick, 1988; McGrath, 1991; Poole, 1983a, 1983b), which emphasized the importance of contextual factors in influencing a group's developmental path and described multiple alternative developmental patterns rather than one common group development trend.

As the earlier linear developmental models were largely developed based predominantly on research conducted with therapy, training, and self-analytic groups (Tuckman, 1965), reviewers (Bettenhausen, 1991; Guzzo & Shea, 1992; Moreland & Levine, 1988) often concluded that earlier linear models were not applicable to organizational work groups, especially after Gersick's (1988, 1989) publication of the "punctuated equilibrium model." For example, Guzzo and Shea (1992) suggested that "Gersick's research is a challenge to traditional views of group development and it has the merit of being empirically demonstrated in different settings" (p. 287). Bettenhausen (1991) reported that

challenging the notion that groups accomplish their work by progressing through a series of stage(s), Gersick (1988, 1989) proposed and found support for a punctuated equilibrium model in which groups alternate between periods of inertia and revolution triggered primarily by their members' awareness of time and deadlines. (p. 352)

This article presents a three-dimensional definition space of group development that integrates linear and nonlinear models of group development. This definition space overcomes the limitation of the current one-dimensional (i.e., path dependency) categorization of group development models and provides a simple and comprehensive framework for understanding the vast group development literature. Various theoretical models of group development will be positioned in the definition space to demonstrate the utility of this framework. Furthermore, this framework can enable direct comparison between competing models of group development and guide researchers' and practitioners' selection of appropriate models.

Definition of Group Development

There have been more than 100 so-called group development theories through the years (Hill & Gruner, 1973). Despite the popularity of the research topic, the term *group development* is rarely defined. Throughout the literature, there seems to be an assumption that there is a shared understanding of what the term means. But what exactly is group development? What are developmental stages, trends, and phases? What aspects of a group develop? For group development researchers, development can mean anything from the growth of group solidarity or cohesiveness, changes in the relationship toward the leader, changes in the relationship among group members, changes in the primary concerns of group members, and changes in task orientation and output. It might also involve questions of why the group came together initially and why it ceased being a group.

To develop a comprehensive understanding of the group development literature, we conducted a literature search using combinations of the key words *group process(es)*, *time*, *group development*, *temporal*, *changes*, and *longitudinal*. We also referred to earlier reviews of group development theories (e.g., Braaten, 1974; Cissna, 1984; Hare, 1973; Lacoursiere, 1980; Tuckman, 1965; Tuckman & Jesen, 1977; Wheelan, 1994) to ensure a comprehensive coverage of the literature.

The literature search located hundreds of group development models, echoing Moreland and Levine's (1988) observation that "there are a great many theories of group development; nearly everyone who does research on this topic (and some who do not) eventually theorizes about it" (p. 155). To navigate this chaotic and vast definition space of group development, we constructed the following questions to help identify the focal argument of each model and how it can be used to understand developmental patterns of work teams.

Figure 1
Definition Space of Group Development

Note: Content refers to whether the word development refers to temporal changes in one specific aspect of the group or in the overall picture of the group. Population refers to whether the observed pattern of development is restricted to a specific kind of group or generalized to groups of all kinds. Path dependency refers to whether the word development implies path-dependent changes toward a better state or whether it merely describes changes that occur over time.

These questions are (a) Is the word *development* meant to refer to changes over time in one specific aspect of the group or in the overall picture of the group? (b) Is the observed pattern of development meant to be generalized to a specific kind of group or to groups of all kinds? and (c) Does the word *development* imply path-dependent changes toward an optimal state or does it imply only that change occurs over time? The following discussion illustrates that each of these three questions sorts group development theories along a continuum, forming the three axes of the definition space of group development, termed the content, population, and path dependency axes (based on questions a, b, and c above, respectively; see Figure 1). Anything that falls within this definition space can be defined

as group development, resulting in a complex and confusing phenomenon termed group development.

