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Collective efficacy: How is it conceptualized, how is it measured, and does it really matter for understanding perceived neighborhood crime and disorder?

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Abstract

Building on the insights of the self-efficacy literature, this study highlights that collective efficacy is a collective perception that comes from a process. This study emphasizes that 1) there is *updating*, as there are feedback effects from success or failure by the group to the perception of collective efficacy, and 2) this updating raises the importance of accounting for members' degree of *uncertainty* regarding neighborhood collective efficacy. Using a sample of 113 block groups in three rural North Carolina counties, this study finds evidence of updating as neighborhoods perceiving more crime or disorder reported less collective efficacy at the next time point. Furthermore, collective efficacy was only associated with lower perceived disorder at the next time point when it occurred in highly cohesive neighborhoods. Finally, neighborhoods with more perceived disorder and uncertainty regarding collective efficacy at one time point had lower levels of collective efficacy at the next time point, illustrating the importance of uncertainty along with updating.

A growing body of literature has employed the concept of collective efficacy to explain various neighborhood processes (for reviews of this literature, see Hipp and Wo 2015; Sampson 2006). A not uncommon consequence for any construct to which social scientists turn with such vigor is that this wholesale adoption of a concept runs the risk of creating conceptual confusion. That is, there is a risk that all things good *are* collective efficacy, just as the concept of social capital sometimes simply indicates all things good in a neighborhood or community. To utilize the important insights provided by the concept of collective efficacy it is useful to consider carefully what this construct really implies, and how it should be measured. These considerations are analogous to Portes' (1998) discussion regarding social capital, as we need to distinguish between what *is* collective efficacy, what are the *determinants* of it, and what are the *consequences* of it. Conflating these creates conceptual murkiness and stunts theoretical development.

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One key insight that I will develop here is the notion of *updating* for how members of a group view the group's collective efficacy regarding some task. This insight comes from a close reading of the general notion of self efficacy, and makes clear that whereas collective efficacy is a general perception of the group members, it is malleable and develops from a *process*. Although Sampson (2006) has noted that collective efficacy is produced through social interactions, important unique insights emerge from my focus on the feedback from prior success, or lack of it, when engaging in collective behavior. An implication is that the possibility that crime or disorder in the neighborhood might impact residents' perception of collective efficacy is not some arcane statistical possibility, but in fact is a likely important part of the process through which residents develop their level of collective efficacy.

A second unique contribution from the present study is that this updating implies that the degree of *uncertainty* members of the group have regarding this collective efficacy has important implications. As I will elaborate later, this uncertainty is distinct from a neighborhood with an average level of collective efficacy. This uncertainty will typically occur in a low crime or disorder neighborhood, as residents will have little actual evidence to know whether their neighbors will engage in informal social control when confronted with neighborhood problems. Furthermore, I will point out that this uncertainty implies that a single event of disorder or crime can have a strong impact on subsequent perceptions of collective efficacy, depending on the response that is observed in that instance.

This study therefore considers: 1) whether levels of perceived crime or disorder cause residents to update their sense of collective efficacy over time; 2) whether crime or disorder events provide information to residents that reduces their level of uncertainty about collective efficacy over time; 3) whether crime or disorder events in neighborhoods with much uncertainty regarding the level of collective efficacy result in reduced collective efficacy over time; and 4) whether higher levels of collective efficacy within a context of high cohesion might reduce the level of crime or disorder over time.

Background

Defining self-efficacy and collective efficacy

To begin, we need to unpack the key terms of Bandura's (1977) concept of *self-efficacy* and *collective efficacy*. Self-efficacy focuses explicitly on the efficacy expressed by an individual, and is defined as “the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations” (Bandura 1995: 2). Thus, self-efficacy is a sense of what *can* be accomplished in a situation that does not include any out of the ordinary circumstances. Furthermore, self-efficacy is a task-specific construct—a person has self-efficacy regarding a particular task—rather than some general trait characterizing a person. The insights of the broad literature studying self-efficacy are of use to scholars in the collective efficacy tradition, given the substantial overlap in the constructs, and I will touch on these.

Collective efficacy extends the idea of self-efficacy to a collectivity. As discussed by Wickes and colleagues (Wickes, Hipp, Sargeant, and Homel 2013), there are dual intellectual lineages for the concept of collective efficacy from both psychology (Bandura 1986;

Bandura 2000; Zaccaro, Blair, Peterson, and Zazanis 1995) and sociology (Sampson, Raudenbush, and Earls 1997). Building on the theoretical framework of self-efficacy, Bandura noted that “perceived *collective* efficacy will influence what people choose to do as a group, how much effort they put into it, and their staying power when group efforts fail to produce results” (Bandura 1982: 143, emphasis added), and hypothesized that collective efficacy was a property of any sized group, ranging from small collectivities to nation-states. Sampson and colleagues (Sampson, Raudenbush, and Earls 1997) theorized the importance of collective efficacy for neighborhoods as “the capacity for achieving an intended effect” (Sampson and Raudenbush 1999: 612).

Informal Social Control

Although collective efficacy is a broad concept referring to the collective sense of being able to accomplish some collective task, much recent social science literature utilizing this concept uses neighborhoods as the collectivity of interest and the specific task of reducing crime through the provision of informal social control. As noted by Sampson, Raudenbush, and Earls (1997: 918), “Social control refers generally to the capacity of a group to regulate its members according to desired principles—to realize collective, as opposed to forced, goals.” Importantly, this is a *behavioral* measure. Measuring informal social control is quite difficult, as such sanctioning behavior can only occur *if there is delinquent behavior* (Sampson 2006). This emphasizes the need to somehow account for the limited opportunities in some neighborhoods, by, for instance, measuring the proportion of observed instances of delinquent behavior in which a resident actually engaged in sanctioning behavior. One such approach would measure the *potential for informal social control* in a neighborhood by offering residents a series of vignettes and asking them their own likelihood for engaging in such behavior (Warner 2007). Similarly, studies have asked residents the degree to which they feel responsible for the neighborhood (Steenbeek and Hipp 2011; Taylor, Gottfredson, and Brower 1984). An advantage of such an approach is that to the extent residents answer such questions honestly and accurately, the answers of all residents in the neighborhood could be combined as a measure of the likelihood of residents responding to delinquent behavior by engaging in sanctioning behavior. Of course, the validity of this measure crucially relies on the extent to which residents actually answer such questions honestly and accurately. Social desirability bias might lead some to claim that they would engage in such activity when in fact they would not if confronted with such a scenario. The studies that ask about informal social control *behavior* typically have limited information about what the activity was. For example, one study asked residents whether they help watch over one another's house, but what respondents mean by “watching over” can vary (Bellair 2000). Another study asked residents whether had “been active to improve the livability and safety of the neighborhood”, which is also vague about the actual activity (Steenbeek and Hipp 2011).

Nonetheless, studies often use neither the behavioral action of providing informal social control nor the *potential* for informal social control in a neighborhood, but instead frequently ask a series of vignettes in which, rather than asking the respondent what they might do in such an instance, ask respondents to report on what they believe their *neighbors* might do in such an instance. That is, the initial question stub of “how likely is it that you would

intervene if...” is replaced with “how likely is it that your neighbors would intervene if...” (Odgers, Moffitt, Tach, Sampson, Taylor, Matthews, and Caspi 2009; Reisig and Cancino 2004; Sampson, Raudenbush, and Earls 1997; Taylor 1996; Wickes, Hipp, Sargeant, and Homel 2013). Combining the responses of residents in a neighborhood (or any other collectivity) on these measures captures the extent to which residents expect others to engage in such behavior. Indeed, Sampson and colleagues in later work referred to this measure when summed over all residents of the neighborhood as the *shared expectations* of informal social control (Morenoff, Sampson, and Raudenbush 2001; Sampson, Morenoff, and Earls 1999; Sampson and Raudenbush 1999). I argue that given the definition of collective efficacy provided above—a collectivity's sense of efficacy regarding a particular task—these measures indeed *are* collective efficacy regarding the ability of residents to provide informal social control.

Note that although I claim these expectations of informal social control *are* collective efficacy, a common strategy in the neighborhoods and crime literature combines them with a measure of cohesion/trust to create a measure termed “collective efficacy” (Browning, Feinberg, and Dietz 2004; Mazerolle, Wickes, and McBroom 2010; Sampson, Raudenbush, and Earls 1997). However, scholars are increasingly questioning this approach given that measures of trust and cohesion in neighborhoods are very general constructs and not task-specific—which is a crucial component of collective efficacy.¹ The psychology branch of collective efficacy research typically does not combine a general measure of cohesion as a *component* of the task-specific construct of collective efficacy, but instead considers that cohesion may enable collective efficacy (Zaccaro, Blair, Peterson, and Zazanis 1995). And recent neighborhood studies have shown empirically that collective efficacy and cohesion/trust appear to be distinct constructs using data from Chicago (Rhineberger-Dunn and Carlson 2009) and Brisbane, Australia (Wickes, Hipp, Sargeant, and Homel 2013), and another study conceptualized them as distinct constructs (Foster-Fishman, Collins, and Pierce 2013).

