Unequal effects of disruptive events

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Abstract

Disruptive events have significant consequences for the individuals and families who experience them, but these effects do not occur equally across the population. While some groups are strongly affected, others experience few consequences. We review recent findings on inequality in the effects of disruptive events. We consider heterogeneity based on socioeconomic resources, race/ethnicity, the likelihood of experiencing disruption, and contextual factors such as the normativity of the event in particular social settings. We focus on micro-level events affecting specific individuals and families, including divorce, job loss, home loss and eviction, health shocks and deaths, and violence and incarceration, but also refer to macro-level events such as recession and natural disasters. We describe patterns of variation that suggest a process of resource disparities and cumulative disadvantage versus those that reflect the impact of non-normative and unexpected shocks. Finally, we review methodological considerations when examining variation in the effect of disruptive events.

1 | INTRODUCTION

Disruptive events are life events that alter life conditions and take a toll on well-being in multiple domains. Experiencing a disruptive, or adverse, event can have long-term consequences for individuals and families. They can be micro-level events affecting individuals or families, or macro-level events, affecting neighborhoods or larger geographic areas. Disruptive events often result in socioeconomic and socioemotional distress. Such events thus often alter individual trajectories and induce long-term scarring, rendering them an important focus of sociological study. Disruptive events can be especially harmful to children if they alter their health, cognitive, and socioemotional development in ways that shape later socioeconomic attainment and well-being. Understanding the consequences of disruption is important because these events are prevalent at the population level and because socioeconomic and other sources of advantage stratify the risk of exposure and the ability to respond. People with fewer resources are usually more likely to experience diverse sources of disruption in their lives, ranging from family and economic instability to violence

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and incarceration. Yet greater likelihood of exposure to disruption does not necessarily lead to a greater response to disruption. Given the recent pandemic's health, economic, and social upheaval, it is a critical moment to carefully consider the differential impact of disruptive events on life chances.

This review focuses on micro-level events, that is, sources of disruption affecting specific individuals or families, such as divorce, job loss, home loss, and health shocks. Macro-level events, by contrast, refer to population-wide exposures, including economic contraction, pandemics, and natural disasters. Naturally, these two levels of exposure are connected. For example, job loss increases during an economic recession, and the effects of job loss vary depending on whether the event occurs during an economic recession or an expansion. Therefore, our review considers the macro-level context as a source of variation in the impact of individual-level shocks. We focus on contextual factors examined widely by sociologists, such as the aggregate level of economic well-being and social normativity of the disruptive event. There are, of course, other possible sources of response variation that we do not focus on in this review. For example, some individuals are more susceptible than others to disruptive events due to genetic or personality factors, as suggested by the "differential susceptibility" hypothesis proposed by developmental psychologists (Belsky et al., 2007; Belsky & Pluess, 2009). In addition, we do not focus on how the life course timing of events impacts response to disruption (Amato & Booth, 1997; Elder, 1998).

We begin by offering two overarching theoretical frameworks for understanding variation in response to disruptive events by socioeconomic conditions and social factors. We then review research on disparate responses to exposure to selected disruptive events, including divorce, job loss, home loss, health shocks, violence, and incarceration. Finally, we offer methodological insights in studying response variation and concluding remarks.

2 | THEORIES ON UNEQUAL RESPONSE TO DISRUPTIVE EVENTS

The consequences of disruptive events vary, sometimes dramatically, across different groups. The literature suggests that the same event can have profound negative consequences for some populations but more minor, or even no, impact, among others. As a result, aggregate estimated effects can mask substantial heterogeneity and miss dissimilar, and even opposite, effects across different groups. We consider two diverging theories as to how the effects of disruptive events vary across the population: (1) resource disparities and cumulative disadvantage; and (2) non-normative and unexpected shocks.