Axis 1: Content

The first axis refers to the question of whether the word *development* is meant to refer to temporal changes in one specific aspect of the group or in the overall picture of the group. This question sorts group development research on a continuum ranging from the *specific* to a more general or *comprehensive* perspective. At the *specific* end of the continuum, there is a considerable body of literature dealing with specific aspects of a group during the course of its life. For example, Poole's (1983a, 1983b; Poole & Roth, 1989a, 1989b) contingency theory proposes that groups can follow multiple paths of decision making depending on the contingent internal and external factors such as group structure and work task variables. Gersick's (1988, 1989) punctuated equilibrium model examines temporal changes in a group's pacing and time awareness activities and its task-oriented behaviors. These models describe specific aspects of a group's development and make no attempt at a comprehensive picture of that development, which includes temporal changes in a wide range of processes such as leadership, structure, decision making, relationship maintenance, and so on.

At the *comprehensive* end of this continuum, the word *development* is used with an eye toward a more comprehensive picture of group development. For example, Tuckman's (1965, Tuckman & Jensen, 1977) model proposes that groups progress through five generic stages of orientation, conflict, cohesion, performing, and termination. These stages are also known as forming, storming, norming, performing, and adjourning. Wheelan's (1994) integrative model asserts that groups progress through developmental stages of inclusion and dependency, fight and counterdependency, trust, work, and termination. Both models describe generic developmental stages observed in groups over time and describe changes in a variety of processes, such as structure, communication, norms, leadership, trust, and work performance.

Axis 2: Population

Is the observed pattern of development meant to be generalized to a specific kind of group or to groups of all kinds? This question sorts group development theories into another continuum ranging from *population specific* to *generalized to all*. At the *population specific* end of this continuum,

group development models aim to describe the developmental pattern of a specific kind of group such as problem-solving groups (Bales & Strodtbeck, 1951), decision-making groups (Poole, 1983a, 1983b), and project teams with definite deadlines (Gersick, 1988, 1989). At the *generalized to all* end of this continuum, theorists attempt to describe general developmental patterns across different types of groups, such as therapy, training, laboratory, and work groups (e.g., Tuckman, 1965; Tuckman & Jensen, 1977; Wheelan, 1994). Theories at either end of this continuum can belong to either end of Axis 1 (the content continuum). That is, both theories of specific kinds of groups or theories of all kinds of groups can describe changes in one specific aspect of a group over time or provide a comprehensive picture of development over time.

Axis 3: Path Dependency

Does the word *development* imply path-dependent (i.e., history matters) changes toward a better state, or does it merely describe changes that occur over time? Again, this question sorts group development research on a continuum, ranging from *path dependent* to *non-path dependent*. At the path dependent end of this continuum, group development refers a normative pattern of changes which implies that a group matures over time (e.g., Bennis & Shepard, 1956; Lacoursiere, 1980; Tuckman, 1965; Wheelan, 1994). From this point of view, maturity for the group means something analogous to maturity for a person. That is, groups, like people, undergo stages of development, and by achieving the milestones of a developmental stage, a group progresses to a more mature stage of development in which the group can be more productive and group members more satisfied; thus, history matters. For example, Wheelan's (1994) integrative model argues that once groups resolve early developmental issues such as dependency and counterdependency, groups will be able to operate under more effective working conditions such as high level of trust and productive work structure and processes.

At the non-path dependent end of this continuum, group development research that examines common patterns of change that occur over time. However, no developmental stage or phase is considered more advanced than any other stage or phase. For those who describe development as patterns of behaviors rather than stages or phases, no particular pattern of behavior is considered superior to other patterns of behavior. Instead, these models focus on the contingent factors that lead to alternative developmental patterns. In other words, group development is conceptualized as temporal change as a

reaction to a group's internal and external environment rather than a normative pattern that all groups progress through over time. For example, McGrath's (1991) time, interaction, and performance (TIP) model argues that groups can take alternative paths between the different stages of goal choice, mean choice, policy choice, and goal attainment depending on the nature of the assigned task, the expertise of the composing members, and the contextual environment. Poole's (1983a, 1983b; Poole & Roth, 1989a, 1989b) contingency theory proposes that groups can undergo different "decision-making" paths depending on the contingent internal and external factors, such as group structure and work task variables.