The process of efficacy: updating

An important insight that comes from Bandura's concept of self-efficacy is the notion of *updating* that constantly occurs regarding one's sense of efficacy. Updating refers to the process of reassessing one's sense of efficacy based on new information that has been obtained in some fashion (Bandura 1997). This idea, and its implications, has not been sufficiently appreciated in the collective efficacy literature. For self-efficacy, scholars have demonstrated the importance of updating with experiments (Bandura 1982: 124-126), and it is posited that individuals will reassess their self-efficacy based on their own experiences, as well as vicarious experiences, verbal persuasion, or the physiological state in which they experience the event (Bandura 1982: 126-7). Thus, there are four posited mechanisms through which self-efficacy can be changed: 1) enactive mastery experiences (indicators of

¹Few studies have tackled the conceptual challenge of defining a “task” (for an exception see Wickes, Hipp, Sargeant, and Homel 2013), and one reason is that a group's collective efficacy regarding various tasks may well be highly correlated. Thus, a neighborhood's collective efficacy regarding banding together to address the need for speed bumps to protect children playing on neighborhood streets may well be similar to their collective efficacy regarding their ability to keep a local fire station from being closed by the authorities. We might therefore define each of these as instances of a single “task” of the more general ability to acquire resources from the city government. The theoretical challenge is defining the proper level of abstraction when determining “tasks.”

capability); 2) vicarious experiences (observing the attainments of others); 3) verbal persuasion that one has capabilities; and 4) physiological and affective states through which one assesses their capabilities (Bandura 1997: 79).

This notion of updating in the self-efficacy literature translates exactly to the concept of collective efficacy. Nonetheless, scholars have not fully accounted for this, despite its important implications. Figure 1 illustrates this process, and highlights that it is necessary to understand collective efficacy through the micro to macro link in which the group-level property acts upon individuals, who then engage in behavior, and their attitudes then aggregate back up to the neighborhood level. This multilevel model follows in the “boat” tradition suggested by Coleman (1990). Thus, whereas collective efficacy is a shared belief among residents in the neighborhood, it is potentially changed through processes that occur within the neighborhood.

One mistake is to presume that collective efficacy is a monolithic concept among all members of the collectivity: in fact there can be different perceptions among group members regarding the level of collective efficacy for the group (Bandura 1997: 478-480). Bandura notes that “A group belief, therefore, is best characterized by a representative value for the beliefs of its members and the degree of variability or consensus around that central belief” (Bandura 1997: 479). The psychology literature studying collective efficacy is well aware of this issue, and discusses the challenge of distinguishing between the self-efficacy of individuals within a group, the perceived collective efficacy of each member of the group, and the overall sense of collective efficacy among group members (Bandura 2000; Watson, Chemers, and Preiser 2001; Zaccaro, Blair, Peterson, and Zazanis 1995). Some suggest that the variability in this assessment of collective efficacy among group members may be an important indicator of lower actual efficacy (Zaccaro, Blair, Peterson, and Zazanis 1995: 314-15).² Thus, in Figure 1 there is a neighborhood level collective efficacy (above the line), but this plays out in related levels of perceived collective efficacy by residents in the neighborhood (below the line).

This collective efficacy will affect the likelihood of individual residents engaging in sanctioning behavior in a particular instance of deviant behavior or social/physical disorder (either choosing to attempt the task, or not). However, the outcomes of such instances will almost certainly feedback on residents' sense of collective efficacy, both for those who choose whether to engage in social control as well as others who witness the incident or learn about it later. For example, if an instance of deviance or disorder occurs and residents in the neighborhood do not respond with sanctioning behavior (path B in Figure 1), this will likely reduce these residents' sense of self efficacy regarding engaging in sanctioning behavior; but it will also affect other residents who observe or learn about the event (path F) as an instance of deviance in which no informal social control was forthcoming. As a consequence this should have a negative effect on residents' perception of collective efficacy at a later date as they update their beliefs (path K). And if several people alter their opinion,

²It may be that success at a particular task requires that some percentage of the group members—not necessarily all—have high collective efficacy. The necessary functional form of effective collective efficacy in a neighborhood has received virtually no consideration, but is a necessary avenue for future research.

the level of collective efficacy in the neighborhood will be changed (path M2 showing the aggregation of these perceptions up to the neighborhood level). Thus, at the next time point residents will have a somewhat lower sense of collective efficacy regarding residents' likelihood of responding to such deviance with informal social control, unless they can cognitively explain away this incident as an instance of ineffectiveness due to unusual circumstances (path E).

Furthermore, if youth are seen hanging out on a street corner, and a resident confronts them but the youth do not leave, this would be an example of a failed attempt at informal social control (path D). If this can be cognitively explained as an unusual instance (path G), there will be no updating and this would have no effect on future collective efficacy. However, if there was nothing out of the ordinary (path H), this would likely negatively impact residents' perception of collective efficacy (path J) and result in updating and lower levels of neighborhood collective efficacy (path M2). In contrast, if youth are seen hanging out, and a resident confronts them and is successful in getting them to disperse (path C)—which may have the effect of reducing the likelihood of a crime being committed—this successful outcome should increase residents' perception of collective efficacy through updating (path I), and result in higher levels of collective efficacy in the neighborhood (path M2).³ Note that this general model repeats throughout time as t1 and t2 simply refer to the beginning and end of the particular time period; thus, the change in collective efficacy by t2 (whether increasing, decreasing, or remaining the same) will be reflected as the new updated level of collective efficacy at t1 for the next time period.

It is worth emphasizing that perceived collective efficacy is impacted by many features beyond crime incidents—including social and physical cues in the environment—but particularly important may be various incivilities as well as physical or social disorder. In fact, disorder perceptions may have a stronger effect than crime perceptions for several reasons. First, typically it is more feasible for residents to react behaviorally to social or physical disorder (by confronting offenders) compared to confronting some crime offenders, which may be risky (e.g., a robber). Second, whereas crime events occur rarely and are rather ephemeral given that they typically occur quite quickly and when no one is around, social disorder can be present for longer periods of time (e.g., groups hanging out on street corners) and physical disorder is even more stable/visible (e.g., broken windows, graffiti). For this reason, disorder is more easily observed and hence a lack of a response cannot be attributed to residents being unaware of the issue. Third, if one subscribes to broken windows theory (Wilson and Kelling 1982) in which disorder leads to more crime, then the failure of residents to respond to it can be seen as a failure with serious future consequences for the neighborhood: such failure would naturally then impact a neighborhood's sense of collective efficacy. Or if one subscribes to the theory that crime and disorder arise from the same process (Sampson and Raudenbush 1999), then either crime or disorder would be

³I point out that I have largely framed the discussion of updating within a cognitive framework. Nonetheless, this could also be driven by an emotional process. For example, observing a failed attempt at informal social control could increase the level of fear of a resident, which could reduce their sense of collective efficacy. Furthermore, they may then “spread” this fear through conversations with their network ties, which would also reduce the collective efficacy of other neighborhood residents (as well as increase their sense of fear). This suggests fear might operate as a mediating factor. I do not pursue this question directly here, but leave it to future research to consider this possible emotional process.

expected to have the same causal effect on perceived collective efficacy. Fourth, the disorder and decline model (Skogan 1990) posits negative consequences for neighborhoods as a consequence of disorder, and therefore it is likely to impact perceived collective efficacy (Steenbeek and Hipp 2011). Thus, both crime and disorder are expected to impact residents' sense of collective efficacy. This leads to the hypothesis: *H1: Higher levels of perceived crime or disorder at one time point will cause residents to update their assessment of collective efficacy downward and therefore reduce the level of collective efficacy in the neighborhood at the next time point.*

Although this notion of constant updating appears quite obvious once one works through the model, the vast majority of studies testing collective efficacy in the neighborhoods and crime literature almost completely ignore this possibility even when they occasionally consider other determinants of collective efficacy (Browning 2009; Browning, Feinberg, and Dietz 2004; Burchfield 2009; Mazerolle, Wickes, and McBroom 2010; Morenoff, Sampson, and Raudenbush 2001; Sampson, Raudenbush, and Earls 1997; Sampson and Wikstrom 2008; Schreck, McGloin, and Kirk 2009). In the psychology literature more consideration has been given to updating of collective efficacy: for example research has explored this question for small groups in experimental designs (Prussia and Kinicki 1996). A meta-analysis of over 31,000 individuals found that the collective efficacy of groups was impacted by group performance (Stajkovic, Lee, and Nyberg 2009). Sampson (2006) pointed out that collective efficacy comes from repeated interactions in the neighborhood, which highlights the possibility that these perceptions can be shaped over time, and some recent work in the neighborhoods and crime literature asks whether collective efficacy is impacted by the social environment of neighborhoods (such as social cohesion or social networks) (Burchfield 2009; Silver and Miller 2004; Warner 2007; Wickes, Hipp, Sargeant, and Homel 2013), or the physical environment (Cohen, Inagami, and Finch 2008). However, fewer studies have considered that crime or disorder might impact levels of collective efficacy: one exception ignored crime as an outcome measure (Duncan, Duncan, Okut, Strycker, and Hix-Small 2003). An important consequence for cross-sectional studies is that updating implies that collective efficacy is actually endogenous to crime or disorder. A consequence is that cross-sectional studies would need to use instrumental variables to account for this endogeneity; however, the vast majority of cross-sectional studies have failed to account for such endogeneity (a few exceptions include Armstrong, Katz, and Schnebly 2010; Bellair 2000; Sampson and Raudenbush 1999). Thus, we will observe notable feedback effects from crime or disorder to collective efficacy if this model is correct.

