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Capturing the Peer Context: The Paradox of Progress

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Adolescents lead enormously complicated social lives. Many youth find it difficult to keep track of their own relationships with friends and romantic interests. For the investigator, the task is exponentially more complex because overlapping and interlocking relationships and networks must be disentangled, dissected, and diagrammed. This special issue contains some important new findings about peers, but it is equally noteworthy because it illustrates several significant methodological changes in the way we do business. New ways of thinking about peers and new ways of analyzing data about peer relationships promise to simplify many aspects of our research enterprise. Pictograms occupying every bit of space on laboratory walls are rapidly becoming a thing of the past. By the same token, however, these advances have revealed the limits of our assumptions and the inadequacies of our practices, particularly when it comes to the depth and frequency of our data collection efforts. This is the paradox of progress. In this essay I will summarize some of the methodological developments highlighted in this special section and I will describe some important implications that these improvements hold for research in the future.

Advances in our Ability to Capture the Peer Context

The special section is a methodological treasure trove. Listing all of the innovative techniques employed is beyond the scope of this essay. Instead, I urge the interested reader to contrast these studies with the state-of-the-art strategies advocated in the methodological chapters devoted to the measurement of friendship (Berndt & McCandless, 2009) and peer groups (Kindermann & Gest, 2009) in the recent *Handbook of Peer Interactions, Relationships, and Groups* (Rubin, Bukowski, & Laursen, 2009). A few points about the present set of studies merit special consideration. First, most of these studies include sophisticated analytic strategies that reflect the complexities of the peer context. Second, the search for simple main effects has given way to a recognition that the action is in the interaction. Third, samples have become larger and more inclusive. Fourth, longitudinal designs have embraced the prospect that peer relationships may be linked to individual development. Each of these issues will be discussed in turn.

Data Analytic Strategies

Twenty years ago, whilst in graduate school, I had the good fortune of being an author on an innovative study that compared the conflict behaviors of preschool friends and nonfriends (Hartup, Laursen, Stewart, & Eastenson, 1988). We struggled to devise solutions to the problem of nonindependent data; many children had multiple friends and each had interactions with a

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large number of nonfriends. The main results were presented in the form of chi-square analyses (conducted by hand) that contrasted friends and nonfriends on various conflict and social behaviors. Sometimes we treated relationships as if they were independent (overlooking the fact that some individuals contributed more data than others). At other times, we limited each child to one friend and one nonfriend relationship (overlooking the loss of power and concerns about generalizability). Even after taking these liberties, we were still confronted with circumstances in which statistical contrasts were impossible, so we limited our presentation to descriptive statistics only.

Contemporary scholars are fortunate in that new statistical techniques overcome many of the obstacles posed by nonindependent data. Dyads and peer groups must be treated differently (for reviews see Laursen, 2005; Laursen, Popp, Burk, Kerr, & Stattin, 2008). Both new statistical techniques and the different treatment of dyads and groups are illustrated to good effect in this special issue. At the dyadic level, scholars have embraced analytic strategies for correlated cases that describe change in the unique and shared variance in each partner's perceptions and behaviors (Kenny, Kashy, & Cook, 2006). Results from these analyses provide a nuanced view of individual roles in relationships. At the group level, multilevel modeling and dynamic network modeling approaches are gaining currency (Burk, Steglich, & Snijders, 2007; Snijders, Steglich, & van de Bunt, in press). These are designed to give the investigator a glimpse into the relative influence of dyads and groups. These analyses provide a sophisticated partitioning of nested sources of variance. Uneven contributions by individuals can be accommodated, reflecting the fact that in the real world some youth have no friends and others have many friends, some youth have no romantic partners and others have many romantic partners, some youth have neither and others have both.

A Focus on Moderation

Hydraulic models are a familiar fixture in research on peer relationships during adolescence. Who has more influence over the child, parents or peers, friends or romantic partners? This search for simple main effects assumes that influence is a zero-sum game, which means that an increase in the influence of one type of relationship reduces the influence of another type of relationship. Things rarely work this way. Instead, influence waxes and wanes in different relationships; sometimes relationship forces are countervailing and sometimes they are independent, but usually they act in concert (Laursen & Collins, 2009). This important insight has dramatically changed the way we approach research on peer influence, because it suggests that the search for risk factors includes more than simply identifying the domains and age periods in which peer pressure is most likely to have untoward effects.