2.1 | Resource disparities and cumulative disadvantage

Individuals and families with limited economic resources are often less equipped to compensate for the negative socioeconomic consequences of disruptive events. They have limited compensatory resources, such as familial support, an individual safety net, and mental health resources. For example, the negative consequences of a recession on economic well-being are stronger for individuals with fewer skills and assets not only because they are more likely to become unemployed but also because if they lose their jobs, they have limited ability to self-insure and take longer to return to employment (Heathcote et al., 2020; Krusell & Smith, 1999; Mukoyama & ahin, 2006). Among children, in-utero exposure

to a natural disaster has a strong negative effect on children's cognitive development among disadvantaged families but no effect among more advantaged families (Torche, 2018). Similarly, in-utero exposure to radiation reduces educational achievement only among low-SES families (Almond et al., 2009). Recent scholarship examines potential mechanisms for this kind of socioeconomic stratification, highlighting resources to alleviate the consequences of harmful exposure available to more advantaged families, such as disposable income, time, information about and access to compensatory strategies (Hsin, 2012; Torche, 2018). In addition to differential access to economic, social, and cultural resources, class-based interactional styles and familiarity with institutions could result in unequal responses to disruptive events (Calarco, 2018; Lareau, 2011).

Constraints faced by disadvantaged families and racial and ethnic minorities emerge not just from having fewer resources in a single domain but from interactive and compounding dimensions of disadvantage (Manduca & Sampson, 2019). The cumulative advantage framework suggests that an initial favorable position in socioeconomic resources produces further relative gains, widening gaps over time (DiPrete & Eirich, 2006; Merton & Merton, 1968). While employment, family stability and good health can accumulate advantages, disruptions in these domains are key sources of economic insecurity and accumulated disadvantage (Evans et al., 2013; Maroto, 2015; Western et al., 2012). Accumulated resources shape the risk of economic security in response to disruptive events and the ability to recover from their consequences (Hacker, 2019; Morduch & Schneider, 2017; Osberg, 2018; Western et al., 2012). Multiple disruptive events like divorce, job loss, and health shocks can precipitate a period of family economic insecurity and impact children's socioeconomic trajectories (Maroto, 2015; McCloud & Dwyer, 2011; Renzulli & Barr, 2017). A cumulation of disruptive events can also result in high allostatic load, that is, "wear and tear" of the organism emerging from repeated or chronic stressful exposures (Evans, 2003; McEwen & Stellar, 1993).

The stress emerging from diverse sources of socioeconomic disadvantage acts as a predisposing factor for the influence of new exposures, that is, an additional adverse event will cause more damage to those already debilitated by long-term multidimensional disadvantage (McEwen & McEwen, 2017). For example, disadvantaged children are more likely to suffer from mental health issues from cumulative exposure to harsh conditions, which could reduce their ability to cope with exposure to disruptive events (Currie et al., 2010; Jans et al., 2018). These kinds of cumulative disparities have been particularly salient during the COVID-19 pandemic. Low-income families and racial/ethnic minorities were more vulnerable to the health and economic consequences of the pandemic because of multiple factors, including a higher likelihood of living in crowded conditions, concentration in public-facing occupations, and persistent discrimination and disadvantage that contributed to an unequal burden of comorbidities (Garcia et al., 2021; Webb Hooper et al., 2020). These factors rendered maintaining social distancing a privilege difficult to afford and created barriers to access healthcare for disadvantaged and racially minoritized individuals (DiRago et al., 2022; van Dorn et al., 2020; Yancy, 2020).

Socioeconomic resources do not unambiguously compensate for disruption, however. Low-income families may be less vulnerable to the economic loss associated with disruptive

events simply because they have "less to lose," a floor effect that would be particularly important for highly stratified outcomes. For example, research suggests that the income loss following parental divorce does not affect the probability that disadvantaged children graduate from college given that their baseline graduation probability is low even in the absence of disruption (Bernardi & Boertien, 2016; Bernardi & Radl, 2014; Brand et al., 2019b; Kalmijn, 2010). As we discuss below, socioeconomic resources also correlate with how expected and how normative disruptive events are for different groups, which could also moderate their impact.

2.2 | Non-normative and unexpected shocks

Another strand of literature suggests that the impact of disruptive events on individuals and families depends on the social context, particularly on the prevalence and normativity of the disruptive event in a specific social setting. For example, becoming unemployed is less detrimental for psychological well-being as the state- or county-level unemployment rate increases (Clark, 2003), and the loss of social connections following divorce is attenuated in regions where divorce is more accepted (Kalmijn & Uunk, 2007). Similarly, the negative effect of non-marital fertility on infant health declines as non-marital fertility becomes more normative (Torche & Abufhele, 2021). The impact of child death on intimate partner violence against the mother is also more severe for mothers living in regions where this experience is uncommon (Weitzman & Smith-Greenaway, 2020).

