Assessment of the Peer Group:

Identifying Naturally Occurring Social Networks and Capturing their Effects

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The notion of a "group" implies a social unit that extends beyond the dyad. In developmental psychology, there are at least three distinct traditions that study peer group effects. The first tradition, building on Moreno's (1934) work, focuses on sociometric groups of individuals who receive similar nominations of liking and disliking from peers in a setting, such as a classroom (Bukowski & Cillessen, 1998). A second tradition examines social crowds of youth who share a common reputation among peers for patterns of behavior and values (Brown, 1999). A third tradition focuses on groups of youth whose social ties (friendships or interactions) are differentially directed toward one another rather than to other peers in the setting (Cairns, Perrin & Cairns, 1985; Hallinan, 1979). Each approach assumes that knowledge about a person's group membership has diagnostic value for assessing his or her functioning and that group membership leads to socialization influences (for review, see Rubin, Bukowski & Parker, 2006).

Figure 1 illustrates the different roles of individuals, relationships, and interactions (Hinde, 1997). The approaches differ first in how groups are created. Groups that are culturally assigned or “obligatory” (Laursen, 1997; e.g., classrooms) are defined independently of the people under study. Sociometric research holds this perspective: The peer group is where people interact. The other groups are less well defined because they depend on individual preferences. The approaches also differ in the social ties that define the groups. For sociometric and crowd researchers, the goal is to identify sub-groups of people who share commonalities. In sociometry, these are commonalities in social status (e.g., of rejected or popular children; individual ties are not implied). In crowds, the defining feature is social-behavioral reputation; members of a crowd (e.g., nerds, jocks) share “ideational ties” and are committed to a shared set of norms (Simmel,
1950), but they do not necessarily share ties. In contrast, friendship and interaction groups are defined by “relational ties”. The distinctions have implications for decisions about the social partners that need to be identified, as well as for expectations about processes within groups.

**Purpose of the chapter.** In this chapter, we focus on social crowds, friendship groups, and interaction groups. Our goal is to document the challenges that the approaches are facing and to outline suggestions for their integration in a way that supports theory building.

The study of peer groups has historically been plagued by two thorny issues: how to identify groups in natural settings and make sense of the "abstract art" of Moreno-type diagrams (Cairns, 1983); and how to conceptualize and empirically capture their effects. Many studies document correlations between the characteristics of individuals and those of their groups, but it is not clear how the correlations should be interpreted. They can imply that groups influence individuals, but it is just as likely that they denote that people form groups who are similar to one another. Experimental studies in which members are randomly assigned to groups demonstrate that influence is possible, but such studies cannot easily be generalized to the real world in which people are able to select partners based on social preferences. Both challenges are inextricably linked: Choices of methods for identifying peer groups imply a conceptualization of the processes by which groups are likely to shape development; and conceptualizations of group influences rely on methods to adequately capture the characteristics of peer groups.

**Central Issues in the Assessment of Peer Groups**

**Sources of Information regarding Crowds and Groups**

Social crowds are defined as reputational labels assigned to individuals by their peers that involve stereotypes about personality and behavior (Brown, 1999). Crowds can be identified with ethnographic methods (e.g., Eckert, 1989), but by definition, peers are the ideal source of
information. Brown (1999; Brown & Klute, 2003) developed a two-stage process in which first, an overall account is obtained of the social categories that children agree exist in a setting (e.g., jocks, nerds), and then social "type" ratings of peers are used to assign individuals to the categories. Self-reports ("Which crowd would most of your classmates say you belong to?") may be sufficient because they correlate with peer-reports and are similarly related to indices of personal adjustment (Urberg, Degirmencioglu, Tolson, and Halliday-Scher, 2000), but they are also subject to concerns about self-enhancement biases.

*Friendship groups* are defined by feelings of liking between individuals. As with dyads (see Chapter 4; Hartup, 1996), self-reports give the best information. Nonetheless, there are differing perspectives on measurement operations and on the importance of reciprocity. Most researchers ask youth to identify their friends, but alternative procedures include nominations of "liked" peers or ratings of "liking". Disagreements about the value of reciprocity fall along disciplinary lines. Developmentalists see reciprocity as a requirement: A friendship exists when both individuals agree on the friendship; sociologists tend to view unreciprocated friendships as key reference-groups or as links that connect larger groups (Bearman, Moody & Stovel, 2004).

