Using a Contextual Effects Measurement Approach to Understand the Influence of Community on Individual Behavior

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A social organization perspective identifies processes operating in the community that may influence an individual's behavior. To understand such processes, researchers can apply a contextual effects measurement approach, which is used to assess the influence of group-level effects on lower level outcomes. However, few community studies employ this approach. The purpose of this article is to present and evaluate the merits of the contextual effects measurement approach.

Keywords: Measurement; Behavioral Issues; Community Context; Social Organization; Social Processes

Research suggests that adolescents are at risk for severe behavior problems (Eaton et al., 2012; Federal Bureau of Investigation, 2011; Robers et al., 2012), which is of concern because engaging in problematic behaviors may result in adverse consequences. For example, adolescents who report behavior problems also report academic difficulties that place them at risk for dropping out of school (e.g., Viljoen et al., 2005). Community interventions are particularly important for adolescents because approximately 40% of their day includes unstructured time (Bartko, 2003), and unstructured time is associated with high risk behavior problems for adolescents (Eccles, 2003). Community interventions potentially can address this concern (Coulton, 2005).

In order to provide successful community interventions that deter behavior problems among adolescents, practitioners require a comprehensive understanding of the processes that operate in the community. One useful perspective that identifies community processes is social organization. In general, *social organization* refers to the "collection of values, norms, processes, and behavior patterns in a community that organize, facilitate, and constrain the interactions among community members" (Mancini et al., 2005, p. 319). This perspective identifies mechanisms operating in the community that influence individual-level outcomes, such as behavior problems. These mechanisms then can be leveraged through community interventions to help deter behavior problems.

In the study of adolescent behavior, previous community research focused less on mechanisms and more on community structural characteristics (Kroneman et al., 2004). Most of these studies focused on traditional community structural characteristics such as socioeconomic status, residential mobility, and ethnic heterogeneity (e.g., Beyers et al., 2003; Bruce, 2004; Chung & Steinberg, 2006; Cleveland, 2003; Leventhal & Brooks-Gunn, 2000; Stewart et al., 2002; Wight et al., 2006). Other studies examined criminogenic factors such as high community homicide rates and exposure to crime (Buckner et al., 2004; Ozer, 2005; Sampson & Laub, 1994; Sams & Truscott, 2004). These studies indicate that no single element stands alone when examining factors that influence individual behavior; rather, multiple complex mechanisms intertwine in the community to influence an individual's behavior.

Due to these complexities, some scholars have aimed to identify social processes (or mechanisms) that may operate in the community (e.g., Stewart et al., 2002). Community studies examining these social processes allow researchers to expand beyond the influence of structural characteristics to more fully capture the complexities of the person–environment interactions that shape an individual's behavior. Nonetheless, community studies that aim to understand how social processes influence an individual's behavior are inconclusive, thus highlighting a need for advancements in research, which include using a different approach to measure these mechanisms.

One promising solution to this dilemma is to use the contextual effects measurement (CEM) approach. Blalock (1984) first posited this approach, and later Mancini and colleagues reintroduced the idea (2005). The purpose of this article is to present and evaluate the merits of this measurement approach in understanding individual behavior in the context of the community. Using behavioral problems among adolescents as an example, the authors demonstrate how CEM has been used to examine individual- and group-level effects on individual-level outcomes. This article also shows how findings from studies that used a CEM approach can inform community-level interventions.

Understanding the Influence of Community Characteristics on Individuals

Historically, researchers have used two main methods to identify the mechanisms through which community characteristics influence individual behavior. The first method is a compositional approach, which focuses on examining how community composition explains individual-level behavior (Diez Roux, 2002). This method often uses census data to identify and summarize the intergroup differences and then draws inferences about variability in each individual's observed behaviors. As shown in Figure 1, community composition is measured at the community-level and is expected to influence individual-level outcomes. The most common ways community composition has been measured is by using rates of poverty or joblessness (Mancini et al., 2005); however, researchers also have used the percentage of a specific group of people within a community

