Committee V
The Emotions: Focus on Inter-Male
Aggression and Dominance Systems
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Draft–for Conference
Distribution Only

DOMINANCE SYSTEMS AMONG PRIMATE ADOLESCENTS

by

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The Twelfth International Conference on the Unity of the Sciences
Chicago, Illinois November 24-27, 1983

Overview

There is probably no fact more antagonistic to developmental psychologists than the realization that humans are animals. It seems to be an embarrassment or, if realized, ignored. Certainly it is underplayed. For example, the "animal nature" of young children, not yet socialized, or of adolescents, still enthralled with the trauma of puberty, may be discussed in developmental psychology textbooks, but with humor or with the sense that with proper nurturing "it" will go away.

Others are not so quick to dismiss the interplay of biology and human features. For example, Bouchard's "Minnesota Twins" research project has brought together psychologists, psychiatrists, pediatricians, and physiologists to study identical twins reared apart to explore the medical, psychophysiological, psychomoter, emotional, cognitive, personality, and attitudinal aspects of develoment (Holden, 1980). Kreuz, Rose, and Jennings (1972), on the other hand, demonstrated how a psychological factor (stress) can affect one's (officer trainee) biology (circulating plasma testosterone).

While genetists and physiologists have made inroads in influencing the way developmental psychologists think about human nature on a molecular level, disciplines such as ethology that emphasize a biological perspective on a molar level have had little impact. Although ethology has a long history (Eibl-Eibesfeldt, 1975) only recently has the field come of age in terms of textbooks (e.g., Boice, 1983), books of readings (e.g., Omark, Strayer, & Freedman, 1980), and organization (what was to become the International Society of Human Ethology first met in 1974). Much of this ethological research has focused on infants and young children. There have been, however, several recent attempts to develop an ethological theory of adolescent development (Montemayor & Savin-Williams, in preparation; Savin-Williams & Montemayor, in preparation; Weisfeld, 1979; Weisfeld & Berger, 1983).

The first section of this paper details the basic assumptions of ethology, highlighting its contribution to the "unity of the sciences". The second is a review of what is currently known about male and female dominance-anatagonism-aggression among non-human

primate adolescents. This literature forms the basis for a review of the theoretical assumptions and the empirical research that I have conducted during the last 10 years on dominance behaviors and hierarchies in groups of human adolescents in naturalistic settings. In the final, and fourth section, I draw from the preceding conclusions concerning the nature and study of dominance systems in primate adolescents.

Interactions Among Nonhuman Primate Adolescents

Overview

The purpose of this section is to review the non-human primate literature on dominance behavior as the initial step in constructing an ethological perspective on adolescence. All available field studies of free-ranging groups of primates are reviewed in relation to information pertaining to the period of life between the onset of pubescence and the attainment of adult status. Two other papers (Montemayor & Savin-Williams, in preparation; Savin-Williams & Montemayor, in preparation) are more complete treatments of social behavior among nonhuman primates.

Assumptions

The central theoretical position of this paper is that all animals, including humans, exhibit behaviors that have a genetic basis. Thus, behavior should be studied in fundamentally the same manner as other biological phenomena, as part of the adaptive equipment of the organism (Lorenz, 1965). Three critical ethological assumption follow: (1) humans are on a phylogenetic continuum with other animals, (2) behavior can be genetically transmitted, and (3) humans share with other primates many fundamental behavior patterns.

Although many behaviors are species-specific, closely related species share an environmental and a genetic history.

Medin (1974) suggests that cross-species research is crucial in three respects. First, comparative research elucidates the evolution of behavior: how humans behave now is dependent not only on the immediate situation but also on how ancestors faced similar circumstances. Second, such research aids in understanding how the demands of a particular environment have been met by changes in anatomical structures and associated patterns of behavior. And third, the principles and functions of behavioral systems or processes may be explicated by cross-species research.

My focus here is to examine the ways in which the observations and research data on non-human primates is beneficial for developmental psychology:

> Neither individual nor collective behavior can be studied adequately from the narrower approach of the anthropocentric psychologist or the historian who focuses excusively on human accomplishments and failures . . . The recent expansion of concepts and principles that enliven and challenge the field of developmental psychology stems largely from contributions of ethologists and other behavioral scientisits who have taken a broader subject matter than the behavior of any single species (Riesen, 1974; p. 433).

In particular, data from the non-human primates have implications for a psychology of adolescence.

In this paper we examine adolescence among nonhuman primates in order to identify those characteristics of this stage of life which are typical of most primate genera. This is not to content that there is one primate pattern. It is difficult to define with precision what it means to behave as a primate since behavior is dependent on environmental factors, such as ecological niche, population composition and density, and recent group experiences and history, as well as on taxonomic position (Dolhinow, 1972). Thus, in the following review of the antagonistic behavior of primates ranging from lemur (Lemur) to chimpanzee (Pan), the search is not so much for the pattern as for a common theme from which variations are derived.

The value of examining developmental issues in species other than our own has been demonstrated through recent reviews of nonhuman primate research on the mother-infant relationship (Swartz & Rosenblum, 1981), paternal behavior (Mitchell & Brandt, 1972; Redican & Taub, 1981), peer interaction (Rosenblum, Coe, & Bromley, 1975; Savin-Williams, 1980b), and relations with parents and peers during adolescence (Montemayor & Savin-Williams, in preparation). In these reviews the adaptive vaue of various types of associations for children has been identified, along with environmental pressures which might account for the diversity of these relations. Similarly, by examining the period of adolescence in nonhuman primates we gain an understanding of its evolutionary significance and thereby approach the study of human adolescence with a deepened appreciation of its importance for human growth and development. Although this paper is not the first attempt to develop an ethological theory of adolescence (Weisfeld, 1979; Weisfeld & Berger, 1983), it is the first to systematic review the behavior of pubescent, preadult nonhuman primates as the basis for an ethological theory of adolescence.

Prosimians

In one lemur group of subadult males were involved in considerably fewer agonistic interactions (spats, chases, and jump-fights) than one might statistically expect (5 observed

vs. 51 expected) (Jolly, 1966). In another troop subadult males were actively engaged in dominance interactions, especially in lengthy stink fights with subordinate adult males (Budnitz & Dainsi, 1975). Of the five group males, the subadult male ranked fourth and was occasionally involved in dominance interactions. Lemur subadult males may be prevented from anogenitally marking females by adult males; whenever a subadult male approached an estrous female in one group he was chased and occasionally cuffed by adult males (Chandler, 1975).

Richard and Heimbuch (1975) found in three groups of Propithecus that subadult males were frequently the recipients of aggression, considerably more often than they aggressed against other group members. For example, in one group the subadult male aggressed six times but was aggressed against 83 times. For the three groups, for every aggressive act initiated by the subadult he received 5.5 aggressive acts (71% of which were from adult females). Only agonistic encounters with juveniles were mutually reciprocated by the subadult male.

New World Monkeys

While still in the natal group, young squirrel subadult males are rowdy, but

> . . . when males reach a given age (probably around five years old) they begin to become physiologically and behaviorally adult; but if the maturing males are not able to successfully establish themselves in the troup's adult hierarchy because they are too frequently or seriously chased and fought, they will be forced to avoid the fully adult males and to assume some peripheral or totally separated positions in the troup (Baldwin, 1968; p. 307).

Among themselves subadult males establish a dominance hierarchy based on relative strength, but is is barely detectable and is insignificant when compared to the adult male hierarchy. Adult males generally pay little attention to young males in the troop until

they reach subadult status; then, the number of interactions, primarily antagonistic, increase dramatically (Baldwin, 1968 & 1969).