*Social groups based on frequent interaction* can also be identified via self-reports, but because children tend to exaggerate associations with popular peers (Leung, 1996), alternative strategies have been developed. One alternative is to observe peers (Hanish, Martin, Fabes, Leonard & Herzog, 2005; Ladd, 1983; Strayer & Santos, 1996), but such studies are costly and often constrained by limited access to interaction settings. In contrast, peers are expert participant-observers with unique access to interactions in social settings. This led Robert Cairns to develop the *Social-Cognitive Map* (SCM) procedure, in which peers in a school setting are asked to identify classmates who "hang around together a lot" (Cairns et al., 1985; Gest, Farmer,
Xie & Cairns, 2003; Kindermann, 1996). Respondents name or list as many groups as they can but are not required to classify all peers into groups. The reports are aggregated into a symmetric co-occurrence (or co-nomination) matrix in which each off-diagonal cell contains the frequency with which a pair of youth is reported to belong to the same group. This matrix can be analyzed with various quantitative techniques; because peer reports show typically considerable consensus, not every student in a class needs to participate to arrive at a reliable map.

Approaches to identifying group structures

Social crowds. A central issue in analyzing crowd data is whether to constrain each individual to be in only one crowd or whether to permit membership in multiple crowds. In Brown's original two-stage peer-report approach, each student was classified into a unique crowd; but later, the coding procedure was refined so that each individual received a separate score for each crowd label (the proportion of peers who assigned the individual to each crowd; Brown & Klute, 2003). Similar coding options exist for self-reports of crowd affiliations.

Social groups. Strategies for identifying group structures fall into two approaches and are equally applicable to data on friendships and interactions (Frank, 1995; Gest, Moody & Rulison, 2007; Moody, 2001). In one approach, individuals are grouped together when their patterns of ties are similar (i.e., correlated). For example, in the 1950's, network researchers factor analyzed interaction matrices: Individuals with highly correlated profiles loaded on the same factor and were seen as members of the same group. Researchers using the SCM data collection method follow this tradition. Cairns and colleagues (1985) originally identified dyads whose nomination profiles were reliably correlated and then used decision rules to build groups; later, they used confirmatory factor analysis (Cairns, Cairns, Neckerman, Gest & Gariepy, 1988). More recently, SCM researchers have used a computer program that identifies groups comprised of individuals
whose profiles are correlated ($r > .40$) with at least 50% of the other group members (Estell, Farmer, Cairns & Cairns, 2002; Farmer, Estell, Bishop, O’Neal & Cairns, 2003; Rodkin, Farmer, Pearl, & Van Acker, 2006), whereas Gest and colleagues (2007) used principal component analysis. Hierarchical cluster analysis also falls in this tradition (Strayer & Santos, 1996).

A second approach is to search directly for groups by applying algorithms that optimize intuitive notions of internally cohesive yet distinct group structures, such as not splitting apart triads of mutual friends, or maximizing the density of friendships within groups (e.g., UCINET by Borgatti, Everett & Freeman, 1999; NEGOPY by Richards, 1995). Other approaches directly identify groups based on graph theory features such as degree of embeddedness (Moody & White, 2003). With the same data, different algorithms will often (but not always) yield similar group structures; there is some indication that variations may be especially consequential when analyzing friendship nominations rather than SCM groups (Gest et al., 2007).

These approaches aim to divide a social network into largely non-overlapping groups. A different approach is to identify groups individually for each person, preserving multiple group overlap. With friendships, this can involve identifying unreciprocated nominations. With SCM interaction groups, probabilities can be computed from the co-nomination matrix to determine the peers with whom an individual is co-nominated more often than can be expected by chance. This strategy gives up on notions that groups exist over and above the level of individuals' ties.

Assessment of Group Characteristics

The second task is to capture the groups’ central characteristics. Developmentalists are highly interested in whether the characteristics of peer groups influence children. We take as a starting point that the measures characterizing the individual group members must be obtained independently from the perspective of any other member of the group because individuals'
descriptions of group-mates are shaped by their own characteristics (Jaccard, Blanton & Dodge, 2005). When individuals’ characteristics are defined independently (by self-, peer- or teacher report), they can be aggregated across group members to form composite group profiles.

