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From swarms to summer camps : a theoretical deconstruction of cohesion among groups of latency aged boys

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Prairie Chiu
From Swarms to Summer
Camps: A Theoretical
Deconstruction of Cohesion
Among Groups of Latency
Aged Boys

ABSTRACT

This thesis is an interdisciplinary theoretical deconstruction of cohesion among groups of latency aged boys. Process research on the development of cohesion among informally organized groups of latency aged boys is lacking. Also, much of cohesion research is adult-oriented, rather than child-oriented. This project seeks to elucidate some of the hows of cohesion among this population by applying a biological theory examining cohesion among aggregates of animals to a social psychological theory considering cohesion among latency aged boys. It is the author's hope that such an approach will yield valuable insights into the mechanisms of cohesion and its facilitation, while increasing validity for both theories through a complimentary dialogue.

Realistic conflict theory, developed by Muzafer Sherif on the basis of a 1961 large-scale, ambitious experiment involving two groups of latency aged boys, hypothesizes about intergroup relations. It addresses the features of small cohesive groups, and examines the role of superordinate tasks in facilitating cohesion between individuals and between groups. Applied to realistic conflict theory will be self organizational theory, which seeks to deconstruct group-level, emergent phenomenon and pattern, and to discover the principles, mechanisms, and properties of self-organized animal groups.

The product of this exercise will feature a formula for balancing task and social cohesion given the initial homogeneity of the group, and recommendations about both increasing cohesion and interrupting a positive cohesion feedback loop. Finally, there will be an exploration of the most effective implementation of superordinate tasks to facilitate task cohesion in groups of latency aged boys.

FROM SWARMS TO SUMMER CAMPS: A THEORETICAL DECONSTRUCTION
OF COHESION AMONG GROUPS OF LATENCY AGED BOYS

A project based on an independent investigation,
submitted in partial fulfillment of the requirements
for the degree of Master of Social Work.

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2009

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“You know I don't want to write my thesis chapter when I'm procrastinating by writing other chapters.”

I would like to acknowledge the "Twilight" soundtrack on perpetual repeat as instrumental in keeping me focused on my work.

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CHAPTER I

INTRODUCTION

Phenomenon And Research

Cohesion in groups of latency aged boys is a phenomenon that has fascinated researchers for many decades. In 1939, social psychologist Kurt Lewin, one of the pioneers of cohesion research, conducted a study with colleagues to determine the effects of three different leadership styles on the cohesion of small, formally-led groups of latency aged boys (Lewin et al., 1939). In 1954, another social psychologist, Muzafer Sherif, orchestrated the famed “Robbers Cave Experiment,” which examined inter-group conflict and solidarity among latency aged boys in an outdoor camp (Sherif et al., 1961). Sherif’s *realistic conflict theory*, developed from and validated by the experiment, will be one of two theories examined in this project.

Explorations of cohesion in groups of children have continued within the discipline of therapeutic groupwork. Andrew Malekoff (2004), a prominent New York children’s groupwork clinician, has successfully applied such therapeutic models as the “Boston model” to working with youth. However, although cohesion is generally accepted as the necessary precursor to therapeutic progress in groupwork, little is known about how cohesion develops. Irvin Yalom, in his seminal *The Theory and Practice of Group Psychotherapy*, comments on the facilitation of cohesion in groupwork with adults (Yalom & Leszcz, 2005). Citing research on groupwork practice, Yalom and Leczcz (2005) identify trust, warmth, empathic understanding, and acceptance as the four

indicators of a cohesive bond and enumerate related therapist tasks, but admit that cohesion itself is difficult to define precisely.

Cohesion is operationally defined by Yalom & Leszcz (2005) as “attractiveness of a group for its members.” However, such a definition only accounts for one aspect of cohesion—social cohesion. Social cohesion relies on the subjective assessment of group members. Historically, cohesion has undergone many revisions as a construct (Dion, 2000). In fact, the study of cohesion is as much an attempt at defining cohesion. Treadwell, Lavertue, Kumar, and Veeraraghavan (2001) review many of the conventional definitions of cohesion. For example, cohesion is defined as a member’s motivation to remain in group (Treadwell et al., 2001). Elsewhere, Canham and Emanuel (2000) describe cohesion as “tied together feelings,” while Mayerson (2000) focus on “group-as-a-whole” events. Dion (2000) reports: “The word *cohesion* derives from the Latin word *cohaesus*, meaning “to cleave or stick together.” Expanding upon this root meaning, and considering existing definitions, a working definition of cohesion has been developed for this project:

An emergent property of a group of individuals arising under specific conditions that manifests as a cleaving or sticking together of the individuals in a non-random, patterned way that is not necessarily conscious to those individuals or within their will.

Research on cohesion has largely been focused upon adult groups. This body of research is vast, and spans many sub-areas, including the military, sports, therapeutic groups, corporations, and academia (Dion, 2000; Miller, 2007). Mostly, the research relies upon individual/subjective data on the experience of cohesion within a group, rather than on an analysis of group-level properties (Beal et al., 2003). Also, much of the

research has sought to discover outcomes of group cohesion, rather than understand or identify behaviours indicating cohesion (Beal et al., 2003). Until recently, cohesion has predominantly been interpreted as a single variable that has the same effects whether it is described as “interpersonal attraction” or “high task cohesion” (Zaccaro & Lowe, 1988). In surveying cohesion research, Dion (2000) highlights the lack of research on the relationship between different effects of cohesion, the unknown generability of cohesion to different groups, and the lack of a standard measure of cohesion all as areas that necessitate further exploration and study. Even so, the conceptualization of cohesion has evolved to include the multi-dimensions of task and social cohesion, horizontal and vertical cohesion, and subjective versus objective cohesion (Dion, 2000).

In her review of the research on children’s therapeutic groupwork in schools, Zipora Shechtman (2002) cautions against applying adult research to children, citing four key areas in which children differ in therapeutic group settings from adults. While a consensus has largely been reached regarding the efficacy of cohesion in producing positive results for individual group members, such as increases in self esteem, performance, and other outcomes (Shechtman, 2002; Blonk et al., 1996; DeMar, 1997), Shechtman (2002) cites a need for methodologically rigorous, process-focused research on children’s groupwork. Within research on children’s groups, more has been written about teenagers than latency-aged children (e.g. Malekoff, 2004).

Given seemingly fundamental differences between children and adults, it seems that any additional empirical research depending upon existing adult-oriented conceptualizations of cohesion would still fall short of addressing identified research needs. Instead, the focus should be upon the exploration of new theoretical developments,

with the aim of infusing the study of child group cohesion with new insights that can serve as the foundation of a new child-oriented model of cohesion. Once such a model is established, testable hypotheses can be supported, and rigorous empirical research designs implemented.

Brief Theoretical Overview

Group cohesion is a topic relevant to everyone. Alienation or ostracisation is a universal human experience that is reflected in the bullying pandemic in schools, in the racial self-segregation of large cities, and in the experiences of immigrants. Furthermore, a lack of cohesion can be argued to be behind social oppression of all forms—whether due to race, class, religion, gender, or sexual orientation, etc. In considering cohesion, the use of a biological model of cohesion seems a natural choice, as animals band together for many reasons—almost all of which are directly or indirectly related to survival. Although this project will not focus upon the adaptive or maladaptive motivations behind cohesion, it is important to be reminded of the differences between the instinctively collective orientation of animals and the increasingly individualistic behaviours of humans that may or may not serve our species' survival in the end.

The two theories that will be examined in this project are self-organizational theory and realistic conflict theory. Self organizational theory is defined as:

Self-organization is a process in which pattern at the global level of a system emerges solely from numerous interactions among the lower-level components of the system. Moreover, the rules specifying interactions among the system's components are executed using only local information, without reference to the global pattern. (Camazine et al., 2001)

It is the foundational theory for much of the biological research today on group cohesion in swarms of animals. Originally developed to apply broadly to both biological and non-biological systems, self-organizational theory considers the emergent properties, principles, and mechanisms of any system that displays patterns at the group-level and is goal-oriented. When applied to animal groups such as birds, insects, and fish, self-organizational theory has been utilized to simulate flocking behaviour, and predict when animals will swarm, among other things (Couzin & Krause, 2003; Klarreich, 2006; Reynolds, 1987).

Conversely, realistic conflict theory is a social psychological theory that focuses on the differentiation of groups, and the relationship between intergroup conflict and the availability of resources in the environment. Simply defined, realistic conflict theory states that limited resources will lead to conflict between groups in the form of discrimination and negative stereotyping (Sherif et al., 1961). The seminal “Robbers Cave Experiment,” conducted by Turkish social psychologist Muzafer Sherif, verified the hypothesis of this theory. The experiment studied two groups of latency aged boys in a wilderness summer camp as they underwent the three phases of in-group formation, intergroup conflict, and intergroup cooperation (Sherif et al., 1961). The experiment is significant because it shows the subjects’ linear progression from the development of small group cohesion, to intergroup conflict with hostility and prejudice, to an eventual resolution of these negative feelings through a newfound cohesiveness among the two groups.

Self organizational theory and realistic conflict theory are both theories that make hypotheses about phenomena at the group-level. According to Dion (2000), this group-

level focus, as opposed to an individual-based approach, wherein individual assessments are relied upon for data, has largely been omitted from the cohesion research. Although the two theories are not mirrors of each other in their respective fields of theoretical biology and social psychology, they are complementary. Self-organizational theory, developed largely from computer modeling, has the potential to deconstruct an empirical-based study of group cohesion by proposing the internal mechanisms and parameters that may be at play. There are few theories in the social psychological realm that focus upon the possible antecedents of cohesion in a way that has broad application across different types of informally organized groups. Furthermore, as self-organization bridges many fields of study, including the “hard sciences” of biology, physics, and chemistry, it brings with it the internal validity and rigorousness inherent in these other disciplines and lends any new derivation or interpretation of it an “inherited credibility.”

Increasingly stringent ethical guidelines regulating the use of human research subjects has curbed ambitious, large scale experiments such as Sherif’s “Robbers Cave Experiment,” hereafter referred to as Robbers Cave. The reliance on computer modeling and simulation shown by more abstract theories, such as self-organization, is sufficient for the study of simple organisms such as cells and insects, but seems unable to account for the complexity of human beings adequately. As such, older studies which directly studied groups of latency aged children still hold much value. Sherif, in Robbers Cave, was able to manipulate two separate groups of boys in a wilderness environment. On their own, such studies provide limited information about the *hows* of cohesion with which to formulate new theory. They are, at best, anecdotes or case studies for group clinicians. However, coupled with an abstract theory such as self-organization, it is the

author's hope that new insights may be drawn about the development of cohesion among groups of latency aged boys. Furthermore, coupling Robbers Cave with self organization provides the latter with grounding in reality. Finally, Sherif's study was chosen due to its unique incorporation of two tiers of cohesion—between individuals and between groups. Although the purpose of the study was to study the development of intergroup conflict, many implications can be drawn from all phases of the experiment.

Methodology And Aims

In light of the research on cohesion, it seems that a group-level theoretical exploration of the mechanisms and antecedents of cohesion specifically in latency-aged children that can be applied to a wide variety of both informally-organized and formally-led groups would be a valuable contribution to the field of study. This includes latency aged children in the context of therapeutic groups, social skill groups, play groups, classrooms, playgrounds, neighbourhoods, street gangs, summer camps, clubs, and cliques, among others. Any aggregation of latency aged children can benefit from an increased understanding of cohesion. Research on boys would also be more valuable to practitioners, as males seem to make up the greater percent of children accessing social services (in schools, corrections, courts, etc.).

As mentioned previously, this project utilizes an interdisciplinary approach wherein self organizational theory is applied to realistic conflict theory and the phenomenon of cohesion among groups of latency aged boys. Such an approach will hopefully provide increased external validity to self organizational theory, which lacks a strong empirical basis, and conversely reinterpret and update the rich narrative data of realistic conflict theory through the infusion of increased internal validity. In Chapter 6,

following a deconstruction of cohesion among groups of latency aged boys, I will present a formula for balancing task and social cohesion. This formula will consider the initial parameters of homogeneity, time, and frequency of opportunities for successful performance of the group and how they contribute to cohesion. The aim of this formula is to allow the social work practitioner both an assessment tool that will aid him/her in gauging the level of cohesion in a particular group, and guidance as to which parameters of cohesion need to be *tuned* with the overall goal of increasing cohesion. Recommendations will also be made about increasing or interrupting cohesion, and how to best administer superordinate tasks to facilitate cohesion development. Interrupting cohesion has practical applicability when used as an intervention with street gangs, social cliques, and other unholy alliances.

Relevance To Social Work

This topic bears relevance to the field of social work in a number of ways. Understanding cohesion in groups can provide groupwork clinicians working with children much needed credibility and accountability (Shechtman, 2002). Groupwork is an economical mode of treatment that is unfortunately underused (Shechtman, 2002). By facilitating the development of a child-oriented model of cohesion, groupwork clinicians can gain some credibility, and hopefully groupwork usage will increase. Also, a child-oriented model of cohesion supports clinicians in better understanding child group development and how it differs from adult group development, allowing a more objective assessment of their work. Furthermore, by allowing implications to be made about larger systems of which children are a part, a new model of cohesion can aid social workers and

other service providers in selecting more effective interventions—be it in classrooms, on the playground, or on the streets.

Transition

In the following chapter, I will elaborate upon the methodology to be employed in the application of self organizational theory to realistic conflict theory and the phenomenon of cohesion among groups of latency aged boys. Then I will discuss the phenomenon in more detail, and review current relevant research. Following will be an involved exploration of both theories. To conclude, I will present tools for the practical application of the insights garnered from the exercise, and make recommendations, as well as point the way towards further research.

CHAPTER II

CONCEPTUALIZATION AND METHODOLOGY

Working with two distinctive theories requires both a clear methodological approach and also an open mind. This chapter will elucidate the interdisciplinary approach that this project takes, the rationale behind the choices of the two particular theories, and identify the individual theoretical components that will be focused upon. The method of synthesizing these components into a logical, useful understanding of cohesion will be discussed in more detail, as well as author biases and strengths and limitations of the project.