Again, this continuum can interact with the previous two continuums to form a three-dimensional definition space. The previous two continua form a two-dimensional (Content $\times$ Population) plane. Group development research that falls at any point on this plane can describe either path dependent or non-path dependent development patterns, thus creating the Content $\times$ Population $\times$ Path Dependency definition space of group development. This definition space provides a comprehensive coverage of the current group development literature. Table 1 illustrates how various group development models can be positioned in the definition space.

In sum, there are vast differences among the various researchers' definitions of group development, and the above three continuum form the axes of the definition space for the term *group development*. Research on any temporal changes that fall within this definition space have been classified as group development research, resulting in apparent differences in the underlying assumptions of various group development models. This three-dimensional definition space highlights the limitations of the current one-dimensional categorization of group development models. The current literature categorizes group development theories on only the path-dependency dimension in the three-dimensional definition space. Researchers have classified the group development theories into (a) linear models, (b) pendular models, and (c) nonsequential models (Chidambaram, Bostrom, & Wynne, 1991; Mennecke, Hoffer, & Wynne, 1992). Both linear and pendular models conceptualize group development as a predictable pattern of changes over time. Although linear models define development as a group's gradual and incremental progress through a logical sequence of stages over time (e.g., Tuckman, 1965; Wheelan, 1994), pendular models argue that resolution of any focal issues within groups is only temporary and that various issues, problems, or approaches to problems recur within a group's life cycle (e.g., Bion, 1961; Worchel, 1994). Linear and pendular models dominated the group development literature up until the 1980s. Although the

(text continues on p. 337)

Table 1
List of Group Development Models and Their Positions in the Definition Space of Group Development

Author(s) and Focus of the Model	Types of Groups From Which the Model is Derived	Content	Population	Path Dependency
Linear models				
Bales and Strobeck (1951) phases of problem solving	Laboratory problem-solving groups	Specific—describes phases of decision making	One type—apply to problem-solving groups under full-fledged condition	Path dependent—the groups progress through the three phases in order, but no one phase is superior to the others
Heinicke and Bales (1953) developmental trends of small groups	Laboratory problem-solving groups (students)	Comprehensive—changes in structure consensus	Intermediate	Path dependent
Lacoursiere (1980) intrapersonal and interpersonal reactions and emotions	Therapy, task oriented, training, committee, self-analytic groups	Comprehensive	All groups	Path dependent
Mann, Gibbart, and Hartman (1967) member-to-leader relationship	Training groups (student groups in the course, $n = 4$)	Comprehensive	All groups	Path dependent

Tuckman (1965) and Tuckman and Jensen (1977) changes in group process and structure	Training, therapy natural or laboratory	Comprehensive	All groups but applicability to naturally occurring groups is not warranted	Path dependent
Wheeler (1994) changes in group process and structure	Work groups therapy training	Comprehensive	All groups	Path dependent
Cyclic model				
Bion (1961) work and emotionality in groups	Therapy groups	Comprehensive	Population specific—therapy groups	Path dependent and cyclic
Bales (1953) task-oriented activities drive positive or negative reactions	Laboratory groups (leaderless discussion student groups)	Comprehensive	Some types of groups—mainly problem-solving groups	Path dependent and cyclic
Worchel (1994)	lab groups, social groups	Specific—group cohesiveness, members' identification with the group, and self-awareness	Generalized to all types of groups	Path dependent and cyclic

(continued)

Table 1 (continued)

Author(s) and Focus of the Model	Types of Groups From Which the Model is Derived	Content	Population	Path Dependency
Nonsequential models Gersick (1988) task-related, especially pacing activities	Work groups with limited lifespan	Specific—a group's time-management strategies and task-related activities (1989)	One type of group—project teams with a definite deadline	Non-path dependent
McGrath (1991) multiple functionalities of a group, including a group's well-being, member support, and productivity functions	Work groups	Comprehensive—three functionalities that parallel one another	Toward the generalized to all end but not as general as Tuckman—applying to all work groups, and can be modified to apply to most groups	Non-path dependent
Poole (1983ab, 1989ab) decision-making paths	Decision-making groups	Specific—a group's decision-making activities	Intermediate—all decision-making groups	Non-path dependent

two types of models describe different patterns of progression over time, they share the assumption that there is progress in a group's handling of development issues (i.e., path dependence). Through the years, several attempts have been made to review the literature on group development (Braaten, 1974; Cissna, 1984; Hare, 1973; Lacoursiere, 1980; Tuckman, 1965), and there has been little negative evidence that challenges the linear developmental patterns of small groups. Based on studies of therapy, training, and self-analytic groups, there is substantial evidence that groups display general linear or cyclic developmental trends regardless of the characteristics of the group.