Much the same pattern has been detected in a group of golden-lion marmosets (Snyder, 1974). Adults will tolerate same-sex juveniles until they become young adults, at which point the adults will drive the young out of the group. As the young female matures she becomes subordinate to all; she is seldom seen eating with the group and food may be stolen from her.

An exception to the general finding that subadult males are either not part of the dominance hierarchy or are low status members of it is provided by Jones (1980) who reported that among howler monkeys high-ranking individuals are young adults; intermediate-ranking individuals, middle-aged adults; and low-ranking individuals, older adults. This exceptional hierarchy apparently is the result of the ecological niche in which these animals live, one that favors individuals with high energy over those with physical strength.

Old World Monkeys

More is known about subadult antagonism among Old World monkeys than in any other group. Shortly after puberty subadult macaque males assert themselves, first over infants, juveniles, and adult females, and then amongst themselves (Simonds, 1965). The peer group hierarchy that emerges among subadults generally is inferior to the adult male dominance structure, but it is indicative of future relative ranking in the adult male hierarchy (Southwick, Beg, & Siddiqui, 1965). In the total dominance hierarchy adult males dominate all other animals while subadult males and adult females dominate juveniles, who in turn dominate infants (Dittus, 1979). Further, dominant adult males displace subadult males to the troop's periphery away from favored feeding areas.

In most cases, subadult males rank low in the total dominance hierarchy (Yamada, 1971). Based on giving way, fights, and various physical gestures and threats, four subadult males in a South Indian macaque group were ranked in the four lowest places in the adult

hierarchy (Simonds, 1965). In the Cayo Santiago population, Loy (1971) found that the bottom six places in the group hierarchy were occupied by three- or four-year olds while the top six monkeys were five years or older. Thus, in most groups the leaders and sub-leaders tend to be adult males while the peripheral or follower members are young adult or subadult males.

During the juvenile and early adolescent periods, a male's status is largely determined by the rank of his mother (Koyama, 1967; Sade, 1967; Drickamer & Vessey, 1973). But after puberty physical strength and abilities, physique, and assertiveness become more influential. In one group a male, ranked 11th at the onset of the study, underwent a dramatic musculature and size growth spurt; nine months later he was displacing the beta individual (Simonds, 1965).

For the macaca subadult female dominance interactions do not appear to be crucial for later status or breeding efficiency. As a juvenile she ranks immediately below her mother; as a subadult and as an adult she also ranks immediately below her mother (Koyama, 1967; Sade, 1967).

With the onset of sexual maturation, subadult baboon males become the recipients of increased hostility from adult males. They frequently turn on juveniles and defeat them in aggressive encounters. As a juvenile, age is the prime determinant of winning aggressive encounters; but after the age of five years there is little correlation between age and aggressive interations. Subadulthood thus appears to be a time to reassess peers in terms of strength and fighting ability (Owens, 1975b). By the fifth year large subadults dominate some adult females and by the seventh or eighth year they begin to climb the adult male hierarchy. During this period subadult males become increasing pugnacious and daring (Hall & DeVore, 1965).

In hamadryas and gelada baboons an aggressive relationship develops between the leader male and his male offspring as the latter sexually matures (Dunbar & Dunbar, 1975). Avoidance of the harem leader is the adolescent's usual defense. Toward the end

of the subadult period he may become a "young adult leader," working and associating closely with the harem leader to coordinate travel and herd stray females. If the harem leader is exceptionally old, he may then assume leadership and sexual privileges over the harem.

Subadult vervet (Strusaker, 1967b; McGuire, 1974) and guenon (Bourliere, Hunkeler, & Bertrand, 1970) males rank lowest on the adult male hierarchy. More than 50% of all group agonistic and supplantation encounters involve these older juvenile males, usually directed at younger juveniles or subadult females. They may displace an adult female, something never observed prior to this age. The more sexually advanced the guenon subadult male the more likely he is to receive adult male aggression, especially during the breeding season. During the non-sexual season, however, both juvenile and subadult males approach, groom, and mount females without fear of adult male intervention (Bourliere, et al., 1970). Many late juvenile talapoin males have minor wounds, missing tufts of hair, and other signs of being aggressed against during the breeding season (Rowell, 1973). Subadult females by contrast are quite passive and non-agonistic (McGuire, 1974).

Toward adult males, mangabey subadult males interact agonistically (attacks, chases, threats) more than peacefully. Exactly the reverse pattern is the case for their associations with other group members. In one study they were submissive to adult males (69 of 78 encounters) and dominant over adult females (33 of 50 encounters) and juveniles (29 of 29 encounters) (Chalmers, 1968).

Subadult male langurs are involved in a considerable number of dominance interactions with adult males and females; but they only dominate other subadults or those younger (Jay, 1965; Poirier, 1970). During puberty, as a male matures in size and strength he asserts himself, first over low-ranking females and then, as a young adult, over low-ranking males. These situations, plus the fact that they are also competing through physical contact, aggressive threats, and chases among themselves for food, right of way along paths, tree positions, and estrous females, produce tension in subadult male langurs.

Some, however, avoid these antagonisms by maintaining close proximity to the dominant male, living peacefully in that position. Yoshiba (1968) claims that these males are being groomed for the top leadership position by the adult male.

The amount of aggression between adult and subadult male langurs appears to be affected by the relations which the adult males have with each other. In troops with one clearly dominant male and few aggressive interactions among adult males, social relations between adults and subadults are relaxed. In troops with no dominant male and many agonistic interactions among the adult males, relations with subadults also are tense and aggressive (Boggess, 1982). Subadult langur females are subordinate to all adult females, but they seldom engage in any dominance interactions except when in estrus (Jay, 1965; McGuire, 1974).

Subadult males are rarely observed to directly challenge an adult male, especially a high status one. The attacks, when they occur, tend to be more "hit and run" and harassment. For example, subadult male patas monkeys have been observed to taunt and harass adult males during copulations (Loy & Loy, 1977) and feeding (Zucker & Kaplan, 1981). Such behavior indicates a growing boldness coupled with some caution.

Apes

Carpenter (1964) observed that as young gibbons mature a special and poignant antagonism develops between them and their same-sex parent--in a spirit of intense competition for status and sexual access. Tenaza (1975) substantiated this relationship between males but not between daughters and mothers.

Similarly, siamang researchers Aldrich-Blake and Chivers (1973) have observed increased hostility among group males as the offspring reach puberty. Most of the 213 scraps that Chivers (1972) recorded involved subadult and adult males, usually when the former intruded within the personal space of the latter. Siamang subadult males, however, are more tolerated by their fathers than are gibbon subadults.

Little information is available concerning antagonistic behavior in orangutans, perhaps because of their asocial nature. Rodman (1973) observed that as the male orangutan matures there is increased competition between him and adult male visitors which effectively forces him away from the mother-dominated family group. Galdikas-Brindamour (1975) reports adult males are usually intolerant of subadult males; when the former approach the latter flee in terror.

Subadult blackback gorillas are subordinate to silverbacks and dominant over all other males in an age-graded and strength-based hierarchy. In actuality there are few direct physical contacts or dominance interactions between the two classes of males; the hierarchy is clearly set, recognized, and rigid (Schaller, 1963).