Realistic conflict and self organization are two theories that are complementary to each other. Realistic conflict is a theory that was developed through an extensive field study that itself built upon previous field studies. In his “Robbers Cave Experiment,” Sherif credits the works of researchers such as Clifford Shaw, Frederick Thrasher, and William Whyte, all of whom did seminal field studies of street gangs (Sherif et al., 1961). Sherif’s concern in Robbers Cave is not as much “how” cohesion comes about as why there is a lack of cohesion between groups of people. Realistic conflict is ultimately a theory about the source of intergroup tension, conflict, and hostility. However, to study intergroup dynamics, Sherif first creates cohesive groups of latency aged boys. He achieves this by utilizing superordinate tasks as a means through which to foster individual interdependency. Sherif’s confidence in the efficacy of superordinate tasks in creating cohesion is derived from both the works of his predecessors, mentioned above,

and from his own previous studies (1949; 1953). At both the individual level and the group level, Sherif is successful in creating cohesion through this means. It is this aspect of Robbers Cave that this project will largely depend upon.

Self-organization theory seeks to explore the “how” of group cohesion. Borrowing heavily from the traditional “hard sciences,” self organization theory utilizes mechanisms such as *feedback* to explain how components of a system organize and form patterns. It also considers the principles and properties of self-organized systems. For the purposes of this project, I will be considering self-organization as applied to animal groups, even though it is a theory that was developed for, and has broad application across various disciplines (Heylighen & Joslyn, 2001). Self-organization relies upon computational modeling as a means through which hypotheses are tested. However, its hypotheses are based upon empirical observations of animal groups (Cazamine et al., 2001).

This project attempts to incorporate self-organizational theory into realistic conflict theory, and then apply the end result to groups of latency aged boys. These two theories seem to be complementary due to each theory’s limitations. Self organization theory does not account for the complexity of human beings, and realistic conflict theory focuses little on internal validity—i.e. showing and explaining causal relationships between variables. Wheelan (2005), however, perceives the theories’ limitations as their strengths. She claims that the aforementioned critique of abstract theories such as self-organization is a common one (Wheelan, 2005). Such a critique, she argues, fails to account for the *emergent principle*, which assumes that “the complexity of social life need not be reducible to the cognitive complexity of individuals” (Wheelan, 2005). In

fact, the simplification of individual components in computational modeling, upon which much of self-organizational theory is based, is exactly what is needed to discover the fundamentals of a system (Wheelan, 2005). Fundamentals “proved” in the controlled medium of modeling then provide a guide for subsequent empirical research, which often have more external validity.

In terms of cohesion in groups of latency aged boys, both theories have the strength of being “bottom up” theories, where cohesion has been conceived of and induced, or built—not merely extrapolated from observation (Wheelan’s term, 2005). Also, both theories address group level phenomena without neglecting the role of and processes at the individual level. In fact, Sherif’s experiment addresses two tiers of cohesion—one between individual boys, and another between two groups of boys.

Methodologically, this project will honour the emergent principle and invoke the Hegelian concept of *aufhebung*. *Aufhebung* describes the process through which both aforementioned theories, representing the thesis and antithesis of the Hegelian dialectic, will be synthesized into something that is simultaneously both the sum of and more than the sum of their respective parts. Specifically, I will utilize self-organization to reinterpret and enhance realistic conflict theory through an examination of the inducement of cohesion at Stages 1 and 3 of Sherif’s Robbers Cave Experiment. I will compare and contrast key features of the two theories, drawing parallels where they exist, and accounting for differences—gaps in the dialectic—through supplementation of supportive research or auxiliary theories. The end product, a culmination of the interchange between the two theories, will be assessed for validity, applicability, and utility in social work practice, and relevance to the phenomenon in question.

In realistic conflict theory, I will focus on the homogeneity of Sherif's subjects. Homogeneity is conducive to social cohesion—the cohesion that arises through the interpersonal attraction of individuals to each other within a group (Festinger et al., 1950, as cited in Zaccaro & Lowe, 1988). I will also explore the role of superordinate tasks in creating cohesion at both the individual and group levels of Robbers Cave. Considering the small group features proposed by Sherif, I will address the significance of the common motive, the emergence of social hierarchy, and the development of norms. Finally, I will examine the relationship between in-group cohesion and intergroup conflict.

In self-organizational theory, I will utilize its principles of dynamism, emergence, decentralization, and dense heterarchy in my examination of Robbers Cave. I will carefully apply the mechanisms of feedback, and explore the properties of attractors, parameter tuning, and bifurcation as it applies to Stage 3 of the experiment. I will also briefly discuss the parallel between “rules of thumb” and norms, and consider the role of stochastic events.

It is also important to note that I will be adopting Zaccaro and Lowe's (1988) empirically-supported conceptualization of cohesion as a “multidimensional” construct in my discussion of the differing roles of social and task cohesion.

The author has potential biases that have influenced her choice of the two theories identified in this project. Based upon her experience as a group work clinician, the author believes strongly in the efficacy of informally-organized, leaderless groups—and in the fluidity of leadership in general. Consequently, both theories describe groups that do not have formal leadership. Also, the author prefers group work as a mode of treatment over

individual-based modes. This is reflective of a systemic/contextual ideological view of the development of the human psyche, and is manifested in the focus upon group-level phenomena in this project. Finally, the author's own unique experience as an immigrant has undoubtedly influenced her belief in the strength of task cohesion over social cohesion in bringing people together—as the experience of an immigrant often includes the acceptance that one is irrevocably different. With biases identified, it seems necessary now to assure the reader that although these biases undeniably guided the selection of theories used in this project, the author is now committed to examining them faithfully and fairly, and to be receptive to the end results, whatever they may be.

As Dion (2000) rightly points out, after almost eight decades of cohesion research, we still have no convincing means of quantifying this phenomenon: “We have no standard, off-the-shelf measure of cohesion in which we can have strong confidence.” One reason for this may be the inherent difficulties in attempting to measure something that can only be observed through its effects. As such, a synthesis of a social psychological theory of cohesion's effects with an abstract, mechanistic theory such as self-organization may yield new solutions to this dilemma. One of the shortcomings of utilizing such an approach is the lack of validity. Grandberg and Sarup (1992) report that Sherif himself was preoccupied with the real world application of his research—with external validity. He perceived experimentation in the real world as the “crowing touch of analysis,” a fallacious approach which undoubtedly limited his discovery of unforeseen or unpredictable elements (Grandberg & Sarup, 1992). Perhaps this is the reason Sherif's work was not included in Dion's survey of cohesion research highlights (Dion, 2000). In fact, there is very little critical assessment of the Robbers Cave Experiment to be found in

the cohesion literature. In terms of this project, the reliance on Sherif's work also compromises its internal validity, while simultaneously increasing its external validity. Even given the latter, the homogenous subjects of Robbers Cave are hardly representative of the world's latency aged boys. Validity, however, seems to be a perennial problem for social psychologists, and this project is not exempt from that problem. Some effort will, therefore, be made to assess the validity, relevance, and applicability of the final product.

Another shortcoming of this project is the age of the Robbers Cave Experiment. There has been significant development in the field of cohesion since its publication, much of which this project does not address. Additionally, whether the emergence principle is to be assumed or not, the critique persists about the usefulness of reducing human beings to the simplicity of birds, fish, and insects. It may be that the cognitive sophistication, language, and culture of human beings disqualifies us from any theory of cohesion that is based upon instinctual drives such as protection from predators, and mechanisms that assume little or no individualized motivation. This reductionist approach would be a glaring ethical concern in an experimental project. However, this remains a theoretical exercise.

There is much inherent strength in an interdisciplinary approach. The increased specialization of disciplines has resulted in traditionally cooperative areas of study to split off from each other and take very distinctive trajectories that employ distinctive methods. By applying self organizational theory to realistic conflict theory, I hope to update an empirically rich and rare study of latency aged boys in a somewhat controlled experiment with a theory that has emerged from new developments in computer modeling and the tracking of large aggregates. Although there is a limitation in utilizing a social

psychological theory that does not have as its primary purpose the specific study of cohesion, the data is still relevant. The aim of this project is to reinterpret Sherif's findings in the context of cohesion. At the very least, this project will fulfill some of the research needs around a child-specific conceptualization of cohesion and serve as a spring board for further theoretical development and experimental formulation.

In conclusion, the author aims to integrate components of both realistic conflict and self-organizational theory into a new understanding of cohesion among groups of latency aged boys. The strengths of this approach are the production of new insights, and the enhancement of internal validity for realistic conflict theory. The limitations of this approach include lack of overall external validity for the final product, and a possible lack of relevance to the phenomenon due to the datedness of the experiment. In the next three chapters, we will first consider the research on cohesion, and then examine both realistic conflict and self-organizational theory in further detail.

CHAPTER III
COHESION AMONG GROUPS OF LATENCY AGED BOYS

Introduction

The phenomenon under study is cohesion among groups of latency aged boys. It is necessary before a review of the literature on the topic to clarify “cohesion,” and “groups,” as well as specify the particulars of this phenomenon.

A working definition of cohesion that has been developed for this project is:

An emergent property of a group of individuals arising under specific conditions that manifests as a cleaving or sticking together of the individuals in a non-random, patterned way that is not necessarily conscious to those individuals or within their will.

This working definition does not presume that the individuals are motivated to be in the group, as a cohesive group may contain individuals who dislike their membership in it (Brown, 2000). However, individuals can be presumed to be aware of their membership.

Whilst there is ample research on the correlates and benefits of cohesion in groups (Dion, 2000), there still remains a lack of consensus on the mechanisms that operate to create cohesion. There is also a lack of understanding about cohesion itself as the “glue” that binds individuals together (Brown, 2000). This working definition refers to the antecedents of cohesion rather than the consequences of it. Clark et al. (1997) defines an emergence property as one which: “the larger system (the group) must possess [...], while its components (the individual members) do not” (as cited in Parrish et al., 2002).

Properties Of Groups

The group here is defined as three or more individuals—‘individuals’ referring to individual components or entities, not necessarily sentient, although all the individuals that this project concerns itself with are sentient. In a study on schools of fish, Partridge (1982) found that among three or more fish, there ceases to be a distinction between leader and follower. Other research into swarms of animals has found that after a critical density of individuals is reached, animals spontaneously self-organize (Klarreich, 2006; Couzin & Krause, 2003). Although it is not necessary to strictly define the size of the group in our study of the phenomenon, it is important to note the role of the size of the group on the development of cohesion. Other group properties that are of significance are the context of the group, the presence of formal leadership or lack of it, and the homogeneity of the group. All these aspects affect cohesion and will be addressed in the following literature review.

Literature Review

Before beginning the search on literature pertaining to the phenomenon of cohesion in groups of latency aged boys, it is helpful to better understand the concept of cohesion and its development historically in the discipline of social psychology. Review of the seminal theorists, models, and empirical studies in the field yielded primarily adult-oriented research. However, research on adult cohesion may not readily apply to children’s groups (Shechtman, 2002). A preliminary search on children’s groups revealed an abundance of quantitative outcome studies. However, while these studies demonstrated the effectiveness of group work on various subject measures, such as assertiveness and locus of control (examples: Blonk et al., 1996; DeMar, 1997), they do not provide insight into the inner processes of group work and cohesion. Instead, a

qualitative study and a case study, specifically addressing cohesion in children's groups, provided valuable ideas on possible antecedents of cohesion (Canham & Emanuel, 2000; Mayerson, 2000). The qualitative study was able to identify and also correlate the ability of the adult facilitator to take on a non-facilitating role with the experience of "group-as-a-whole" events (GAW events) by both adults and children within the group (Mayerson, 2000). Also reviewed is a seminal quantitative study by one of the pioneer researchers of cohesion that dealt indirectly with cohesion by measuring and correlating aggression in boys groups with different leadership styles (Lewin et al., 1939). Supplementing the limited research on cohesion in children's groups is research on cohesion in animal groups. The field of theoretical biology has made extensive study of fish, birds, insects, ungulates, and wolves. Presented here is some of the most current research on the self-organization of these species (Klarreich, 2006; Couzin & Krause, 2003; Parrish et al., 2002). Also presented are studies uncovering some of the properties of physical cohesion among groups of ungulates (Conradt & Roper, 2000; Michelena et al., 2008), considering heterogeneity in groups (Gueron et al., 1996; Romey, 1996; Sayama, 2007), and the lack of social hierarchy in natural environments (Mech, 1999; Kerkhove, 2004). Finally, this chapter will consider briefly some of the wisdom of group work practitioners in regards to cohesion. The following chapter will be divided into three sections, addressing in sequential order cohesion in human groups, in animal groups, and in group work with both adult and children.

Cohesion In Human Groups

Definitions, conceptualizations, and historical developments. Dion (2000)

succinctly traces the development of the scholarship on cohesion from Freud to present

day theories. Reviewed in his article are the works of seminal theorists. Emile Durkheim linked the loss of social cohesion to suicides (as cited in Dion, 2000). Kurt Lewin and his colleagues believed that cohesion is an essential property of groups, and hypothesized that cohesion is a balance between the attraction to and repulsion by a group that individual members have—a theory that is currently known as ‘field of forces’ (as cited in Dion, 2000). Leon Festinger conducted a set of famous studies at an MIT dormitory that found that proximity between students, or *propinquity*, is a factor in developing group cohesion (as cited in Dion, 2000). He also was one of the first to theorize about the existence of two types of cohesion—task and social (as cited in Dion, 2000). Schachter and Back distinguished between vertical and horizontal cohesion (relating to cohesion among members of a group, and cohesion between members of a group and the leader(s) of the group (as cited in Dion, 2000). These examples are just a handful of the important developments in the field of cohesion, as highlighted by Dion. Dion (2000) also addresses cohesion in the related areas of the military, and sports. In summary, Dion (2000) cites as significant contributions the ideas of horizontal and vertical cohesion, and the distinction between social and task cohesion—the latter of which was found to be better correlated to the correlates of cohesion—and recommends that future research focus more upon the group as a whole rather than on the individuals within it. This project will utilize the distinction between social and task cohesion in its application of self organizational to realistic conflict theory.

An article focusing upon the idea of the “group-as-a-whole” places the ideas of Freud, Le Bon, MacDougall, Foulkes, Bion, and Lewin in the context of their tumultuous war times (Ettin et al., 1997). Group-as-a-whole thought concerns the “nature and

consequences” of treating individuals with differing values and needs within a group setting (Ettin et al., 1997). The British psychoanalyst Bion’s idea of “basic assumptions” in particular seems to have influenced the Canham and Emanuel (2000) case study (as cited in Ettin et al., 1997). Lewin’s contributions are also lauded. Ettin et al. (1997) cites his “field of forces” theory of group cohesion, and his formula for individual behaviour within a group setting, $B=f(P,E)$, which recognizes the dual importance of both the individual’s and the environment’s contribution (Ettin et al., 1997). Ettin et al. (1997) also reports that Lewin’s seminal 1939 study of the effects of leadership style on aggression in boys groups was replicated in 1994.