These diverse findings suggest a powerful contextual mechanism: As negatively-assessed events become more prevalent and normative, the stigma associated with those events is less severe because they represent a smaller deviation from the social norm. Declining stigmatization will reduce negative social responses such as labeling, isolation, status loss, and discrimination and the rift these responses cause to individual identities (Burke, 1991; Hatzenbuehler et al., 2013; Link & Phelan, 2001). Given the heterogeneity in response by contextual normativity, socioeconomically advantaged groups could be more vulnerable to the consequences of disruptive events than their disadvantaged peers insofar as disruption is less prevalent in their social contexts.

An additional contextual factor likely to moderate the effect of disruption on individual outcomes is institutions and policies intended to protect individuals from risks. For example, the probability of falling into poverty as a result of job loss and unemployment varies dramatically across countries depending on welfare state generosity (Brady et al., 2017), and the consequences of unemployment for mental and physical health depend on the generosity of unemployment benefits (Cylus et al., 2015; Rodriguez et al., 1997). Thus, variation in the effect of disruption based on the institutional context is a widely expected source of heterogeneity, given that institutional responses are explicitly implemented to moderate the negative impact of shocks on well-being.

There is a close empirical connection between the likelihood of experiencing a disruptive event and its social normativity. Given the high level of homophily (i.e., the similarity of people in networks across race, age, socioeconomic status [SES], and other characteristics) and segregation in social networks, those unlikely to experience disruptive events are part of social networks where these events are non-normative. Individuals with a low likelihood

of disruption may also lack coping mechanisms and experience such events as unexpected shocks. By contrast, as highlighted by the psychological literature, a high likelihood of experiencing adverse events can contribute to developing protective mechanisms variedly termed habituation, adaptation, and resilience, which could reduce the reactivity to a novel exposure (Feder et al., 2009; Gump & Matthews, 1999). For example, research has found that job loss is not as consequential for psychological well-being among those accustomed to economic precarity as those accustomed to stability (Brand, 2015; Brand & Simon Thomas, 2014). The distinction between the likelihood of experiencing a disruptive event and its social normativity is important, however, because it highlights two distinct levels of analysis and mechanisms. Stigmatization resulting from violating a social norm is a *collective* response by others. In contrast, the likelihood of experiencing a disruptive event is an *individual*-level attribute that shapes the expectation of disruption and the availability of coping mechanisms.

This framework yields contrasting predictions relative to the resource disparities framework outlined above. Events such as divorce or unemployment are usually less expected and less normative among socioeconomically advantaged groups, making these groups more vulnerable to their detrimental effects. This is not to say that psychological distress or other consequences of disruption are lower among those with high levels of economic insecurity. In fact, the more disadvantaged populations tend to have higher levels of psychological distress. Instead, it is to say that this toll is the result of cumulative exposure to multiple stressors, as described above, rather than a single discrete disruptive event (Aneshensel, 1992; George, 1993).

2.3 | Unequal effects of disruptive events

2.3.1 | Divorce—Research on family instability assesses the effects of changes in household composition, such as divorce or remarriage. A large literature has established that marital disruption decreases household income and increases economic insecurity (Holden & Smock, 1991; McManus & DiPrete, 2001; Sullivan et al., 2020). Many families need two earners to maintain a middle-class lifestyle, which creates more economic insecurity when families experience disruption (Hacker, 2019). Several studies focus on how parental divorce affects children's socioemotional well-being and educational outcomes (Amato, 2000; Cherlin et al., 1998). Some groups are more vulnerable to disruptive family events than others. Responses can vary due to limited resources to help manage the burdens associated with changes in household composition (resource disparities and cumulative disadvantage). Or, responses can vary because marital disruption is less expected and constitutes a more stigmatizing deviation from social norms in their social milieu (social normativity and predictability).