or the ratio of one group to another (e.g., Clear et al., 2003). Although these studies tend to identify important predictive factors, studies that use this method tend to be susceptible to bias from over-adjustments, thus yielding overly conservative estimates of the effects of the community context. Therefore, any conclusion about the specific processes operating in the community is often conjectural or may lack explanatory power.
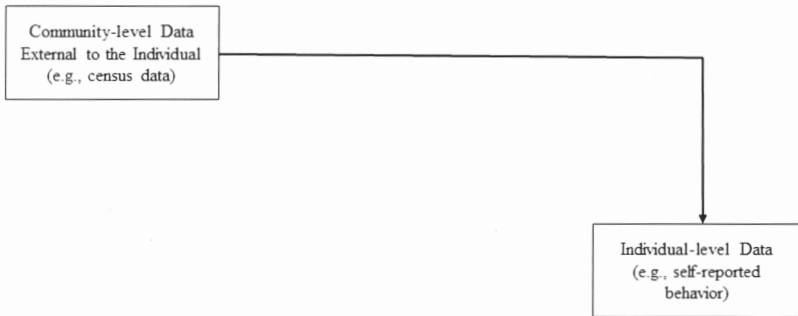

Figure 1. Example of Compositional Approach

The second method commonly used in community studies of individual behavior is the contextual approach. As shown in Figure 2, this method uses a micro-level approach wherein individual-level data assess how each individual perceives the community. Although an individual's perception of the community in which they live undoubtedly influences one's behavior, contextual studies do not allow researchers to understand how broader community-level processes influence individual behavior independently of an individual's personal views (Mancini et al., 2005). Thus, the limitation of this approach is that it generally lacks objectivity in assessing the mechanisms that occur in the community.
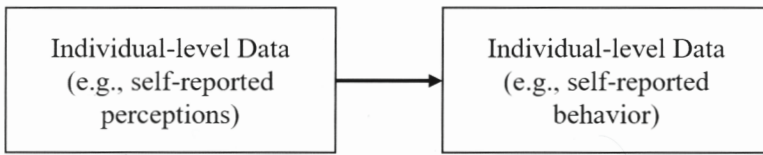
Figure 2. Example of Contextual Approach

These two approaches—compositional and contextual—are complementary and can be used in tandem to maximize results. Although both methods provide insight into community predictors of behavior problems, they do not directly assess group-level processes external to the individual (Blalock, 1984), such as community capacity or collective efficacy (Lynam et al., 2000; McNulty & Bellair, 2003). Such an approach thus would be useful in deciphering the processes that occur in the community that influence individual behavior.

The Contextual Effect Approach

To remedy the shortcomings of the two common approaches used by community research scholars, we advocate using a contextual effects measurement (CEM) approach. As shown in Figure 3, this approach examines community-level effects (as measured at the individual level and then aggregated to the community level) on microlevel outcomes (Blalock, 1984; Diez Roux, 2002). This approach also includes controls for appropriate microlevel variables. It directly assesses macrolevel processes (or mechanisms) at the community level and allows for the creation of complex conceptual frameworks.
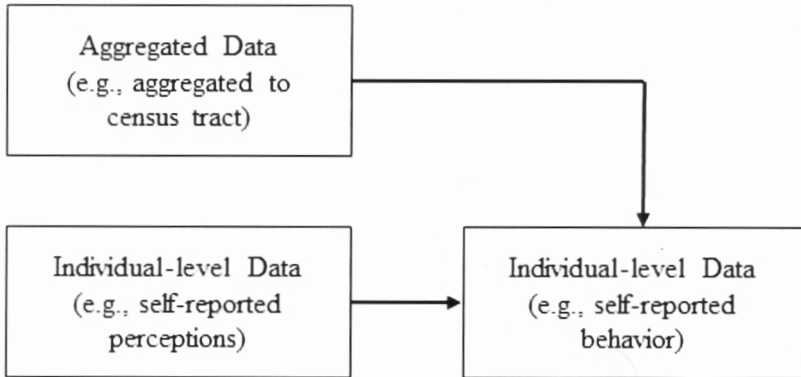
Figure 3. Example of Contextual Effects Measurement Model

The CEM approach lends itself to the examination of several types of hypotheses (Blalock, 1984). For example, researchers can use this approach to hypothesize that both group-level and individual-level community characteristics directly affect individual behavior. Further, this approach allows one to hypothesize about the influence of both the quality and quantity of community characteristics on behavior.

According to Bowen and colleagues (1995), three main features set the CEM approach apart from the other approaches. First, individual outcomes are the dependent variables. Second, both individual-level and community-level factors are independent variables; the latter generally are aggregated from information independent of individual perception reports (and are sometimes aggregated to the census tract). Third, the effects of the community-level variables are "independent of the micro effects, even though they will ordinarily be correlated with them" (Blalock, 1984, p. 356). This last characteristic is the defining feature of all contextual effects models (Blalock, 1984). It emphasizes the relative objectivity of the CEM approach; thus, research can draw conclusions about the effects of the community on the behavior of the individual.