Along the vein of the Dion article, Brown’s *Group Processes* (2000) also gives a historical overview of the development of the study of cohesion, albeit supplementing Dion by addressing different theorists. Brown (2000) identifies the terms “solidarity, commitment, morale, and esprit de corps” as synonyms for “cohesion.” He cites the early development of interpersonal attraction—an early description of social cohesion—as the dominant explanation of group cohesion, and provides three counterexamples to it (Brown, 2000): If interpersonal attraction was the only determinant of cohesion, cohesion would 1) not be an emergent property 2) not exist when group members dislike each other 3) not exist when group members have never met (Brown, 2000). Brown (2000) explains that as a result of these counterarguments, Hogg (1992) developed the idea of cohesion as a measure of the individual members’ attraction to the idea of the group (as cited in Brown, 2000). Brown (2000) also cites Sherif et al.’s (1961) “Robbers Cave Experiment” as the seminal work that presented the relationship between intergroup competition and in-group cohesion. Sherif et al. (1961) found that when intergroup

competition increased, so did in-group cohesion. Sherif et al.'s results were confirmed by Julian et al. in 1966 (as cited in Brown, 2000). It is significant to note that references to Sherif's work were very limited in the cohesion literature, with this being one of the instances of its mention. Brown (2000) also explores the relationship between a group's cohesion and its failure or success, and discovered that five year olds do not experience the predicted decrease in group cohesion that comes as a result of failure of the group to achieve its goal (Turner et al., 1984, as cited in Brown, 2000). Also, according to this study, the role of choice in joining the group seems to play a role in group cohesion (as cited in Brown, 2000). Indeed, performance's link to group cohesion has been extensively explored in two meta-analyses. Beal, Cohen, Burke, and McLendon's (2003) meta-analysis, reworking data from 65 studies on the relationship between cohesion and performance, yielded the conclusion that behaviours and efficiency are better correlated with cohesion than outcome and effectiveness—respectively. Furthermore, a more complex workflow, defined as patterns of interaction between members of a group, seemed to be linked to an increase in cohesion (Beal et al., 2003). Mullen and Cooper's (1994) meta-analysis of 49 studies questioned whether performance was indeed a product of cohesion, as was previously believed (as cited in Brown, 2000). Their findings indicated that positive performance may have given rise to cohesion, a finding supported by a 1975 study by Helmreich (as cited in Brown, 2000).

Finally, Treadwell, Lavertue, Kumar, and Veeraraghavan (2001) reviewed many of the conventional definitions of cohesion. For example, cohesion was defined as a member's motivation to remain in a group, which is related to the idea of choice referred

to in Brown (2000). The authors also distinguish between task cohesion and emotional cohesion (Treadwell et al., 2001).

Measures. Researchers attempting to measure cohesion heavily favoured the usage of surveys administered to the individuals in a group. Griffith (1988) identified in a study of over eight thousand US military subjects that cohesion seemed to be represented by four dimensions: horizontal cohesion (that between the soldiers themselves), vertical cohesion (that between the soldiers and their officers), the internalization of the values of the military, and the soldiers' confidence in their leaders and in their weaponry. Alternatively, in a test of their revised "Group Cohesion Scale" in eight adult psychodrama group classes, Veeraraghavan, Kellar, Treadwell, and Kumar (1996) found that time spent together was a factor in cohesion.

Cohesion in children's groups. A London case study of a one year psychoanalytic psychotherapy group for six children four to eight years old provides a compelling and rare glimpse into the processes of the small group (Canham & Emanuel, 2000). In the evolution of the group, the children begin by attempting to pit one co-facilitator against the other, and cannot conceive of themselves as a group. Furthermore, when the children play, one child is always left out, and scape-goated or vilified. The authors speculate that this sort of "togetherness" is more akin to a gang than to a cohesive group. However, towards the end, the children are able to express in action, play themes, and in drawings the idea of a group as a whole wherein all the members are included. This stage in the group is characterized by expression of hostile feelings, vulnerability, and empathy. Canham and Emanuel (2000) acknowledge the contribution of Bion's theories in their assessment of the group's cohesiveness.

Mayerson (2000) conducted a qualitative study focusing exclusively on the phenomenon of “group-as-a-whole” moments, or GAW. GAW moments are defined as when the group seems to have a “life of its own.” The study consisted of five same gender groups of five to eight latency aged children meeting for ten months with two or three adult facilitators in an after school setting. As in the above process case study, groups were unstructured, and described as “play activity groups.” In post group interviews, evaluations of process recordings and drawings, member-identified GAW moments were found to correlate with fluidity of roles.

The aforementioned Lewin, Lippitt, and White study of 1939 is an ambitious experimental quantitative study exploring the relationship between different leadership styles and aggression levels in three groups of ten year old boys. Over five months, each group experienced a “democratic”, “laissez-faire”, and authoritative leadership style (Lewin et al., 1939). Pre-tests and playground observations were taken, and the Rorschach was also administered. The researchers found that under democratic leadership, groups showed the least aggression. The word “we” was also used most frequently under this leadership style. Authoritative leaders, on the other hand, in addition to being disliked, yielded groups characterized by high horizontal (member to member) aggression, passivity towards the leaders, and scapegoating. While the study does not speak directly about cohesion, it seems to look indirectly at cohesion by focusing upon the behaviour that is antithetical to it, namely, aggression. In this sense, the conclusions reached by the authors seem to indicate that leadership style affects both horizontal and vertical (member to leader) cohesion indirectly by affecting aggression levels in the group. Interestingly, this conclusion seems contrary to that reached by the

Canham and Emanuel case study, wherein expressions of hostility seemed to lead to increased cohesion. Sherif (Sherif et al., 1961) also refutes Lewin et al.'s conclusions.

In these three valuable studies of group process, cohesion is defined as “tied together feelings,” GAW moments, and indicated by the use of the word “we.” Correlates of role fluidity, expressions of hostile feelings, vulnerability, and empathy were also identified. The Mayerson (2000) study uniquely proposes that cohesion is facilitated through the adult facilitator's ability to enter into a different role in play with the children. Furthermore, the Lewin et al. (1939) study suggests that a non-authoritative, democratic style of leadership may be most conducive to cohesion. These studies, however, focus upon formally (adult) led groups. Additionally, most cited thus far have treated cohesion as a uni-dimensional construct.

Multidimensionality. Stephen Zaccaro has spearheaded the conception of cohesion as a multidimensional construct. Two important studies, one in 1988 with Lowe that utilizes as its subject an undergraduate psychology class, and another in 1990, which focuses upon military squadrons, show conclusively that cohesion, when conceived of as consisting of “interpersonal cohesion” and “task cohesion,” yields separate correlates for each dimension. Specifically, task cohesion was found to correlate strongly with performance, while interpersonal cohesion correlated with both increased commitment to the group and increased distraction from performance (Zaccaro & Lowe, 1988). Zaccaro's multidimensional construct of cohesion will be employed in our consideration of the phenomenon of cohesion among groups of latency aged boys. However, it is questionable whether the conclusions of adult studies can be applied to children's groups.

The application of adult-oriented research to children. Israel's Zipora Shechtman, in her 2002 review of the literature on children's school-based groups, has identified four areas in which children's groups differ from adult groups: stages of group development, "experiencing," "interpretive interaction," and "therapeutic factors." Due to these findings, she warns of the dangers of generalizing group work theory across all ages, and stresses the importance of doing child-focused research (Shechtman, 2002). She also expresses the need for rigorous, process-oriented research, as opposed to the readily abundant quantitative outcome studies (Shechtman, 2002; Leichtentritt & Shechtman, 1998). In a 1998 study, Leichtentritt and Shechtman found that children tended to self-disclose frequently in small, formally-led school-based groups. In fact, compared to the children, the adult leaders self-disclosed the least, and trainees (under the adult leaders) self-disclosed more than the leaders but less than the children (Leichtentritt & Shechtman, 1998). Self disclosure seems to be a significant part of the process of developing cohesion for children. It is unclear whether adults also self disclose, or how that might manifest in group settings. In a 1997 quantitative study of children's groups in a school in Israel, Shechtman also found developmental differences among elementary school-aged children and adolescents. It appears that even among children, it is unwise to generalize across ages.

The applicability of animal research to humans. Considering the danger of applying adult and adolescent cohesion and group work research to latency aged children, it may seem even more unwise to apply animal research to these same children. T.C. Schneirla (as cited in Sherif & Sherif, 1966), warns against the pitfalls of "zoomorphism," which is the reverse of anthropomorphism. Addressing the trend of the

1960's in finding analogies between the complexities of animal societies and human society, Schneirla proposes the concept of "levels"—wherein animal societies form a continuum of less-complex to more-complex, of which humans are not a part. The separate "level" of complex human society may be compared to the level of the animals, but not seen as analogous or functioning under the same processes and mechanisms (as cited in Sherif & Sherif, 1966). With his warning in mind, the remainder of the chapter will consider animal cohesion research, with the hope that some insights into the construct of cohesion may be garnered, and fresh interpretations of cohesion in groups of latency aged boys made through this cross fertilization between the disciplines of highly individualized and cognitively developed adults, less individualized and cognitively developing children, and more collective, less cognitively sophisticated animals.

Cohesion In Animal Groups

Parrish et al. (2002) proposes that "aggregation" is universal for all animal groups, and argues that it occurs for the purposes of information transfer. Klarreich's (2006) eye-opening article on cutting edge biological research on swarms of animals considered aspects of group cohesion not addressed in the Dion (2000) literature review. Researchers studying ants, locusts, and fish found unanticipated determinants of how groups navigate the areas of leadership, group expertise, productivity, and architecture. For example, ants became more productive as they increased in density, but productivity is not related to density in a linear way (Klarreich, 2006). The implication for group cohesion research is that size is a critical determinant of cohesion. Klarreich (2006) also cites research that shows locusts spontaneously self-organizing into cohesive groups when a certain density of individuals is met. The article also introduces the concepts of

positive feedback mechanisms, alignment zones, and swarm intelligence (Klarreich, 2006). The biologist responsible for most of the concepts in Klarreich's article is Princeton's Iain Couzin. In his treatise on "Self-organization and collective behaviour of vertebrates" (Couzin & Krause, 2003), Couzin utilizes Camazine et al.'s (2001) definition of self-organization: "a process in which pattern at the global level of a system emerges solely from numerous interactions among the lower-level components of a system."

In other words, self-organization is the study of cohesion among components in a system. The theory of self-organization proposes that this cohesion is emergent, and that it is also based upon the interactions between the components (Camazine et al., 2001). Couzin and Krause (2003) rule out the migratory groups of animals as an example of self-organization because all the animals are focused upon arriving at one geographical location, and thus the patterns of their gathering are not contingent upon their interactions. Joanne Corbin (2009) argues that even when a common geographical location is the primary aggregate motivator, self organization exists as individuals navigate physical proximity with one another. Couzin and Krause's (2003) research has also revealed that self-organization tends to have an inversely proportionate relationship to cognitive sophistication among animals. This may explain why self-organization is frequently found among insects, birds, and fish, but less among primates and other mammals, which tend to form familial, or hereditary, groups. Couzin and Krause's (2003) treatise draws from both original and other research and modeling to address all aspects of animal cohesion. They trace the development of thought on how animal groups orchestrate complex behavioural patterns from the early ideas of "thought transference" and the influence of "electromagnetic fields" to the idea of leadership in groups (Selous,

1931; Presman, 1970; Heppner & Haffner, 1974, as cited in Couzin & Krause, 2003). They also survey the development of the computer modeling of groups—an important research tool given the nature of the live subjects. There are many properties of self-organized groups. Individuals in these groups tend to follow simple “rules of thumb” which are based solely on limited, localized information they garner from their neighbours, instead of from a leader (Partridge, 1982; Couzin & Krause, 2003). The positions that individuals occupy within groups have different costs and benefits (Couzin & Krause, 2003). Through modeling, Couzin & Krause (2003) also show how changes in the alignment zones of individuals lead to changes in the group’s formation. Through experimentation with human subjects, they illustrate how groups make decisions based upon a “majority rules” rule (Couzin & Krause, 2003).

Because animals cannot be surveyed individually with instruments, their behaviour has been the primary measure of group cohesion. As such, many studies focus upon the physical cohesion of groups of animals. Two studies on the movement of groups of ungulates found that physical cohesion within a group of individuals was affected by the activity level of the individuals. Conradt and Roper (2000) found that differing levels of activity among deer resulted in segregation within the group. Likewise, Michelena et al. (2008), videotaping Merino sheep, confirmed the findings, but also found that sheep tended to stay cohesive longer with same sex individuals—showing that “social affinity” plays a part in physical cohesion. Michelena et al. (2008) measured cohesion through two properties of the group: the degree of polarization (alignment) of the individuals with each other, and the inter-individual distance.

Homogeneous versus Heterogeneous. Given the role of “social affinity” in groups of ungulates, it seems relevant to address the issue of homogeneity versus heterogeneity of self-organized groups (Michelena et al., 2008). The prevailing practice in school-based intervention groups has been to create heterogeneous groups of children for the purposes of modeling appropriate behaviour, etc. (as cited in Shechtman, 2002). However, self-organization research shows conclusively that heterogeneous groups self-segregate (Gueron et al., 1996; Sayama, 2007). Sayama (2007) finds that in artificially modeled heterogeneous swarms, self-segregation is inevitable and spontaneous due to the “differences in [the individual’s] kinetic parameter settings that causes the differences in the local environs they ‘prefer.’” Similarly, in a simulation of both a homogeneous and heterogeneous herd, the homogeneous herd was more likely to stay together (Gueron et al., 1996). In fact, in 1996, Romey showed that even the introduction of one single individual fish operating under a different set of rules governing group movement into a different school of fish can affect the trajectory of the entire school.