Both adolescent male and female chimpanzees rank near the bottom of the group dominance hierarchy (Goodall, 1968). If an adolescent's mother is a high-ranking individual then he/she may be dominant over some low-ranking matures. The female adolescent rarely engages in dominance interactions, despite the fact that she is in a precarious position in the group: likely to be threatened by adult males and females and by adolescent and juvenile males.

During late subadulthood males enter into dominance interactions on a consistent and sustained level. At first they threaten low-ranking chimpanzees. This signifies that the adolescent apprenticeship is over, as is also maternal protection and male tolerance of insubordination. Severe retributions are likely to occur once a male is sexually mature. Apparently, the more sexually mature a young adolescent male is, the more likely he is to receive aggressive attacks from adult males (Albrecht & Dunnett, 1971). Yet, he continues to associate with adult males, often sitting and watching from a slight distance (Pusey, 1978). Goodall (1968) believes that the adolescent male needs to be on good terms with the adult males, desiring reassuring contact after feuds, promoting his own status and group bonding as well.

Summary

The frequency of dominance behaviors, roughly catalogued as threats, aggressive contacts, and supplantations, increases during the subadult period in male non-human primates. An individual has not only the motivation (sex drive, power motif, biochemical disequilibrium) but also the means (strength, canines, vocalizations) by which to gain status. Until this time adult males give little attention to young males. But with pubescence the latter begin to assert themselves, and adult males respond in kind to their potential rivals. Occasionally, researchers have recorded a direct relationship between the specific level of sexual maturity in subadult males and the amount of aggression received from other group members. The adult male's intolerance of maturing males often results in scars, tears, and bruises for the latter. But because of previous social experiences, including play activities, "there are more dominance fights avoided by one animal slipping quietly away than there are actual fights or chases" (Dolhinow, 1972; p. 363).

It is not clear why an adult male is provoked to aggress against the young group males--perhaps in response to their increased sexual interest in "his" females, or to his fears concerning losing his dominance status to these upcoming insurgents. And too, he may merely be responding in kind to the aggressive behavior initiated by the subadults. The primate literature provides few resolutions to these behavioral and motivational issues.

The subadult's first place in the adult dominance hierarchy is usually last. But by late subadulthood or young adulthood he begins to enter into dominance interactions, first defeating adult females and lowly ranked males; when he establishes a semi-permanent position, he is an adult. That position is not bequeathed to him by the status of his mother, as is often the case for subadult females. While rank seldom gives breeding power, it does orient group leadership, cohesiveness, travel arrangements, peaceful existence, and food gathering.

The subadult female rarely engages in dominance interactions, in continuity with both her juvenile and adult pattern. She neither asserts herself nor is she the recipient of antagonism from others, both beneficial to her as a mate and as a mother.

Dominance Interactions Among Human Adolescents

Overview

The kinds of behaviors, behavioral interactions, and social structures described above are also characteristic of human adolescents interacting with each other in naturalistic settings (Savin-Williams, 1977). This first occurred to me in a University of Chicago class taught by noted human ethologist Daniel G. Freedman in 1973. A masters thesis, a dissertation, and several book chapters and journal articles later, the current report summarizes the importance of these studies for understanding intra-sex aggression and control among adolescents.

Theoretical Review

As noted in the above review of non-human primate adolescents, it is not uncommon for adolescent individuals to engage in social interactions that can be construed as dominance behavior. The net effect of these behaviors on a group level is a system of status differentiation that is necessary for group formation and maintenance (Rowell, 1966). The alternative to "fitting in" is to become peripheralized to the group, as a solitare or a member of a bachelor group, or to leave one's natal group for another.

Ethologists such as Lorenz (1966) and Tinbergen (1968) argue that humans still genetically harbor a number of behaviors that predispose them toward the formation of hierarchical dominance relations when engaged in interpersonal behavior within the context of a social group. Tiger (1970) also maintains that it is "human nature" to create hierarchical orders based on dominance and submission behaviors:

> The nub of the historical argument is that during the formative periods of human anatomy and bodily structure--which are broadly replicated in today's model of the human--patterns of social differentiation in the dominance form were also developing, and it is this prior phenomenon which governs the occurrence of dominance hierarchies in contemporary societies, rather than only a variety of formed or historical circumstance (p. 295).

Mechanisms. An arrangement into a dominance hierarchy is one of two structural mechanisms--the other being territoriality--prevalent in vertebrates for controlling intra-species aggression. These mechanisms have evolved to reduce the harmful effects of aggression without negating its useful aspects such as protection from predators, population regulation, and habitat utilization. This reduction of overt aggression renders the most potentially harmful aspects of aggression--injury, death, energy waste--ineffectual by engendering intragroup, multisensory familiarity and by enhancing the prospects for an average expectable environment through fostering intragroup predictable behaviors.

Wilson (1975) notes that animals who depend for survival on relatively stable group units utilize dominance rather than territorial behavior to control aggression, adjust mutual relations and determine priority access to resources:

> Dominance behavior is the analog of terriotrial behavior, differing in that the members of an aggressively organized group of animals coexist within one territory (p. 279).

This does not imply that group living animals do not have territories; rather, their geographic area is compressed into personal space (Hall 1966) with the center being not a relatively set location but one's own body.

Evolutionary Significance. Since ethology is a branch of biology (Tinbergen, 1963), an essential question for ethological investigators is the survival value of the phenomenon studied. The evolutionary significance can be seen from either an individual or a group selection level of analysis, in either case, focusing on the functional aspect. Rowell (1966) concluded that the evolution of dominance hierarchies had a three dimensional basis: (1) the immediate advantage to the dominant animal (access to resources such as food, sexual mates, sleeping sites, attention and locomoter position); (2) the genetic

advantage (sexual selection); and (3) the social advantage (group order, peacefulness and security). Group cohesion is maintained because a dominance hierarchy serves to dissipate aggression and overt fighting, facilitates known average expectable behavior of individual group members, determines commodity acquisition if the supply is limited, structures the limited resource of attention and thus eliminates waste, provides for division of labor and thus aids efficiency, organizes activities for an enhancement of group competence and performance, and establishes social distance while still maintaining sufficient proximity for "groupness". Poirier (1974) summarizes:

> Since each animal knows its position vis-a-vis others and acts accordingly, and as long as each stays in its place, there is minimal disruption (p. 142).

Less systematic has been the thinking in regard to the benefits or compensations of being subordinate. McGuire (1974) suggests that it is adaptive for some individuals to be submissive in order to avoid stress and the fear of real or imagined physical, social, or psychological harm. The potential for stress may be quite high in animals who lack the physical or temperamental equipment--biologically and/or environmentally induced--to "defeat" others. Physically losing may have costly consequences; so too may stress. Under stress individuals waste energy, face the prospect of acting "irrationally" or non-adaptively, suffer disease and physical system breakdown (unable to digest food, endocrinological imbalances), and are less capable of breeding.

In other ways, being subordinate is advantageous to an individual. Certainly, one's fitness is considerably higher by displaying submissive behavior than if she/he were to make an all-out effort to dislodge the most dominant group member. Alexander (1974) notes that like other group members a subordinate individual is informed by the various group dyadic interactions "when and how to display aggression, and when and how to withold and appease and withdraw" (p. 330). By such knowledge one increases his/her survival and reproductive chances by remaining in the group. In many social species individuals face little hope of survival if alone, and are almost universally

excluded from breeding (Wilson, 1975). But a submissive male will probalby survive, eating with the group and benefitting from predator protection, with the outside chance of occasional breeding opportunities. Also, by staying with the group a subordinate individual may enhance his/her inculsive fitness by aiding the survival opportunities of closely related kin. Furthermore, in most instances the dominance ordering is not rigid since top ranking individuals migrate or die; thus, by staying with the group as a subordinate or peripheral member one has a chance to move up in dominance status.