The CEM approach enables scholars to conceptualize multilevel and cross-level propositions to explain individual-level behavior (Weller, 2009). It also decreases the chances of omitted variable bias and relies on hierarchical linear models (HLM) (Raudenbush & Bryk, 2002). Thus, the value of CEM is that it

allows researchers to demonstrate how variation in individ-
ual-level outcomes results directly from the influence of both
group-level and individual-level community characteristics.
The basic CEM model described above also can be expanded to
include compositional measures and examine cross-level inter-
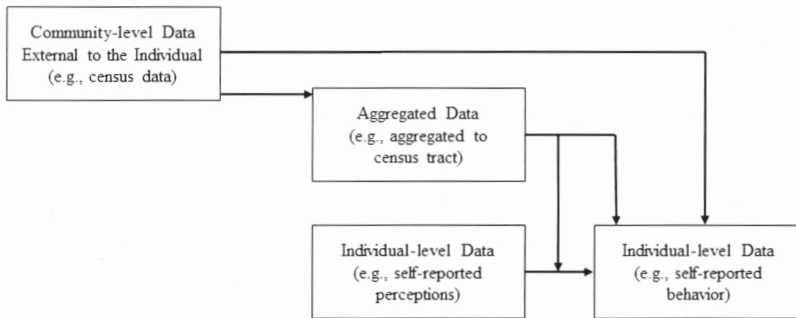actions (see Figure 4).

Figure 4. Expanded Contextual Effects Measurement Model

Empirical Support for a
Social Organization Perspective

To illustrate the application of the CEM model, the authors
identified three articles that used this approach to investigate
possible community factors that may influence individual be-
havior. These articles examined the effects of community-level
peer behavior and community member's behavior while con-
trolling for parenting practices.

Peer Network Structure

Haynie and colleagues (2006) conducted a study that used
a CEM approach to assess the relationship between exposure
to adverse peer behavior and adolescent violence. The authors
developed a peer network structure for each individual in their
sample. They hypothesized that peer behavior would mediate
the influence of community structural characteristics on behav-
ioral problems among adolescents. The authors used census
data from 2,449 census tracts and the Add Health dataset. The

Add Health dataset collected information on students between seventh and twelfth grade from 80 high schools and 52 middle schools in the U.S. Data also were collected from the students' peers and parents. The authors used census data to capture community structural characteristics, including community socioeconomic status, ethnic heterogeneity, and immigration concentration (Beyers et al., 2003; De Coster et al., 2006).

Unlike other social organization studies, Haynie and colleagues (2006) developed a peer contextual effects variable. The authors first developed a peer network for each adolescent based on whom the students identified as their friends. Second, the authors aggregated the number of fights in the last year to the peer network structure, creating a group-level mean score of peer behavior. They subjected the mentioned variables to HLM: level two included community structural characteristic variables while level one included the peer effects variable, individual-level student reports of peer behavior, and several control variables (e.g., age, race, parental practices).

Similar to studies that used a compositional measurement approach (Beyers et al., 2003; Bruce, 2004; Chung & Steinberg, 2006; Wight et al., 2006), the HLM analysis found that community socioeconomic status had a direct effect on adolescent behavioral problems (Haynie et al., 2006). However, Haynie and colleagues also found that peer effects directly influenced adolescent self-reported behavioral problems as well as mediated the relationship between two community structural characteristics (socioeconomic status, immigration concentration) and adolescent self-reported behavior problems. These results suggest that examining peer behavior from a CEM approach may provide insight into the mediational role of peer network structure between community structural characteristics and adolescent behavior problems. This study also highlights the importance of including community structural characteristics in contextual effects studies.

Community Member Effects

In a 2004 study, Simons and colleagues used a CEM approach to explore the influence of community member involvement in African American youths' lives on the occurrence of behavioral problems. Controlling for parental practices, peer behavior,

and the level of adolescents' commitment to school, the authors hypothesized that community member monitoring and supervising would be negatively associated with behavioral problems among adolescents. The authors used census data to capture community socioeconomic status and the Family and Community Health Study dataset to assess collective socialization.