Group profiles are typically calculated as group averages. Such scores pose different challenges in studies of non-overlapping groups versus individually defined groups. With non-overlapping groups, researchers commonly compute separate group profile scores for each individual in the group by excluding his or her own score from the average. So, for a group of four individuals, each individual’s group average is calculated across the other three members. This has two advantages: Conceptually, this accounts for the fact that a group is experienced differently by its members (e.g., a group of one girl and two boys is experienced by the girl as a group of boys but as a mixed-sex group by each boy); statistically, it makes it possible to examine individual differences in group contexts. But this approach has also disadvantages: Conceptually, it denies the possibility that groups have shared qualities beyond the sum of their members; statistically, it does not fully take into account the non-independence of group scores for members of the same group. An alternative is to move to the group as the unit of analysis. Hierarchical Linear Modeling (HLM) can be used to separate individual within-group effects from between-group effects (Ryan, 2001). This works well when groups are non-overlapping and have low turnover over time, but to account for the realities of group dynamics, HLM approaches will need to be further developed to take into account time-varying and overlapping group structures. The situation is simplified when there is group overlap and groups are identified separately for each individual (e.g., Kindermann, 2007); group profiles can be computed individually. Conceptually, this ensures that group averages include all partners who
have ties with an individual. Statistically, there are fewer problems with non-independence of group profiles when these include individuals’ ties that bridge across groups.

*Relevant Theoretical Models*

When identifying natural groups, methodological choices are closely connected to underlying theoretical perspectives: We begin with a brief summary of theories of group-level dynamics, including approaches to dyadic processes that have implications for group contexts. We then discuss their implications for methodological decisions and for studying group selection and influence processes. The discussion will be highly selective; we only include theoretical frameworks that pay attention to member selection (thus excluding groups that are not self-selected, e.g., in the literatures on group dynamics and organizational psychology), and only include approaches that require researchers to identify the individuals that form a group (thus excluding purely ideational groups, e.g., social categories from an individual social perception perspective, and intrapsychic approaches to social identity and in-group out-group comparisons).

*Theories and models relevant to group-level processes*

*Social interaction processes.* Proximal processes that occur in frequent interactions are seen as the "engine" of development (Bronfenbrenner & Morris, 1998) and of individual differences in adjustment. With regard to groups, two key phenomena are individuals’ influences on groups (e.g., member selection and group dissolution), and groups’ influences on individuals. With regard to group selection, Patterson, Littman, and Bricker (1967) proposed a "shopping" model in which adolescents seek out affiliates according to compatibility of personal characteristics and interaction patterns. Processes of group influence on individuals include evaluative feedback, persuasion, coercion, resource control, and a variety of social learning processes (Altermatt & Pomerantz, 2003; Berndt, Laychak, & Park, 1990; Dishion, Andrews, &
Crosby, 1995; Hawley, Little, & Pasupathi, 2002). Social learning processes are relevant to group processes in two ways. A group can be narrowly defined as an individual’s set of direct interaction partners; these constitute highly overlapping groups of ecological *microsystems* (Sage & Kindermann, 1999). However, groups can also be defined more broadly. It is possible that group contexts amplify the salience of dyadic exchanges that occur within them (Thibaut & Kelley, 1959), and thus, groups can be defined as *mesosystems* that also include indirect links.

*Theories of close relationships.* Close relationship researchers focus on the broader relational context of social interactions (Hartup & Stevens, 1994; Hinde, 1997). A major focus of developmental research has been on change in the norms underlying friendship. Laursen and Hartup (2002) contend that reciprocity norms govern friendships across development, but that these norms shift over time from a focus on material equality to a focus on needs that allows for short-term imbalances in each partner’s contributions. This formulation builds upon social-psychological theories (Thibaut & Kelley, 1959) that frame dyadic and group processes in terms of the exchange of resources (information, goods). Social exchange dynamics become extremely complex in group contexts, but can be expected to generate differentiated role and status structures and to generate pressure for conformity to group norms (Thibaut & Kelley, 1959).

*Social comparison theory.* According to Festinger (1954), humans have a fundamental need to compare themselves to others to evaluate their abilities and opinions. This press for social comparison motivates individuals to affiliate with groups comprised of others similar to themselves. Within those groups, individuals compare themselves to individuals who are not too different from themselves. When discrepant evaluations among members of the same group emerge, individuals will attempt to reduce the discrepancy by changing their own positions or by attempting to change the positions of other group members. Most research on social comparison
has focused on adults in laboratory situations (Suls, Martin & Wheeler, 2002), but a significant literature indicates that many adult-like comparison processes are evident in children by about 4th grade (Ruble & Dweck, 1995). Social comparison theory provides explanations for the tendency to affiliate in groups, for selection pressures that create group similarity, and for the development of shared group norms; but it does not specify the nature of the groups that are most likely to motivate social comparisons (e.g., crowds, friendship groups, interaction groups).