On a group selection level of analysis, West-Eberhard (1975) points out that subordinate group members, because they are dispersed from the core of the primary habitat, are the ones most likely to pioneer new ecological niches, thus learning new species forms of adaptation. They are the "cutting edge of evolution" (Wilson, 1975).

Hierarchy. The notion of hierarchy is "the principle by which the elements of a whole are ranked in relation to the whole" (Dumont, 1970; p. 66) or, more concisely, "a set of ordered levels" (Whyte, Wilson and WIlson, 1969; p. vii). Hierarchy thus marks the "conceptual integration" of the larger and the smaller and of that which encompasses with that which is encompassed (Dumont, 1970). Hierarchical rank is a societal category--much like age, sex, in-out, normal-abnormal, etc.,—global in application because it reflects the dilemmas, experiences and associations which are intrinsic in constructing and maintaining a conceptual framework of the social work (Schwartz, personal communication).

Pattee (1973) maintains that:

> It is a central lesson of biological evolution that increasing complexity of organization is always accompanied by new levels of hierarchical controls. The loss of these controls at any level is usually malignant for the organization under that level. Furthermore, our experience with many different types of complex systems, both natural and artificial, warns us that loss of hierarchical controls often results in sudden catastrophic failure (p. xi).

The central assumption is that "nature loves hierarchies":

> Hierarchical organization is so universal in the biological world that we usually pass if off as the natural way to achieve simplicity or efficiency in a large collection of interacting elements. If asked what the fundamental reason is for hierarchical

organization, I suspect most people would simply say, "How else would you do it?" (Pattee, 1973; p. 73).

While the empirical observation of hierarchy is well documented, the explanation of hierarchical sturcture is more speculative. Most researchers believe that hierarchical structure facilitates the "survival of complexity" due to its enhancement of integration. By ordering parts in terms of the whole the complexity of the whole is established. Thus, not to see hierarchy, regardless of the level of empirical concern, would be surprising because it would imply chaos.

Dominance. In comparative and social psychology interpersonal or social dominance has traditionally had its reference in such concepts as competition and aggression: one controlling the behavior of another by force or fighting (Schneirla, 1951; Scott, 1953). Wilson (1975) equated dominance and aggression hierarchies: "the set of sustained aggressive-submissive relations among these animals" (p. 279). In the more phylogeneticaly "advanced" species few researchers are so inclined to equate dominance and aggression, noting that a multiplicity of factors other than aggression mediate dominance behavior, including the behavior of the subordinates (supplantation, avoidance, attention).

Social psychologists have referred to a dominant individual as a leader (Glidewell, et.al., 1966), an egotist (Whiting and Edwards, 1974), a headship (Gibb, 1969) and an authoritarian (Adorno et. al., 1950) among others, in large part depending on "how" dominance is asserted or expressed. One may attempt to exert dominance from various motivational desires: to serve one's own interests, to gain desirable prerequisites, to counter dominate, to humiliate or to aggress against another, or to assume leadership over a group (Maccoby and Jacklin, 1974). A dominant person desires power, prestige and material gain, and manifests ascendance, assertiveness and social boldness (Gibb, 1969).

As utilized in this paper, dominance is eclectic, referring to specific varieties of behavior occurring in a dyad in which one pair member asserts or expresses power and/or authority over the other. In the process, influence may have preceded and leadership in a

larger group may result. Thus, dominance is primarily a relational term that can be utilized to describe a person ("a dominant individual") or to indicate a social role or position ("the most dominant in the group") without reference to responsibilites or obligations.

This encompassing definition of dominance is congruent with the ethological perspective which emphasizes a holistic approach, but it is incongruent with social psycholgoical research which has compartmentalized leadership, influence, power, authority and dominance.

Dominance hierarchy. The joining of the two concepts dominance and hierarchy has primarily been undertaken by primatologists and ethologists who consider that among social animals with the capability of individual recognition, a dominance hierarchy will be the result of the residual or inevitable inequalities of aptitudes of group members, thus enhancing a "chain of command" (Dumont, 1970). Alcock (1975) asserts that social animals athat did not evolve a system of interindividual dominance relations became extinct because "their excess members lived longer during hard times, devoured the countryside, and caused the downfall of the entire group" (p. 229).

Method for Research

Settings and Participants. Groups 1-13 (Table 1) were observed at the same five-week leadership camp setting in Michigan during the summers of 1973-1979. Groups 14 and 15 were involved in a New England bicycle travel trip sponsored by a private youth organization; the females in group 16 were at a Jewish camp in New York State.

The 60 males and 36 females were between the ages of 11 to 17 years and were in groups ranging in size from 4 to 10 (see Table 1). The sample is predominatly Caucasian (94%), protestant or catholic (except group 16), and middle- to upper-class.

Measures and Procedures. The instruments and means for collecting data varied from one study to the next, but all included observational and sociometric measures and procedures. An underlying theme of the research was the comparison of ethological and

traditional psychological methods of collecting data (see Savin-Williams, Small, and Zeldin, 1981).

Observation Measures. Eight types of social dominance behaviors measured the assertion of one individual (X) over another (Y). These behaviors, not necessarily synonymous with aggression, wins, or conflict, were derived from field studies of primatologists, social psychologists, and human ethologists, and were pretested in a pilot study (Savin-Williams, 1977). Only dyadic interactions between cabin members were recorded.

Index behaviors were divided into overt (notated with an *) or indirect subcategories, depending on the degree to which dominance was initiated by X (overt) or Y (indirect) and was expressed through direct (overt) or subtle (indirect) means.

1. Verbal Directive: X verbally communicates to Y what to do and Y complies.
   *(a) direct order or request
   (b) indirect directive or suggestion of behavior
   (c) giving unsolicited advice or information
2. Verbal Ridicule: X raises his/her status or lowers Y's status by verbally abusing Y or by putting himself or herself in a good light at the expense of Y. Y does not contradict, usually withdrawing from further interaction.
   *(a) name calling, teasing--usually through direct confrontation
   (b) talk about, verbal put-down, gossip, cattiness-usually through a third person
   *(c) bragging or boastful behavior
3. Physical Assertiveness with Contact: X pushes, shoves, kicks, or hits Y. Y takes a submissive posture, flees, or, if asserts self in turn, loses.
   *(a) overt aggressiveness, in earnest
   *(b) play fighting, in fun, with a smile

4. Recognition: Y acts in such a way as to place X in a more powerful position. X becomes a social monitor for Y.
   (a) imitating or modeling behavior, appearance, speech; agree with
   (b) ask for approval of behavior or appearance; to apologize
   (c) give compliments or favors; ask where is; defend
   (d) ask or solicit information or advice; divulge information; wait for
5. Physical or Object Displacement: X takes an object away from Y, or X approaches Y and Y moves away.
   *(a) direct removal or supplantation
   *(b) indirect control; not asking to borrow; moving into space; maintain privilege position.
6. Verbal or Physical Threat: X asserts verbal or physical authority over Y with Y not countering.
   *(a) verbal challenge, usually with threat of bodily harm
   *(b) physical challenge without making actual physical contact; glaring
7. Counter-Dominance: X, commanded by Y, assertively or passively disobeys and Y does not pursue the demand.
   *(a) ignoring a direct order or request
   (b) ignoring the other; shunning; spatial exclusion
8. Verbal Control: X verbally argues or battles with Y and gets the last word or monopolizes the content and structure of the verbal interaction
   (a) arguments or battles; direct refutation
   (b) monopolizes a conversation; interrupts the other's speech
   (c) contradictions without anger; corrections

In all studies the indices of dominance were significantly intercorrelated, indicating that they were rank ordering group members in a similar fashion. Thus, the behaviorally

based hierarchy in each group was a summation of these eight indices. Observation data were also collected on prosocial behavior, athletic ability, leadership, hiking position, and bed position in the various groups.