An important question then is the *degree* to which updating occurs for the efficacy of a collectivity, and the effect of this on the stability of collective efficacy over time. Empirically, whereas Sampson (2006) noted that collective efficacy is relatively stable over time in Chicago neighborhoods, there is nonetheless a nontrivial amount of change. For example, in Los Angeles the correlation over seven years for census tracts was about .69 and .70 for cohesion and collective efficacy, respectively, and .77 when combined; these values fall somewhat when aggregating to the smaller units of block groups of .64, .61, and .71.⁴ However, to put these values in context, consider that other neighborhood measures are considerably more stable over time. For example, in the city of Los Angeles the correlation over the same period in tracts for violent and property crime rates, respectively, was .91 and .

90. In Southern California, from 2000 to 2010 the correlation for various measures aggregated to tracts was .96 for percent owners and percent Latino, .95 for percent black, .94 for average household income, and .87 for average length of residence. Unless scholars have a very strong justification for assuming that the efficacy of the collectivities in their study is quite stable over time, such an assumption of no feedback effect is almost certainly unjustified.

Uncertainty regarding collective efficacy

A second important implication of the notion of updating is that theorists need to take into account residents' *uncertainty* about the amount of collective efficacy in their neighborhood. The level of such uncertainty may vary across neighborhoods based on the amount of feedback regarding collective efficacy. In neighborhoods in which incivilities happen with regularity, residents will have a relatively good estimate of the likelihood that fellow residents will provide sanctioning behavior. In a neighborhood in which deviant behavior is often met with relatively successful sanctioning behavior, residents will report a high level of collective efficacy regarding providing informal social control. Or, in a neighborhood in which deviant behavior is almost never met with sanctioning behavior, a relatively low level of collective efficacy will exist. In between these two extremes lies a neighborhood in which deviant behavior is only sometimes met with sanctioning behavior, or in which the sanctioning behavior is only sometimes successful. In this case, residents will have an average level of collective efficacy regarding this behavior. In each of these neighborhoods, each additional positive or negative instance of sanctioning behavior would likely have little impact on residents' overall sense of collective efficacy to provide informal social control given their already large amount of information regarding this ability.⁵

On the other hand, in neighborhoods with few incivilities residents may have a difficult time assessing how their neighbors would respond to such an event (St. Jean 2007: 164). Respondents might infer from behavior in other social dimensions to guess how residents might respond, but they would have little direct empirical evidence for forming such an assessment. A consequence would be considerable uncertainty regarding their neighbors' potential behavior. I emphasize that this uncertainty is an individual-level construct, *not* a neighborhood-level construct. If residents were to discuss their level of uncertainty, this discussion by definition would reduce the level of uncertainty. Therefore, this uncertainty is the *number* of residents who are uncertain and not some neighborhood level agreement. This has important measurement properties that I will discuss in the methods section. This leads to the hypothesis: *H2: Higher levels of crime or disorder in a neighborhood allow residents to update their beliefs and will result in less uncertainty about collective efficacy at the next time point*

This highlights a conceptual distinction between a neighborhood with an average level of collective efficacy and a neighborhood in which little deviant behavior creates greater

⁴The somewhat higher values found in Chicago may be due to aggregating to larger units yet (pairs of census tracts); it is well-known that correlation values necessarily increase with larger aggregation units (Hannan 1991).

⁵Note that this implies a Bayesian notion of updating information. That is, a resident has a prior expectation of the level of collective efficacy in the neighborhood, and each incident provides new information to be incorporated into this assessment. In Bayesian terms, the posterior probability is the expected level of perceived collective efficacy after incorporating this new information.

uncertainty among residents regarding the level of collective efficacy. In a neighborhood with a higher level of uncertainty regarding collective efficacy, a single deviant event in which no one responds with sanctioning behavior (or does so and is unsuccessful) could potentially have a large negative impact on residents' perceptions of collective efficacy. Such will be the case unless residents determine that there were extenuating circumstances (thus a situation going through paths B to E in Figure 1, or through paths A to D to G). Whereas this uncertainty will not impact collective efficacy in the absence of any disorder or crime events, a single event could possibly have a strong impact. A person unsure of the amount of collective efficacy is therefore not the same as someone who assesses the amount of collective efficacy as being at an average level. This suggests that an ideal measure would ask respondents their perception of a) the level of collective efficacy, and b) how certain they are of this. This also implies the hypothesis: *H3: Neighborhoods with higher uncertainty regarding collective efficacy that have more crime or disorder in one year will report lower levels of collective efficacy the next year*

The context in which social control action occurs

Note that in this “boat” model, individual perceptions occur within a particular context that may be consequential. For example, in a highly cohesive neighborhood residents may be more likely to hear about instances in which residents responded with action to a threatening situation. This implies that higher levels of cohesion could lead to higher levels of collective efficacy. Furthermore, a key assumption of the collective efficacy model is that members perceiving a stronger sense of efficacy will themselves be more likely to engage in informal social control activity, which may not be the case if persons choose to free-ride and assume that someone else will engage in the behavior (Olson 1971). Some evidence from the psychology literature suggests that cohesion may be important for solving the well-known bystander effect (in which persons are less likely to engage in behavior when other persons are around). For example, one experiment found that the bystander effect was dampened when there was an expectation of future interaction with the other bystanders (Gottlieb and Carver 1979), and two other experimental studies found that the bystander effect was reverse, as increasing the size of the group in high cohesion circumstances actually brought about an *increase* in the probability of stated action (in contrast to the bystander effect) (Levine and Crowther 2008; Rutkowski, Gruder, and Romer 1983). These results imply that the level of cohesion in a neighborhood may be important for fostering social control behavior. Another possibility is that a context of repeated interactions and cohesion might create a situation in which failing to act in a particular instance brings sanctioning, thus overcoming the free rider problem (Sampson 2006; Steenbeek and Hipp 2011). Indeed, Sampson and Raudenbush suggested that cohesion and trust form an important context, as “One is unlikely to take action in a neighborhood context where the rules are unclear and people mistrust one another” (Sampson and Raudenbush 1999: 612). This implies that neighborhoods with high levels of collective efficacy within a context of higher cohesion will be most effective in addressing social problems. Indeed, some of the language from Sampson et al. hints at a moderating effect in which both collective efficacy and cohesion/trust must be present: “In sum, it is the *linkage* of mutual trust and the willingness to intervene for the common good that defines the neighborhood context of collective efficacy” (Sampson, Raudenbush, and Earls 1997: 919, emphasis added). Thus, *H4: Higher levels of*

collective efficacy within a context of high cohesion at one time point will reduce the level of perceived crime or disorder at the next time point

Data and Methods

Data—The data come from households nested in block groups in three North Carolina counties.⁶ Vance and Person counties have about 40,000 persons, and Moore county has about 80,000 persons. Henderson is the largest city in Vance County (about 15,000 population), Pinehurst is the largest city in Moore County (about 13,000 persons), and Roxboro (8,000) and Rougemont (6,500) are the two largest cities in Person County. The population density in the three counties is 169, 107, and 91 persons per square mile. The median household income ranges from \$31,000 to \$42,000 to \$48,000, and the percent in poverty is 20.5%, 12%, and 11.4%. The population is generally black and white, ranging from 13% to 28% to 48% black in the three counties. Although the present study is not focused on a large metropolitan area, other research of rural areas has found the same negative relationship between collective efficacy crime as in urban environments (Cancino 2005); although there is some debate about the systemic theory in such settings (Kaylen and Pridemore 2011). Nonetheless, an advantage of the present study is that the data were collected at three one-year time points, which allows exploring the possible feedback effects identified above, in contrast to nearly all prior studies of collective efficacy that utilize cross-sectional data.

The study surveyed the parents of middle-school children in three public school systems in North Carolina. A simple random sample (not stratified by county) of 1,663 parents of adolescents were administered a 25-minute telephone interview at wave 1 in 2001, and follow-up surveys one and two years later of the same parents. All parents completed the interview in English. By design, in the majority of cases (98.2%) the mother or mother surrogate was the parent interviewed. Response rates at the three waves were 79.8%, 82.5%, and 71.8%, respectively. Adult respondents were geocoded to their home address and placed into 113 U.S. Census block groups (14.7 per block group, ranging from 4 to 42 in wave 1, and 9.5 per block group, ranging from 1 to 31 at wave 3). Given that 9 neighborhoods had less than 3 respondents at wave 3, sensitivity analyses are discussed below to assess whether this impacts the results. Although census tracts are often used as proxies for neighborhoods in urban settings, block groups (a smaller population size) are arguably more appropriate in this rural setting (Hipp 2007a).