Moderation is the new watchword. The impact of peer relationships over individual adjustment may be greater when they are treated as moderators or settings that accelerate or impede outcomes, rather than as predictors that have direct effects on outcomes (e.g., Laursen, Bukowski, Aunola, & Nurmi, 2007). To understand which adolescents are susceptible to which type of influence under which circumstances, we must embrace higher-order interactions. Several studies in this special issue demonstrate the validity of this approach. In so doing, we confront the enormity of the task before us, for we are learning that individual factors and relationship factors interact in unpredictable ways. We suspected they might, because generic interventions targeted at troubled youth have proven stubbornly ineffective or, worse, moderately effective with some individuals and counterproductive with others (Dishion & Piehler, 2009).

A new view of the peer context is emerging, one that defines risk and protective factors in terms of how individual characteristics interact with (a) characteristics of friends and romantic partners, (b) the quality of these relationships, and (c) features of the group in which these relationships are embedded. If this sounds messy and complicated, it's because it is. There is

no simple way to systematically describe the direction and magnitude of influence in peer relationships without reference to combinatorial or additive processes. The studies in this special issue offer a glimpse into what will certainly be a difficult search for replicable patterns.

Samples and Generalizing from Them

New analytic techniques and a newfound interest in moderation dictate large samples. Once admirable, samples consisting of one grade in one large school are increasingly commonplace and increasingly inadequate. At the level of the dyad, the studies in this special section included between 100 and 200 pairs. At the level of the group, sample sizes ranged from 300 to 1500. Samples of this magnitude represent a massive data collection undertaking. Those who remember the not-too-distant past know that much smaller samples were once the norm. New data analytic techniques are a driving force behind increases in sample size, because many of these procedures are unreliable when applied to fewer subjects.

Other forces are at work too. First, larger samples increase the power to detect small effects. This is obviously good. But it is all the more important when one considers the fact that interaction effects are typically small and difficult to detect (McClelland & Judd, 1993). Greater attention to moderation demands greater attention to sample sizes. Investigators would do well to visualize subgroups represented by higher order interactions (e.g., boys in low quality friendships who smoke) and calculate the number of participants needed to identify differences between groups that are small and (in a regression format) limited in terms of the variability that remains after accounting for main effects. Group-based analytic strategies partition variance in a different way, but their demands for large samples, particularly when testing for interactions, are equally great.

Second, a greater premium is now placed on generalizability. To accomplish this, samples have grown larger and more representative. Consider the samples described in this special issue. A few were convenience samples, but most were collected with an eye toward broad representation. Some samples mirrored larger populations. Other samples captured all or most of an entire population. The advantages of improved sampling cannot be overstated; as samples become more representative, conclusions based on these samples can be generalized to broader populations with greater confidence.

Drawing Conclusions about Change

How much individual change can we attribute to peers? This question is at the heart of most studies of peer relationships. We are careful not to invoke causality; none of the scholars in this special issue assert that peers cause change. Nevertheless, the goal of each study is to inform conclusions about causality. There are many ways to do this, but one common practice involves isolating factors associated with change (see Rutter, 1994). Correlational longitudinal data are a necessary first step in this process because they help to establish antecedent conditions for change. Studies of this nature are also important because they tell us who is changing and how much they are changing. The longitudinal studies in this special issue link peer variables to subsequent increases or decreases in individual behaviors and attitudes, thus setting the stage for later studies that might demonstrate how changes in peer relationships precede changes in individual adjustment.

Some argue that cross-sectional studies cannot inform the debate about the role of peers in individual development. I tend to be more circumspect, particularly with regard to research aimed at disentangling perceptions of relationship partners. Unpackaging distinct perspectives has important implications for the study of influence because it raises the prospect that change is in the eye of the beholder. We know that parents and children hold differing views of their relationship and that these views are linked to discrete trajectories of change (Callan & Noller,

1986). We do not know whether the same is true of peer relationships because we have only recently begun to identify differences between relationship partners (e.g., Burk & Laursen, 2005). The partner perception studies described in this special issue are an important step in this direction.

Challenges Confronting our Efforts to Capture the Peer Context

It is often the case that methodological constraints mask conceptual and empirical limitations. Improvements in data collection techniques and advances in statistical practices can dictate commensurate refinements to constructs and tools previously deemed adequate. The study of peer relationships and peer networks must be similarly refined to keep up with methodological innovations. I return to each of the advances described above to illustrate the nature of these challenges. This list of prescriptions and proscriptions is not an indictment of the papers included in this special section but rather a set of guidelines for future studies.