Observation Procedures. Nine undergraduate or graduate students conducted observations (I collected data on 6 of the 16 groups). Again, the exact procedures varied depending on the study, but most characteristic were the procedures described below and in Savin-Williams (1979).

Those who collected the observational data on dominance interactions also assumed counselor functions. This dual role as participant-observer enabled a direct but unobtrusive recording of behavior without hindrance or suspicion. For example, observers recorded dominancne interactions among group members during athletic games as they kept score, during cabin meetings as they took minutes, and during rest hour as they wrote letters. A premium was placed on unobtrusively observing naturally occurring behavior in the ongoing life of the group.

For 3 hours per day during the 5-week camping sessions, the observers recorded all episodes of social dominance which occurred between members of each cabin group. Observations entailed the use of an event-sampling technique, "all occurrences of some behavior" (Altmann 1974), and were made during five behavior setings: (1) rising from and going to bed (rest periods), (2) meals, (3) cabin cleanup, (4) cabin discussions and meetings, and (5) athletic activities.

The observers were trained by me prior to camp on data-collection techniques and behaviors to be recorded. After this initial training period the counselors-to-be and I watched 2 hours of volleyball and 3 hours of softball games at a Chicago junior high school for precamp reliability data. Due to the nature of data collection, the camp setting, and camp policy, reliability checks during the camping session were not possible. Post-camp observer reliability scores were obtained from an audio tape and accompanying written transcript of a cabin dicussion session.

The approval of the executive director of the camps had been procured prior to the collection of data. This approval was received only after the following human subject conditions were guaranteed: (1) the study would in no manner interfere with normal camp procedures or camper behavior; (2) confidentiality of the participants would be strictly maintained by coding all behavioral records to mask the identity of the adolescents and by eliminating all personal references from subsequent oral and written presentations of the data; and (3) participants would be debriefed in language appropriate for their level of understanding as to the nature and purposes of the project and their role in the project, and would be given also the option of having their data deleted from the study (all willingly participated).

In other groups a time sampling technique was employed in which all occurrences of dominance acts were recorded within a limited time span (Wright, 1960). This was necessary because of the nature of the activities: a wilderness travel camp.

Sociometric and Other Measures. In all the groups the adolescents were asked to rank group members in order of dominance. The term was defined as when someone exerted power, authority, or influence over others. This was usually completed during the first and last weeks of the camping session.

Many other attributes were assessed through either peer rankings, counselor rankings, tests, or measurements. These included, friendship, popularity, athletic ability, pubertal maturation, chronological age, physical size, socioeconomic status, overtness of behavior, frequency of interactions, leadership, camping ability, intelligence, creativity, cooperativeness, camp spirit, self-esteem, physical attractiveness, and empathy.

Results

From the 16 groups there are many detailed results that are specific to a particular group(s). This brief presentation of the data will focus on general research findings as they relate to developmental change and stability in the two sexes.

Males. Male adolescents from the ages of 11 to 17 years interacting in same-sex and same-age groups share with other primates a system of structuring interpersonal relations that can be characterized as a dominance hierarchy. This hierarchical group structure was recognized by group members (including one's self rank) both verbally and behaviorally within days if not hours of coming together. Relative status remained temporally stable during the 3 to 5 weeks of camp and was cross-situationally consistent in the various camp settings (e.g., discussions, athletic games, mealtimes).

The most frequent expression of dominance was verbal ridicule. Friends were usually closely-ranked individuals. Over time the frequency of dominance acts within a group decreased as the hierarchy became more clearly linear; the expression of one's status also became more overt. One male group countered this trend by becoming less overt over time, but the frequency of dominance interactions increased.

There were several notable age differences in dominance interactions. Early adolescents were more likely than late adolescents to physically assert themselves over cabinmates, and to argue. Physical variables such as pubertal maturation, athletic ability, and physical fitness predicted relative rank among early adolescents; among late adolescent males mental abilities, camp experience, and social skills were more important correlates of dominance status. With age dominance interactions were less overt, less physical, and more based on recognition of another's status through submissive behaviors.

Females. While 9 of the 16 groups studied were all-male, only 5 were all-female (2 were coed). Thus, our findings are more tentative in regard to dominance systems among females. A system of status differentiation was prevalent among the adolescent females, although this group structure differed from that of adolescent males and across the adolescent years.

Compared with the male dominance hierarchy, the group structure among early adolescent females was less stable. Relative dominance among dyads was likely to fluctuate during the course of camp. These occurred not among low status individuals as

in male groups but middle and even high ranked individuals. There was also considerable disagreement among the females on relative rank within the group and the rank order derived from these sociometrics did not always correspond with the behavioral observations of intra-group interactions. There was also no decrease in the frequency rate, and occasionally there was an increase of dominance acts within a female group.

The females in our groups seldom asserted their influence through physical means or by verbal argument. Rather, verbal ridicule, ignoring, shunning, and giving unsolicited advice were the most prevalent means of dominance expression. This sex difference increased dramatically among the older adolescent females. Dominance behavior was more likely to be subtle than it was to be overt; overtness of expression decreased over time in the early adolescent females. Compared with adolescent males, the females were more likely to underrank themselves on dominance status. Athletic ability, pubertal status, leadership skills, and peer popularity predicted the rank order in early adolescent female camp groups.

The level of instability found among early adolescent females was not characteristic of our one group of late adolescent females. Relative dominance status among the dyads increased in directionality over time as dominance behavior became more overt during the camp setting. The females recognized relative dominance status among themselves on the sociometric exercise.

Rather than a linear, hierarchial status rank-ordering, the late adolescent females formed a "cohesive dyarchy". A group structure based on coalitions with a dual system of leadership was formed--some females assumed the role of instrumental leader while others became expressive leaders. The cabin functioned as a cohesive group manifested through a complex and stable form of social interactions. Least predictive of relative status were physical attributes or self-report abilities; characteristics perceived by peers--such as well known, friendship, camp spirit, and empathy--significantly predicted relative group rank among late adolescent females.

Conclusions

Dominance Behaviors

A diversity of behaviors are used by primate adolescents to assert or recognize relative differences in status. The eight indices of dominance and submission that were incorporated in the research on human adolescents reported above are not equivalent in content or form but in effect: one individual being dominant over another. In content many of the behaviors may also be indicative of other constructs, such as friendliness; in form dominance may range from overt to subtle and from vocalizations to physical acts. This variety of forms allows for and encourages cross-species and cross-cultural comparisons. For example, supplanting others, gaining access to priorities, displaying threat gestures, and receiving attention from others are behaviors that connote dominance in both human and nonhuman primate adolescents. In all human groups studied, however, the primary mode of expressing status was verbal, thus highlighting the symbolic, linguistic uniqueness of humans. Any definition of dominance that is applicable to only one species is doomed to obsolescence as a narrow and ungeneralizable tool. At least this is an ethological view.