The measure of *perceived crime* is composed of seven questions asking about “things that you may have seen or heard around your neighborhood. In the last 3 months have you: 1) heard gun shots; 2) seen somebody arrested; 3) seen drug deals; 4) seen someone being beaten up; 5) seen somebody get stabbed; 6) seen somebody get shot; 7) seen someone pull a gun on another person ($\alpha=.70$). Although a measure of official crime reports may be preferable, a study across 25 years found a relatively strong correlation (.70) between perceptions of crime and crime rates reported by the police (Hipp 2013). *Perceived disorder* is measured by the following five questions: 1) people in your neighborhood take good care of their homes (reverse coded); 2) there is too much drug use in your neighborhood; 3) your neighborhood is clean (reverse coded); 4) people in your neighborhood respect one another's

property (reverse coded); 5) people leave a lot of junk in their yards ($\alpha=.84$). Notably, Sampson and Raudenbush (2004) detected a high correlation between residents' perceptions of disorder and observations by trained observers.

The measure of *collective efficacy* regarding the neighborhood's ability to respond with informal social control against social disorder, is composed of six questions, which asked "Please tell me how likely or unlikely it is that your neighbors would step in and do something in each situation: 1) teens were damaging property; 2) teens were showing disrespect to an adult; 3) a fight broke out in front of someone's house; 4) teens were hanging out and smoking cigarettes; 5) teens were hanging out and drinking alcohol; 6) teens were hanging out and smoking marijuana ($\alpha=.92$). The response categories were a four-point Likert scale ranging from very unlikely to very likely.⁷ I also constructed a measure of *uncertainty of collective efficacy* by computing the number of these questions to which each respondent replied "I don't know", and then computing the average across residents within each neighborhood.⁸⁹ The measure of *perceived cohesion/trust* is composed of the following three questions: 1) people in your neighborhood are willing to help their neighbors; 2) people in your neighborhood do not share the same values; 3) people in your neighborhood can be trusted ($\alpha=.70$). The response categories were a four-point Likert scale ranging from very untrue to very true.

I combined these individual-level factor scores into neighborhood-level measures by following in the spirit of "ecometrics" (Raudenbush and Sampson 1999) with the following approach (this same approach was used for the perceived cohesion, crime and disorder measures, and the uncertainty of collective efficacy measure). First, I estimated a factor analysis of each of these constructs and then created factor scores for each individual based on these factor loadings (the uncertainty of collective efficacy measure simply computes the number of questions the respondent answered "I don't know" on). Second, I accounted for compositional effects of these neighborhoods by estimating fixed effects models in which

⁷It is worth noting that the sample only contains parents, and mostly mothers; thus, I do not have households without children. In this study site, 43% of the families in an average block group had children. Further, in 75% of the block groups, more than 37% of the families had children, and in 90% of the block groups at least 26% of the families had children, suggesting they have a non-trivial representation in this study site. It is not clear how important this is, as scholars have not considered whether parents and non-parents should behave differently. On the one hand, Grannis (2009) has argued that local ties are primarily dominated by households with parents, suggesting that non-parents can be safely ignored when studying neighborhood ties. On the other hand, a few neighborhoods have very few non-parents, so the question is how representative parents are of general neighborhood perceptions. As one way to assess this, I compared parents and non-parents (and men and women) in the Los Angeles area with data from the Los Angeles Family and Neighborhoods Survey (LA FANS) survey. I estimated fixed effects models for block groups (to account for similarity in environment) and found no significant differences between males or females, or between parents and non-parents in mean levels of perceived informal social control or cohesion. I also tested and found no significant differences between mothers and: fathers, women without children, and men without children. Thus, although it would be ideal to have a sample of all residents in a neighborhood, I am aware of no evidence that parents do not accurately report on the neighborhood.

⁸Note that one possibility is that respondents are more likely to report uncertainty regarding collective efficacy over time due to survey exhaustion. However, there is no evidence that this measure of uncertainty is increasing over time in this study. In fact, the percent reporting uncertainty goes from 7% and 8% in the first two waves, to just 3% in the third wave.

⁹Scholars in the survey design field have long been aware that those responding "don't know" to a query can be a heterogeneous group that includes both people who are aware of the issues involved, but simply ambivalent, and people who have little information with which to answer the question. Indeed, in Bogart's presidential address to the American Association for Public Opinion Research in May 1967 he talked about the importance of this distinction (Bogart 1967). Studies have noted that persons providing this answer differ systematically from the general population, suggesting that they should not simply be coded as being ambivalent about the issue (Converse 1976-1977; Feick 1989; Sanchez and Morchio 1992). One study showed that knowledge of a topic increased the probability of having no opinion rather than answering "don't know", further accentuating this distinction (Faulkenberry and Mason 1978). Given that in the present study there is a theoretical expectation that some respondents will truly not know the answer to how much collective efficacy there is in their neighborhood, this is a valid response to probe.

the outcome measure was the factor scores of a particular construct and the covariates were potential individual-level biasing effects and $k-1$ dummy variables for the k block groups.¹⁰ This parses out these biasing effects, and the parameter estimates for the indicator variables of the block groups are then used as unbiased neighborhood-level estimates in the final models. This approach is similar to the empirical Bayes estimates from a hierarchical linear modeling framework and both yield very similar results (see Steenbeek and Hipp 2011 for a study that tested and found considerable similarity in the results); a distinction is that whereas the empirical Bayes estimates are shrunken toward the mean, the fixed effects approach takes these means as unbiased neighborhood-level estimates. Finally these block group estimates are included as variables in the models that are estimated with a full information maximum likelihood estimator.

Several block group-level measures important in prior literature are created from the 2000 U.S. Census and included to minimize the possibility of spurious effects (Hipp 2007b; Krivo and Peterson 1996; Morenoff, Sampson, and Raudenbush 2001). Specifically, a measure of concentrated disadvantage was constructed as factor scores based on a principal components analysis of average household income, percentage of residents below 125% of the poverty rate, and the percent single parent households ($\alpha=.85$). Also constructed were measures of percent vacant units, percent living in the same house five years previously, the unemployment rate (only correlated .35 with the concentrated disadvantage scale), the percent African American, the percent Latino, and a measure of racial/ethnic heterogeneity in the block group k based on the Herfindahl index (Gibbs and Martin 1962: 670) (the groups are white, African-American, Latino, Asian, and other races). The summary statistics for the variables used in the analyses are displayed in Table 1. The average neighborhood-level correlations between waves were .68 for the cohesion measure, .43 for collective efficacy, .70 for perceived disorder, .59 for perceived crime, and .08 for uncertainty about collective efficacy. The correlations for cohesion and collective efficacy suggest that there is a non-trivial amount of updating that is occurring between waves. The average intra-class correlation across waves was .093 for cohesion, .055 for collective efficacy, .11 for disorder, .088 for crime, and .004 for uncertainty about collective efficacy. The low value for uncertainty highlights that this is an individual-level construct that is aggregated as a compositional measure, and does not measure neighborhood-level agreement (for a discussion of the distinction between measures driven by general agreement versus those driven by a summation of persons or events, see Bollen and Lennox 1991; Jöreskog 1979).

Methodology

The main models estimated are cross-lagged structural equation models in which the block group constructs at one time point are posited to affect the other constructs at the following time point. To assess whether disorder leads or lags crime based on arguments around broken windows theory (Sampson and Raudenbush 1999; Wilson and Kelling 1982), the level of both perceived crime and disorder at the previous time point are included as

¹⁰Based on the insights from a study of a national sample viewing residents' characteristics that bias perceptions of crime or disorder (Hipp 2010) I included the following individual-level covariates: female, age, African American, Latino, other race, Two-parent household, level of education, homeowner, length of residence (logged), first year in the residence, number of moves in the last five years, frequency attend religious services.

predictors of crime or disorder at the current time point. Each model has several equations estimated simultaneously: one for each outcome variable. Thus, a prototypical equation is:

$$y_{1t} = \beta_1 y_{1(t-1)} + \beta_2 y_{2(t-1)} + \Gamma_1 X_{(t-1)} + \Gamma_2 X_2 + \zeta_{1t}$$

where the outcome (y_1), say witnessed crime, is measured at time t , and is predicted by the level of witnessed crime ($y_{1(t-1)}$) measured at the previous time point, the collective efficacy regarding providing informal social control ($y_{2(t-1)}$) at the previous time point, a vector of time-varying variables ($X_{(t-1)}$) at the previous time point (including disorder), and the time-invariant Census variables (X_2). Thus, such an equation is testing the effect of, for example, collective efficacy on the change in crime witnessed at the next time point. The models control for the level of the outcome variable at the previous time point, and therefore capture change in the outcome variable (Finkel 1995). Given that there were three waves of data, each equation is estimated at two time points (as wave 1 cannot be estimated given the lack of $t-1$ measures), and the coefficients are constrained equal over waves. The models estimate separate disturbance values at each time point, freely estimate any autocorrelation in the residuals for a construct over these waves, as well as the correlation between the disturbances of constructs measured at the same time point. These models were estimated using a maximum likelihood estimator in Mplus 5. There was no evidence of outliers or multicollinearity problems in the models, as all VIF's were below 4.¹¹ To assess whether attrition affected the representativeness of the sample, fixed effects models were estimated to test whether those who left the sample at later waves responded any differently to the questions of interest on the earlier waves of data. There was virtually no evidence of such an effect.

