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Introduction to the Special Issue:

20th Century Origins and 21st Century Developments of Peer Nomination Methodology

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Abstract

This issue of *New Directions for Child and Adolescent Development* looks at current practices and recent advances in peer nomination methodology. Peer nominations provide a key method for assessing relationships, social status, and interpersonal behavior. This introductory article begins with a history of peer nomination methods, with a focus on the early origins of peer informant measures and the nature of Moreno's (1934) sociometric methodology (highlighting fundamental differences from the modern sociometric procedure). Next, the article addresses major changes that have occurred in peer nomination research over the course of the past two decades, including the recent focus on popularity and relational aggression, statistical advances, logistical challenges and innovations, and the changing conventions of the nomination procedure itself. The final section includes a brief overview of the articles included in this issue.

Introduction to the Special Issue:
20th Century Origins and 21st Century Developments of Peer Nomination Methodology

For nearly a century, developmental researchers have used peer nominations as a central method for assessing peer relationships among children and adolescents. Peer nominations have been used at the forefront of research on friendships, social groups, social status, and social behavior. They have been used to establish the benefits of friendship and acceptance, the threats of isolation and rejection, the causes and consequences of aggression and prosocial behavior. They have helped to establish the continuity of social adjustment and internal working models over the course of development, measuring aspects of peer relationships that have been linked to both parenting and adaptive romantic relationships.

Peer nomination research has been in a constant state of development since its inception. Foci, methodological conventions, and theoretical orientations change, while new methodological analyses and statistical approaches emerge. In this issue of *New Directions for Child and Adolescent Development*, each of the primary articles will provide a unique perspective on both the current state and the current direction of the field. In this introductory article, however, I will set the stage by providing a historical perspective on peer nomination methods (with an emphasis on their inception), leading to an analysis of some of the major changes and developments that the field has undergone in the early years of the twentieth century.

A Brief History of Peer Nominations

Precursors and Early Origins

Although peer nomination methodologies are typically traced back to Moreno (1934) or Hartschorne and May (1929), the foundations of peer-informant methods were laid decades

earlier with research on peer ratings. In 1903, one of the founders of modern psychology, James Cattell, assessed the traits of five "men of science" using ratings from twelve acquaintances each. Noting the promise of Cattell's procedure, Norsworthy (1908) asked members of a sorority to rate each other on a list of the same traits, and specifically analyzed the amount of consensus in their ratings.

By the following decade, there was active research on the assessment of character traits in both industry and education, and several measures were designed that could assess employees or teachers based on responses of either supervisors or well-acquainted colleagues (Monroe & Clark, 1924). Studies using undergraduate peer ratings were also conducted by personality researchers (Folsom, 1917) and vocational psychologists (Hollingsworth, 1916). Additionally, the US military became interested in the efficiency and effectiveness of officers at the outset of the first world war, and researchers Walter Dill Scott and Harold Rugg were employed to adapt and study the "man-to-man" scale (Monroe & Clark, 1924), which was completed by both supervisors and fellow officers (Rugg, 1921). Based on his research in the military and with teachers, Rugg (1921) ultimately concluded that the conditions for accurately and reliably rating human character were nearly impossible to maintain.

Despite the pessimism of Rugg (1921) and others (see Hollingsworth, 1916), peer-based investigations expanded in the 1920s. Although much of this work continued to focus on skills and personality characteristics, researchers were beginning to use peer reports to assess personal feelings, relationships, and status, and studies using peer nominations (as opposed to ratings) were first published. For example, Perrin (1921) asked college students to name others based on "degree of personal affection," Almack (1922) asked 4th-7th graders to name peers with whom they would like to work or invite to a party, Dexter (1926) asked undergraduate women to

identify their most popular peers, Hsia (1928) assessed "best mixers" among early adolescents, and Furfey (1927) analyzed reciprocated choices derived from asking boys to nominate peers with whom they liked to play. In many ways, these studies of interpersonal affection and relationships in the 1920s prefaced the shift in the use of peer reports in psychological, sociological, and educational contexts away from general personality assessment and toward assessment of interpersonal behaviors (Harshorne & May, 1929) and relationships/groupings (Moreno, 1934).