Individual adolescents varied considerably in the way they expressed their status. For example, some primate adolescents appear to be "bullies", physically asserting themselves in a rather overt and aggressive manner. Others display more finese, using subtle, non-threatening behaviors such as shunning or ignoring to indicate their status.

Although these behaviors may reflect a style or "personality trait", it is also true that different situations elicited differing response styles. For example, during athletic games and rough-and-tumble play activities physical threat and acts were frequent means of expressing dominance. In the human groups verbal argument and interruptions were common dominance behaviors during group discussions.

Thus, the specific behaviors used to express one's dominance status may vary by an individual's style, the situation in which the act occurs, one's age (discussed below), and one's sex (discussed below), among many possibilities. These variations should not, however,

disguise the fact that a conceptualization of dominance as a higher order phenomenon than specific behaviors is warranted. In all human studies reported above the specific indices of dominance were significantly intercorrelated.

Group Structure

It is justified based on the empirical research presented that primate adolescents behave in dyadic situations with other same-sex, same-age adolescents in a fashion that can be summarized on a group level as a dominance hierarchy. This stable and ordered, but not invariant group structure, can be assessed not only through observations of interpersonal behavior but also from verbal reports among human groups.

The dominance hierarchy may exist within a play group, a bachelor group, or an adult hierarchy, enduring over time as members enter and exit the group. In the human studies the incorporation of new group members or the exchange of cabin counselors for a day did little to disrupt the dyadic behavior patterns.

While it is not possible to determine the exact point in the life of an ongoing group that relative dominance status is recognized by group members, in new groups (such as the human camp groups) "end anchoring", the identification of extreme stimuli in a series and the judgment of others relative to those extremes (Sherif and Sherif, 1964), occurs within a relative brief (perhaps hour) period of time. In the camp studies over time the behavioral dominance hierarchy became more stable, with most dyadic relationships becoming firmly entrenched. The contested or flexible dyadic relationships were predictable, resulting in occasional shifts in relative status occurring between adjacently ranked group members (one up, one down). This basic hierarchical stability may extend over a long period of time. Weisfeld, Omark, and Cronin (1980) found Omark and Edelman's (1976) first- and third-grade children maintained their relative dominance positions 8 years later as high school freshman and juniors.

Aside from major disruptions, the dominance hierarchy remains stable over time and settings, increasing in stability as group members more clearly distinguish relative status. Challenges become more selective, respecting clearly established dyadic relationship while challenging the flexible ones. This plasticity would appear to be prevalent in most adolescent groups.

Individual Characteristics

Non-human primate research has seldom undertaken the task of predicting the group dominance structure by reference to individual characteristics of its members. Research on humans has occasionally undertaken such procedures, but with little success since few of the physical, behavioral, and social measures consistently or significantly relate to dominance status, e.g., age, body size, aggression, sociability, experience, popularity.

During the early pubescent years physical traits may be most important in distinguishing relative rank. One explanation for this is the dramatic saliency of physical variability during this time. For example, among the 12 to 13 year olds in the human male adolescent groups 1-5, pubertal maturation stage (Tanner, 1962) ranged from 1 to 4; among the 14 to 17 year old boys in groups 10 - 11 the stages were either 4 or 5. Relative differences in height and weight were just as marked: from 58-71 inches and from 81-140 pounds among the early adolescents, but from 66-73 inches from 121-165 pounds among the late adolescents. When physical features become more equalized at the conclusion of pubescence, perhaps other traits such as intelligence, peer popularity, and camp experience are emphasized, demarcating individual variation and, consequently, importance in regard to group dominance status. The drop in the use of pushing and shoving and of overt categories of behavior among late adolescents underscores this deemphasis of physical modes of asserting dominance position. The finding that girls develop this deemphasized pattern earlier could be attributed to their earlier physical maturation or to an earlier learning of the importance of social and mental characteristics, or to both.

The non-human primate literature suggests that a more productive technique than relating the entire rank order to some dimension is to examine the characteristics of individuals at the extreme points of the hierarchy. Non-human primate adolescent alpha males tend to be morphologically larger and physically stronger than other group members. "Social graces" with a "pleasing personality" are as important as physical size and strength in many primate species for attaining a prominent position in the group. An alpha is the center of attention, a focal animal for unification of the group. Although not always the leader in trail progressions, a top ranked individual leads in the sense of initiating and directing group movement. Such an individual defends the group against both internal and external sources of disturbances. Dominant chimpanzees are not only stronger but also more highly motivated, coordinated and "ingenious" than are subordinates (Goodall, 1968).

The data do not, however, answer how an individual has his/her "degree" of dominance or submission. Most likely, there is a plurality of determinants, some tied to morphological and temperamental inheritance and others to socialization factors. This "degree" is probably flexible and defines a range of possibilities rather than a precise positional placement. The range is dependent on who else is present and on characteristics of the setting. If six alphas were placed together in a group, it is obvious that not all could be "most dominant'; if an omega was placed in a group of juvenile individuals two to three years younger, then it is doubtful that she/he would reside at the bottom of the new dominance hierarchy.

The position taken in this paper is that when individuals freely interact, some are more likely than are others to rise to the top of a hierarchy, and others to fall to the bottom. This is also the position of McGuire (1974) who argues that in many primate groups some animals are compelled toward achieving a high dominance status. He outlines the role of genetic and environmental factors in this "idiosyncratic male hypothesis":

> The hypothesis assumes that certain males are particularly assertive and aggressive by virtue of their genetic makeup. One essential element of this hypothesis, therefore, is genetic. Depending upon

> conditions of upbringing, such as mother's rank, n, social structure, etc., a certain amount of aggressiveness is more or less likely to manifest itself. But no conditions have been found which would suggest that continual intense aggressiveness, as seen in the fission process, is environmentally determined. Males that exhibit this continual intense aggressive behavior are called idiosyncratic males, i.e., their behavior does not appear to be the result of social conditions alone (although given conditions would theoretically enhance or suppress such behavior) (p. 124).

Other group members--whether for biochemical, morphological, temperamental or socialization reasons--seem "satisfied" with low status.

Sex Comparisons

In primate groups a non-estrus female adolescent rarely engages in dominance interactions, usually ranking near the bottom or next to her mother in the group dominance hierarchy. While at pubertal onset she may decrease, maintain, or increase her radius of social contact in relation to former standards, her relations with peers of either sex dramatically decreases during adoelscence. Adult females now become her "reference" group and infants become her focus of attention. Perhaps due to social contact and hormonal chagnes (Baldwin and Baldwin, 1977), the adolescent female becomes more passive and withdrawn from aversive contingencies. She seldom asserts herself or is the recipient of antagonism, an adaptive strategy for protecting genetic potential. Unlike her male counterpart, the female adolescent seldom becomes a solitaire, forms a unisex group, relocates, or becomes peripheralized. Staying with the natal group is the norm; if this is abridged then it is usually just after the onset of pubescence and before first parturition.

Among human adolescents the two sexes diverge considerably in their manifestation of dominance behavior. Boys in the cabin groups were more likely to physically assert themselves, argue with others, and, to a lesser extent, verbally/physically threaten and displace cabinmates; girls were more likely to recognize the status of others, give unsolicited advice and information, and shun and ignore. This reflects the general trend for boys to

be direct and girls to be indirect in dominance encounters. Young adolescents males thus asserted their status by utilizing the "power" related components of dominance behavior; girls expressed their status through vertical, evaluative behavior.