It is notable that the measure of uncertainty regarding collective efficacy had almost no relationship with collective efficacy (a -.07 correlation), or cohesion (correlated -.15), suggesting that these tap different constructs. Confirmatory factor analysis (CFA) found that collective efficacy regarding providing informal social control and cohesion are two distinct constructs as the model fit at each wave always improved dramatically when moving from the model with a single latent variable to one specifying two latent variables.¹² The correlation between cohesion and perceived collective efficacy ranged from .61 to .73 at the individual level and averaged .61 at the block group level.¹³

Results

I first estimated cross-sectional models at wave 1, which mimic the common strategy in the collective efficacy and crime literature. The pattern of results in this sample is very similar to

¹¹I also tested for possible spatial effects by constructing spatially lagged versions of the exogenous measures. These spatial lags were constructed based on a distance decay capped at a maximum of two miles from the block group. These spatially lagged measures showed little effect, and did not substantively change the primary results in any way. Arguably, the sparser environment of the sample (compared to highly urban areas) explains these non-effects.

¹²The highly significant chi square improvement was 489.5, 290.2, and 467.1 for waves 1, 2, and 3, respectively on 2 degrees of freedom (*df*). All other fit measures also improved: for example, the Comparative Fit Index (CFI) improved from .97 to .99 in wave 1, from .96 to .98 in wave 2, and from .92 to .98 in wave 3.

¹³I also assessed the average neighborhood-level reliability (Raudenbush and Bryk 2002). For perceived collective efficacy this value was .55, for cohesion it was .67. A combined measure of cohesion and collective efficacy was also .67.

the results of other studies (often in more urban settings), as I find that collective efficacy about informal social control is negatively associated with perceived crime in model 1 and perceived disorder in model 3, whereas cohesion is significantly negatively associated with disorder (but not significant for crime).¹⁴ I then include an interaction between cohesion and collective efficacy, which demonstrates a significant relationship with both perceived crime (model 2) and disorder (model 4). Although this interaction has an unexpected positive coefficient, this specification assumes no updating—an assumption that will be called into question in the longitudinal models. It is notable that in comparing the r-squares, model 2 explains 4.6% and 3.1% more for crime and disorder, respectively, than a model including a combined measure of cohesion and collective efficacy suggesting that a multiplicative relationship of cohesion and collective efficacy is more appropriate than an additive one for this cross-sectional model.

I next turn to the longitudinal models testing the relationship between cohesion or collective efficacy and neighborhood crime or disorder as reported by these residents, displayed in Table 3. Model 1 mimics the common approach of combining cohesion and collective efficacy into a single scale, and there is only a modest negative relationship between this combined measure and perceived disorder at the next time point, controlling for the other variables in the model. And the relationship with perceived crime at the next time point is nonsignificant. Equation 3 in this same model simultaneously tests the reverse causal effect, and there is strong evidence that higher levels of perceived disorder at one time point are associated with lower levels of combined cohesion and collective efficacy at the next time point. This is consistent with my theorizing above about the importance of updating for collective efficacy. Interestingly, it is perceived disorder that has this strong negative relationship, whereas perceived crime shows no such relationship. This may reflect the fact that disorder is less ephemeral, and therefore has a stronger impact on residents' perceptions.

I next distinguish the separate effects of collective efficacy regarding expected provision of informal social control, and cohesion/trust. In model 2 we see that it is cohesion that explains why block groups have lower perceived crime the following year, and not the measure of collective efficacy (equation 1). A one standard deviation increase in cohesion one year results in a .274 standard deviation decrease in perceived crime the following year. There is no evidence that higher levels of collective efficacy regarding informal social control result in less perceived crime the following year. And higher levels of cohesion or collective efficacy in one year do not have a significant relationship with the level of perceived disorder the following year (equation 2). On the other hand, when we look at what explains the level of updating of collective efficacy we see in equation 4 that perceived crime has a strong negative effect on collective efficacy ($\beta = -.278$) the following year. Given that this equation is controlling for the level of collective efficacy in the prior year, it is in fact capturing the effect of perceived crime on change in collective efficacy. There is also evidence of a direct negative relationship between neighborhoods with more perceived disorder and the level of cohesion the following year (equation 3). Furthermore, there is an indirect effect in which higher levels of disorder increase perceived crime at the next time

¹⁴An ancillary model that replaced cohesion and collective efficacy with a combined factor score of the two found a negative relationship with both perceived crime and disorder, controlling for the other variables in the model.

point, which then is associated with reduced collective efficacy at the following time point (this indirect path is significant at $p < .05$). Whereas equation 4 demonstrates that cohesion is a precondition for collective efficacy—higher levels of cohesion one year increase the level of collective efficacy the following year ($\beta = .203$)—there is no evidence of a mediating effect in which higher levels of collective efficacy result in less perceived crime at the next time point. On the other hand, the fact that perceived crime directly decreases the level of collective efficacy—even *controlling* for the level of cohesion—is consistent with the updating hypothesis.

To test whether the presence of cohesion is a moderating condition which enhances the effect of collective efficacy on perceived crime and disorder, I next estimated a model including an interaction between cohesion and collective efficacy. Model 3 shows that this interaction indeed has the posited negative effect for both perceived crime and disorder. This relationship for the disorder model is visually depicted in Figure 2: whereas the level of cohesion has only a modest negative relationship for disorder the following year in low collective efficacy neighborhoods (the top line in this figure, which is one standard deviation below the mean), highly cohesive neighborhoods have considerably lower disorder levels at the next time point if this cohesion occurs in the context of a high level of collective efficacy (the bottom line in this figure, which is one standard deviation above the mean). This cohesion and collective efficacy also have an indirect effect on perceived crime levels, given that the same model finds that reduced disorder is associated with lower perceived crime at the next time point. There is also a direct interaction effect as neighborhoods with more cohesion have lower perceived crime at the next time point and this effect is somewhat more pronounced if there are also high levels of collective efficacy. Notably, block groups with high levels of collective efficacy (but low levels of cohesion) suffer the biggest increase in perceived crime the following year. This may point to the importance of the certainty regarding the level of collective efficacy in a neighborhood, an issue to which I turn next.

In the final model, I tested the importance of uncertainty regarding the level of collective efficacy by including this measure. In Table 4, greater uncertainty regarding the level of collective efficacy at one time point results in an increase in perceived crime ($\beta = .241$) and reported disorder ($\beta = .207$) the following time point. Thus, it appears that *uncertainty* regarding collective efficacy is important even controlling for cohesion and collective efficacy. The cohesion and collective efficacy relationships with perceived crime and disorder remain the same as in model 3 of Table 3. In equation 3, greater levels of uncertainty regarding collective efficacy also results in a decrease of cohesion at the next time point.¹⁵

In this same model, to test hypothesis 3 that crime events occurring in a context with greater uncertainty regarding the level of collective efficacy will have a particularly strong negative effect on the level of collective efficacy, I included an interaction between reported crime or

¹⁵To assess whether neighborhoods with small numbers of respondents are driving the results, ancillary models were estimated that used a weighting scheme in which neighborhoods were weighted by square root(N). The results in these models were very similar to those presented in the tables. The only difference we detected is that the positive relationship between uncertainty about collective efficacy and either perceived crime or disorder becomes nonsignificant due to a large increase in the standard error; the coefficient size remained similar.

disorder and this uncertainty. In a model that included an interaction between perceived crime and this uncertainty, the interaction was not significant, so I focus on the results of the model containing the interaction of perceived disorder and uncertainty. In equation 4 there is strong evidence of this moderating effect, which is visually depicted in Figure 3. In block groups with low levels of reported disorder, the degree of uncertainty regarding the level of collective efficacy has essentially no effect on the change in collective efficacy reported over the subsequent year (the left side of the figure). In contrast, in block groups with high levels of disorder, residents in neighborhoods reporting greater uncertainty regarding the level of collective efficacy in the neighborhood at one time point report lower levels of collective efficacy one year later than do residents in block groups with less uncertainty. This is consistent with the importance of updating, and suggests the importance of accounting for this. The fact that this effect was stronger for perceived disorder than perceived crime may reflect that there is a greater expectation for action in response to disorder. It is also worth emphasizing that the variance explained in the equations is increased 44% for crime and 12% for disorder compared to model 1 of Table 3, and 18% for collective efficacy compared to model 2 of Table 3.

Conclusion

I have emphasized that although the concept of collective efficacy holds great promise for social scientists studying virtually all collectivities, researchers need to carefully consider how they measure and model collective efficacy. One important takeaway point is that whereas collective efficacy captures a shared belief among members of a collectivity, it nonetheless is malleable and arises from a process, and therefore must be considered in a dynamic framework. This updating by residents implies that cross-sectional studies need to explicitly consider collective efficacy regarding some particular group goal as endogenous. Another key implication of updating is the importance of distinguishing between members' assessment of the level of collective efficacy and their degree of *uncertainty* regarding this collective efficacy. This was shown to have empirical importance in this study.