The authors developed a contextual effects variable of collective socialization (Simons et al., 2004). To create this contextual effect variable, they aggregated an eight-item scale assessing caregivers' perceptions of adult involvement in the community to the census block level, thus creating a group-level mean score of collective socialization. A two-level HLM was used, which found an association between community socioeconomic status and adolescent behavioral problems (Beyers et al., 2003; De Coster et al., 2006; Haynie et al., 2006). Additionally, Simons and colleagues (2004) found that collective socialization was inversely associated with behavioral problems, suggesting that fewer behavioral problems occur among youths in communities with more adults monitoring and supervising adolescent behavior. Their findings also supported that collective socialization mediated the relationship between community socioeconomic status and adolescent self-reported behavior problems.

Although Simons and colleagues (2004) partially examined the role of community members using census data, another study used a locally-based geographic dataset (Cantillon, 2006). Cantillon (2006) employed a dataset consisting of 103 tenth-grade males from public high schools in a Midwestern town with their caregivers and one community member who resided on their residential block. This study established community boundaries based on the block where each youth resided. On average, each block consisted of 17 households. Unlike other studies, Cantillon used block-level aggregated parent and community member reports to measure community socioeconomic status, residential mobility, community social organization, and informal social control.

Cantillon (2006) measured community structural characteristics by averaging adult reports of their household income and their perceived frequency of residential turnover. Moreover, this study created a contextual effects variable of social organization from adult reports on three different four-item scales. For example, to operationalize social organization, the author used each

adult's responses to items assessing the level of shared emotional connection among community members, community members' influence on local issues, and desired community safety. The measured components of social organization assessed the sentiments among community members. Cantillon (2006) subjected the mentioned variables to Structural Equation Modeling, and found that low community socioeconomic status and residential mobility were associated with behavioral problems.

Implications for Research

Future studies of behavior problems should address the dynamic and interactive components of community processes by using the contextual effects measurement approach. A possible beginning place would be to replicate previous research and examine the influence of adult community members and adolescents' peer networks on behavior problems using different samples. Further, given that previous studies using a contextual effects measurement approach show an association between family processes at an aggregate level and adolescent behavior problems (Cantillon, 2006; Haynie et al., 2006; Simons et al., 2004), future studies also should include parenting processes as controls.

The CEM approach also has implications for other areas of research. This approach primarily has been implemented in community studies; however, future research could examine other forms of "community." For instance, the family could be considered a type of community, and an individual's behavior could be examined in the context of this "community." For adolescents, the family is the most immediate community; the influences of family on behavior are important. Thus, the CEM approach could help identify the mechanisms through which an adolescent's family affects their behavior.

This article has emphasized using the CEM model when studying behavioral problems among adolescents. However, adolescents are not the only individuals susceptible to community influence, and problematic behavior is not the only type of behavior that warrants study. Thus, future community studies examining different samples (e.g., women, elderly) and different types of outcomes (e.g., sexual behavior) also could benefit from using such an approach.

Limitations of the Contextual Effects Measurement Approach

Although the CEM approach has strengths, researchers using this approach may encounter limitations. A first limitation arises from the definition of community boundaries. For example, Haynie and colleagues (2006) used census tracts to define community boundaries. However, individuals may perceive their community to be smaller than the census tract. Subsequently, community measures using census data may assess several communities existing within a single tract.

Another possible limitation of the CEM approach comes from treating community characteristics, such as peer networks, as individual-level predictors. As Haynie and colleagues (2006) noted, doing so does not allow for predictions about community characteristics that determine the level of influence peer networks have on adolescent violence. To address this limitation, they proposed incorporating peer networks into models and conducting a three-level HLM model. In this case, adolescents would be embedded within a peer network, which would then be embedded within a community.

Another possible limitation comes from small sample sizes. For example, Cantillon's (2006) research did not find an association between community social organization or informal social control and behavior problems. The author argues that the lack of support for these relationships may be due to some of the community blocks comprising two study participants. The author recommends that future research follow Bryk and Raudenbush's (1992) rule of thumb, which suggests 15 cases per geographic unit.

Although not specific to the CEM approach, a final limitation is the possibility of omitting important community-level factors that may affect an individual's behavior. As such, strong theoretical models are necessary when using a CEM approach and considering the selection of study participants.

Conclusion

The purpose of this article was to present and evaluate the merits of the contextual effects measurement (CEM) approach.

Applying the CEM approach may result in a rich and comprehensive understanding of how dynamic community processes can affect an individual's behavior. It is important to utilize this approach since studies examining possible processes operating in the community are relatively scarce and it remains unclear which processes influence human behavior. The CEM approach is one possible way to detect these processes; it thus has important implications for understanding the dynamic processes that occur in the community and for community-level interventions.

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