*Influences from outside the group.* Members of a group can differentiate themselves from other groups partly by fostering within-group conformity, but also by pressuring members of other groups to adhere to different sets of norms (Brewer & Miller, 1996). Moreover, stereotypes held by out-group members can lead to biases in the treatment of groups. Such external pressures are most applicable to crowds, which are defined as peer-assigned social categories (Brown, 1999) that represent "normative guideposts" for adolescents' behavior and give "directives on attending to and interpreting messages from the broader youth culture" (p. 76). Similar outside influences may also exist for relationship or interaction groups. Teachers can treat members of a group similarly, or members can share experiences with adults, institutions, or other groups. A key distinction, however, is that youth are free to leave these groups when external pressures are excessive, but because crowd membership is defined by the peer culture rather than by the individual, external pressures on members of a crowd may be impossible to avoid.

*Structural balance theory.* Generalizing from Heider’s (1946) work on attitude formation, Cartwright and Harary (1956) described a press for structural balance in social networks. The basic notion is that every triad in a network can be described in terms of whether the ties among members are in balance. For example, if mutual friendships exist between AB, AC and BC, then triad ABC is in balance and there is no press for change. In contrast, if AB and AC are friends
but B and C are not, a state of imbalance exists, resulting in pressure for BC to form a friendship
or for AB or AC to dissolve their friendship. Empirical studies have validated the proposition
that states of structural imbalance can predict network changes over time; developmentally, it
highlights that the formation and dissolution of individual ties can result from larger structural
features of a network. Because structural balance is defined with respect to direct ties among
individuals (friendship, interaction), it is not applicable to the study of social crowds.

*Individual status in a network context.* Developmental researchers measure individual
status with “impact”-type indices (nominations for friendship, liked most, perceived popularity,
"coolness" or social group membership) that capture the number of nominations directed to an
individual but not their patterning. Alternative indices focus on the degree to which individuals
occupy strategic positions of influence within the network of ties (Wasserman & Faust, 1994).
For example, two individuals may receive an equal number of friendship nominations, but the
one who represents the only "bridge" between two otherwise distinct groups can occupy a more
important position for the transmission of ideas or behaviors across groups (Granovetter, 1983).
This is related to the study of "contagion" processes in which direct ties can mediate or amplify
information from indirect affiliates (Bearman et al., 2004). Borgatti (2005) discusses several
“topological” indices of network centrality and the theoretical notions they embody. Working
within this tradition, Moody and White (2003) found that after controlling for the number of
friendship nominations youth received, those whose friendships were tightly interconnected in
highly cohesive subgroups reported stronger feelings of school connectedness.

*Implications for methodological choices*

The theoretical processes described differ in the types of social ties they implicate.
Friendship and interaction groups emphasize close relationships and social learning processes,
respectively, but both types of ties are subject to similar group-level dynamics (involving social comparisons, social exchange, structural balance, and variations in topological network position). In contrast, the lack of ties within crowds suggests that only imitation and social comparison dynamics are necessarily in play within them, and that social processes occur in interchanges with the outside. Theories also differ in whether they require the researcher to (a) identify each individual’s direct interaction partners, (b) identify non-overlapping groups, or (c) consider the entire network without identifying subgroups. Contingency learning (including evaluative discourse), persuasion, and power assertion all require identification of the direct partners who exert influence. In contrast, imitation, social comparison and social exchange theories highlight the importance of structures that entail direct as well as indirect ties. Finally, concepts of structural balance and topological importance can be explored without identifying subgroups.

**Implications for Studying Peer Group Selection and Influence**

The most challenging questions for peer research are about developmental processes. Historically, the main interest has focused on processes that produce similarities among group members: initial selection of members; similarities that members share with regard to their experiences outside of their group; and mutual influences among group members.

Selection is a defining feature of all natural groups and a key process by which children can influence the contexts to which they are exposed. Social learning based “shopping” models (Patterson et al., 1967), social comparison theory (Festinger, 1954) and close relationship research (Laursen & Hartup, 2002; Thibaut & Kelley, 1959) all assume that peers form groups based on similarity. In contrast, it is the specific merit of crowd approaches and theories of between-group differentiation that they highlight group-external influences. Finally, within-group influences are conceived of as socialization processes. This concept dominated the
literatures three decades ago, but research has declined because of sobering conclusions about the extent to which correlational studies allow researchers to make causal interpretations (Harris 1995). For research on peers, the concept needs to be reconceptualized. The traditional understanding was that influence was unidirectional and that it would "make" a child similar to a socialization ideal. In peer groups, the socialization agents are also children, and influences occur from each member of a group towards all other members. This perspective has two implications.