Codifying Peer Nomination Methods: Sociometry and the Guess Who Test

The 1934 publication of Jacob L. Moreno's *Who Shall Survive?* revolutionized peer relationship research by introducing the subfield of sociometry. Although previous researchers had made use of peer nominations, Moreno's work codified and popularized the theoretical framework and research methodology for studying group structures.

The cornerstone of Moreno's sociometric method involved asking participants to nominate peers within a given social group on the basis of preference. Two foundational aspects of Moreno's method, however, distinguish it from modern peer relationships research. The first is that subjects were asked to nominate peers based on their desires to engage with those peers in a particular way; that is, rather than simply being asked whom they liked or disliked, participants would be asked with whom they wanted to work, or live, or eat, etc. The second is that nominations were actually used to restructure the group in terms of the criterion for a given question; for example, peer nominations would be used to determine who sat next to whom during lunchtime, roommate arrangements within a sorority, etc. These two aspects of Moreno's method were, according to Moreno and his followers, *requirements* of the sociometric methodology; studies that did not involve these methodological features (e.g., studies that simply

asked participants to list their friends or the peers they most liked) were considered "quasi-sociometric" or "near-sociometric" (Lindzey & Borgatta, 1954; Polansky, Lippitt, & Redl, 1950). Early sociometrists argued that the physical reorganization of group arrangements provided for both the reliability and validity of the nominations themselves. Harmon (1949), for example, argued that assessing reliability and validity of sociometric nominations was as useless as doing so for votes in a public election, saying that "in psychometrics, the data are almost always measurements of a sample of behavior; in sociometry, by contrast, the data are almost always directly descriptive of the universe itself" (p. 747).

Despite the historical influence of Moreno's framework and methodology, modern peer relationships researchers utilize peer nomination methods that are only similar to Moreno's method insofar as they ask individuals to name peers who fit specific criteria. After the 1930s and 40s, researchers rarely reorganized group structures based on concrete nominations, and even asking about concrete arrangements gradually gave way to general questions about liking and friendships by the 1980s (Hartup, 1983).

In fact, modern peer nomination methods seem to more closely resemble those proposed by Hartshorne and May in 1929 than those proposed by Moreno five years later. Hartshorne and May established the methodology of the "Guess Who Test," which provided a number of behavioral descriptions and asked children to write the names of peers who fit each description. Although the wordings of some questions are dated, others are remarkably similar to peer nomination items used today (e.g., "This one is always picking on others and annoying them;" "Here is someone who will always stop what he is doing to help a fellow pupil;" Hartshorne & May, 1929, p. 88). Variations of the Guess Who Test were widely used in later decades (often paired with separate "sociometric" questions to assess group structure and affective reactions)

and direct descendants of the measure are still in use today (e.g., in the Revised Class Play; Masten, Morison, & Pellegrini, 1985).

The Latter Half of the 20th Century

Much of the peer nomination research between the late 1930s and early 1950s was based on assessing correlates of peer acceptance and peer rejection/social isolation (Hallinan, 1981). Researchers determined that individuals who were accepted by the peer group tended to have positive characteristics and strong social skills, whereas individuals who were rejected tended to have negative characteristics and weak social skills. In general, these studies were atheoretical and the relative consistency and straightforwardness of these findings failed to stimulate subsequent research (see Hallinan, 1981), which may have contributed to the dearth of psychological peer nomination research through the 1960s (Hartup, 1983).[1] The field was revitalized in the 1970s, however, with an explosion of research on friendships and group structures (Hallinan, 1981; Hartup, 1983).

After the renewed interest in peer relationships in the 1970s, the following decade saw the popularization of three conceptual and analytical innovations exemplified by the publication of Coie, Dodge, and Coppotelli (1982): the consideration of acceptance and rejection as two separate dimensions of peer reactions, the combination of acceptance and rejection scores to form *social preference* (liking - disliking) and *social impact* (liking + disliking) scores, and the categorization of individuals into distinct "sociometric status groups" based on levels of preference and impact.[2] The Coie et al. (1982) model of group classification was widely used by

[1] Although uncommon in peer relationships research, sociometric methods were being used by teachers and educational researchers during this time. Gronlund (1959), for example, provides a thorough summary and evaluation of sociometric methodology, including a review of research on the reliability and validity of peer nomination measures.