Data Analytic Strategies

All analytic methods contain important assumptions about the data and the conclusions that one draws from the results. Unfortunately, as analyses grow more complex, these assumptions become more opaque. The problem is not just that investigators, reviewers, and editors do not fully understand the output generated. At a more fundamental level, we may not appreciate that analytic algorithms are predicated on assumptions about the data and the sample. Nor do we appreciate how the results reflect these assumptions and the consequences that follow from violating them. The output is often difficult to interpret, so it is tempting to describe the results in terms of analytic models with different assumptions. Finally, unfamiliarity with assumptions and prerequisites can give rise to a misapplication of methods. Of the many scholars who have recently become acquainted with Actor-Partner Interdependence Models (APIM), only a small percentage know that these analyses are not as appropriate when (a) both participants are describing one partner; (b) both participants are describing the same variable; (c) there is mutual influence on either the predictor or outcome variable; and (d) the same external force influences both partners (Kenny et al., 2006).

Better data are needed. Dichotomous data are not easily accommodated in most of the approaches illustrated in this special section. Unfortunately, it is common practice to collect dichotomous data with standard sociometric nomination procedures. A rating and ranking system of preference or affiliation is superior to one in which children simply nominate their friends or preferred affiliates. But ratings can be cumbersome to gather, because each child must rate all (or a large subset of) other children in the target sample. Other changes are needed. Unlimited nominations, be they preferences or attributes, are better than a fixed number of nominations because the latter promotes skew and restricts the variance available. As samples increase, investigators understandably tend to sample more constructs with fewer items. Unfortunately, constructs with fewer items are almost always less reliable and less stable than constructs with many items. Constructs based on single items are most problematic. There are many reasons to avoid single item constructs (see Rushton, Brainerd, & Pressley, 1983). Add to the list the fact that single-item constructs preclude routine adjustments for internal reliability that help to improve model fit in longitudinal studies.

A Focus on Moderation

It is one thing to find a statistically significant interaction and yet another to make sense of it. Many studies in this special section illustrate this conundrum. The traditional follow-up to a statistically significant regression interaction (in regression-based approaches) is to plot slopes at different values of the moderator, but this approach sacrifices power and forces arbitrary categorical distinctions onto a continuous variable. Alternatives to this approach (e.g.,

Preacher, Curran, & Bauer, 2006) have yet to gain widespread acceptance. Multiple group contrasts are required to test for moderation in APIM analyses. Separate analyses are required to contrast each path, inflating error. These contrasts are extremely sensitive to sample size (MacCallum, Browne, & Sugawara, 1996). A quick calculation suggests that close to 300 dyads are required to detect small differences with moderate power. Not surprisingly, few studies contain this kind of power. Given that peer context effects typically fall in the small to medium range, underpowered research should be a significant concern. Other problems confront scholars using SIENA, because there are currently no follow-ups that elaborate on moderated findings.

As mentioned earlier, better data are needed. Restricted ranges are an inevitable byproduct of samples of convenience. The same problem arises, to a lesser extent, from samples of volunteers, because participation tends to be inversely linked with extreme scores. Moderator analyses lose their meaning in the absence of data that represents the full range of scores, because the mean and standard deviation (which often form the basis for follow-up contrast groups) tend to be artificially low. Comparing groups that are, in relative terms, high and low on a variable is not synonymous with comparing groups that are, in absolute terms, high and low on a variable.

Potential moderators should be identified prior to the collection of data, so that variables are selected that lend themselves to grouping. Scales designed to identify youth with clinical syndromes produce two meaningful groups: Youth with problems and youth without problems. These inventories are not designed to distinguish among well-adjusted youth, so there is no reason to expect that groups with low scores and groups with average scores are particularly valid. Nor should we expect valid groupings when scales designed to identify clinical populations are used to create groups based on standard deviations from the group average, because the high problem group will probably include some youth who qualify as having a clinical disorder and others who do not. Similar concerns about groupings arise when using scales designed to measure normative behavior, because they tend not to follow a normal distribution. Most youth at one standard deviation above the mean on relationship negativity report scores that are below the scale midpoint. Should these youth be grouped with those whose scores are at the ceiling? These and other problems arise because of insufficient attention to measurement validity.

Samples and Generalizing from Them

Longitudinal samples tend to be homogeneous with respect to transience, which means that most participants are youth who stay in the same place and interact with the same peers. This problem is not specific to any one sampling strategy. It arises in samples of youth involved in stable romantic relationships or stable friendships, samples of youth who do not change classrooms or schools, and samples of youth whose classes or schools have participation rates at or above a certain minimum. Some studies track youth who change schools, but network and nomination data are unavailable for these participants. Missing data procedures may be applied, but these assume that cases are missing completely at random, a standard that is difficult to reach. The treatment of missing categorical data is a matter of contention; it is one thing to gauge the variance around missing ratings and quite another to do the same for a missing friend or romantic partner nomination, particularly if the goal is to determine the presence or absence of a specific relationship.