Nonsequential models emerged in the 1980s when studies of task-oriented groups (including decision-making groups, laboratory problem-solving groups, naturally occurring work groups, and organizational project teams) became more prevalent (e.g., Gersick, 1988; Insko et al., 1980, 1983; Katz, 1982; Obert, 1983; Poole, 1983a, 1983b; Poole & Roth, 1989a, 1989b). These models presented developmental patterns that appeared to differ dramatically from the linear and cyclic patterns. TIP (McGrath, 1991), the contingency theory (Poole, 1983a, 1983b; Poole & Roth, 1989a, 1989b), and the punctuated equilibrium model (Gersick, 1988) are all classified as nonsequential models. Limited by the one-dimensional categorization, the organizational behavior literature has viewed nonsequential models as a competing paradigm to the linear and cyclic development models. Thus, the organizational behavior literature has questioned the application of the traditional group development literature (linear and pendular models) to work groups (e.g., Bettenhausen, 1991; Guzzo & Shea, 1992).

The traditional, one-dimensional categorization of group development models has neglected the fact that group development models vary in their content and population as well. A close examination of the three-dimensional definition space indicated that linear group development models are derived from a wide range of groups, including therapy, training, laboratory, and naturally occurring work groups. There is more variation among linear models in terms of their positions in the definition space than among the nonsequential models, nevertheless linear models predominantly define group development at the *comprehensive-generalized to all-path dependent* corner of the definition space. That is, a linear developmental pattern is more likely to be found when the researcher is interested in providing a comprehensive picture of the general developmental pattern of groups of all types. Most linear models employ the term *group development* with a path-dependent connotation. For example, Tuckman's (1965), Lacoursiere's (1980),

and Wheelan's (1994) models are all at the *comprehensive-generalized to all-path dependent* corner of the definition space.

On the other hand, the nonsequential models (i.e., Gersick, 1988, 1989; McGrath, 1991; Poole, 1989a, 1989b) define the term *group development* at the *content specific-population specific-non-path dependent* corner of the definition space, and there is less variation in their positions within the definition space. That is, nonsequential developmental patterns are observed mostly when a group development model describes temporal changes in only the task-related aspects of task-oriented groups. These models usually only apply to task-oriented groups, and the term *group development* is employed without the path-dependent connotation. Thus, it is inappropriate to view linear and nonsequential categories as mutually exclusive categories as the two types of models focus on different dimensionalities of temporal change in groups for different types of groups. Furthermore, it is misleading to conclude that traditional stage models do not apply to work groups unless their lack of application can be demonstrated empirically. Many stage models are designed to describe common developmental patterns shared by all types of groups, including organizational work groups.

Another common misunderstanding in the organizational literature is that the validity of stage models is questionable because clearly defined "stages" ("a presumably natural or nonarbitrary division of a changing process"; English & English, 1958, p. 520) proposed by these models are not always found in group research (Arrow, 1997; Bettenhausen, 1991; Gersick, 1988, 1989; Guzzo & Shea, 1992; Seers & Woodruff, 1997). However, most models used the term *developmental stages* to describe clusters of behaviors that most groups display at various points of their lifespan, which can probably be better captured by the term *developmental phase* ("a recurrent state in something that exhibits a series of changes"; English & English, 1958, p. 386) or *trend* ("the direction manifested in a series of events; a dynamic tendency or inclination to behave in a given way or in a certain direction"; English & English, 1958, p. 564).