[2] It should be noted that all three of these innovations emerged from previous research. Lemann and Solomon had argued in 1952 that acceptance and rejection should be considered two-dimensionally, and proposed an "indifference score" derived from these scores. Dunnington (1957) proposed the inverse of indifference score in

developmental psychologists during the 1980s and 1990s, and is still used by some researchers today (although less widely, due to the development of the field as discussed below). Using Coie et al.'s framework as a starting point, researchers focused primarily on the study of peer rejection and victimization into the late 1990s (Cillessen & Marks, 2011; see Bierman, 2004, for a review).

A Century of Research, a Century of Debate: Lingering Methodological Questions

Looking at the history of peer informant measures generally, and peer nominations in particular, it is striking to see the longevity of some of the methodological questions that we are still asking today, as well as the sophistication with which those questions were addressed.

Questions about the reliability and validity of peer informant measures, for example, are now over a century old (Hollingsworth, 1916; Rugg, 1921). Although a number of researchers analyzed reliability and validity of peer nomination measures during the 1940s and 50s (see Gronlund, 1959, for a review), a consensus seemed to emerge thereafter that assessment of internal reliability was unnecessary in peer nomination research and that nominations were primarily validated through face validity (Lindzey & Borgatta, 1954). Today, researchers are still debating the proper assessment of reliability and validity in peer nomination research (e.g., Marks et al., 2013; Terry, 2000).

Since at least the 1930s, researchers have questioned the appropriate use of positive and negative nominations and whether positive and negative nominations should be combined (Coie et al., 1982; Lemann & Solomon, 1952; Myers, 1934). Beyond research on social preference, this discussion is currently playing out in the popularity literature regarding the construct of unpopularity (Cillessen & Marks, 2011; Hopmeyer, Schwartz, Nakamoto, & McKay, 2007).

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what he termed the "notice" score. Peery (1979) reintroduced the notice score as "social impact" and proposed an initial framework for grouping participants based on preference and impact.

Basic issues of data collection have also been subject to disagreement among peer relationships researchers. Some common methodological conventions have been rejected entirely over the years (e.g., the tendency to weight the value of nominations differently based on nomination order; Bronfenbrenner, 1945; Gronlund, 1959; Peery, 1979), but there continues to be disagreement regarding other conventions, including (for example) the utility of asking nominators to provide limited nominations (in which participants can name a certain number of peers—usually three—for a given item) versus unlimited nominations (in which participants can name any number of peers; Terry, 2000; see also Lemann & Solomon, 1952; Gommans & Cillessen, 2015).

Finally, the statistical treatment of peer nomination data has been a matter of debate since at least the publication of Urie Bronfenbrenner's seminal 1945 exploration of the topic. Currently, different researchers treat their data in a variety of different ways, including using raw nomination counts, log-transformed scores, standardized z-scores, ratio methods, and methods that quantify nominations' deviation from chance (Bronfenbrenner, 1945; Terry, 2000). Other researchers may use more recent forms of statistical manipulation or more advanced statistical methodologies in analyzing peer nomination data, as discussed below.

Peer Nomination Research During the Past Two Decades

The landscape of peer nomination research has developed considerably over the course of the past two decades. New logistical challenges to data collection have invited innovations, new technologies have been introduced, new variables are being assessed, new statistical techniques are changing the way we analyze our data, and the conventions of the data collection procedure itself have changed.