The first key finding was that residents appear to update their assessment of neighborhood collective efficacy regarding informal social control, as higher levels of perceived crime in one year had a strong negative direct effect on reported collective efficacy regarding provision of informal social control the following year. And perceived disorder had an indirect negative effect on collective efficacy by increasing perceived crime at the next time point, which then subsequently reduced collective efficacy. These effects were found even controlling for the level of collective efficacy and cohesion in the prior year. Furthermore, the evidence in these models that general cohesion was reduced in the following year in neighborhoods with higher levels of disorder the previous year implies that cohesion is also a collective characteristic that can change over time. Although these results were consistent with the updating hypothesis advanced here, we cannot be certain the exact mechanisms that bring about such effects. The fact that crime and disorder decreased the level of cohesion one year later may suggest that these work through the mechanism of fear (Markowitz, Bellair, Liska, and Liu 2001). Nonetheless, exploring possible mechanisms are a useful direction for future research. Note that an additional potential mechanism is that residents' travels during their routine activities can take them outside their immediate neighborhood,

and their experiences during these activities can shape their perceptions of their own neighborhood. This may imply a spatial relationship between the characteristics of nearby neighborhoods and residents' perceptions of collective efficacy, which suggests a useful avenue for future research.

A second key finding was the importance of accounting for the level of *uncertainty* residents have regarding collective efficacy. In the present study, neighborhoods in which residents report higher levels of uncertainty regarding collective efficacy in one year reported higher levels of crime and disorder the following year. Furthermore, such neighborhoods also reported lower levels of cohesion the following year (which implies an indirect effect on crime), and suggests that this uncertainty can also impact perceptions of “groupness” (cohesion). This uncertainty also leaves neighborhoods vulnerable, as consistent with hypothesis 3, neighborhoods with high levels of uncertainty regarding collective efficacy that experienced high levels of disorder one year reported less collective efficacy the following year. This result is consistent with the model proposed here in which residents who are uncertain about the level of collective efficacy, but then observe various disorder events, are particularly likely to report lower levels of collective efficacy at subsequent time points (due to this new information). Although this is a direct consequence of updating, it has not been considered in prior research.

A perhaps surprising result was the lack of evidence that higher levels of collective efficacy at one time point, or a measure that additively combined collective efficacy and cohesion (the common approach in the neighborhoods and crime literature), were significantly associated with less perceived crime or disorder at the next time point. This is a notable finding given the large body of research showing a negative cross-sectional relationship between collective efficacy and crime. One possibility is that the rural setting of the study was the cause of this surprising result. Although the focus of the study on a rural area may limit the generalizability of the results, it is notable that the cross-sectional results exhibited the common finding in the existing literature (both in rural and urban areas) of a negative relationship between collective efficacy and crime or disorder. Instead, the difference in results occurred in the longitudinal models. And in these models there was strong evidence that perceived disorder impacted collective efficacy at the next time point through updating. This result calls into question the causal direction of this relationship, suggesting that future neighborhood research in different contexts will be needed to assess whether there is something unique about this particular study site. Notably, collective efficacy was only associated with lower perceived crime or disorder at the next time point when it occurred in the context of high cohesion—that is, a *multiplicative* relationship. Neighborhoods that simultaneously had higher levels of cohesion and collective efficacy at one time point experienced greater reductions in perceived crime *and* disorder at the next time point. Indeed, Sampson and colleagues (Sampson, Raudenbush, and Earls 1997) argued that cohesion and trust provide an important context for enabling the effectiveness of collective efficacy. The results here in this study suggested that researchers should more carefully consider whether this is better captured as a multiplicative relationship.

An important takeaway point from these results is that cross-sectional designs of the collective efficacy and crime relationship need to explicitly consider the endogenous nature

of this relationship. Assuming that collective efficacy is exogenous to crime is untenable to the extent that updating is prevalent. Scholars need to use estimation techniques—such as instrumental variables approaches—that account for this endogeneity. As a demonstration of possible consequences of ignoring this endogeneity, a counterintuitive positive coefficient was estimated for the interaction between cohesion and collective efficacy for crime and disorder in this study's cross-sectional models. In contrast, the expected negative coefficient was detected in the longitudinal model, implying that the cross-sectional model that did not account for endogeneity implicitly had the feedback effect of updating confounding this relationship. And future research—even if cross-sectional—would be well served to measure the degree of uncertainty of residents regarding collective efficacy. Directly asking respondent how certain they are of the level of collective efficacy would allow researchers to account for this important dimension in their models.

It is worth emphasizing that there were some differences in the results between perceived crime and perceived disorder. Whereas crime and disorder may arise from the same social conditions, it is not necessarily the case that collective efficacy is similarly effective in addressing both, or that crime or disorder similarly impact residents' perceptions. Whereas a crime event can arguably have a large impact on residents' perceptions, crime events are relatively rare. Furthermore, crime events are ephemeral in that they happen quickly, whereas disorder, especially physical disorder, can be present for long periods of time. In this study, the finding that higher perceived crime at one time point led to less collective efficacy at the next time point is consistent with this idea of the strong impact of crime events. More perceived disorder only indirectly impacted collective efficacy by reducing the level of cohesion at the next time point (which had consequences for subsequent collective efficacy). It may be that when disorder remains unaddressed there is a particularly strong negative impact on residents' sense of cohesion in the neighborhood and a reduced sense that residents are “in this together”; this is because residents may be more likely to expect action in response to disorder events (given the lower risk involved compared to crime events) (Steenbeek and Hipp 2011). The fact that it was only when high levels of collective efficacy were accompanied by high cohesion that residents reported less disorder at the next time point highlights the important inter-relationship between cohesion and disorder. And the evidence that residents in neighborhoods with more cohesion reported less perceived crime at the next time point is consistent with the results of a recent study of neighborhoods in the Netherlands finding higher levels of cohesion were related to lower violence at the next time point (Hipp and Steenbeek 2015).

Beyond the rural setting, this study has limitations to note. First, I did not have official measures of crime, but rather a combined measure of residents' perceptions. Although evidence from other studies suggests similar results using either perceptions or official measures (Sampson, Raudenbush, and Earls 1997), this limitation should be kept in mind. Second, with a longitudinal sample there is potential bias introduced due to the inability to survey those who have moved between waves; given that these are residents who may be most likely to have updated their beliefs about neighborhood collective efficacy it may be particularly important to study this sub-group in future work. Third, the study was limited to focusing on neighborhood change over a two year period, which is a relatively short period. Future work should test for changes over longer periods. Finally, it would be better for future

surveys to directly query residents on their level of certainty about collective efficacy in the neighborhood, rather than the indirect measure used here based on whether or not residents answered particular questions. Furthermore, a possible direction for future work would be to measure the variance among residents in their assessment of collective efficacy as another way to capture this uncertainty.

In conclusion, I highlight that collective efficacy is an important concept that has the potential to be a useful tool in the arsenal of social scientists studying many different types of collectivities. A key feature of this construct that scholars have underappreciated is the importance of updating: as the members of a collectivity update their information regarding the amount of collective efficacy, the actual level of collective efficacy will change. Future research will need to carefully distinguish between the possible effect that collective efficacy can have on crime or disorder in neighborhoods and the impact crime or disorder can have on collective efficacy through updating by residents. This also implies that scholars should more carefully account for the level of uncertainty of the members of the group regarding the level of collective efficacy. Scholars must be much more cognizant that collective efficacy occurs from a process, and the dynamic nature of this process must be accounted for when studying its consequences.

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Appendix

Table A1
Cross-sectional models from wave 1, with perceived crime and disorder as outcomes

	Crime				Disorder			
	Model 1		Model 2		Model 3		Model 4	
Cohesion	-0.116		-0.037		-0.499	**	-0.415	**
	(0.108)		(0.111)		(0.117)		(0.120)	
Collective efficacy	-0.343	**	-0.201	†	-0.371	**	-0.218	†
	(0.088)		(0.105)		(0.095)		(0.114)	
Cohesion X collective efficacy			0.424	*			0.456	*
			(0.182)				(0.197)	
Concentrated disadvantage	-0.040		-0.062		0.014		-0.010	
	(0.042)		(0.042)		(0.045)		(0.045)	
Percent occupied units	-0.210		-0.066		-0.446		-0.290	
	(0.369)		(0.365)		(0.399)		(0.396)	
Residential stability	0.114		0.216		-0.029		0.081	
	(0.255)		(0.252)		(0.276)		(0.274)	
Percent African American	0.230		0.243		0.204		0.219	
	(0.182)		(0.178)		(0.197)		(0.193)	

	Crime				Disorder			
	Model 1		Model 2		Model 3		Model 4	
Percent Latino	0.495		0.543		0.204		0.256	
	(0.447)		(0.437)		(0.484)		(0.474)	
Racial/ethnic heterogeneity	-0.033		-0.034		0.266		0.264	
	(0.194)		(0.190)		(0.210)		(0.206)	
Population density	0.191	**	0.190	**	0.095	**	0.094	**
	(0.032)		(0.031)		(0.034)		(0.033)	
Unemployment rate	0.346		0.478		-0.105		0.036	
	(0.556)		(0.546)		(0.602)		(0.592)	
R-square	0.567		0.586		0.621		0.639	