For example, Wheelan's (1994) five stages were defined based on behaviors characteristic of a group dealing with a particular developmental issue, such as dependency. Groups at the dependency stage tend to follow the leader's suggestion, and members at this stage tend not to challenge the dominant point of view in the group. However, this is not to say that groups do not engage in any other activities during this stage. Work definitely does occur at this stage, as it is the main reason for the group's existence. Conflicts might occur between group members or subgroups, but the model argues that groups at the dependency stage are less likely to express their conflicts openly

because of safety concerns. When transition from the dependency stage to the counterdependency stage occurs, conflicts between group members or subgroups become the group's most predominant behaviors. That is, a group at the counterdependency stage spends a large proportion of its time and energy on member conflicts and counterdependency issues. Note that the transition from dependency to counterdependency and conflict does not occur immediately. Groups do not switch all at once from having no conflict to having a great deal of conflict. Instead, the process is such that group members gradually experience more differences in opinion. Furthermore, group members also become increasingly more comfortable with expressing opinions that differ from the group's dominant point of view. It is when conflicts and counterdependency become the predominant behavior that the group is classified as moving into the counterdependency stage. Thus, the model does not propose clear boundaries between different developmental stages. Rather, each developmental stage is defined by a cluster of behaviors with which the group is most occupied at a particular point in time.

Using the Definition Space

The three-dimensional definition space proposed here overcomes the limitations of the current one-dimensional understanding of group development and provides a simple but comprehensive framework for comparing competing models of group development (Figure 1, Table 1). The following discussion will illustrate the utility of this definition space by comparing Gersick's (1989) punctuated equilibrium model with Wheelan's (1994) integrative model of group development. Although most researchers see these as competing models (e.g., Bettenhausen, 1991; Guzzo & Shea, 1992), the use of the definition space clarifies this misconception and illustrates the complementary nature of these two models.

An Empirical Illustration

Figure 1 demonstrates the respective position of the two models in the definition space of group development. First, in terms of content, the punctuated equilibrium model describes changes in the way a group works on its tasks over time (specific), whereas the integrative model describes the overall developmental pattern of a group over time (comprehensive), including dimensions such as leadership, decision making, norms, and social relationships. This difference in content is reflected in the difference in the

two coding systems (see Table 2 for the coding categories and examples). Gersick's (1989) observational system focused on

ideas and decisions that gave the product its basic shape or that would be the fundamental choices in a decision tree if the finished product were to be diagrammed . . . and points where milestone ideas were first proposed, whether or not they were accepted at that time. (p. 14)

The integrative model, on the other hand, uses the group development observation system (GDOS), which captures temporal changes in groups' structures and processes in both socioemotional and task-related dimensions (see Table 2). Each statement is identified by its speaker, target, location in time, and functional role in a group's activities, thus portraying a comprehensive picture of the changes in the central theme of a group's interaction over time. For example, the coded transcript in the bottom section of Table 3 demonstrates the integrative model's focus on different group processes such as work, flight (fl; avoidance of intimacy or work), and pairing (p; relationship building). The first theme abstracted in the top section of Table 3 demonstrates how the same group interaction was coded by the punctuated equilibrium model as a process of the group examining its resources. Because the punctuated equilibrium model focuses on the process of the group's approach to its work, statements that represent relationship maintenance or avoidance of intimacy are less relevant.

On the other hand, GDOS accounts for only the frequency of groups' various activities but not the content meaning of the acts. This means that despite the fact that the integrative model attempts to make predictions about the path dependency and quantity of work done at each developmental stage, its coding system only allows the observation of the amount of time devoted to work at each developmental stage. By contrast, the punctuated equilibrium model captures how work is done and the amount of attention that a group pays to its pacing activities at different phases. Although both the punctuated equilibrium model and the integrative model describe temporal changes in the work of the group, the two coding systems yield different information about a group's task activities.