As the camp session progressed most male dyads decreased their frequency but increased the overtness level of dominance encounters. This supports the position that a hierarchical arrangement of group members abets antagonistic interactions, thus enhancing the prospects for group order and harmony. The female pattern was of a different nature and thus, perhaps, had different effects. Rather than reducing the frequency and raising the overtness of dominance relations, female dyads tended to increase the frequency rate and to make the interactions less visible, i.e., more indirect.

The female pattern of expressing or recognizing authority in an indirect fashion is considerably more conducive for developing and maintaining close knit relationships than is the more competitive and direct assertion of power by males. In the camp studies, the adolescent females varied this frequency rate of dominance interactions in accordance to the situation. This indicates their greater willingness to accommodate behavior to the particular activity, implying a greater sensitivity to the surrounds and to the complexity of the social environment. Male status seldom changed; flucutations in the dominance hierarchy occurred primarily among the followers. An alpha girl during the middle camp often slipped to the beta position before regaining her prominence during the last week of camp. There is female flexibility, temporally as well as situationally.

There is also some evidence to raise doubts that the dominance hierarchial structure so prevalent in male adolescent groups is adequate to describe status differentiation among adolescent females. As noted above, primate adolescent females seldom congregate in groups; when they do, they are more likely to form cliques of twos or threes (Savin-Williams, 1980c) than the relative large groups that may be artifically imposed by a camp setting among human adolescents.

There is some indication, based on our groups of human adolescent females, that a different structure, which we termed a "cohesive dyarchy", is more descriptive of dominance relations among adolescent girls. One way in which this structure differs from the dominance hierarchy is that individuals are ordered in a less linear arrangement. The horizontality of the cohesive hyarchy implies that more than one person can be at one rank. For example, two girls may be equally effective in asserting dominance, but do so in different fashions. This reflects the greater divison of labor in accordance with female needs of expressivity; it acknowledges the equal importance of looking out for each others' feelings and of "getting the job done". In the sociological literature the concepts of instrumental and expressive leaders is well-documented (Parsons and Bales, 1955). An instrumental leaders reduces the likelihood of group conflict due to lack of direction by giving structure to group activities; an expresive leader reduces the likelihood of conflict between indivdiuals, and thus allows the group to function as a more cohesive unit.

This dichotomy may be helpful in understanding the behavioral differences between Alice and Betty in one of our adolescent female groups. Alice, as the instrumental leader, was successful in overt behaviors involving ridicule and control, while Betty filled the expressive role, successsful in subtle behaviors, involving others' recognition of her status and her own counterdominance. The girls approached Alice and Betty for different reasons. They were far more likely to ask Betty for advice on friendship, clothing, and hairstyle, and to approach Alice to ask her to do something with them (e.g., go swimming, take a walk) or to seek approval of ideas for group activities. It is plausible that in male groups the instrumental leader is the alpha-ranked individual; if there is an expressive leader he is clearly subordinate in the dominance hierarchy since instrumentality is not highly valued in male socialization (Parsons and Bales, 1955).

The male bonding theory of Tiger (1969) and the female contingency hypothesis of Angrist (1969) both acount for the sex differences noted above. In primate groups Callan

(1970) has noted that dominance relations among females tend to be relatively unorganized and unstructured when compared with intermale behavior.

> I should like to suggest, roughly, that one structural feature common to a good deal of human and animal social life is that the males are the conspicuous participators, the upholders of the contours and corners of the social map, and that the position of the female is characteristically more subtle or even equivocal with respect to this map (p. 144).

While females may not be regularly engaged in dominance interactions among each other or with males, they are the "keepers-in-being" of the system as a system by concerning themselves with the interpersonal aspects of group life.

The greater male proclivity for formulating and maintaining hierarchical and cohesive same-sex groups is empirically congruent with Tiger's (1969) speculations on group bonding and evolutionary theory. He proposes that male-male bonding is a positive valence or attraction, serving group defense, food-gathering and social order maintenance purposes that are a direct consequence of pre-hominid ecological adaptation:

> The two critical adaptations were the development of patterns of hunting large animals which may have involved tools and, more significantly, a propensity to form co-operative bonds which (as I will later argue) would have to be all-male (p. 35).

Male-female physical and behavioral differences oriented the male toward participation in the hunting-gathering manner of exploiting the environment.

Because of early socialization experiences adolescent males are more likely to adapt to mega-structural situations, such as camp. On the other hand, according to Angrist (1969), females are oriented toward a contingency sex role development. Rather than simply fitting into a highly organized and rule enforced structure, females negotiate interpersonal relationships in face-to-face interactions. Such a linear system is dysfunctional because it negates the informal, socioemotional aspects of interpersonal relationships for cohesive and compatible female adolescent groups. The cohesive dyarchy form allows for these unique female characteristics.

Effects of a Dominance System

Ethologists assume that a systematic group structure, whether patterned as a dominance hierarchy or as a cohesive dyarchy develops and is maintained because individuals and/or the group benefit(s) from such a structure. Alexander (1974) concluded that all groups "form and persist" because all group members gain genetically.

Given the ethological studies conducted to date, the genetic advantage of a particular status position is a matter of speculation. It is possible, however, to demonstrate "personal benefits" an individual may derive from a dominance position. For example, high ranking human adolescents at camp frequently ate the biggest piece of cake at mealtimes, sat where they wanted to during discussions and slept in the preferred sleeping sites during campouts (near the fire)--all "scarce resources" at camp. These are not unlike the benefits other primate adolescents gain from high status. Subadult male langurs base accessibility to food, right of way and tree position on relative dominance rank (Yoshiba, 1968).

Perhaps the most salient benefit from high status is internal. Levi-Strauss (1951) noted that even in cultures where being a leader may result in personal loss or death, some individuals strive for the position because of its "intrinsic reward," an enhanced self-esteem. Chance (1967) suggested that the most dominant male individual is the focus of attention within the group. Others imitate him, seek his support, and allow him to innovate without inhibition from other group members (McGraw, 1972). In non-human primates Washburn and Hamburg (1968) have noted that "being dominant appears to be its own reward--to be highly satisfying and to be sought, regardless of whether it is accompanied by advantage in food, sex, or grooming." (p. 473)

There is little speculation as to the personal benefits of a subordinate rank. Sherif and Sherif (1964) suggest that all group members seek to belong to and be approved by the peer group. To achieve this security some group members are willing to submit. Alexander (1974) is more explicit:

> The subordinate also gains by his behavior: like the dominant he is informed by the interactions of the hierarchy when and how to display aggression, and when and how to withhold and appease and withdraw, so as to stay alive and remain in the group and be at least potentially reproductive for the longest period (p. 330).

Many of the subordinate adolescents in the camp studies appeared to identify with the group's success and to accept their status as a way of life. They avoided, with a passion, making decisions and being responsible for others. Deciding which way to travel on a strange path or which of several foods to take on a campout is not an enjoyable or sought after task for some adolescents. Perhaps the maxim, "everyone cannot be a leader" should be altered to include the words, "nor wants to be."

In primate groups, the advantages of a dominance hierarchy are to alleviate the damaging aspects of aggression without decreasing its survivial value (defense of self and group, predator protection, altruism, delineation of habitat) and to add stability and expectancy to social living (Eibl-Eibesfeldt, 1975).

Because of their group status, particular individuals have specialized group obligations and roles to perform, expected of them by other group members. Failure to carry out these duties implies that loss of the prestige that has been bestowed by the group (Thrasher, 1927). From a more egotistical point of view Alexander (1974, p. 327) notes: "Whenever individuals derive benefits from group functions they may be expected to carry out activities that maintain the group, and thereby serve their own interests as well."