First, conformity may not be the best indicator to study. Experimental and naturalistic studies have traditionally taken conformity as the indicator of group socialization (Asch, 1955; Sherif, et al., 1961). Although member convergence can indicate influence, it is just one of many processes. In natural groups, similarity exists in many features when groups are formed (Kandel, 1978). In addition, such groups are highly fluid, and it is hard to disentangle changes that are due to member turnover from changes due to member convergence. Analyses are typically restricted to stable groups ("after selection has occurred," Urberg, Degirmencioglu, & Pilgrim, 1997, p. 835) but stable groups may be special groups. Finally, the focus on group convergence may lead researchers to "reify" groups as discrete units. Treating groups as segregated spheres is warranted with experimental groups and justifiable with crowds. However, because relational groups tend to be fuzzy, and people are members of many groups at the same time, there is risk in adopting group-level analytic strategies and potential value in studying individually defined groups.

Second, natural groups may not always produce uniform outcomes. Socialization implies change; a focus on change broadens the scope of peer influences and suggests to consider a range of outcomes (in addition to convergence) and change in various directions (Kindermann, 2003; Mounts & Steinberg, 1995). In groups of friends, questions about change have been examined in terms of onset of deviant behaviors (Ennett & Bauman, 1994; Urberg, et al., 1997) and in terms
of academic attitudes, behavior, and motivation (Berndt & Keefe, 1995; Berndt, Hawkins & Jiao, 1999). With interaction groups, analyses of change have been used to study school motivation (Kindermann, 2003; 2007). Group interactions were expected to make children increasingly different from one another: Students who were "rich" in terms of motivation and motivation of affiliates were expected to become "richer" over time, whereas "poor" children would decline.

Theoretically, it is hard to reconcile beliefs that intimate relationships provide mutual support with expectations that they produce uniform outcomes in the form of a social "mold" (Cairns & Cairns, 1994). Instead, social groups may make children enjoy activities that they would not enjoy (as much) if they were not with a group (Furrer & Skinner, 2003) and they may also foster increasing autonomy and differentiation (Deci & Ryan, 1985; Altermatt & Pomerantz, 2003).

**Key Studies**

*Studies clarifying the reliability and validity of group measurement approaches*

*Group Homogeneity.* All approaches share an interest in the extent to which members of groups are similar to one another. This is also called "homophily" (Kandel, 1978), "mesh" (Hinde, 1997), "assortativeness" (Kindermann 2003), or "synchrony" among members (Cairns, Neckerman, & Cairns, 1989). Often, homogeneity of a group is taken as validity information that a group exists. Virtually all studies from all approaches find homophily; the pervasive finding is that "good" groups tend to consist of well-adjusted members (and vice versa) and that membership in such groups is predictive of various kinds of positive developmental pathways (e.g., Brown, 1999; Cairns & Cairns, 1994; Epstein, 1989).

Assessments of social crowds (Brown, 1999) have been explicitly developed with the goal to detect within-group homogeneity of members' social reputation. Prinstein and La Greca (2002) showed that adolescents' self-nominations for most kinds of crowds overlapped with
peer-assigned crowd designations. Crowds of popular students have been shown to match perceptions of teachers (Rodkin, Farmer, Pearl, & van Acker, 2000). Groups of friends also tend to be homogeneous (Kandel, 1978). An important question is about aggregation of dyads into larger groups. Urberg, Degirmencioglu, Tolson, and Halliday-Scher (1995) report that over 90% of adolescents' best friends were members of their friendship groups, but concordance dropped to 70% when all friends were considered. Questions also extend to the definitions of groups and raise caution about whether friendship groups should include isolated dyads, "loose groups" (in which not every member can be reached by every other member via a direct or indirect path), or "liaisons" (children who are not members of a group but have friends in cliques and ties bridging across cliques). Finally, interaction networks show similar homophily in a variety of variables (Cairns & Cairns, 1994; Kindermann, 2007), and they have also been examined with regard to whether they capture ‘real’ groups. Overall, SCM maps tend to converge with group affiliations identified in independent observations (Gest et al., 2003).