The upshot is that samples tend to be biased toward those whose lives are stable, those whose relationships are stable, and those whose communities are stable. Small cities that are homogeneous with respect to culture, language, ethnicity, and socioeconomic status tend to be overrepresented. We hope that results from these samples generalize to the poor, urban, and mobile, but such claims remain suspect until we demonstrate that peer networks are similar for

populations with high and low levels of transience and that peer relationships are similar for youth whose lives are stable and youth whose lives are not.

Better data are needed. Most adolescents participate in numerous social contexts and establish peer relationships with youth of different ages who attend different schools. It is a tall order to gather data on each of these relationships. Capturing everyone in these networks requires data from the community, which is not practical in large cities. Passive consent procedures are an important method for obtaining the response rates required for generalizing from sample populations, but this tactic may run afoul of ethical strictures. Selective sampling techniques are underutilized options that have proven effective, particularly in studies focused on peer groups (Brown & Larson, 2009). Finally, with respect to relationships, there is an unfortunate tendency to assume that each relationship has the same significance. There is tremendous variability across youth in rankings of their closest relationships; during mid-adolescence approximately equal numbers report that their closest relationship is with a mother, a friend, and a romantic partner (Laursen & Williams, 1997). Close relationships do not carry equal valence to adolescents, so we ought not to assume equivalent attitudes toward them, behaviors in them, or consequences from them. Only when the relative significance of each peer affiliation is assessed can analyses take these variations into account.

Drawing Conclusions about Change

Change is rarely tidy. Regression models and linear growth models are deceptive because they suggest orderly growth. Scatterplots of real data suggest otherwise. Some individuals manifest nonlinear trajectories; others display variations in intercept to slope trends. This complexity is hard to capture with conventional data analytic strategies, particularly with small samples and only two or three time points. It is important to remember that analytic techniques are designed to impose their own order on the data. Different techniques have biases for different types of order. Conventional APIM techniques model linear change across two time points. SIENA does not model change at all; rather, it simulates change. Many recognize these distinctions, but few appreciate their implications.

The papers in this special section resemble most studies of peer relationships in that they focus on change experienced by the participant. Data are almost always collected and analyzed as a function of the participant's age or grade in school. This strategy loses sight of the fact that peer relationships and peer networks have developmental trajectories of their own. We know a few things about peer relationships during different age periods. We know very little about the course of relationships and peer groups (Hartup, 1996). The lack of attention to relationship change has important consequences for conclusions about relationship consequences. For example, selection effects are often estimated without accounting for the fact that youth affiliate with one another before they are categorized as friends. Estimates of socialization effects are made without accounting for the fact that the influence of a friend or romantic partner varies across the course of a relationship. Failure to disentangle change with respect to the life of the relationship from change with respect to the life of the individual may be one important reason why modest effects dominate the study of peer relationships.

Better data are needed. There is little hope for understanding processes of change in relations with peers or changes in individuals attributed to relations with peers when data collection intervals are measured in half or whole year units. Much can happen between friends and romantic partners in a month, let alone a year. Many relationships do not last this long. Are they not influential? Even in long-term relationships, stability should not be assumed in the form and content of interactions. From the beginning to the end of a school year, stable friendships fluctuate in terms of relative closeness and amount and quality of interactions. To neglect these variations in relationship properties is to neglect a significant source of influence.

Investigators are often forced to focus on stable relationships, which can be a significant source of sampling bias. Youth who maintain the same friendships and the same romantic relationships across a span of months and years are not the same as those who go through several different relationships during the same time period. Adolescents who cycle through many relationships may be less socially mature and more prone to peer influence or they may be less socially inclined and more immune to peer influence. Most adolescents chart the course of their close peer relationships from week to week, particularly from weekend to weekend (Larson & Richards, 1994). This suggests that days and weeks should be our measurement interval, not semesters and years.

The Paradox of Progress

The scholars who contributed to this special issue and editors who conceived the project and refined the product are to be congratulated. Critical new insights were offered into adolescent friendships, romantic relationships, and group relations. The papers describe state-of-the-art data sets and showcase cutting-edge analytic techniques. But the papers also highlight important limitations to accepted procedures. The contemporary study of peer relationships is in a stage akin to that of astronomers scanning the universe with big new telescopes. As the first to look through these new telescopes, we are privileged to see clearly stars that were once faint. We are also in a position to see stars whose existence we never imagined. Thus, our progress is paradoxical: We know more about the peer context than ever, but we have also learned that the topic is far more complex than we previously thought.

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