** p < .01 (two-tail test),
 * p < .05 (two-tail test),
 † p < .05 (one-tail test). Standard errors in parentheses. N = 113 block groups

Table A2
Cross-lagged models: model treating perceived crime, perceived disorder, cohesion, and collective efficacy as endogenous

Equation:	Model 2 from Table 3							
	(1)		(2)		(3)		(4)	
	Crime		Disorder		Cohesion		Collective efficacy (a)	
Cohesion (t-1)	-0.234	**	-0.126		0.523	**	0.260	*
	(0.076)		(0.102)		(0.080)		(0.114)	
Collective efficacy (t-1)	0.046		-0.086				0.074	
	(0.056)		(0.075)				(0.086)	
Crime (t-1)	0.149	*	-0.086		0.119		-0.399	**
	(0.072)		(0.075)		(0.083)		(0.100)	
Concentrated disadvantage	-0.014		0.026		-0.034		-0.056	
	(0.026)		(0.035)		(0.030)		(0.040)	
Percent occupied units	-0.060		-0.204		0.206		0.350	
	(0.219)		(0.298)		(0.255)		(0.336)	
Residential stability	0.053		0.058		-0.057		0.399	†
	(0.152)		(0.206)		(0.177)		(0.232)	
Percent African American	-0.087		-0.013		-0.097		-0.016	
	(0.111)		(0.150)		(0.128)		(0.168)	
Percent Latino	-0.266		-0.289		-0.308		0.699	†
	(0.275)		(0.369)		(0.326)		(0.412)	
Racial/ethnic heterogeneity	0.075		0.273		0.123		-0.121	
	(0.120)		(0.169)		(0.139)		(0.180)	
Population density	0.000		0.016		0.000		0.038	

Equation:	Model 2 from Table 3							
	(1)		(2)		(3)		(4)	
	Crime		Disorder		Cohesion		Collective efficacy (a)	
	(0.020)		(0.028)		(0.024)		(0.030)	
Unemployment rate	0.041		-0.054		-0.100		0.956	†
	(0.332)		(0.448)		(0.386)		(0.506)	
Disorder (t-1)	0.205	**	0.547	**	-0.235	**	-0.105	
	(0.068)		(0.094)		(0.080)		(0.091)	
R-square	0.31		0.46		0.46		0.31	

Notes: (a): this is collective efficacy regarding informal social control behavior of fellow residents

**

p < .01 (two-tail test),

* p < .05 (two-tail test),

†

p < .05 (one-tail test). Standard errors in parentheses. N = 113 lock groups

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Highlights

- This study emphasizes the notion of residents *updating* their sense of collective efficacy
- This study develops the idea of residents' *uncertainty* regarding collective efficacy
- 3-wave cross-lag models on a sample of 113 block groups in three rural North Carolina counties
- Neighborhoods perceiving more crime or disorder reported less collective efficacy one year later
- Uncertainty about collective efficacy and perceived disorder leads to less collective efficacy

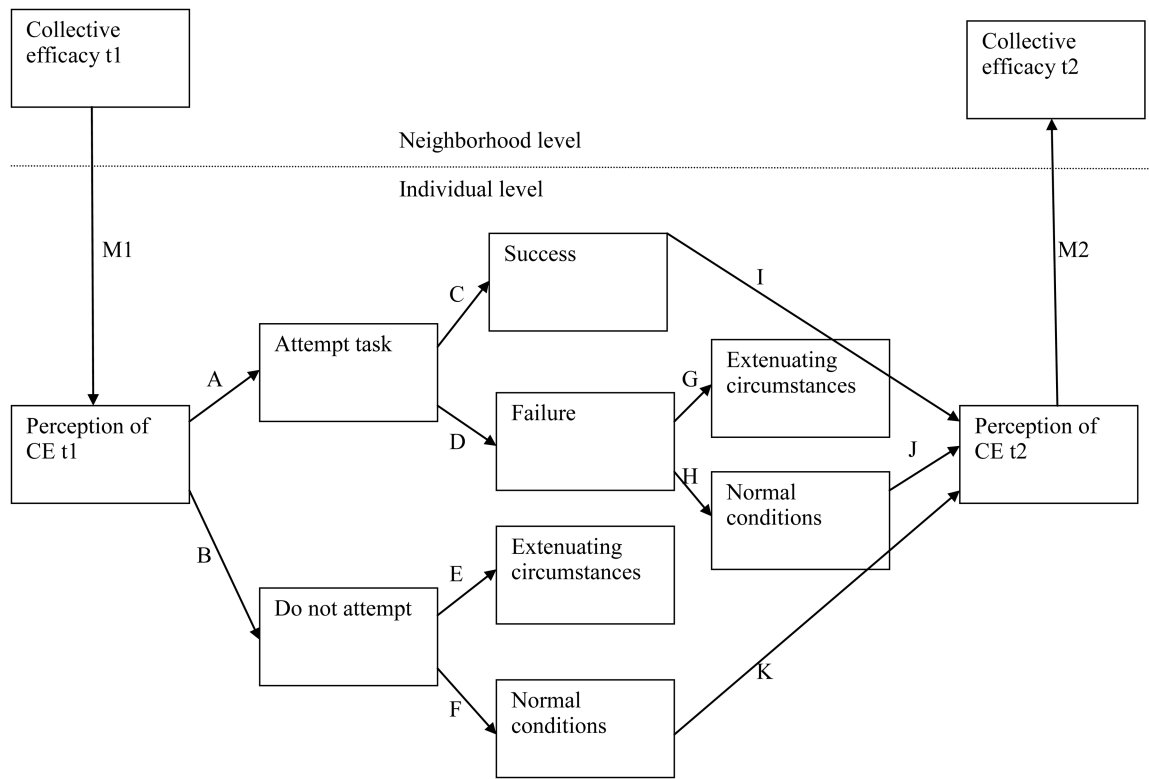


Figure 1. Theoretical model of collective efficacy regarding informal social control behavior

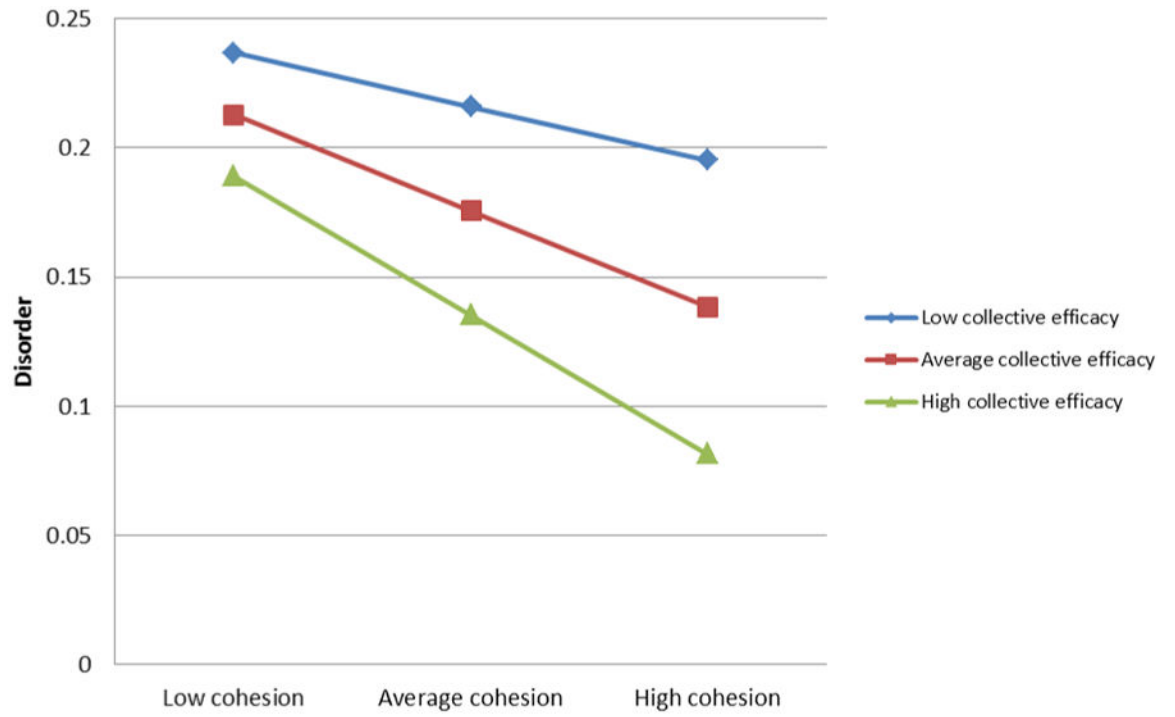


Figure 2. Interaction of cohesion and collective efficacy predicting disorder in block groups