*Group Stability.* All peer relationships are fluid over time. Relatively little is known about the stability of crowds (Brown, 1999). Stability of individual friendships has been studied extensively, but because there is no consensus on how to quantify group stability, estimates from studies using different metrics are difficult to interpret. For example, Hallinan (1979) reports that 18% to 30% of groups in middle school kept at least three members during the year, whereas Cohen (1977) found that 76% of high school friendship groups kept 50% of their members across a school year. Estimates for interaction groups vary similarly, ranging from 40% (Kindermann, 1993) to 60% (Cairns, Leung, Buchanan, & Cairns, 1995) within a school year. The most informative studies use the same metric to examine variations in stability in different contexts. Neckerman (1996) found that interaction group stability was low when students were
divided over multiple classrooms across years, but remained moderate when classrooms were kept together. However, high fluidity does not need to imply low stability of the psychological group environment: Even when member turnover is high, selection processes can occur such that the psychological composition of the groups remains fairly consistent (Kindermann, 1993).  

*Studies that clarify overlap among crowds, friendship groups and interaction groups*

*Structural similarity.* Gest and colleagues (2007) applied three group-detection algorithms (one similarity-based, two graph-theoretic) to two types of data (self-reported friendships; peer-reported interaction groups). Results indicated that the similarity of solutions varied for the different data types. For self-report friendships data, agreement across grouping strategies was modest, suggesting that the strategies are not interchangeable. For peer-nominated interaction groups, the grouping solutions were much more concordant. A *valued co-nomination matrix* provided the most robust basis for identification, making the choice of algorithms less consequential. For both types of data, homophily was strongest for groups identified by principal components analysis (a similarity-of-ties algorithm).

There are also indications that members of the different kinds of groups are not the same. Kindermann (2007), in a cohort of 6th graders in a small town, found that although most students were members of interaction networks (80%) and about the same number had reciprocal friends (in class, in school, and outside school), groups of friends were not identical with interaction groups: Slightly more than half of children's friends were members of their interaction groups (others were friends that were not publicly known), but 70% of the members of interaction groups were not friends. Most children without an interaction group had reciprocal friends, and most children without friends had an interaction group. To gauge crowd structures, children were also asked to give names to nominated groups. Many names converged with crowd designations
reported in the literature (e.g., popular kids, nerds, brains, jocks; Brown, 1999; Eckert, 1989), but students with large networks were typically members of several crowds. Large groups of "cool" students or "nerds" bridged between separate interaction groups; among the six separate crowds of "nerds" or "geeks", two provided the connection between the otherwise separate crowds of "popular" students (the map can be viewed at www.psy.pdx.edu/~thomas/Research).

**Similarity in composition.** The different identification methods also converge in their findings on specific target phenomena, even across different kinds of groups. One of the main research areas is aggression. At least some aggressive children tend to affiliate with one another; some are popular as a crowd, with aggressive cliques or with their own interaction group (e.g., Cairns, et al., 1998; Chen, Chang & He, 2003; Estell, et al., 2002; Farmer, et al., 2002; 2003; Rodkin, et al., 2006). Homophily also exists in deviant and problem behaviors (e.g., Ennett & Bauman, 1994; Urberg, et al., 1995, 1997, 2000). Finally, a large body of research also indicates homophily in children's school motivation, academic aspirations, performance, and school dropout. Findings on crowds (Clasen & Brown, 1985) converge with those on friendship groups (Berndt, et al., 1999; Berndt & Keefe, 1995; Hallinan & Williams, 1990) and interaction groups (Cairns & Cairns, 1994; Chen et al., 2003; Kindermann, 2007; Ryan 2001).

**Functional differences.** The consistency of findings across different kinds of groups is striking and invites suspicions that the respective assessments may be measures of the same underlying phenomenon. However, there are indications that the functions of the different kinds of groups can be different. For example, Urberg and colleagues (2000; see also Brown, 1999) argue that although friendship groups appear to be uniquely predictive of adolescents' problem behavior over and above crowd associations, relationship ties and interactions can "channel" or modify norms of the peer culture. Thus, mutual influences in relationships and social interactions
may occur differently when adolescents belong to different crowds.

Studies clarifying peer selection effects

Studies of selection typically focus on a dyadic level, but the processes have implications for the development of group structures (Epstein, 1989). At the group level, peer selection has traditionally been seen as a methodological "problem" (Kandel, 1978; Urberg, et al., 1997) and has not been studied extensively. This contrasts with key studies of dyadic selection of friends (Gottman, 1983; Hallinan, 1979; Parker & Seal, 1993; for review, see Hartup & Stevens, 1997). Patterson and colleagues' (1967) "shopping" model was adapted by Kindermann (1993) with the assumption that over time, children would optimize the composition of their interaction groups. In the one classroom of 4th graders that was examined, students' levels of motivation at the beginning of a school year predicted how the motivational composition of their peer groups changed over the year when students' own scores were weighted with the number of newly gained peers. The effect was weak but suggests that when children include many new members in their groups, they tend to do so in a way that matches their own motivation levels.