Popularity, Relational Aggression, and the Growth of International Research

In terms of the content and focus of peer nomination research, the most important innovations of the past twenty years have emerged from parallel and interconnected interests regarding two particular variables: popularity and relational aggression. Although quantitative researchers had, for decades, referred to liking/acceptance nominations as indications of "popularity" (e.g., Coie et al., 1982), Parkhurst and Hopmeyer's 1998 exploration of popularity as a status construct (rather than an affective or relational construct) provided an ecologically valid way for researchers to assess social status within child and adolescent peer groups (see Cillessen & Marks, 2011, for a review). Whereas accepted children and adolescents were high in prosocial behaviors and low in antisocial behaviors, popular individuals showed a mix of these characteristics, which itself allowed for the identification of multiple subtypes of popular individuals (e.g., prosocial, antisocial, and bistrategic; Hawley, 2003; see also de Bruyn & Cillessen, 2006; Rodkin, Farmer, Pearl, & van Acker, 2000). From a research perspective, the ability to measure status along with relationships, affective reactions, and social behaviors opened up a number of interesting questions and opportunities.

Around the same time that researchers were beginning to investigate popularity, Nicki Crick proposed a measure of relational aggression (Crick & Grotpeter, 1996), building upon previous methods of measuring aggression (which focused on physical and verbal acts) to include acts that are intended to harm relationships (e.g., gossip, rumor-spreading, social exclusion, etc.). Initially, Crick identified relational aggression as a form of aggression used primarily among girls, who had previously been overlooked in aggression research. Although gender differences in the frequency of relational aggression have not consistently emerged (Card, Stucky, Sawalani, & Little, 2008; see also Lansford et al., 2012), it is clear that the assessment of relational aggression provides for a more nuanced understanding of interpersonal behavior.

By the early 2000s, many researchers were including items assessing popularity and relational aggression in their peer nomination inventories, and research on the two variables quickly became interconnected. Indeed, positive relations between popularity and relational aggression were apparent in this early research (see Cillessen & Rose, 2005), and later longitudinal studies indicated that increases in relational aggression could both precede and follow increases in popularity, suggesting complex processes for the establishment and maintenance of social status within peer groups (Crick, Murray-Close, Marks, & Mohajeri-Nelson, 2009). These research programs also led to increased interest in other forms of social status (e.g., social dominance; Hawley, 2003) and additional forms and functions of aggression (e.g., proactive and reactive aggression; Smeets et al., 2017).

Research on popularity and relational aggression has also been a focus of international research on peer relationships that has taken place in recent years. There has been rising interest in the bases and correlates of status in countries and cultures across the world, as well as the ways that antisocial and harmful behaviors may manifest themselves in different cultural contexts.

As these research areas have developed, public interest in status, aggression, and particularly bullying has increased in recent years, sparked initially by the 1999 Columbine massacre and bolstered by an increasing focus on cyberbullying and "mean girls" phenomena (as popularized in the 2004 film *Mean Girls*). Although there are multiple ways to assess social status and behavior, peer nominations provide a "gold standard" for measuring popularity (which is based on peer consensus) and relational aggression (which, due to its covert nature, is difficult to assess with other methods), particularly among adolescents. As parents and educators become

more interested in these topics, and as institutions develop programs to deal with related problems, peer nomination research has a greater ability to affect educational and social policy.

Statistical Advances

As with many areas of psychology, the increased power of statistical computing software has expanded the flexibility and approachability of complex statistical methods, in addition to allowing for new statistical approaches to be developed. Longitudinal investigations have benefitted from general statistical techniques of latent variable modeling, including structural equation modelling (SEM). In particular, multilevel modeling is useful for peer nomination researchers collecting data from large samples; in addition to providing advanced methods of modeling change over time, multilevel modeling allows for more appropriate statistical treatment of nested data (e.g., participants nested with social groups, classrooms nested within schools, etc.) and allows researchers to assess the effects of variables at multiple levels of analysis (e.g., Ellis & Zarbatany, 2007).

Beyond the utility of general statistical innovations, social network analysis (SNA) frameworks and related statistical software have been particularly focused on analyzing interpersonal relationships and social behaviors using peer nomination data. SNA allows for assessment of both socialization and selection processes in longitudinal data, and allows for a nuanced analysis of the ways in which characteristics of social relationships, groups, and structures affect outcomes (see Veenstra, Dijkstra, Steglich, & Van Zalk, 2013, for a review).