Modeling. The Gueron et al. (1996) and Sayama (2007) studies would not have been possible without the advent of computer modeling techniques, so an exploration of this aspect of the research on cohesion seems warranted. Perhaps the most infamous example of self-organization modeling is the work of Craig Reynolds, whose work was featured in the Hollywood movie *Batman Returns*. Although a computer graphics and artificial intelligence expert, Reynolds’ 1987 article entitled “Flocks, Herds, and Schools: A Distributed Behavioral Model” proved a seminal work for the modeling of self-organized groups. Reynolds’ creation, “Boids” are birdlike creatures that follow three basic behavioural rules and adhere to two forces (Reynolds, 1987). These rules and forces

will be described in greater detail in Chapter 5. The result of these parameters is that the “Boids” successfully mimic the physical cohesion of real life groups of birds, fish, and other self-organized animals. Reynolds (1987) concludes that these simple rules and forces can be applied to the flock/school as a whole in relation to other flocks/schools. The success of self-organization modeling has helped animal cohesion researchers support their theory that cohesion among animals is an emergent property that depends on fairly simplistic, localized interactions among individuals.

Social structure. One of the prevailing presumptions about higher order animal groups, such as groups of wolves, is that these groups are based upon a strict social hierarchy. The implication is that humans must necessarily operate in strictly hierarchical social structured groups as well. However, recent research has shown that wolves may not utilize hierarchy in the wild (Mech, 1999; Kerkhove, 2004). In fact, it is now believed that the stereotypical competitiveness and hierarchy among canines is due to the conditions of captivity (Mech, 1999; Kerkhove, 2004). This finding has implications for the role of the environment on in-group structure.

Group Work With Children And Adults

Conventional adolescent group work theory holds that group cohesion aids in the ability of a group’s members to “do work.” For example, the Boston model seems to imply this conclusion by characterizing the “differentiation stage” as that during which outside observers notice that “*they are a group*” (Malekoff, 2004, p. 56). As such, cohesion can be positively correlated with effectiveness of a group, and by substitution, correlated with the variables that are positively influenced by group outcome, such as internal locus of control, frustration tolerance, assertiveness, social behaviour, peer

relationships, social anxiety, self evaluation/concept, as well as time. In a sense, these are the “clues” to cohesion, even though the distinction between task and social cohesion is not focused upon in the Boston model.

Irvin Yalom is perhaps the single most important contributor to group work theory in the field of groupwork. In his seminal *Theory and Practice of Group Psychotherapy* (Yalom & Leszcz, 2005), Yalom argues that the urge to belong is innate. However, cohesion does not always feel comfortable. Yalom & Leszcz (2005) compare cohesion within groupwork to the therapeutic relationship in individual treatment, and describes cohesion as leading to “trust,” “warmth,” “empathic understanding,” and “acceptance.” Alluding to the distinction between task and social cohesion, they contrast a “sense of belonging” with the success of the group, qualified as the group’s functioning, and observe that the latter leads to increased cohesion. This conclusion echoes those of Helmreich (1975) and Mullen & Cooper (1994) (as cited in Brown, 2000).

Summary And Transition

In conclusion, a review of the research on cohesion and group work has highlighted some of their antecedents. Time and frequency of contact seem to be contributors to cohesion. The homogeneity, size, and density of the group also seem to determine whether the group self-organizes. Unfortunately, it is apparent that very little study has been done of the mechanisms of cohesion in human groups. It is clear, however, that any theoretical exploration will have to employ a multidimensional construct of cohesion and not rest primarily on adult-oriented research. Furthermore, it should consider informally led groups, or at least groups where the adult abandons his/her role as leader at times (Mayerson, 2000). Most importantly, any new understanding of

cohesion in groups of latency aged boys should address the distinction between task and social cohesion, and the former's relationship to performance. I will now to turn to realistic conflict theory.

CHAPTER IV

REALISTIC CONFLICT THEORY

Introduction And Synopsis Of The Experiment

Muzafer Sherif's realistic conflict theory is a theory that provides a framework for understanding the relationship between groups. The theory's main thesis is that limited resources in the environment of groups will lead to their conflict with one another, and to the development of prejudices and discriminatory attitudes (Sherif et al., 1961). The Robbers Cave Experiment, henceforth referred to as Robbers Cave, convincingly verified this thesis. Sherif's research interest was primarily in informally-led small groups. In Robbers Cave, he and his colleagues define a group as:

a social unit which consists of a number of individuals who, at a given time, stand in more or less definite interdependent status and role relationships with one another, and which explicitly or implicitly possesses a set of norms or values regulating the behavior of the individual members, at least in matters of consequence to the group. (Sherif et al., 1961, p. 28-29)

In 1954, Sherif and his colleagues transported two busloads of eleven year old boys to a secluded summer camp in Robbers Cave State Park in Oklahoma. The 22 carefully selected boys were divided into comparable groups, which were kept isolated from and unaware of each other. During the first few days of the experiment, each group was given tasks that required the interdependency of the boys on each other. For example, each group was asked to list eight items they would like to acquire from a canteen. At the end of this period, or Stage 1, each of the groups had developed into a cohesive unit with a

distinct social hierarchy and group norms. The groups named themselves the Eagles and the Rattlers.

In Stage 2 of the experiment, the groups were made aware of each others' existence, and hostilities between them ensued. The Eagle and Rattlers engaged in pre-planned competitive tasks, such as baseball games and tug-of-wars. The intergroup hostility became so extreme that Sherif and his colleagues were forced to quickly move onto Stage 3 of the experiment.

In Stage 3, a series of superordinate tasks that required the cooperation of both groups led to a gradual decrease in the hostility and conflict between them. At the conclusion of Stage 3, all the boys insisted on riding home on the bus together.

Sherif and his colleagues' focus in Robbers Cave were on "intergroup relations."

The experiment is described in the following way:

[...] it undertakes to trace over a time period the formation and functioning of negative and positive attitudes of members of one group toward another group and its members as a consequence of experimentally introduced situations. Therefore, the main hypotheses relate to attitudinal and behavioral trends predicted as a result of controlled alterations of the conditions in which experimentally formed in-groups interact. (Sherif et al., 1961, p. 27)

Sherif et al. attempted to recreate the "natural process of spontaneous group formation" in Stage 1 of the experiment (1961, p. 35). As such, the boys were not aware of their participation in the study. Care was taken to disguise directives as natural, everyday occurrences or problems that needed to be solved, and data was collected in a variety of non-intrusive ways. Tasks were introduced subtly, so that the direction of adult staff was minimal, and the tasks seemed to the subjects to be their own ideas. For example, instead of directing the boys to engage in a certain activity, supplies or equipment, such as a coil

of rope, or a canoe, were left by the boys' cabins. During Stage 2, a competitive atmosphere between the two groups was carefully created, although each group was led to believe that the other group was interfering with its success. Sherif et al. describes this environment as containing "situations which will be perceived by one group as frustrating and which will be perceived as caused by the other group, and not by the camp administration" (1961, p. 45). Similarly, the superordinate tasks of Stage 3 were disguised as everyday events, such as a truck breaking down, or bulk food needing to be partitioned. While the boys' parents and teachers were informed that Robbers Cave would be an "experimental camp" studying teams and teamwork, it is unclear how aware the boys themselves were about the purposes of the study (Sherif et al., 1961, chap. 3).

While all three stages of the experiment are relevant to the study of cohesion among groups of latency aged boys, in particular, Stages 1 and 3 can be made to bear most on an understanding of the development of cohesion. An immediately apparent value of examining the Robbers Cave Experiment is the use of latency aged boys as subjects. In addition to fulfilling a research need for child-oriented process studies, Robbers Cave is rife with rich empirical details and data of the kind that is rarely gathered or included in present day studies. And although the formation of cohesion among the boys was not the primary aim of the experiment, Stage 1 is focused entirely on the development of in-group cohesion, and Stage 3 seems to parallel Stage 1 in creating cohesion between the Eagles and the Rattlers instead of between individuals.

In the following sections, the essential features of in-groups, as verified by Stage 1 of Robbers Cave, will be examined. Next, traditional explanations for intergroup relations that fuelled Sherif's development of realistic conflict theory will be explored.

An understanding of these traditional explanations is important because intergroup relations seem to be an effective analogy for in-group relations, but not vice versa (Sherif & Sherif, 1966). Furthermore, these traditional explanations have been employed frequently in the explanation of cohesion among groups of latency aged boys (e.g. Lewin et al., 1939). A detailed discussion of the experiment's hypotheses will follow. Finally, the theory will be applied to the phenomenon, with particular attention to relevant aspects.

Features Of Small Groups

In compiling a list of essential small group features, Sherif drew heavily on the works of gang researchers Thrasher (1927), Shaw (1930), and Whyte (1943) (as cited in Sherif et al., 1961). In *Groups in harmony and tension*, Sherif and Sherif (1966, p. 192) list four features:

1. common motive or motives conducive to interaction among individuals
2. differential effects of the interaction process on individuals
3. rise of a group structure with hierarchical statuses within it and clear-cut in-group demarcations
4. standardization of values and norms and other group products in terms of which activities within the group are regulated

In our aim to better understand cohesion, it is enough to be aware of feature 1. The exact content of the motive(s) is/are not important. Unlike animal groups, which primarily band together for survival, human motives for group membership can be very complex. For example, Sherif and Sherif (1966) state that "very often, just being with the in-group

becomes a goal in itself.” In Robbers Cave, Sherif et al. (1961) argue that not only is a common motive or motives necessarily for cohesion, it is sufficient.

Features 2 and 4 refer to both the effects of group cohesion on the individuals’ attitudes, judgements, etc. and the standardization of these attitudes and judgements within the group. In an attempt to understand the antecedents of cohesion, it is not as relevant as feature 3, which may be viewed as controversial, especially given the emphasis on and enforcement of equality among children in classrooms and other settings. Sherif and Sherif (1966) attribute the rise of group structure to the differences between individuals within a group, even given his and his colleagues’ stringent attempts at creating homogeneous groups: “since individuals are not identical, the expectations engendered in this state of reciprocity fall into a hierarchical scale.” Compare this with Sayama’s (2007) findings about the self-segregation of heterogeneous groups. It is also likely that animals have less individualistic differences between them, and as such are more likely to be heterarchical. The studies of Mech (1999) and Kerkhove (2004), which found that in natural environments, animal groups traditionally believed to be highly hierarchical tended to be less so, seem to support this observation. It would be interesting to see whether the social hierarchies that develop in the Eagles and the Rattlers would exist in a purely natural environment devoid of adult manipulation.

An important relationship discovered in the course of Robbers Cave that is related to point 3 is that an increase in intergroup conflict will lead to an increase in in-group solidarity (Sherif et al., 1961). Sherif and his colleagues use the word “solidarity” synonymously with “cohesion.” The relationship is explained thus: “the rise of a group structure necessarily implies distinguishing those who are in the group from those who

are not in the group” (Sherif & Sherif, 1966). While Robbers Cave attributes this relationship to the lack of resources hypothesis, in Chapter 6, we will propose an alternate conception of this relationship between in-group cohesion and intergroup conflict.

In considering these features of small groups, it is important to recall that Sherif and his colleagues verified them through observation and other measures in Robbers Cave. As such, a survey of hypotheses that Sherif et al. considered and rejected prior to the inception of Robbers Cave seems warranted.

Historical Background And Aims Of The Theory

In *Groups in harmony and tension*, Sherif and Sherif (1966) consider historical explanations for the lack of cohesion among groups of human beings—specifically, the explanations of race, national character, human nature, leadership. As suggested, such a consideration is important due to the frequent assumption of these explanations in cohesion research, with the exception of race, perhaps.

The belief that some races were superior to others, and that the ensuing hierarchy of racial groups created conflict between them has, according to Sherif and Sherif (1966), been thoroughly disproved by a large body of conclusive evidence to the contrary. As such, they spend very little time on this topic. Current research on horizontal hostility, however, shows that one of the effects of racial oppression is the hostility of minority groups to other groups that are similar to them, but less distinct from the dominant group (White & Langer, 1999). A good example of this is the hostility between Asians and Blacks (Fong, 1997). In light of this research, it is clear that a hierarchy of races, based not on inherent superiority and inferiority, but on perceived superiority and inferiority by the dominant race, creates hostility and conflict between groups. This research, however,

is not incommensurate with realistic conflict theory, as racial demarcations are often representative of access to resources and power.

National character is another explanation that has been proposed as a cause of intergroup conflict (Sherif & Sherif, 1966). This explanation holds that certain traits characterize certain nationalities of people. And it is these differences in traits that cause conflict between groups (Sherif & Sherif, 1966). Sherif and Sherif rightly point out, however, that not only are stereotypical traits often not representative of the majority of a nation's members, but that national character, if assumed, has been shown to change through time. An example they give is of the barbarous Vikings, who are now peaceful Scandinavians (Sherif & Sherif, 1966). Changes denote relativity to context.

Human nature is another traditional explanation that Sherif and Sherif (1966) examine. This explanation is influenced primarily by Freud's assertion that aggression is a basic drive of all human beings (as cited in Sherif & Sherif, 1966). According to Freud, groups are held together by *eros*, and remain together if there's an external target available to serve as an outlet for aggression (as cited in Sherif & Sherif, 1966). This assertion seemed to be supported by Lewin et al.'s (1939) study on the relationship between leadership style and aggression in groups of latency aged boys. Sherif & Sherif (1966), however, discredits this experiment as a valid study of group solidarity, as the groups are formally organized. However, there is no evidence of aggression across all cultures, nor is there found to be a predominance of the kind of complexes that Freud believed would develop as a consequence of the repression of aggression (Sherif & Sherif, 1966). Additionally, in studies, younger children were found to be less aggressive

in general than older children, further debunking the Freudian model (Sherif & Sherif, 1966).

Leadership's role is the final explanation that Sherif and Sherif (1966) examine. The efficacy of the leader in groups is evident—including in Robbers Cave. However, in considering whether leadership is responsible for intergroup conflict, there is no evidence of universal leadership traits (Sherif & Sherif, 1966). In fact, leadership seems to be relative to the situation the group finds itself in. Furthermore, leaders themselves seem to be limited in their actions by a group's norms (Sherif & Sherif, 1966). A study on children's groups has also shown that a leader's willingness to assume different (non-leadership) roles leads to an increase of "group-as-a-whole" moments (Mayerson, 2000). As such, leadership does not seem to be the determinant of intergroup relations.