Studies clarifying group influence effects

Two research programs have examined details of group influence processes on children's school motivation. Berndt and colleagues (Berndt et al., 1995; 1999) studied groups of friends, and Kindermann (1993; 2007) examined interaction groups. Both followed similar strategies to come as close to causal interpretations as possible. In terms of design, both examined change in children's own characteristics over time as a consequence of the composition of their earlier peer groups; individuals served as their own controls with regard to selection processes. Studies from both programs indicate that groups can influence children's development. Berndt and colleagues (1999) showed that the characteristics of friendship groups predicted changes in 6th graders'
adjustment over a school year. Kindermann's (2007) study focused on interaction groups, and included controls for a range of selection factors (group size, stability, homogeneity), as well as for involvement from parents and teachers. Despite membership changes, group motivation profiles were moderately stable, and group profiles predicted changes in students' motivation over the school year, even when selection and group-external adult influences were controlled.

*Studies clarifying intra-group processes.* Correlational studies with rigorous controls suggest that group influences are possible, but they do not explain how they can come about. A second step is to examine whether the mechanisms theoretically postulated to cause change do actually occur in the real world. This requires natural observations. Several such studies have documented that a variety of interactions (e.g., discussions, evaluative discourse, prosocial interchanges, learning contingencies) can be mechanisms of group influence (Adler & Adler, 1995; Dishion, et al., 1995; Hawley, et al., 2002; Wentzel, McNamara-Barry & Caldwell, 2004). One study (Sage & Kindermann, 1999) examined learning contingencies in a classroom of 5th graders. Sequential analyses showed that children's behaviors had different consequences when they were members of different interaction groups: The more engaged students were, the more they experienced contingent support for their (frequent) on-task behavior from group members, while non-members responded at random. For low motivated students, positive responses from group members were rare. These patterns can explain differential changes in children and are consistent with the changes found in correlational studies. The study followed Bronfenbrenner's ecological model for identifying the sources of peer influences in school, and used SCM assessments to identify all of children's interaction partners as direct socialization agents. Note that a group-level analysis would likely have required to assign each child to one specific group (i.e., excluding multiple group memberships), to exclude ties with others who were not members
of this main group (i.e., liaisons or dyadic ties), and to include indirect connections (in analogy to “friends-of friends”) even if those themselves were not identified as direct interaction partners.

**Future Directions**

In this chapter, we reviewed and compared three approaches to peer groups that have evolved from over 70 years of research. All three aim to examine group influences. However, each approach holds different assumptions about the nature of groups and their developmentally active ingredients, and each has developed its own assessment strategy. Nevertheless, each finds group homogeneity in many characteristics. At the same time, it is not really clear what this means. Is this diagnostic information about individuals, the functioning of social systems, or selection processes? Or, is this information about the developmental effects of groups? A key problem is how to design studies that allow us to make causal inferences.

Advances in the modeling of social network dynamics should allow us to reconceptualize group experiences so that the model of a socialization "mold" can be overcome and bi-directional models can be developed. The characteristics of self-selected groups that we can identify in natural settings can guide us towards models of their developmental functions, and free us from relying on analogies that can only be created in a lab. The social-psychological theories described above can be elaborated, integrated and translated into sophisticated models of network dynamics. Most promising are models of the “co-evolution” of networks and individual characteristics (Handcock, Hunter, Butts, Goodreau & Morris, 2003; Snijders, Steglich & Schweinberger, 2007). They are not comprehensive (e.g., social ties need to become scalable; subgroup differentiations need to be incorporated), but they allow investigators to specify a range of dynamics that are linked to social-psychological theories (Espelage, Green & Wasserman, 2007; Light & Dishion, 2007).
As a first step, we need to overcome the idea that there is only one valid representation of peer groups. This pertains to different analysis techniques, even when studying the same kind of group, as well to theorizing across approaches. There is a tension between the desire to settle on a small set of "standard" approaches and the need to document the consequences of differing measurement strategies. Given the current state of knowledge, a realistic recommendation is that researchers should be urged to provide explicit theoretical rationales for their choices; and, if possible, to compare the results of multiple measurement strategies within the same study.