High ranking male human adolescents played a crucial instrumental role within the camp group. Arguments during athletic games were reduced to a minimum when the alpha individual, by assessing everyone's athletic skills, told each where to play and for how long. Few objected to his authoritarianism, even those low ranking cabinmates who frequently had to play undesirable (right field, defensive back) positions. The most dominant males initiated and determined group movement; they also made the important decisions within the cabin group, e.g., deciding the theme of the cabin flag or where to

camp on the beach. The subordinates' role was to do the necessary work for the implementation and completion of tasks, and to follow.

As previously discussed, the female pattern was to differentiate the instrumental and expressive dominance status positions within the group. When intermeshing properly, the net effect of this behavior and the behavior of subordinates was the stabilization of interpersonal relations and enhanced group performance.

The level of serious fights in the human cabin groups was extremely low, 1 percent of the over 7000 dominance encounters observed in groups 2-9, and less in the older adolescent groups. In male adolescent groups the number of recorded dominance encounters dropped precipitiously during camp; even though the level of antagonistic behavior tended to increase in female adolescent groups, it became more indirect in form as camp progressed. Thus, with stabilization of the group structure antagonistic behavior became either less frequent or less overt.

The group thus benefits by having dominant individuals within the group: decisions are made, activities are organized, intragroup friction is avoided or reduced and intergroup relationships are negotiated. The group structure assigns roles and obligations to particular group members--which enhances a cohesive and well-functioning group--and regulates interindividual behavior in such a way so as to reduce the level of intraspecific aggression, which is beneficial to individuals and to the survival of the group.

Primate Adolescence

The concepts of dominance and submission behavior and of dominance hierarchy are frequent assumptions in studies of children and non-human primates. Beyond middle childhood, however, the view of Collins and Raven (1969) is prevalent: whereas among groups of animals and human children a simple rank ordering based on power is characteristic, by adolescence the processes of socialization and cognitive experiences enhance the

development of social systems--e.g., authority, leadership, friendship, coalitions--with a complexity far more sophisticated than a dominance hierarchy.

The present research casts doubt on the upper age restriction claims made for a "simple" dominance hierarchy being descriptive of group structure, at least for male adolescents. This is not to imply, however, that behavior that expresses power and authority or that the physical, behavioral and social predictors of status do not change developmentally. Unfortunately, such age trends are difficult to assess given the dearth of naturalistic observation studies on dominance and submission in children and adolescents. Apparently, and most generally, with age verbal and subtle indicators of status gradually replace physical and overt behavioral manifestations.

Although athletic ability is a good predictor of relative dominance rank from childhood through adolescence, it is during adolescence that sexual maturations first becomes instrumental in predicting status. Sade (1967) has pointed this out for primate males:

> I speculate that at about puberty physiological differences between males become more important in fighting and that the differences that derive from past experiences and continued association with adults of different rank become less overriding in determining the winner of fights (p. 113).

During pubescence sexual dimorphism becomes most pronounced, separating the "men from the women"; during preadolescence both sexes tend to look alike. Counter to Darwin's belief that secondary sex characters evolved as sexual lures, Guthrie (1970) views them as having evolved as social signals, functioning as threat displays after pubescence.

Pubertal hair, genitalia, and muscular development play significant roles in status behavior. It is assumed that where hair has been retained on the adult body then it must serve (or have served) a functional purpose (Goodhart, 1960). For example, there is empirical evidence that a beard and a hairy chest symbolize masculinity, maturity and power for college men (Verinis and Roll, 1970).

The genital area, undergoing radical changes during pubescence, may also serve as a social signal. Pubic hair, a darkened scrotum and enlarged testes and penis are visible signs of one's approaching maturity, and hence signify to adult males that one is now potentially a sexual and status competitor (Wickler, 1967). In some primate species there is a direct relationship between the progress of pubescent development and the amount of male aggression which one receives. Pubic and auxillary hair function not only as visual displays but also as olfactory signals of threat.

Thus, for primate males the connection between physical maturation and dominance rank has been theoretically and empirically made. Due to vast deficiencies in studies of primate adolescent females within a group setting (Savin-Williams, 1980c), it is not clear what role pubescence has for female adolescent status. Perhaps female secondary sex characters also serve as threat displays among same-sex peers. Or, they may be held in awe or high esteem because of their role as sexual attractants.

The present study focused on adolescence because it is during the age of pubescence or sexual maturation, regardless of the primate species, when social competitive behavior increases (for males) and group bonding and allegiance are formulated and consolidated (males and females). More specifically, human adolescence is a time when the peer group becomes most influential in the establishment of self-concept (Hartup, 1983), identity (Erikson, 1959), and norms or standards of comparisons by which an individual evaluates his/her own behavior, attitudes and values as well as those of others (Kelley, 1952). Hence the importance of dominance behavior (competitiveness) and hierarchical status (identity, self-concept, norms and standards) in the adolescent peer group (group bonding and allegiance) becomes understandable. The saliency of hierarchical status is illustrated in the present data; both male and female adolescents had an accurate perception of their relative ranking within the cabin group.

Erikson's (1959) notion of adolescence being a time of identity formation offers a psychological explanation for the awareness of, adherence to and maintenance of the

group. Since an essential ingredient of formulating and consolidating an identity is the discovery of one's place among one's peers, a dominance hierarchy or a cohesive dyarchy that is relatively stable across time and activity and that is clearly discernible to all aids the identity process for all group members.

From an ethological stance the end product of adolescence is adulthood. Dominance behavior thus has a new importance during pubescence: the net outcome of one's dominance encounters with other group members may well determine one's relative adult status. This status may have significance in one's relative genetic potential in both the number and the quality (potential to survive) of offspring produced. The outcome, at some point in the primate's evolutionary history, of such encounters may well have shaped what adolescents are today.

Table 1: Summary of the Groups Studied

Group No.	Year	Number	Sex	Age	Publication
1	1973	6	male	13	Savin-Williams, 1977 & 1980a
2	1974	6	male	12-13	Savin-Williams, 1976, 1979 & 1980a
3	1975	6	male	12-14	Savin-Williams, 1979 & 1980a
4	1976	4	male	11-12	Savin-Williams, 1979
5	1976	4	male	12-13	Savin-Williams, 1979
6	1976	5	female	12-13	Savin-Williams, 1979 & 1980b
7	1976	5	female	13-14	Savin-Williams, 1979 & 1980b
8	1976	5	female	12-13	Savin-Williams, 1979 & 1980b
9	1976	5	female	12-13	Savin-Williams, 1979 & 1980b
10	1977	6	male	15-17	Savin-Williams, 1980c
11	1978	5	male	14-16	Savin-Williams, 1980c
12	1979	6	male	14-16	Zeldin, Savin-Williams, & Small, in press
					Savin-Williams, Small, & Zeldin, 1981
					Small, Zeldin, & Savin-Williams, 1983
13	1979	6	male	14-16	Zeldin, Savin-Williams, & Small, in press
					Savin-Williams, Small, & Zeldin, 1981
					Small, Zeldin, & Savin-Williams, 1983
14	1980	10	coed	15-17	Small, Zeldin, & Savin-Williams, 1983
					Zeldin, Small, & Savin-Williams, 1982
15	1980	9	coed	15-16	Small, Zeldin, & Savin-Williams, 1983
					Zeldin, Small, & Savin-Williams, 1982
16	1981	8	female	16-17	Paikoff & Savin-Williams, in press