Although Sherif and his colleagues do not formally address proximity as an explanation for intergroup relations, he remarks that proximity is not sufficient for cohesion (1961, 1966). A hypothesis in Stage 3 of Robbers Cave reflects this: "It is predicted that the contact phase in itself will not produce marked decrease in the existing state of tension between groups" (Sherif et al., 1961). However, Festinger et al. (1963) found in a study of dormitories at MIT that people who interacted with each other frequently were more likely to form relationships—an effect they termed the *propinquity effect*.

Sherif and his colleagues dismissed any explanation of intergroup relations that was relative to context. He wanted to discover a singular cause of intergroup conflict that could be universally applied, irregardless of context. In fact, his realization that all of

these explanations depended upon context may have led him to surmise that context/environment is the singular factor in intergroup relations.

Sherif's aims in developing realistic conflict theory seemed to be threefold. First, Sherif and his colleagues sought an alternative to the traditional explanations of intergroup relations. In a departure from them, he makes the assumption that human beings naturally cohere. As such, contrary to Freud, who believed in the "primary hostility of men towards one another," Sherif and his colleagues attempted to experimentally induce friction between two groups as a means to test hypotheses regarding the causes of friction (as cited in Sherif & Sherif, 1966). Secondly, Sherif recognized that there was a need in the research for a rigorous experiment that also had relevancy to real world problems. This concern for the applicability of theory likely led Sherif et al. to choose as the subject of their study informal, small groups without formal leadership. Sherif and his colleagues spent inordinate amounts of time on the methodology, carefully crafting multiple levels and methods of data collection that could be crosschecked against each other to increase internal validity (Sherif et al., 1961). Furthermore, Sherif et al. (1966) was careful to be as un-intrusive as possible on the subject groups, so that they could develop in as natural an environment as possible. As a result, Robbers Cave validates many of the empirical findings of Shaw, Whyte, and Thrasher, which were all studies of actualities without the controls of experiment. Finally, Sherif et al. (1961, p.4) believed that:

Unless knowledge of the superordinate or larger functioning system is gained first, before tackling the part processes, there is the likelihood of unwarranted generalizations concerning the parts, and misinterpretation of the true functional significance of the processes observed.

Sherif was concerned about the very real world conflict between groups. Perhaps he was especially sensitive to it given his experience as an immigrant (Granberg & Sarup, 1992). Sherif admitted that latency-aged children were not an ideal subject group given the inherent differences between children and adults, and his concern with the later (Sherif et al., 1961). The experiment, however, still holds value in benefiting an understanding of the development of latency aged boys, due to its rich narrative and descriptive data.

Analysis Of The Experiment's Hypotheses

As previously mentioned, Sherif et al. relied upon the observations of Shaw, Whyte, and Thrasher to formulate their hypotheses. Shaw (1930) was responsible for an anecdotal study of a juvenile delinquent, while Thrasher (1927) and Whyte (1943) both studied gangs, in Chicago and Boston respectively (as cited in Sherif et al., 1961). Prior to Robbers Cave, Sherif conducted two studies that did not progress beyond the friction stage (Stage 2) (1949; 1953). Robbers Cave was the first of Sherif's experiments to progress beyond Stage 2.

In the selection process for Robbers Cave, Sherif et al. took great pains in creating a homogeneous group of 11 year old boys. Not only were the boys as identical in school performance, family status, personal history, IQ, etc. as possible, in dividing the subjects into two groups, Sherif and his colleagues attempted to create two matching, comparable groups (Sherif et al., 1961). While it seems that homogeneity is conducive to cohesion, and that a more realistic problem is in creating cohesion among heterogeneous groups, Sherif's rationale was to eliminate extraneous variables as much as possible. By creating

similar groups with similar boys, Sherif could be more certain of the effect of any variable he introduced into the experiment.

Hypotheses in Stage 1 included the hypothesis that:

A definite group structure consisting of differentiated status positions and reciprocal roles will be produced when a number of individuals (without previously established interpersonal relations) interact with one another under conditions (a) which situationally embody goals that have common appeal value to the individuals, and (b) which require interdependent activities for their attainment. (Sherif et al., 1961, p.40)

This hypothesis incorporates two of the small group features mentioned at the beginning of the chapter. Another hypothesis at this stage of the experiment predicts the development of the norms also described in these features.

In Stage 2 of Robbers Cave, the hypothesis that is relevant to cohesion development is number 2, which states that: “The course of relations between two groups which are in a state of competition and frustration will tend to produce an increase in in-group solidarity” (Sherif et al., 1961). This hypothesis, however, cannot be interpreted as an inversely proportionate relationship between intergroup solidarity and in-group solidarity, as an increase in intergroup solidarity (or a decrease in conflict between groups) will not lead to a decrease in in-group solidarity.

In Stage 3 of Robbers Cave, Sherif et al. (1961) predicts that contact would not be sufficient in decreasing hostility between the two groups. Rather, superordinate goals requiring the cooperation of both groups would decrease hostility. Sherif et al. (1961, p.52) states the two hypotheses as follows:

When groups in a state of friction are brought into contact under conditions embodying superordinate goals, the attainment of which is compelling but which cannot be achieved by the efforts of one group alone, they will tend to cooperate toward the common goal.

Cooperation between groups necessitated by a series of such situations embodying superordinate goals will have a cumulative effect in the direction of reduction of existing tensions between groups.

As mentioned previously, there seems to be some evidence that frequent contact can lead to the development of cohesion (Festinger et al., 1963). The fact that Sherif et al. supported all their hypotheses in Robbers Cave, however, including their prediction that contact would fail to lessen the conflict between groups, may point to the fact that unlike the Festinger study, the Robbers Cave subjects were already in a state of conflict when contact was increased, so the efficacy of the *propinquity effect* on cohesion could not be tested.

Similarly, in Stage 1 of Robbers Cave, Sherif et al. (1961) supports their hypothesis that a common motive that requires interdependent activity between individuals will create group cohesion, as exemplified by the emergence of a group structure. However, Sherif et al. lacks the control of a heterogeneous group to test the efficacy of social affinity in determining group cohesion. Also lacking is the control of a task-less group.

Zaccaro & Lowe (1988) have shown convincingly that cohesion is a multidimensional concept. Sherif, like Festinger, worked with a “unitary” definition of cohesion that failed to account for the differences in effect between social and task cohesion (Zaccaro & Lowe, 1988). In fact, Zaccaro and Lowe (1988) have found that task cohesion, which is represented by Sherif et al.’s hypotheses pertaining to Stages 1 and 3 of Robbers Cave, is more strongly related to performance than social cohesion. The Robbers Cave groups seem to contain both social cohesion and task cohesion. It is

difficult to ascertain which of these is responsible for the effects Sherif and his colleagues observe. In Chapter 6, we will consider both types of cohesion, as well as the role of performance.

Relevance To Cohesion Among Groups Of Latency Aged Boys And Transition To Self

Organizational Theory

In considering this theory, it is clear that a common motive among a rather homogeneous group that is predisposed to the development of social cohesion is a very effective enabler of task cohesion. Sherif believed that the highest point of group solidarity, or cohesion, is when “reciprocities and expectations become stabilized into a definite group structure and each member lives up to the standardized expectations defining his relative role” (Sherif & Sherif, 1966). As such, group structure seems to be linked to the development of cohesion. What is unclear is whether cohesion creates group structure, or whether group structure creates cohesion. Sherif seems to argue for the former.

Relevant key features of this theory that can be directly applied to an understanding of the nature of cohesion in groups of latency aged boys are the empirically observed and experimentally verified features of small groups, the discovery that intergroup hostility can increase in-group cohesion, and the efficacy of superordinate goals on in-group *and* intergroup cohesion. Also relevant to our understanding of the phenomenon are the factors of time and frequency of contact, although Sherif et al. (1961) do not believe contact alone is sufficient in decreasing intergroup conflict.

Sherif and Sherif (1966) understood that as in-group functioning did not translate readily to intergroup relations, the frequent study of in-groups in an attempt to

comprehend relationships *between* groups has little yield. We now turn to self organization, a theory that hypothesizes about group-level mechanisms and properties.

CHAPTER V
SELF ORGANIZATIONAL THEORY

Introduction

How many of us have not marvelled at the sudden flight of a flock of birds in a city park, or the synchronized movements of a school of fish at the local aquarium? Undoubtedly, at the core of our reaction is the realization that these animals are able to execute complex behaviours without the assistance of language or an apparent leader or conductor—ingredients we humans rely upon heavily in our coordination with others of our species. So how do they do it?

Self organization is a theory that seeks to explain these complex patterns in seemingly simple, albeit large, aggregates of organisms. Camazine et al. (2001) defined self-organization thus:

Self-organization is a process in which pattern at the global level of a system emerges solely from numerous interactions among the lower-level components of the system. Moreover, the rules specifying interactions among the system's components are executed using only local information, without reference to the global pattern.

Self-organization is a theory that has had broad application in many different disciplines. Most obviously, it has had relevance on systems in the physical, chemical, and biological sciences. In addition to groups of fish and birds, researchers have used self-organizational models to explain complex patterns in insect groups, the design of sea shells, the stripes of zebras, cellular activity, sand dunes, and chemical reactions (Camazine et al., 2001). However, self-organization has been most fruitful for the

artificial life, robotics, computer science, and cybernetics fields, the last of which we will discuss in further detail later on. Insights garnered from studies of ant colonies have improved the efficiency of shipment companies (Miller, 2007). Movies such as *Batman Returns* have benefited from realistic models of bird flocking. For the purposes of this project, however, we will be focusing on self-organization in biological systems, so as to maximize any potential insights into the mechanisms of cohesion among groups of latency aged boys. This chapter will begin by exploring the historical and contemporary context within which the key principles of self-organizational theory developed. Then it will describe in detail those principles, and explain accompanying mechanisms upon which those principles depend. Finally, it will discuss briefly the necessary properties of a complex, self-organized system. Empirical studies or models will support explanations when available.

Context Of The Theory

The *eidos* of self-organization have origins in western philosophy, the post-war development of cybernetics, and the attempts of theoretical biology to explain the complex patterns observed in nature.

Philosophical

In the modern age, the seventeenth century French rationalist Rene Descartes (1637) proposed that a system in chaos tends towards order dependent only upon the “laws of nature” inherent within itself. In his *Discourse on the Method*, Descartes (1637, chap. 5) hypothesized that God created matter in a chaotic state that gradually moved towards the order that is the universe in present time:

[...] the greatest part of the matter of this chaos must, in accordance with these [natural] laws, dispose and arrange itself in such a way as to present the appearance of heavens; how in the meantime some of its parts must compose an earth and some planets and comets, and others a sun and fixed stars.

More than a century later, in his *Critique of Judgement*, Immanuel Kant (1951) introduced the term “self-organizing.” Arguing against the teleological argument, or *argument from design*, as it is otherwise known, Kant (1951) proposed the existence of “self-organizing being[s]” in nature that represented within themselves their own purpose, or “final cause,” due to the necessary ability of their components to mutually “effectively cause” each other. Kant (1951) argued that unlike a watch, which was the common analogy used in support of the teleological argument, “self-organizing being[s]” have “formative power”:

An organized being is then not a mere machine, for that has merely moving power, but it possesses in itself formative power of a self-propagating kind which communicates to its materials though they have it not of themselves; it organizes them [...]

(Second Part – “Critique of the Teleological Judgement,” point 65 – “Things regarded as natural purposes are organized beings”)

Cybernetics

In 1947, English psychiatrist W. Ross Ashby (2004) reintroduced the term “self-organization,” and it was incorporated into the field of *cybernetics*. As biological self-organizational theory owes much of its foundation to cybernetics, a detailed discussion of it is warranted. The term “cybernetics” derives from the Greek *kybernetes*, which means “steerman,” a reference to the teleology, or purposiveness, that cyberneticians believe is inherent in all autonomous systems, whether natural or artificial (Heylighen & Joslyn, 2001). In 1948, cybernetics’ founder, MIT mathematician Norbert Wiener, wrote *Cybernetics, or the study of control and communication in the animal and the machine*.

His ideas promoted a series of conferences following WWII that broadened cybernetics to include minds and social systems, in addition to natural systems and machines (Heylighen & Joslyn, 2001). Cybernetics went on to have bearing upon a myriad of modern day disciplines, including computer science, control theory, artificial intelligence, information theory, and the cognitive sciences, among others.

Essentially, cybernetics is the study of autonomous systems and their goal-oriented behaviours. Heylighen and Joslyn (2001, p.12) writes:

Probably the most important innovation of cybernetics is its explanation of goal-directedness or purpose. An autonomous system, such as an organism, or a person, can be characterized by the fact that it pursues its own goals, resisting obstructions from the environment that would make it deviate from its preferred state of affairs.

However, instead of analyzing the components of a system themselves, cybernetics focuses on the relations between them. In the example of a natural system, such as a flock of birds or a school of fish, the goal is survival, and it is this goal that determines the equilibrium state of the system—its preferred state. A system seeks to maintain equilibrium through the control mechanism of *feedback* (Heylighen & Joslyn, 2001). Cybernetics introduced the idea of positive and negative feedback loops—non-linear causal chains that either dampen or amplify themselves. Feedback is a mechanism that figures heavily in self-organizational theory, and will be addressed in more detail later on in the chapter. Here, it is sufficient to notice the close parallel that cybernetics has to self-organizational theory—including shared terminology.

The seeds of self-organizational theory in biological systems

According to Camazine et al. (2001), self-organization came to be applied to biological systems when other explanations failed to adequately explain the phenomena

of complex emergent patterns. These other explanations included the traditional ideas of leadership, blueprint, recipe, and template (Camazine et al., 2001). For example, the idea of leadership seemed to be a logical explanation of the organization of large swarms, if not for the complex cognitive ability needed for one individual to be able to gather information about the group as a whole (Camazine et al., 2001). Instead, three ideas developed that became the antecedents to self-organizational theory in biological systems. The first idea, *stigmergy*, seeks to explain how individuals respond to changes in their environment that may be a result of the activity of other individuals (Grasse, 1959, as cited in Camazine et al., 2001). For example, in a group of eusocial insects building a nest structure, two individuals may randomly place building material next to each other. Other individuals notice this cluster of building material and move to add to it (Camazine et al, 2001). Stigmergy explains how individuals can affect each other without the need for direct communication. In supplement to the idea of stigmergy, the idea of *decentralized control* is a premise that individuals act upon local-level cues, communication, and stimulus such as that described in the idea of stigmergy without the need for centralized control or leadership (Seeley, 1989, as cited in Camazine et al, 2001). Finally, the idea of *dense heterarchies* proposes a structure of organization wherein the entire group serves simultaneously as leader and follower (Wilson & Holldobler, 1988, as cited in Camazine et al, 2001). As we shall see later on, all three of these ideas figure prominently in self-organization.