Second, in terms of population, the punctuated equilibrium model describes developmental patterns that apply only to "groups that have some leeway to modify their work processes and must orient themselves to a time limit" (Gersick, 1988, p. 36). The integrative model is designed to describe developmental patterns of all types of groups (e.g., intensive care unit nurse teams—Wheelan & Burchill, 1999; executive teams—Buzaglo & Wheelan, 1999;

Table 2
Examples of Coded Statements and Meeting Maps

Letter Code	Type of Statement	Examples
Punctuated equilibrium model		
Action statements		
P	Process	Why don't we just toss out some ideas that we could get into the commercial.
T	Time pacing	We have got 20 minutes left!
R	Resources requirements	That's \$200 per thing, so we basically have the choice of one.
Statements about the final product		
#c	Content	A rich movie star gets into a car . . . chauffeur says "What terminal, sir?"
#d	Details	Should the brakes slam or not? . . . They should.
#f	Format	What if we had a conversation between two people . . . /You can have two different points of view, the budget point of view and the . . .
#p	Procedure	I'll do the second person. Can anyone do that noise? "eerrrr"
Integrated model		
D	Dependency	What do you think we should do?
CD	Counterdependency	I don't think that is a good idea. Why don't we try my idea first?
FI	Fight	That is a stupid idea.
FL	Flight	Did anyone watch the movie on SBS last night?
P	Pairing	Good work, John!
CP	Counterpairing	Can we talk about the commercial instead?
W	Work	Why don't we start writing this down.

faculty member groups—Wheelan & Tilin, 1999; financial services teams and teams working in a hotel—Wheelan, Murphy, Tsumura, & Kline, 1998).

Finally, in terms of path dependency, the punctuated equilibrium model assumes no qualitative differences between a group's task activities in the first and second phases, whereas the integrative model assumes that groups at a later developmental stage should perform better in all aspects of their functioning.

In summary, the punctuated equilibrium model is at the *specific-population specific-non-path dependent* corner of the definition space, whereas the

Table 3
Example of the Original Transcript Coded by the Group
Development Observational System and a Meeting Map
Constructed Based on Gersick's Coding System

Meeting map	Original transcript coded by the group development observational system
0:00-3:00 Examined resources, looking at the tapes available.	<p>B These are all the music tapes (w). A tapes (w) C I wonder what the music is? (w) B while you are sleeping (w), silk road of theme (w), pearl shells (w), which I never heard of (fl), while you are sleeping (w), is that the movie? (fl)</p>
0:30-1:30 Proposed content. One person talked about the movie <i>Crazy People</i> . Wanted to use the idea shown in the movie: "Millions of people get killed every year but we have the fewest number." The group then evaluated the proposed content—"not original."	<p>A hm (fl) C yes (w) B we should use that one (w) D . . . (u) A I am not going to play it (w), I am just going to . . . (w) D OK (w) E has any one seen crazy people (fl) D pardon (u) E crazy people (fl), the movie (fl) B no (answering B) (fl), that's good (referring to the tape recorder)(w) C ok so (w), so we got to basically advertise (w) E they did this thing on the movie (w) where there like was this advertising guy (w), and you know like how they usually say those safety stuff (w),</p>
1:30-4:20 Listened to all the music tapes, commented on the music, and proposed ideas that go with the music. "This is captain someone"; "This is like an Asian music"; "But that doesn't make Asian sound exciting, it just makes it sound relaxing"; "We've also got to mention the country I guess."	<p>1:00 E and he goes millions people got killed every year but we have the fewest number (w), like people get killed (w) D oh, really (p) E they just do all this crazy thing (fl) and people really like it (fl), cause he just like do all these crazy commercials (w) B that's good though (w) E but all these crazy people helps him to make up these ideas (fl), but it's not original (w), but its creative (w) C but they wouldn't know whether it's not original (w) unless they have seen it (w) D yeah (w), but they have the tape (w) E but . . . (u) 015 oh yeah (w) E elevating music (playing music tape 1) (w) B it's like airplane music when you land (w) A oh. Yeah (w) D or when you are taking off (w) A yeah (p), it's true(w) E what's that (the music) (w)</p>

(continued)

Table 3 (continued)

Note: See Chang, Bordia, and Duck (2003, Table 1). The top section of the table illustrates a 5-minute sample segment of the meeting map describing changes in the central theme of a group's discussion over time. This map was constructed following guidelines provided by Gersick (1989). The numbers in the top section represent time elapsed in minutes from project inception. The bottom section of the table shows the transcript for only 2 minutes of the group's interaction because of space limitation. Letters in the right column identify group members. The coding of each statement is in parentheses. The coding was done in the context of the purpose of the communication and the nonverbal behaviors accompanying the communication.