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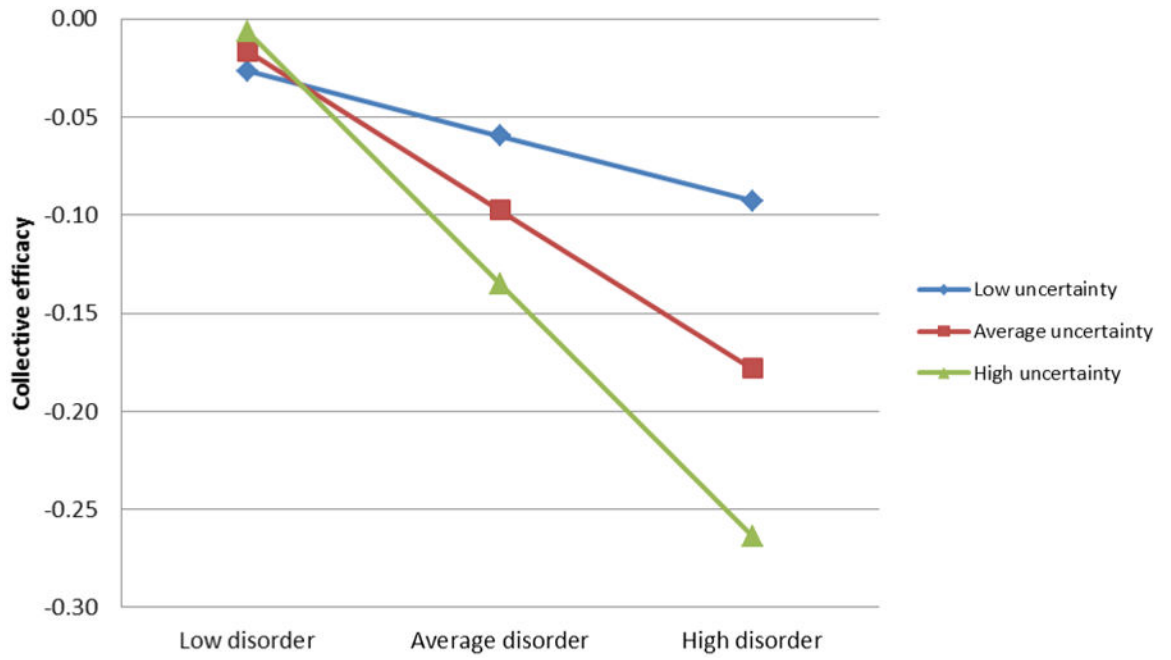


Figure 3. Interaction of reported disorder and uncertainty about collective efficacy predicting collective efficacy in block groups

Table 1
Summary statistics of block-group level variables used in the analyses

	Wave 1					Wave 2					Wave 3				
	Mean	Std. Dev	Min	Max		Mean	Std. Dev	Min	Max		Mean	Std. Dev	Min	Max	
Perceived crime	0.03	0.34	-0.22	2.02		-0.03	0.25	-0.21	1.00		-0.01	0.17	-0.20	1.13	
Perceived disorder	0.02	0.46	-0.54	1.58		-0.03	0.35	-0.53	1.45		-0.01	0.28	-0.52	1.14	
Perceived collective efficacy	-0.02	0.38	-1.22	0.61		-0.05	0.33	-1.53	0.61		0.01	0.31	-0.87	0.65	
Uncertainty of collective efficacy (average)	0.07	0.16	0.00	1.25		0.08	0.11	0.00	0.63		0.03	0.07	0.00	0.43	
Perceived cohesion/trust	-0.01	0.37	-1.29	0.71		0.04	0.34	-1.39	0.52		-0.01	0.28	-1.46	0.67	
Average household income	47,742	18,628	21,281	119,528											
Percent at or below 125% of poverty	19.7	12.2	0.0	58.6											
Percent vacant units	89.2	7.1	61.3	98.9											
Percent in same residence 5 years previously	58.7	9.7	33.2	81.3											
Percent African American	29.5	25.0	0.0	100.0											
Percent Latino	3.6	6.5	0.0	50.3											
Racial/ethnic heterogeneity	35.5	16.0	0.0	64.6											
Percent single parent households	14.5	9.9	0.0	53.2											
Unemployment rate	6.4	5.2	0.0	29.3											

N = 1,615 parents in 113 block groups at wave 1, 1,333 parents at wave 2, and 1,161 parents at wave 3

Table 2
Cross-sectional models from wave 1, with perceived crime and disorder as outcomes

	Perceived crime		Perceived disorder	
	Model 1	Model 2	Model 3	Model 4
Cohesion	-0.116 (0.108)	-0.037 (0.111)	-0.499** (0.117)	-0.415** (0.120)
Collective efficacy	-0.343** (0.088)	-0.201 [†] (0.105)	-0.371** (0.095)	-0.218 [†] (0.114)
Cohesion X collective efficacy		0.424* (0.182)		0.456* (0.197)
R-square	0.567	0.586	0.621	0.639

** p < .01 (two-tail test),

* p < .05 (two-tail test),

[†] p < .05 (one-tail test). Standard errors in parentheses. N = 113 block groups

Note: All models control for concentrated disadvantage, percent vacant units, percent in same residence 5 years previously, percent African American, percent Latino, racial/ethnic heterogeneity, population density, and unemployment rate

Table 3
Cross-lagged models: perceived crime and disorder as outcomes in the same model, and treating cohesion, collective efficacy, or combined cohesion and collective efficacy as endogenous

Equation:	Model 1			Model 2			Model 3			
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(4)
Combined cohesion and collective efficacy (t-1)	-0.111 (0.073)	-0.173 (0.099)	0.338** (0.086)							
Cohesion (t-1)				-0.234** (0.076)	-0.126 (0.102)	0.523** (0.080)	-0.314** (0.079)	-0.203 (0.106)	0.474** (0.081)	0.243* (0.115)
Collective Efficacy (t-1)				0.046 (0.056)	-0.086 (0.075)		-0.076 (0.067)	-0.218* (0.089)		0.064 (0.086)
Cohesion X Collective efficacy (t-1)							-0.143** (0.042)	-0.166** (0.057)		
Crime (t-1)	0.114 (0.073)	-0.116 (0.101)	0.089 (0.086)	0.149* (0.072)	-0.086 (0.075)	0.119 (0.083)	0.184** (0.070)	-0.032 (0.100)	0.131 (0.083)	-0.398** (0.101)
Disorder (t-1)	0.264** (0.070)	0.582** (0.095)	-0.260** (0.083)	0.205** (0.068)	0.547** (0.094)	-0.235** (0.080)	0.202** (0.066)	0.535** (0.092)	-0.223** (0.081)	-0.097 (0.092)
R-square	0.30	0.48	0.37	0.31	0.46	0.46	0.40	0.50	0.43	0.31

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Notes: (a): this is collective efficacy regarding informal social control behavior of fellow residents

** p < .01 (two-tail test),

* p < .05 (two-tail test),

† p < .05 (one-tail test). Standard errors in parentheses. N = 113 block groups

Note: All models control for concentrated disadvantage, percent vacant units, percent in same residence 5 years previously, percent African American, percent Latino, racial/ethnic heterogeneity, population density, and unemployment rate

Table 4
Cross-lagged model with perceived crime and disorder as outcomes in the same model, and treating cohesion, collective efficacy, and uncertainty about collective efficacy as endogenous

Equation:	(1)		(2)		(3)		Model 1		(5)	
	Crime	Disorder	Disorder	Cohesion	Cohesion	Collective efficacy (a)	Collective efficacy (a)	Uncertainty about collective efficacy	Collective efficacy (a)	Uncertainty about collective efficacy
Cohesion (t-1)	-0.247 (0.076)	** (0.101)	-0.122 (0.101)	0.407 (0.078)	**	0.119 (0.105)	0.119 (0.105)	-0.02 (0.028)		
Collective efficacy (t-1)	-0.068 (0.063)	* (0.085)	-0.218 (0.085)			† (0.085)	0.158 (0.085)	0.008 (0.023)	†	
Cohesion X collective efficacy (t-1)	-0.131 (0.040)	** (0.055)	-0.15 (0.055)							
Crime (t-1)	0.188 (0.068)	** (0.096)	-0.077 (0.096)	0.147 (0.080)	†	-0.142 (0.118)	-0.142 (0.118)	-0.032 (0.028)		
Disorder (t-1)	0.216 (0.065)	** (0.089)	0.559 (0.089)	-0.235 (0.077)	**	-0.229 (0.094)	-0.229 (0.094)	0.004 (0.026)	*	
Uncertainty about collective efficacy (t-1)	0.5 (0.111)	** (0.142)	0.663 (0.142)	-0.646 (0.122)	**	0.119 (0.105)	0.119 (0.105)	-0.02 (0.028)		
Disorder X uncertainty of collective efficacy (t-1)						-0.813 (0.188)	-0.813 (0.188)		**	
R-square	0.43		0.53	0.49		0.37	0.37	0.07		

Notes: (a): this is collective efficacy regarding informal social control behavior of fellow residents

** p < .01 (two-tail test),

* p < .05 (two-tail test),

† p < .05 (one-tail test). Standard errors in parentheses. N = 113 block groups

Note: All models control for concentrated disadvantage, percent vacant units, percent in same residence 5 years previously, percent African American, percent Latino, racial/ethnic heterogeneity, population density, and unemployment rate