Observations of birds and fish

Before we explore self-organization, it is useful to discuss hypotheses that have been historically proposed to explain the specific phenomenon of flocks of birds and

schools of fish displaying complex emergent patterns. Couzin & Krause cite three such hypotheses in their 2003 treatise on the self-organization of vertebrate animals. In 1901, Selous proposed that “thought transference” was responsible for the synchronized behaviour of bird flocks:

These curious, pausing, and hesitating movements [...] seem to me to have their origin in what may be termed collective thinking—for this gives a better idea of the appearance of the thing than does the term thought-transference, though that may more correctly indicate the process.

(as cited in Couzin & Krause, 2003)

The idea of thought transference was explored more extensively in Selous’ 1931 work, *Thought-transference (or what?) in birds*. However, there is no evidence to suggest that Selous’ hypothesis was taken seriously by the scientific community. Couzin & Krause (2003) believe that the “Ockham’s razor” principle was responsible for this slight.

In 1970, Presman discussed the possibility that the earth’s electromagnetic fields were responsible for the patterns found in the natural world in his work *Electromagnetic fields and life*. Although primarily focusing upon large scale phenomena such as migration, Presman also suggested that individual-level behaviours such as navigation could be attributed to the electromagnetic fields (as cited in Couzin & Krause, 2003). Today, Presman’s hypothesis is still being rigorously tested in the investigation of the migration of birds.

Perhaps most significant to the development of self-organization was the debate in the early 1970’s over leadership in groups. Heppner & Haffner (1974) argued for the presence of leadership in flocks of birds while D. Radakov (1973) attempted to show that individual fish in schools relied only upon local information to make decisions (both

cited in Couzin & Krause, 2003). Radakov's findings proved to be persuasive enough to become a core principle of self-organization, to which we now turn.

Principles, Mechanisms, And Properties – What Is The Theory And How Does It Work?

Prefacing our address of self-organizational theory, it is useful to consider the difference between principles and mechanisms. Merriam-Webster Online defines a principle as a “comprehensive and fundamental law, doctrine, or assumption,” while a mechanism is “the fundamental processes involved in or responsible for an action, reaction, or other natural phenomenon.” In other words, principles are the premises of a theory, while mechanisms are the actual processes that support these premises.

Principles

A self-organizing system is first and foremost *dynamic*. This means that the components in the system are in constant interaction with each other and with the environment (Camazine et al., 2001). Movement at the component, or lower, level of the system results in constant changes in the organization of the system as a whole—or its higher level properties. Secondly, a self-organizing system exhibits *emergent* properties. Camazine et al. (2001) writes: “Emergence refers to a process by which a system of interacting subunits acquires qualitatively new properties that cannot be understood as the simple addition of their individual contributions.” An example of an emergent property is the wave pattern that the leading edge of a flock of birds forms during flight. This wave pattern is not produced by any one individual bird, nor can it be understood merely in terms of the combined flight of two or more birds. Instead, it is a distinct pattern that emerges from the entire flock as a whole. Properties will be addressed below. Thirdly, self-organizing systems are *decentralized*. As we discussed earlier, within a decentralized

system, individuals in a system act not upon direction or leadership from a single source, but independently and at the local level, aided in decision-making only by localized information in the form of cues and communication with other nearby individuals, and stimuli from the environment (Seeley, 1989, as cited in Camazine et al., 2001). Most likely, dependence on localized information in lieu of leadership provides an adaptive advantage for animals, and especially large groups (Camazine et al., 2001). The principle of decentralization is also linked to that of *dense heterarchy*. In contrast to hierarchy, wherein the flow of power is top-down from one level of organization to the next, a heterarchy has no such levels of power, as individuals mutually affect each other in an egalitarian fashion (Wilson & Holldobler, 1988, as cited in Camazine et al., 2001). However, the lack of formal leadership or a social hierarchy does not imply that the positions that individuals occupy within the group are not significant. Group position has been shown to differ in evolutionary advantages and/or disadvantages (Couzin & Krause, 2003). For example, positioning at the fringes of a group risks susceptibility to predation. Positioning at the leading edge of the group allows both individuals to encounter and consume prey first, but also encounter predators first. The center of the group is advantageous from a safety perspective, but it is least likely to encounter prey (Couzin & Krause, 2003). In animal groups, positioning within the group is a result of the fitness of the individual animals. This positioning can loosely be compared to the emergent social hierarchy that is a feature of small human groups (Sherif et al., 1961).

Although not explicitly stated by self-organizational theory, it is implied that a self-organized system consists of a homogeneous group of components or individuals. In the biological world, the majority of self-organized groups are comprised of one species

of animal, and thus are homogeneous. Heterogeneity in the form of differing genders of individuals, or size of individual creates segregation within groups into smaller subgroups (Gueron et al., 1996; Sayama, 2007). The importance of homogeneity will be addressed in Chapter 6.

Mechanisms

Most relevant to our understanding of cohesion among groups of latency aged boys is the elucidation of the mechanisms inherent in self-organization. These mechanisms allow us to understand the specific “how” of cohesion that remains a mystery in realistic conflict theory even as they are actively investigated by self-organization researchers.

To understand one of the primary mechanisms in self-organization, we refer again to cybernetics. *Feedback*, both positive and negative, is responsible for the changes and patterns in a system. Positive feedback can be described as the accelerator in the system. Its snowballing effect amplifies fluctuations in the system and ultimately creates change. Or, in other words, positive feedback “takes an initial change in a system and reinforces that change in the same direction as the initial deviation” (Camazine et al., 2001). Negative feedback has the opposite effect. It is the braking mechanism of a system. It counteracts change by dampening the amplification of the initial change in the system by interrupting the cycle of positive feedback. Negative feedback often takes the form of physical constraints and limitations, such as the exhaustion of resources, or the action of gravity acting on mass (Camazine et al., 2001). The following simplified example illustrates positive and negative feedback at work:

A group of rabbits eating rich grass in a field multiply quickly. As the rabbit population increases, the grass is consumed quickly. Soon, the grass is gone, and the rabbits begin to starve and some die.

In the above example, the consumption of grass leads to a multiplication of rabbits, which in turn leads to an increased consumption of grass, which again leads to an increased multiplication of rabbits. This is an example of positive feedback. The rate that the grass is being consumed increases proportionately to the number of rabbits. The graph of this example, with the number of rabbits plotted on the x-axis and the consumption of grass plotted on the y-axis, would show a constant slope. Should either the number of rabbits cease to increase or the supply of grass dwindle, the slope would change. In the above example, the exhaustion of the grass resource leads to the decrease in the number of rabbits. This is negative feedback at work. Positive and negative feedback work in conjunction with one another to maintain homeostasis within a system (Ashby, 2004).

Within a natural system, individuals, in addition to being beholden to the laws of physics, are also motivated by their own volitions (Camazine et al., 2001). Whether these volitions are genetically coded, or learned behaviours, they can be described as simple “rules of thumb” that each individual obeys (Camazine et al., 2001). However, rules of thumb can only be deduced hypothetically from modeling of systems, as animal subjects cannot be surveyed for their subjective experiences or thoughts. Computer models, such as the popular “Boids” model created by animator Craig Reynolds (1987), are one means of deducing such rules. Through assigning each “boid” in his “flock” three simple rules of thumb, Reynolds was able to convincingly replicate the flocking behaviour of birds. Although the Boid model is a simple attempt to replicate a physical emergent property of a natural system, the three rules that Reynolds programmed his boids to obey give us a

glimpse into the possible rules that individuals in a real natural system might obey as well. Reynolds (1987) hypothesized based upon real world observations that fundamentally, boids would want to stay close to the flock, but also want to avoid collisions with other boids. He conceptualized these two opposing forces of repulsion and attraction in the following rules:

1. Collision Avoidance: avoid collisions with nearby flockmates
2. Velocity Matching: attempt to match velocity with nearby flockmates
3. Flock Centering: attempt to stay close to nearby flockmates

(Reynolds, 1987)

While it is not in the scope of this project to explore self-organizational modeling in detail, the Boid model illustrates a vital aspect of the methodology utilized in the theory. Research on natural systems has shown that individuals in a self-organized group seem to follow simple rules of thumb such as: “I nest where you nest,” or “I eat where you eat” (Camazine et al., 2001). Often, these behavioural rules can initiate the feedback loops that create the complex emergent patterns that are a feature of self-organized groups (Camazine et al., 2001). For example, the rules “I go where you go,” and “I go where the largest number of other individuals are” would prompt animals initially scattered randomly on a plain to form small clusters. Clusters would more likely form where animals were in close proximity with one another. However, should one of these clusters randomly contain more individuals, it will soon grow at the expense of the other clusters due to positive feedback—specifically that as animals recognize it to be the largest group and join it, their membership will make the group yet larger, and yet more attractive for other individuals (Camazine et al., 2001). The end result is that there is one, physically

cohesive group of individuals that retains structure within it through a rule about physical space between individuals, such as “I stay one body length away from others.”

As self-organization relies upon localized interactions between the individuals, communication of information is essential to its emergence. Non-human individuals in self-organized groups, without the aid of syntactic language, rely primarily on three forms of communication: stigmergic, direct, and environmental. Stigmergic communication, or *stigmergy*, is an indirect form of communication wherein individuals in a natural system respond to the activity and work of their neighbours (Grasse, 1959, as cited in Camazine et al., 2001). For example, in a spire of termites, an individual termite may add material to an initial structure that another termite has built. In turn, another termite may add to the work of this termite, and so on. While stigmergy seems to be more relevant for systems of eusocial insects, which cooperate to create nests, it is an important form of communication to consider because it introduces the idea of *stochastic*, or random, non-deterministic contributors and variables in a system. Stochasticity can be the first cause, so to speak, in a stigmergic chain of responses (Camazine et al., 2001). For example, two termites may have coincidentally placed two balls of soil next to each other, resulting in a suitable platform for additional work. Or a gust of wind may have deposited a large leaf into the spire, which may be a suitable incorporation into the structure.

Stochastic events comprise a portion of the influence the environment has on a self-organized system. As previously mentioned, other influences include resources and their exhaustion, discovery, and availability, obstacles, physical constraints and limitations, and interaction with other groups or individuals (Camazine et al., 2001). For

example, a self-organized group of birds may have to manoeuvre around a telephone pole. Or a school of fish may evade an approaching shark. In a sense, all environmental variables can be seen as stochastic events instigating change in the self-organized system, as the environment is not within the control of the system. Most commonly, the environmental variable in a self-organized system manifests as an exhaustion of resources, which creates a negative feedback loop, or a change in physical space, which may change the density of the group, and affect its physical cohesion.

The final form of communication is direct relaying of information through a variety of species-specific methods, including chemicals trails (ants), dancing (bees), whistles and clicks (dolphins), body posture (wolves), and language (humans). Other less direct forms of communication include physical distance between individuals, for example.

Properties of a complex, self-organized system

Emergent properties, which often seem disproportionately complex in comparison to the dynamic self-organized system from whence they arise, result from the mechanisms described above. As properties are often specific to the type of self-organized group, i.e. wave properties that emerge from the leading edge of a flock of birds, it is more relevant to examine how they arise than what arises.

While feedback explains the mechanism that drives change, and halts it, an *attractor* is a state towards which a system changes. In self organized groups of animals, it often manifests as a new pattern. Camazine et al. (2001) defines this property: “under a particular set of initial conditions and parameter values, an attractor is the state toward which the system converges over time.” An attractor in a school of fish might be the

formation it takes. In realistic conflict theory, an analogous state is the level of cohesion between the two groups of boys. A system has many possible attractors, any of which can be reached through *parameter tuning*, slight modifications in the original variables the system finds itself with (Camazine et al., 2001). An example of a parameter in the above example of a school of fish is density of the fish. An example of a parameter in the human group is the resources available to it. Any modification or tuning of these parameters affects the state that the system takes. In Chapter 6, a graphic illustration of the development of cohesion between the two groups of boys in Robbers Cave will illuminate the utility of identifying critical values of the parameters needed to reach attractor states.

The relationships between parameters in a self-organized system are nonlinear (Camazine et al., 2001). This is a hallmark of the emergence of the system, and occurs as a result of the feedback mechanism. Nonlinearity in self-organizational theory is known as *bifurcation*. Camazine et al. (2001) defines bifurcation as: “the appearance of a qualitative change in behaviour when a parameter-value changes quantitatively.” Bifurcations have been shown mathematically by the “logical difference equation” of Robert May (Camazine et al., 2001). At the group level, bifurcations are manifested as quick pattern changes as the system switches suddenly from one attractor to another with only a small accompanying parameter change (Camazine et al., 2001). In summary, bifurcations allow for small changes in parameters to result in large changes in pattern (Camazine et al., 2001). In a natural system, this means that individuals in a self-organized group can follow the same simple localized rules of thumb but exhibit a diversity of group-level responses given different circumstances or environments

(Camazine et al., 2001). Camazine et al. (2001) argues that this serves an evolutionary advantage. At the least, it attests to the determinant role of the environment as a parameter capable of drastically affecting the collective behaviour of a group of individuals.

Relation To Phenomenon And Transition To Discussion

Self organizational theory deconstructs cohesion into its most basic components. In animal groups, cohesion is primarily manifested as physical synchronization and cooperative work efforts. Self-organized animal groups appear to accomplish their amazing feats without the aid of any formal or external leadership, and through limited forms of communication. Self organizational theory proposes the mechanisms of feedback and “rules of thumb,” and finds that the principles of decentralization, heterarchy, dynamism, emergence, and homogeneity are necessary for the explanation of complex group level phenomenon. Given the relative simplicity of individual components in self-organized systems, and the ability to control extraneous variables through modeling, self organization is a suitable theory with which to begin the exploration of cohesion at its most fundamental constructs.