Finally, improved statistical procedures have allowed researchers to better account for violations of statistical assumptions in peer nomination research. Psychometrician Richard Faldowski and his colleagues, for example, have dealt with positive skew and zero-inflation by applying Poisson and negative binomial regression methods to longitudinal data analysis in a

way that was impossible at the turn of the century (see Avant, Gazelle, & Faldowski, 2011). Similarly, methods of sociometric standardization to adjust nomination counts for different group sizes also have been further developed (e.g., Velásquez, Bukowski, & Saldarriaga, 2013).

Logistical Challenges and Innovations

No change has been more troubling for peer nomination researchers during the past few decades than the increasing difficulty accessing participants from schools, particularly (but certainly not solely) within the United States. Although collecting data within schools has always been challenging, researchers have noted that school officials have been less willing to allow the use of class time for peer relationships research (see Marks, Babcock, Cillessen, & Crick, 2013). When data collection is allowed, it is also increasingly difficult to receive consent from a large proportion of potential participants within a given classroom or grade. Indeed, these issues may be the single most pressing problem for peer nomination research going forward.

In order to combat difficulties in collecting data from large proportions of participants, researchers have tested alternative methods that may substitute for full-sample peer nominations. The use of "teacher nominations" investigated by van den Berg, Lansu, and Cillessen (2013) is promising, but in need of more research. The use of "sociometric experts" was also proposed as a way to greatly reduce the number of necessary nominators in classrooms/grades (Prinstein, 2007), but has been criticized (Marks, Babcock, & Cillessen, 2015).

One major logistical innovation of the past two decades is the ability to collect data with computers (van den Berg & Cillessen, 2013). Lower computer costs and greater access to Wi-Fi has made online data collection increasingly common across areas of psychology (e.g., the ease of designing and administering online surveys through the website SurveyMonkey and similar platforms). Peer nominations can benefit from computer-based data collection in several ways,

including reduced data collection times, reduced data entry errors, and increased privacy of nominations.

Changing Conventions

Beyond these large innovations in peer nomination research, the past two decades have seen multiple smaller changes in the conventions and typical practices used in collecting and analyzing peer nomination data. Three examples stand out as illustrating these changes. First, researchers today are more likely to treat nomination data continuously than to categorize participants in terms of "sociometric status groups," reflecting a general trend toward continuous measurement in many areas of psychology. Second, whereas early research favored utilization of limited nominations because they were substantially easier to analyze, a consensus has emerged over the past two decades and unlimited nominations are now the more common methodological choice (see Cillessen & Bukowski, in press). Third, although standardized multiple-item peer nomination measures are still in frequent use, social behaviors and other constructs are increasingly being measured using single nomination items.

The Current Issue

The current issue of *New Directions for Child and Adolescent Development* addresses a variety of historical and modern questions and debates regarding sociometric methodology, with a focus on current practices, challenges, and innovations within the field.

After discussing the utility and scope of peer nomination methods in general, Cillessen and Marks (this issue) address standard methodological decisions that researchers must make in collecting data using peer nominations, laying out the advantages and disadvantages of those decisions and noting the conventions currently used within the field.

As noted above, data collection opportunities within schools have become increasingly difficult in recent years, but no articles or chapters have yet been published which focus specifically on this issue. Mayeux and Kraft (this issue) aim to fill that gap by discussing problems faced by researchers attempting to collect data (logistical, ethical, etc.) as well as solutions to these problems and opportunities afforded through partnerships with schools.

Next, van den Berg and Gommans (this issue) discuss advantages and challenges afforded by computer-based collection of nomination data, including recent empirical research comparing psychometric properties of computer-based vs. pencil-and-paper measures as well as new research opportunities afforded by the flexibility of the use of computers.

Bukowski, Castallanos, and Persram (this issue) conclude the discussion of peer nomination methodology by reflecting upon the articles in this issue, with a focus on continuity and change of peer assessment techniques in both the historical and recent past. They close their commentary by challenging future investigators to reexamine the fundamental paradigm of peer nomination research.

Ultimately, we hope that this issue will provide a reference for novice and veteran researchers alike, will serve as an overview of the current challenges and innovations in the field, and will spur future research both using peer nominations generally and focusing upon peer nomination methodology specifically.

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