A second task will be to discover more about how natural peer groups emerge and about diverse patterns of socialization. The most informative studies will consider how processes of selection and socialization work together in the real world. On the one hand, the openness of natural groups can shape social influences in complex ways. For example, negative influence processes (e.g., coercion) may not be found that frequently; if such interactions dominate, people are likely to leave or the group may break up. On the other hand, if people select others similar to them, interaction processes do not have as great an opportunity to increase similarity. Rather, socialization may produce maintenance or even increased diversity. For example, children may select peers who like them just the way they are and may stay with them as long as they remain supportive; the role of groups may be to support or amplify pre-existing characteristics. It appears possible that peer groups can create diversity: Once similar children join together in a group, the group may socialize them into different roles or members may strive to express their individuality. Such processes would not lead to increased homogeneity but to patterns in which groups and the individuals within them become more different from each other over time.

The third task will be integration that remains truthful to the strengths of the theoretical assumptions about the different kinds of peer groups. A rough sketch could look like the
For decades, peer researchers have aimed to show that relationships influence development. Because of their reliance on the experimental model, they have mainly looked at similarity among friends and convergence over time, and have largely ignored peer selection. Convergence can occur, but it is hard to detect if friends are similar to one another at the outset. In groups of friends with high-quality relationships, it is questionable whether a social mold model (in which friends attempt to change each other) makes so much sense at all. Instead, friendship may be what holds people, and perhaps society, together; a sense of relatedness may be what helps children and adolescents make sense of the world and of themselves. Friendship groups could be the equivalent of a "safe haven" in social settings.

In contrast, social crowds (and, similarly, sociometric categories) may say more about structure, order, access to resources, and minimization of friction in a social system (e.g., Merton, 1957); crowd affiliations may be what helps adolescents orient themselves within the larger peer culture. Both kinds of groups and their associated processes should co-exist at the same time, in cultures as well as in smaller social systems like schools, and the patterns of overlap in affiliations that people show across both kinds of groups may denote how they define themselves. Finally, if Bronfenbrenner and Morris (1998) are correct that social interactions are the "engine" of development, interaction networks would be the place where groups of people share activities that they enjoy, perhaps influence each others' behavior (directly as well as indirectly), and where people are instrumental for each other in acquiring competencies.

Decisions about the kinds of groups to be identified will need to be informed by expectations about the kinds of peers who provide the arena for the characteristics under study. Groups that are publicly known tend to engage in public activities; when public behavior is of interest (e.g., in classrooms; Kindermann, 1993, 2007), public interactions with groups may be
most influential. In contrast, personal relationships may have strongest effects on private characteristics that may or may not be displayed in public. If private perceptions or goals are targets of examination (e.g., academic or social goals; Berndt & Keefe, 1995; Wentzel, et al., 2004), close friends, because of their intimate relationships, should be most influential. As a consequence, it may be less important to construct separate theories about the different kinds of groups that we can identify, and more important to provide theoretical accounts and models of their interconnections and combined functions for development. Empirically, it may not matter much whether the variables derived from a specific approach have more power in predicting a specific outcome than another approach. Instead, what may be needed most are studies exploring how multiple identifiable aspects of children's peer relationships work together over time. Empirical information about the interconnections of the different kinds of groups may be necessary before we can attempt to build theories about their individual or combined influences.

We began this chapter by highlighting the different traditions of studying social crowds, friendship groups and interaction groups (Figure 1). In reviewing the methods and theories associated with these traditions, it should be clear that crowds, which do not necessarily involve direct ties among crowd-mates, implicate a very distinct set of influence processes, and require a very different set of measurement strategies, than the study of friendship groups or interaction groups. And while both friendship groups and interaction groups involve direct relational ties among their members, there is surprisingly little empirical research that documents the degree to which they overlap in structure or function across different periods of childhood and adolescence. Research that is grounded in the rich tradition of social-psychological theorizing about groups and close relationships may play a key role in motivating studies that address such questions and contribute to broader theoretical integration in the study of peer groups.
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Figure Captions

*Figure 1.* Schematic overview over types of peer groups, with attention to the roles of individuals, groups, relationships, and interactions.
Group more socially or culturally assigned $\rightarrow$ Group more self-selected

No Ties Implied: Social Categories $\rightarrow$ "Ideational" Ties: Social Categories $\rightarrow$ "Relational" Ties: Social Groups

Sociometric Categories

Social Crowds

Groups of Friends

Groups of people who "hang out" together

○ Individuals

←→ Relationships

←→ Interactions