Groups of latency aged boys differ from the self-organized groups described above in some significant ways. Firstly, boys have the advantage of language, which increases communication between individuals in a group, and affects decision making processes, and task coordination processes, among others. Sherif et al. (1961) showed in Robbers Cave that social hierarchy emerges from cohesive small groups. This feature assumes that they are centralized, and hierarchical—both antithetical to the principles of self organization. Sayama (2007) demonstrated that stratification within self-organized

systems results from component differences. It is likely that there are more inherent differences between human individuals, given their complex life developments, experiences, etc. Consequentially, boys groups seem to be less dynamic, although not non-malleable. Also, it is unclear given assumed individual differences just how homogeneous human groups can ever be. Nevertheless, there are parallels between “rules of thumbs” and group norms, between the stigmergy of animal groups and the building upon of ideas and suggestions in the boys groups, and between the emergent physical patterns of animal groups and the emergence of changes in attitude (towards out-groups) in boys groups. Although animal groups cannot be said to be analogous to boys groups, it is not necessary to place them on a continuum to apply to them the principles, mechanisms, and properties of self organization, a theory that transcends the study of organisms.

In the next chapter, our aims are threefold. First, we will address the distinction between task and social cohesion in the Robbers Cave boys groups in an effort to deconstruct the emergence of cohesion in these groups. The mechanism of feedback will also be utilized in this task. Secondly, we will suggest a way of disrupting cohesion in groups, following the increased understanding of cohesion. Thirdly, we will examine in detail the relationship between cohesion and superordinate tasks, time, and frequency of contact, while incorporating the notions of attractors and parameters. We now turn to these tasks.

CHAPTER VI

DISCUSSION

Summarization Of Two Theories In Relation To The Phenomenon

Sherif's realistic conflict theory concerns itself with intergroup relations, and the formation of both in-group cohesion and intergroup cohesion through the introduction of superordinate tasks. Its hypotheses predict that once cohesion is formed, groups would exhibit certain features, most importantly, perhaps, the development of norms, and a social hierarchy. The Robbers Cave experiment supported these hypotheses. In application to the phenomenon, many of the aspects of realistic conflict theory are relevant. Most relevant are Stages 1 and 3, during which cohesion was created among individuals and among groups respectively through the use of superordinate goals. Aspects of the theory which will be utilized in this chapter include this usage of subordinate goals, the reliance on homogeneity, the relationship between in-group cohesion and intergroup conflict, and the aforementioned features of small groups: a common motive or motives, effects on the individuals, the development of social hierarchy, and the development of norms (Sherif & Sherif, 1966).

Self organizational theory as utilized by theoretical biology seeks to explain emergent, complex, group-level patterns in large aggregates of animals. It proposes a set of principles, mechanisms, and properties that distinguishes self-organized groups from other kinds of groups and elucidates the processes within the aggregates that facilitate cohesion and cohesive behaviour. In self organizational theory, the mechanism of

feedback will be applied to the development of cohesion in the Robbers Cave Experiment. Additionally, the properties of attractors, parameter tuning, bifurcation, rules of thumb, and means of communication will be discussed. The deconstruction of cohesion among groups of latency aged boys will hopefully benefit from this cross-fertilization between social psychology and theoretical biology.

According to realistic conflict theory, cohesion in naturally situated, informally organized groups of latency aged boys is formed through the introduction of a motive requiring independence between the group members. The motive is necessarily one which cannot be accomplished alone by one individual. The motive is also one which appeals to the group as a whole. Sherif's "proof" that cohesion has occurred is in assessing the group for four features: a motive, the affect of the group on individual members, the development of a distinct hierarchy with roles, and the development of group norms. These features are his indication that cohesion has been achieved.

According to self organizational theory, cohesion in a group of individuals is achieved when individuals in a group show synchronized movement, have physical proximity, and the group as a whole exhibits emergent complex patterns on the group level. This occurs due to a common motive, and when there is a critical density of individuals, and the individuals are homogeneous. Other conditions that favour this spontaneous cohesion are stochastic events that lead to feedback loops and stigmergy. Several mechanisms and principles then allow individuals to continue to cohere. First off, there is no formal leadership. As such, decisions are mostly made by majority consensus, and individuals act on localized information only, following simple "rules of thumb" (Camazine et al., 2001; Klarreich, 2006). The tuning of parameters, or variables, of the

system can propel the group's behaviour to a qualitatively different state. These different states, often manifested as changes in the group's behaviour or pattern, are called attractors. We will consider attractors in more detail below.

Analysis And Synthesis

In the following section(s), three things will be attempted. Firstly, cohesion, as exemplified by Stages 1 and 3 in Robbers Cave, will be deconstructed to its basic components. Secondly, a recommendation will be made on how to theoretically interrupt cohesion, given the conclusions from the deconstruction section. Interrupting cohesion has practical applicability when used as an intervention with street gangs, social cliques, and other unholy alliances. Understanding impedances to cohesion also has theoretical currency, if we are to assume, as Sherif does, that human beings naturally cohere. Thirdly, a "formula" of cohesion will be presented. This formula will consider the initial parameters of homogeneity, time, and frequency of opportunities for successful performance of the group and how they contribute to cohesion. The aim of this formula is both to allow the social work practitioner an assessment tool that will aid him/her in gauging the level of cohesion in a particular group, and also to provide guidance as to which parameters of cohesion need to be tuned with the overall goal of increasing cohesion. This formula will essentially balance task and social cohesion.

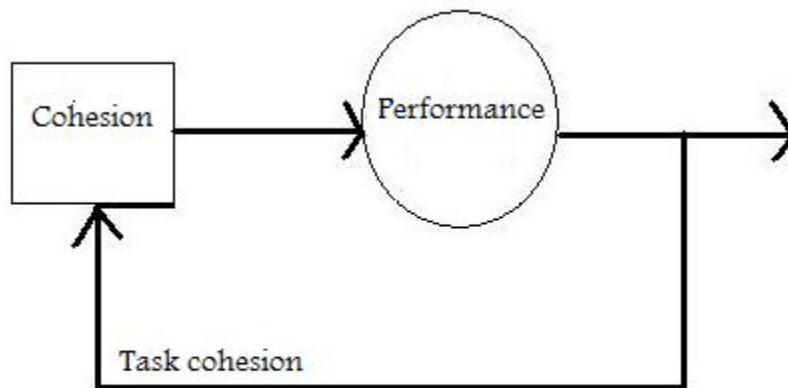
Task 1: Deconstruction Of Cohesion In Stages 1 And 3 Of Robbers Cave

As a foundation for the deconstruction of cohesion, there are some assumptions that need to be made. Firstly, groups naturally cohere (Sherif & Sherif, 1966). Cohesion is a natural state of like individuals, and where there is a lack of cohesion, there is

impedance in the system. Secondly, it can be argued that group structure comes about through individual differences, even among homogenous groups (Sherif & Sherif, 1966)

In Stage 1 of Robbers Cave, Sherif et al. attempt to induce cohesion in homogeneous groups of latency aged boys. These boys have been hand-selected for the experiment to ensure that they have comparable home situations, school performances, social skills, socioeconomic status, religions, behavioural and developmental histories, etc. (Sherif et al., 1961). Research seems to support the assertion that homogeneity facilitates cohesion (Gueron et al., 1996; Sayama, 2007). In heterogeneous systems, such as those with differences in size or gender, groups tend to self-segregate (Gueron et al., 1996; Romey, 1996; Sayama, 2007). It can be assumed that in Stage 1, the Eagles and the Rattlers were predisposed to cohere given their homogeneity. Additionally, the early interpersonal cohesion research argues that interpersonal attraction due to perceived similarity leads to social cohesion (Dion, 2000). Social cohesion has been defined as “the degree to which positive interpersonal relationships exist among members of the group” (Festinger et al., 1950, as cited in Zaccaro & Lowe, 1988). However, social cohesion has been shown to be merely one dimension of the construct of cohesion (Zaccaro & Lowe, 1988; Zaccaro, 1990). Task cohesion, which is defined as “when group membership provides for the personal attainment of important goals,” (Festinger et al., 1950, as cited in Zaccaro & Lowe, 1988) has been correlated most strongly with performance (Beal & Cohen, 2003; Mullen & Cooper, 1994, as cited in Brown, 2000). However, research seems to indicate that task cohesion is a result of performance, not vice versa (Helmreich, 1975; Mullen & Cooper, 1994, both cited in Brown, 2000). Hypothetically, the Robbers Cave homogeneous groups led to strong social cohesion, which in turn led to a strong

performance in the superordinate tasks created for them, which then led to the development of task cohesion. The overall increased cohesion then leads to even stronger performance in task. The mechanism at work here is positive feedback. See Fig. 1 below:



Initial social cohesion with the presentation of a superordinate task initiates the positive feedback loop shown above. As performance occurs, task cohesion is produced in the group, which leads to better performance, which leads to stronger task cohesion, and *ad infinitum*. What begins as social cohesion most likely soon becomes a mixture of social and task cohesion. Both kinds of cohesion are likely interdependent as well.

Yalom and Leszcz (2005, p. 63) refer to this feedback loop in the context of adult therapeutic group work: “[...] the group members’ recognition that their group is working well at the task of interpersonal learning produces greater cohesion in a positive and self-reinforcing loop.” It is unclear, however, under what circumstances negative feedback puts a halt to this feedback loop. Considering Robbers Cave, there seemed to be no evidence of any negative feedback that interrupted this cycle at any time.

In Stage 1, Sherif et al. note the development of small group features within the groups as verification of their cohesion. The development of norms within the groups can be compared to the “rules of thumb” inherent in self-organized animal groups. However, there is a marked difference between boys and animals. Boys are able to come to verbal agreements as a group. Animals, lacking language, must depend on alternate decision-making means, such as through majority consensus (as cited in Klarreich, 2006). A “rule of thumb” within a group of boys might be to avoid deviance in opinion. Norms in Sherif et al.’s groups of boys seem to ensure the cooperation of all members of a group, perhaps in order to facilitate the group’s performance in tasks. Cooperation becomes difficult in the face of deviance, thereby lowering performance and threatening group task cohesion.

To consider cohesion in Stage 3 of Robbers Cave, it is necessary to understand the groups’ response to a situation of competition induced in Stage 2. While realistic conflict theory posits the lack of resources in the environment as a source of conflict and tension between groups, it is interesting to notice that in Stage 2, the behaviour of the two groups is similar to that in Stage 1. Specifically, in Stage 2, the groups overestimate their own competence and underestimate that of the members of the other group (Sherif et al., 1961). In Stage 1, Sherif et al. describes a similar process taking place within the groups themselves as they cohere. The Eagles are surprised when a “low status” boy crosses a rope bridge successfully: “The prediction that [the low status boy] could not do as well as [the high status boy] and the others reveals the development of differential expectations in line with emerging status relationships within the group” (Sherif et al., 1961, p. 80). During this in-group formation stage, overestimation is associated with high status members within the group and underestimation is associated with low status members.

Based upon this observation, one might argue that in Stage 1, as in-groups are still being established, individuals are competitive with one another for social status. Most likely, if they are too deviant, or too unpopular, they may not be included in the group as it forms. At this stage, individual success is more important than group success. In Stage 2, conversely, the success of the group becomes vital. Individual hierarchy is eclipsed by group hierarchy. As the Eagles and the Rattlers jostle with each other for top place in a hierarchy of groups, individual's attitudes towards members of their own group becomes more positive overall, as the success of the group now depends upon the success of all its members. Sherif et al. (1961) recount how one group encouraged its non-swimming members to learn to swim. In a sense, competition is now perceived as a task. This also explains why besting the opposing group increases in-group cohesion.

In Stage 3 of Robbers Cave, winning a competition is once again a task for each of the two groups. However, this time, they are pitted against external forces. Sherif et al. (1961) describe the superordinate tasks fashioned for the two groups, introduced in seemingly naturally-occurring ways. For example, a food truck pretends to be broken down on the road, and requires the concerted efforts of both groups of boys to pull it out of the mud (Sherif et al., 1961). While Sherif et al. argue for the sufficiency and efficacy of superordinate tasks in decreasing the existing hostilities between the Eagles and the Rattlers, given the above analysis of Stages 1 and 2, it seems plausible that the two groups are now perceiving themselves as joined in competition against a third force. Wit: the overused movie scenario of an alien invasion that unifies all nations on Earth; the pursuit of a terrorist threat in the Middle East to unify a nation. The following passage from Stage 3 of Robbers Cave seems to verify this interpretation:

One suggested that they had beaten the Eagles at Tug-of-War, so let's have a Tug-of-War against the tree. The tug-rope was tied to the tree, and they all pulled the tree down - to everyone's great satisfaction. Thus, a means once used in conflict with the out-group was now employed to defeat a stubborn and hazardous tree.

(Sherif et al., 1961, p. 168)

In competition against a threatening third force, such as the lack of food or water, the successful performance of the entire group, Eagles *and* Rattlers, becomes vital. As further verification, the Sherif et al. (1961) data indicates that as the two groups' performance at these superordinate tasks increases, so does the cohesion between them.

Task 2: How To Halt Cohesion?

Given the conclusions above, it is clear that there are two effective ways to disrupt the positive feedback cohesion loop. First, performance has to decrease. This can be accomplished through the introduction of frustrating superordinate tasks, or the creation of obstacles to successful performance. This tactic, however, does not work for children under five years of age, as they respond differently to decreased performance (Turner et al., 1984, as cited in Brown, 2000). For latency aged boys, however, frustrating performance should effectively decrease task cohesion, as successful task performance is necessary for its sustenance. The repeated failure of a group to succeed at tasks can be alternately described as a loss of morale, during which group structure can become unstable and leadership is likely to shift (as cited in Brown, 2000). Another way to disrupt the positive feedback cohesion loop is to thwart the initiation of the loop through the creation of a heterogeneous group, and ensuring that there is little chance for initial social cohesion to develop.