The literature has consistently found that parental divorce and other changes in family structure are more detrimental for advantaged than disadvantaged children, including White children compared to non-White children (Brand et al., 2019b; Perkins, 2019) and children with more educated parents than children with less-educated parents (Bernardi & Boertien, 2016; Bernardi & Radl, 2014). Scholars suggest that the stronger adverse effects among advantaged groups are partly due to the change in available resources before and after

divorce: children from high-SES backgrounds experience a marked economic decline after a divorce. Brand et al. (2019a) find that parental divorce resulted in lower educational attainment among children who had a low likelihood of divorce but had no effect among children whose parents had a high likelihood of divorce. They argue that children of high-risk marriages, who face many social disadvantages over childhood, anticipate or otherwise adapt to their parents' marriage dissolution. By contrast, divorce is an unexpected shock for more advantaged children with relatively fewer adverse circumstances in a family setting.

The observed variation in effects by SES, race, and the likelihood of divorce is consistent with the social normativity and predictability framework. A high prevalence of family and socioeconomic instability among children of color, low-SES children, and children with a high expectation of family instability renders an additional disruptive family transition less impactful, and indeed, less disruptive (Cross, 2020) 2020. For example, Harvey and Fine (2010) describe a 22-year-old interviewee's comments on the benefits of declining stigma as divorce became more prevalent in society: "It's less of a big deal to me. I don't have many friends whose parents are still together. Some are separated, some divorce, some thinking about divorce. I don't think it affects how people see me either" (p. 141). Moreover, children of color and low-SES children often have more extensive networks of extended kin and other adults from whom to derive support, potentially because of expectations of continual adversity. For children experiencing family instability, social networks beyond the nuclear families remain available after family instability for more disadvantaged children, while more advantaged children are more likely to move away from relatives after a family transition (Fomby et al., 2010).

Heterogeneity in the effect of disruptive events on individuals and families could also emerge from interactions between macro-level and micro-level exposures. For example, Smith-Greenaway and Clark (2017) assessed the effect of divorce on childhood morbidity and mortality by analyzing the likelihood of getting a divorce in different regions of sub-Saharan Africa. As the prevalence of divorce in a region increases, parental divorce effects on children's health decreases. This effect holds even for children who lived in higher SES households. Similarly, exploiting variation over time, across communities, and between siblings, Torche and Abufhele (2021) found that being born to unmarried parents causes worse infant health in contexts where most births occur within marriage. By contrast, being born to unmarried parents has limited or no effect in settings where non-marital fertility is prevalent. In contexts where events such as experiencing a marital disruption or having a child out of wedlock are unusual and non-normative, they can result in stigmatization, isolation, and depletion of resources with negative consequences for children.

2.3.2 | Job loss—Job loss has a significant long-term impact on individual and family well-being. Widespread economic insecurity associated with job loss has characterized the last several decades in the United States, increasing the risk of income volatility across the population (Farber, 2010; Hacker, 2019; Kalleberg, 2009; Western et al., 2012). Displaced workers experience decreased lifetime earnings, higher levels of subsequent unemployment and part-time employment, jobs with fewer benefits and less autonomy, continuing job instability, physical and psychological health decline, and social withdrawal (Brand, 2015). The effects of job displacement vary across a range of individual factors, including

demographic characteristics, economic insecurity, socioemotional skills, social support, and the economic context. Workers with higher levels of education are protected from long-term instability and large earnings losses, but those with specific human capital are more susceptible to earnings losses and long-term unemployment (Kletzer, 1998; Podgursky & Swaim, 1987). Effects of job loss, especially multiple job losses, on economic strain can be worse among the economically insecure, leading to debt and bankruptcy (Maroto, 2015; McCloud & Dwyer, 2011). This source of stratification, however, differs according to the outcomes considered. For example, some research has found that the impact of losing one's job on higher levels of depression is stronger among highly-educated workers, perhaps because losing a job is more of an unexpected shock among these workers (Brand, 2015).

A few studies have considered variation in the consequences of unemployment based on the regional unemployment rate as a measure of social normativity. Some studies indicate that the adverse consequences of unemployment for physical and mental health are attenuated in local contexts with high unemployment rates (Clark, 2003; Cohn, 1978; Platt & Kreitman, 1984; Turner, 1995). Others have found no variation in the consequences of unemployment on psychological or psychosomatic symptoms by the level of aggregate unemployment (Dooley & Catalano, 1984; Dooley et al., 1988; Dooley et al., 2000). A recent study in the United States suggests that the harmful impact of losing a job on individual health and subjective well-being declines in contexts of moderate-to-high unemployment (Torche & Daviss, 2021), plausibly because when unemployment becomes normative, the stigma, shame, and guilt associated with losing one's job decreases. Rich qualitative work on contexts of concentrated disadvantage also finds that in communities where "work disappears," unemployment loses its social stigma and negative consequences (Wilson, 1996).