integrative model is at the *comprehensive-generalized to all-path dependent* corner. The distance between the two models in the definition space highlights the noncomparative nature of the two models. Although the punctuated equilibrium model is designed to describe changes in pacing and task-related activities in project teams over time, the integrative model is designed to describe a general developmental trend that can be observed across a wide range of groups. This distinction between the two models is consistent with Seers and Woodruff's (1997) suggestion that researchers should distinguish between the pacing activities from group development as a whole: "Pacing appears to be a task deadline-driven process, and group development appears to involve social factors which can extend beyond task-required interactions" (p. 184). It is also consistent with Seers and Woodruff's argument that Gersick's (1988, 1989) model should be identified as a "group task progress" model instead of as a "group development" model (p. 168).

Chang, Bordia, and Duck (2003) compared the punctuated equilibrium model and the integrative model using simulated project teams in the laboratory setting. Results of this study supported the proposed multidimensionality of group development. Results showed that groups underwent both punctuated equilibrium and linear path-dependent developmental patterns, albeit on different dimensions. The punctuated equilibrium model described changes in a group's time awareness and pacing activities over time and changes in a group's task activities over time, whereas the integrative model described changes in both a group's task and socioemotional activities. This pattern of results also supported the proposed positioning of both models in the three-dimensional definition space of group development. The punctuated equilibrium model is designed to describe changes in task activities and pacing behaviors of project teams with definite deadlines. The integrative model describes a common developmental trend observed across a wide range of groups; thus, it is also applicable to project teams working under time pressure.

Theoretical and Practical Implications

Groups are dynamic entities, and as such the results of any group research or group intervention can vary depending not only on what is measured and how it is measured but also on when it is measured. Thus, when working with groups, it is important to understand their temporal context. The definition space can be used as a guideline for selecting appropriate models of group development. The population dimension highlights the applicability of the specific model to the groups that one is studying or working with. The content dimension focuses on the specific dimension of change in which one is interested. The path-dependency dimension distinguishes between different conceptualizations of group development. Models that define development with a path-dependent connotation describe desirable group behaviors that lead to enhanced group effectiveness. This type of model provides a framework for facilitating effective group processes. On the other hand, models that do not assume the association between development and path dependency (e.g., TIP and contingency theory) better capture the interaction between a group and its environment.

For example, many organizations are now relying on project teams for the development of innovative products. When working with project teams, one could encounter a wide range of problems from running behind schedule, to apathetic attitudes from group members, to conflicts between group members. When designing effective strategies to work with these teams, one needs to first understand the temporal context of the group. Using the population dimension, one could select models specifically designed for project teams (e.g., the punctuated equilibrium model) or models developed to apply to groups in general (e.g., TIP, the integrative model). The population dimension provides a wide range of applicable models for consideration; the content dimension, on the other hand, helps to funnel down the selection of applicable models. If the problem encountered is about the group's difficulties in meeting its deadline, then Gersick's punctuated equilibrium model will be an important choice. The punctuated equilibrium model describes temporal changes in pacing and time awareness activities, which are critical to timely completion of group projects. Chang, Bordia, and Duck (2000) found that an increase in pacing and time awareness over time is an important predictor of timely project completion. Thus, group leaders or facilitators need to not only define temporal milestones but also ensure that group members are constantly made aware of their progress in their project timeline.

On the other hand, if the problem concerns conflicts among group members, the integrative model provides the background understanding for

working with the group to resolve the conflicts. First, the model helps to identify the problem as a common developmental issue for most groups. This puts the problem into context and reduces the anxiety and guilt associated with delayed progress because of member conflict. Second, the model can act as a framework to facilitate conflict resolution. Group members can be assured that successful resolution of conflicts can lead to promising outcomes of trust, structure, and effective work. Third, the model can be used as a framework for understanding the different nature of group conflicts. The model proposes that conflicts can occur throughout a group's lifespan, but the frequency is highest at Stage 2, when group members are trying to establish independence from the group leader. At this stage, coalitions are formed and conflicts tend to occur between subgroups that are for and against the leader. When encountering conflicts of this type, it is important to understand that group members require time to express their differences and to adjust themselves to work with others harmoniously. However, it is also important to note that prolonged periods of conflict can detract a group from its functional goals and seriously reduce its effectiveness. On the other hand, conflicts can continue to occur even after a group moves from Stage 2 into stages of trust, structure, and effective work. However, conflicts at this stage tend to be task focused and can in fact facilitate critical evaluation of group decisions (Pelled, Eisenhardt, & Xin, 1999).