Task 3: A Formula For Cohesion: Task Versus Social Cohesion

$$\text{Cohesion}_{\text{max}} = [(\text{Homogeneity} + (\text{Task} - x)) \vee (\text{Heterogeneity} + (\text{Task} + x))] + \text{time} \\ + \text{frequency of superordinate tasks applied according to points of} \\ \text{bifurcation}$$

The above is a faux-scientific way of saying the following:

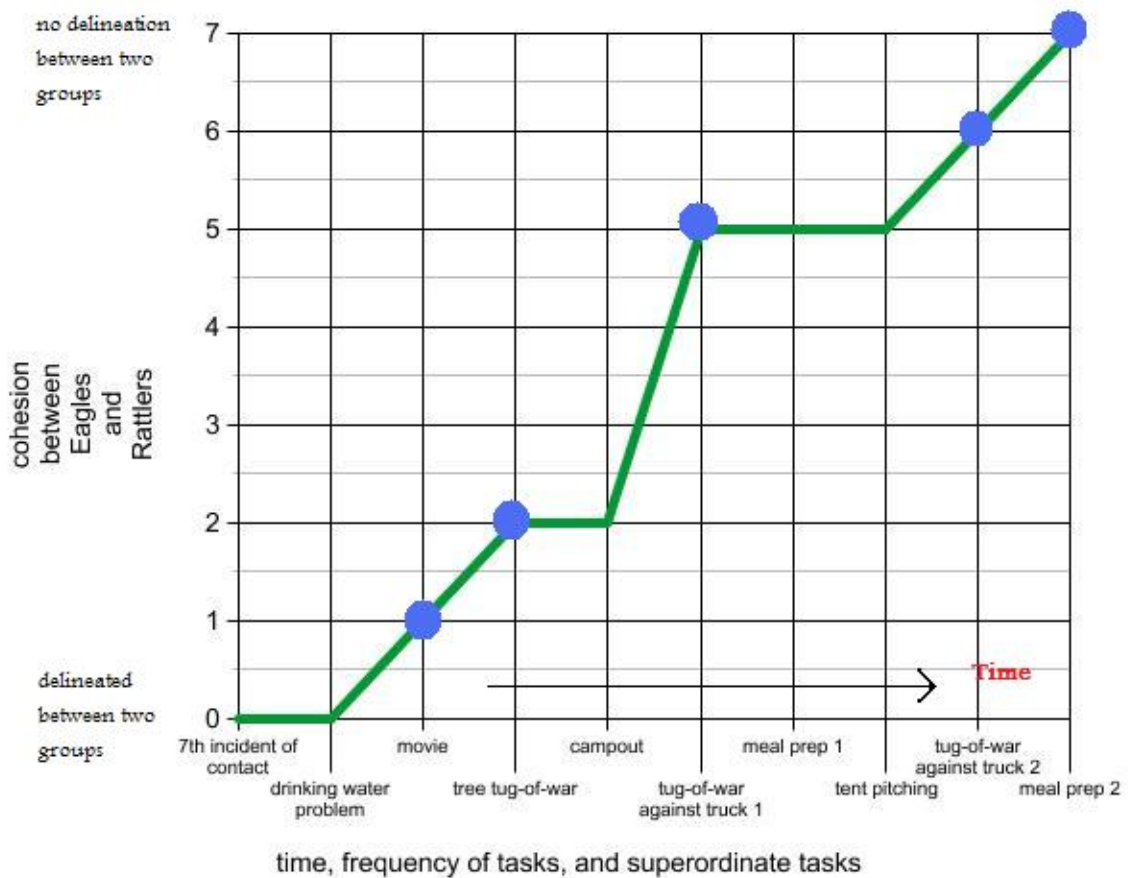
To increase cohesion in a group, various initial conditions need to be present. Firstly, groups need to be homogeneous. This facilitates social cohesion, which allows for task cohesion to form more easily. Secondly, time must be given to allow groups to develop social hierarchies and norms (Veeraraghavan et al., 1996). Thirdly, it is not enough to merely administer superordinate tasks at random. Superordinate tasks, if they are to function in increasing task cohesion, must be administered in the frequency and at the bifurcation points intimated by the graph and discussion below. Furthermore, tasks should be of a level of ease that guarantees success. Should the group lack homogeneity, it is conceivable that superordinate tasks can be increased to serve as the primary facilitator of cohesion. The assumption here is that if homogeneity is present, superordinate tasks are less pivotal in establishing cohesion.

Conversely, groups can theoretically be modified/tweaked to emphasize and encourage one or the other type of cohesion depending on situational needs. For example, groups can be made more homogeneous if availability of superordinate tasks is limited. Likewise, should there be an abundance of superordinate tasks, groups can afford to be more heterogeneous. In summary, there is no “ideal” composition of groups. Rather, the above formula will hopefully aid those working with boys groups in balancing social and task cohesion through balancing the level of homogeneity with an emphasis on

superordinate tasks to facilitate cohesion. Social and task cohesion are both correlated with different outcome measures, but their exploration is outside the scope of this project.

Self organizational theory suggests that group behaviour changes in a nonlinear way based upon parameters in the system reaching certain attractors. In application to realistic conflict theory, it can be argued that superordinate goals must be introduced in a way that promotes the progression of the system towards an attractor that manifests as a change in the behaviour of the group(s). In the terms of Robbers Cave, multiple superordinate tasks were required in succession to allow a shift from hostility to cohesion between the Eagles and the Rattlers. There is evidence of this assertion in Stage 3 of the experiment. Sherif et al. (1961) report that after the completion of initial superordinate tasks, the two groups reverted back to their former positions of hostility. The shift from hostility to cohesion is a gradual process. First, the groups are made aware of each other through repeated contact. Then, they challenge each other to games of baseball and tug-of-war. They spot each other around the common areas of the camp, vote on activities together, and are forced to cooperate in dividing up meal supplies. Through a gradual desensitization process, the Eagles and the Rattlers progress from taunting each other to sitting on the bus together on the ride home. Below is a graph illustrating the progression of the superordinate tasks described in Stage 3 of Robbers Cave:

Fig. 2



Note: Units of measurement on both axes are for illustrative purposes only, and have no quantitative significance. The spacing of tasks on the x-axis does not represent time passed between each task.

Plotted on the x-axis are the succession of superordinate tasks described in Robbers Cave as undertaken by both groups together in Stage 3. By referring to the narrative accounts describing the consequences of each of the tasks on intergroup cohesion, points on the y-axis can be plotted based upon an estimation of whether cohesion increased or decreased following a specific task. Upon viewing the result, it is clear that following certain tasks, cohesion increased significantly between the groups. These points/tasks on the x-axis can be perceived as attractors of this system (marked by blue). Time and frequency of tasks given are also represented by the vector of the x-axis.

The tasks are plotted chronologically, with the earliest task at the left end of the axis. The Robbers Cave data, however, does not indicate the time that passes between each task, therefore this is not represented on the axis.

Although it is safe to assume that both time and the frequency of tasks contribute to reaching the indicated attractors, what is unclear is just *how* and *how much* these parameters contribute to cohesion. Without this information, a precise tuning of these parameters in practical application is impossible. Additionally, it is unclear whether there is a correlation between the type of task and the presence of an attractor. Nevertheless, the important implication here is that all three of these parameters play significant roles in the development of cohesion. In practice, one of these parameters alone may not be sufficient to reach an attractor. The time that has passed, the frequency of the tasks, and the type of task should all be considered.

Other Considerations For Increasing Cohesion

The density and number of individuals in a group seem to be important parameters in self organizational theory (e.g. Partridge, 1982). Density refers to the number of individuals in a contained space. For example, although ten individuals in an open field do not self-organize, ten individuals in a cardboard box may. Klarreich (2006) reports that locusts spontaneously self-organize when their numbers reach the critical density of 30 individuals. As such, the initial size of a group may affect how quickly a system reaches its attractor(s), if size is a parameter of that system. Similarly, in a system wherein density is a parameter, the physical size of the group's environment becomes a significant parameter as well. While group size and density were not discussed in this project, if we assume realistic conflict theory's proposition that social hierarchy is

necessary for group cohesion, then it follows that the larger the size of the group, the longer the process of establishing said hierarchy and accompanying norms about deviance, etc., all of which could effectively prolong or even deter the development of cohesion.

Another consideration is the difference between artificial and “natural” tasks. In Robbers Cave, Sherif et al. are careful to create seemingly natural superordinate tasks for the subjects. Sherif et al. (1961) make a clear distinction between the social hierarchy that develops as a result of “everyday life tasks” and the passage of time versus that which develops as a result of adult direction or instruction that calls for much more expertise and inevitably highlights the skills of one individual in the group. In the latter type, the emergence of social hierarchy likely comes about as individuals are required to be interdependent to perform well on the task. Individuals with expertise and competency in the task migrate towards the top of the hierarchy and differences are thrown into relief, leading to a hierarchical order. In such a way, the social hierarchy within small groups depends upon the motive or task they are faced with. A different task may result in a different hierarchy. Consequently, such hierarchy is unstable, unlike the relatively static hierarchy derived from more natural tasks (Sherif & Sherif, 1966).

Strengths And Weaknesses

We now turn to our assessment of the final product. As previously mentioned, the interdisciplinary approach we have utilized allows the rich, descriptive narrative data of the large scale Sherif et al. study to be interpreted and updated by a abstract theory that has as its primary aim the study of group-level emergent phenomena. The advantages to this approach are myriad. Cross-fertilization between the two parallel disciplines of social

psychology and theoretical biology supplement each theory with considerations of group cohesion not addressed by the other given their differing approaches and developmental tracks. Realistic conflict theory benefits from the internal validity inherent in self organization and self organizational theory benefits from the external validity, however limited, of realistic conflict—especially as the Robbers Cave Experiment is not of the type that can be undertaken by current researchers in the present ethical climate. As such, our end product can be said to be somewhat relevant to children’s group research. It utilizes an existing study of children, and avoids the pitfalls of depending upon adult-oriented cohesion models. However, the concepts of task and social cohesion are still derived from adult studies. It is unclear whether this distinction in cohesion exists within children’s groups.

The conclusions arrived at through this project can hopefully be applied broadly across multiple contexts within which groups of latency aged boys exist, form, and function. Conscious attention was given to maintaining a non-specific stance towards the phenomenon so as to maximize generability. Therefore, those working in classrooms, in playgrounds, with gangs on the streets, at summer camps, in high school hallways, and as groupwork clinicians can benefit from the implications of this theoretical exploration, even if ideal conditions of informal organization and lack of adult leadership are not met. Even without direct application of the recommendations put forth in this chapter, this project’s exploration can be perceived as a contribution to the collective cumulative understanding of how children, and latency aged boys, especially, relate to each other within the context of a group.

Finally, in studying the interactions between task and social cohesion, this project has hopefully indirectly conveyed its non-judgmental position on group composition. Even so, much remains to be investigated. How homogeneous are “homogeneous groups” really? How might homogeneity be quantified? And how realistic is it in real-world application to achieve homogeneous in any group? With the increasing racial diversity in North America, it is more than likely that the implicit power dynamics within interracial groups may interfere with the development of cohesion—as race constitutes a representation of competition for resources and power. The reliance on Sherif et al.’s (1961) study, which did not address heterogeneous groups, hurts the external validity of our conclusions.

Another inherent weakness in our product is the difference in aims between this project and the Sherif et al. study. An extrapolation has been made from cohesion at the group-level in Stage 3 of Robbers Cave to cohesion between individuals at Stage 1. The assumption is that these two levels of cohesion are analogous, as it seems that in Stage 2, even when tasks were divisive rather than superordinate (as in Stage 1 and Stage 3), the groups reacted similarly and cohered within themselves. However, there needs to be some empirical verification of this assumption. Additionally, Sherif et al. (1961) focuses upon the development of cohesion within a group as the group develops in relation to another group. It is unclear whether the development of cohesion within a group would differ given a different context.

Finally, there is an apparent lack of literature in the field of cohesion research about Robbers Cave. As such, it is difficult to assess the study critically. There is,

however, some assessment of it in the field of differentiation studies. It is unfortunate that both fields are not cooperative. This author sincerely hopes that the interdisciplinary approach taken by this project is illustrative of the interdependence of these two fields.

Implications For Social Work Practice

This chapter focused upon providing practical and applicable tools for the social worker, and indeed for anyone working with groups of latency aged boys. The above “formula” for increasing cohesion through the balancing of task and social cohesion, the recommendations about interrupting the positive cohesion feedback loop, and the close examination of attractors within Robbers Cave will hopefully facilitate a better understanding of the parameters of task cohesion and achieve this chapter’s aim.

According to Sherif et al. (1961), the introduction of a superordinate task to a system represents an increase in possible resources for groups within it. In terms of policy implications, a better understanding of how individuals and groups behave in competitive environments should guide the distribution of resources to a community. The conclusions show that the provision of resources alone may not necessarily be sufficient for the pacification of conflicting groups. Furthermore, supplying groups within a community with resources utilizes a deficit model of need and encourages groups to compete with each other in qualifying as the neediest. What this exercise shows is that for competition between groups to lessen, groups must be united against a common enemy in the form of a superordinate task. And the initial failure of the administration of such tasks to decrease intergroup conflict may not indicate that they lack efficacy. Rather, attractors within the system may not be within reach given the amount of time passed, the frequency of tasks administered, the size of groups, the homogeneity of groups, and all

the other parameters discussed. Most importantly, however, in the shift from a deficit model of need to a strengths-based model of performance in tasks, perhaps groups themselves should be allowed to participate in the development of resource distribution policy in an unprecedented way.

Conclusion

The theoretical exploration of this project is by no means conclusive. There are many gaping questions left answered. More research is needed in identifying additional parameters of cohesion and points of bifurcation in systems. Is there a limit to the positive cohesion feedback loop? When does instability due to runaway positive feedback occur? What are the naturally occurring negative feedbacks in such a system? How can cohesion be measured? How exactly does social cohesion facilitate task cohesion? How can the formula presented in this chapter be quantified and tested?

What is clear is that cohesion is a multidimensional construct (Zaccaro & Lowe, 1988). Many parameters have to be tuned optimally for cohesion to form in a group of latency aged boys. More challenging to achieve is the homogeneity that is more readily available in the natural world than in the human world. Sherif et al. (1961) chose largely homogeneous groups for Robbers Cave. This hurt the external validity of their experiment. In reality, groups are not homogenous. Herein lies the relevance and value of our formula. Without judgment, it will hopefully allow social workers to achieve the all-important cohesion within groups without depending upon homogeneity. It is helpful to be able to encourage and facilitate cooperative, synchronized behaviour among a group when this sort of behaviour is absent. An example of this may be in a school classroom, where certain individuals are being targeted by bullying behaviour. However, it is equally

important to understand the contributors to and mechanisms of cohesion when faced with a cohesive group that is having a negative impact on its individual members, out-group persons, or to the community. An example of this is a youth gang engaged in criminal activity. Only by understanding how cohesion comes about can cohesion be undone, and vice versa.

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