Alternatively, the two models can be combined to plan the inception meeting of a group project. The punctuated equilibrium model emphasizes the importance of being prepared for the first meeting, as decisions made at this meeting tend to stay with the group for the first half of their allocated time. By contrast, the integrative model suggests that group members tend to either blindly follow the leader's suggestion or not have the courage to express their disagreement. Combining the two models informs us that group members are vulnerable at the initial stage of a project. Thus, external pressure to perform, the group's tendency to make quick decisions at the first meeting, and group members' dependency on their leader can result in false consensus at this initial stage of a project. In addition, whatever decision is made at this stage will tend to stay with the group for a long period. Thus, group leaders and facilitators should be cautious not to make decisions hastily at the initial meeting. They need to ensure that group members are given the opportunity to express their opinion in the initial meeting. Furthermore, it is a good idea to review these early decisions at a later date, when decision making structure becomes clearer and when group members feel more comfortable expressing differences in opinions.

The definition space can also assist researchers to place the group phenomenon under investigation into a temporal context. This awareness of a group's temporal environment should start at the design phase of a research project. When reviewing the literature to develop a set of hypotheses, a researcher should consider the following questions: (a) What type of group is to be studied (i.e., population)? (b) What aspect of the group is to be studied (i.e., content)? (c) Is the emphasis of the research project on the progression of groups over time or the interaction between a group and its environment (i.e., path dependency)? Answering these three questions helps researchers to select the appropriate developmental model for their research question, which informs them of the different outcomes they can expect at different points of a group's lifespan. Although not all research questions need to be tested longitudinally, keeping a temporal perspective will promote a more holistic understanding of the group phenomenon.

For example, when studying commitment, researchers need to understand that group members' level of identification with their work unit can vary depending on their positioning in the developmental cycle. When selecting a suitable model to inform us about temporal changes in commitment, we need to first select the appropriate positioning of such a model in the definition space. In terms of content, the model needs to provide a specific description of temporal changes in group commitment or group identity. Worchel's (1994) cyclic model and Moreland and Levine's (1988) work on group socialization provide a useful framework for studying group commitment or identity. On the other hand, models that describe an overall picture of group development (i.e., comprehensive models) can also provide useful information because they describe temporal changes in group cohesiveness and efficacy, which are important correlates of group identity.

In terms of population, we can choose group development models specifically designed for work groups and group development models designed to describe temporal changes in all types of groups. Thus, McGrath's (1991) TIP, Worchel's (1994) cyclic model, and Wheelan's (1994) integrative model are all suitable models. Finally, in terms of path dependency, our selection of the group development model depends on the focus of our study. If we are interested in the impact of contingent factors, such as downsizing or organizational change or commitment, then groups at the non-path dependent end (e.g., TIP) will be more appropriate. Alternatively, theories at the path-dependent end better describe natural progression of group commitment or identity over time in a stable environment.

Conclusion

The temporal context of a work group plays a significant role in shaping its behaviors. Although there is limited research specifically on developmental patterns of work groups, there is a large body of literature on developmental patterns of small groups in general. The three-dimensional definition space of group development provides a simple and structured way of selecting the appropriate model(s) to assist understanding of the temporal context of work groups. Furthermore, this definition space of group development highlights the multidimensional nature of group development phenomena, suggesting that researchers and practitioners need not limit their choice to one model in particular nor assume the contradictory nature of alternative developmental models. This article offers a theoretical framework to guide empirical research on the temporal environment of work groups. In doing so, it begins to unravel the black box of group development.

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