Studies comparing the impact of unemployment across gender also speak to the social normativity framework. Given traditional gender-based norms and expectations, employment strikes at the heart of the "masculine normative ideal" (Newman, 1998). Consistently, unemployment has taken a larger toll on health for men than women (Clark, 2003). However, recent research suggests that the stigma and negative consequences associated with unemployment have increased for women and decreased for men in a context of changing gender norms and increases in female-led and dual-earner households (Damaske, 2021; Lane, 2009).

Parental job loss also affects children's outcomes, including lower levels of educational attainment and reduced psychological well-being (Kalil & Ziol-Guest, 2008; Oreopoulos et al., 2008). Scholars have found that this harmful effect varies depending on the likelihood of experiencing job loss. Children with single mothers who are least likely to be displaced are more likely to experience adverse outcomes, such as not finishing high school or suffering from depressive symptoms, than those whose mothers had a higher propensity to experience displacement (Brand & Simon Thomas, 2014). Again, this finding supports the social normativity and predictability framework.

2.3.3 | Home loss and eviction—Much of the recent literature on housing disruption has focused on the consequences of the foreclosure crisis affecting the U.S. between 2007

and 2010. Studies have primarily examined the aggregate-level exposure to foreclosure on financial, social, and health outcomes (Arcaya, 2018; Arcaya et al., 2013; Hall et al., 2015; Hipp & Chamberlain, 2015; Houle, 2014). At the individual level, foreclosure is associated with declines in mental health and increases in suicide, especially for white men (Downing, 2016; Fowler et al., 2015; Houle & Light, 2017), increased substance use (Burgard et al., 2012), and financial instability (Brevoort & Cooper, 2013; Diamond, Guren, and Tan, 2020). Diamond et al. (2020) found that the financial and non-financial (e.g., divorce) effects of foreclosure for individuals, landlords, and neighborhoods are relatively homogenous. However, they also note that those on the margins of foreclosure —typically those from more affluent neighborhoods—are more likely to divorce and move to less affluent neighborhoods. This finding seems to support the social normativity and predictability framework as those on the margin of foreclosure have a relatively low likelihood of home loss. More research is needed to understand variation in effects across socioeconomic conditions.

Eviction is another salient housing disruption with adverse consequences. Experiencing an eviction is associated with an increased risk of suicide (Fowler et al., 2015), depression (Desmond & Kimbro, 2015; McLaughlin et al., 2012), disease exposure (Hoke & Boen, 2021; Leifheit et al., 2020; Nande et al., 2021), job loss (Desmond & Gershenson, 2016), and homelessness (Rutan & Desmond, 2021). Stigma and other forms of social stress are likely important mediators in the relationship between eviction and various negative outcomes (Hoke & Boen, 2021; Vásquez-Vera et al., 2017). Eviction disproportionately affects Black and Latino renters—especially Black women (Desmond, 2012; Hepburn et al., 2020), and those who live in areas with high rent burdens and low investment in welfare (Thomas et al., 2019). Foreclosure is associated with even more adverse outcomes than eviction (Burgard et al., 2012; Pevalin, 2009). Heterogeneity in the effect of eviction is understudied. However, one study finds that Hispanic households were far more likely to move again after a forced move than other households (Desmond et al., 2015).

2.3.4 | Health shocks and deaths—Sudden changes in health, such as the onset of an illness or the death of a parent, can shape individuals and their families' long-term emotional and economic well-being. The impact of sudden illness is exacerbated in the context of increasingly costly and unstable health care (Hacker, 2019). A health shock can lead to significant economic insecurity and bankruptcy (Himmelstein et al., 2009; Maroto, 2015; McCloud & Dwyer, 2011). Low-SES children suffering from a chronic health condition are more likely to be in poor health than their high-SES peers affected by chronic conditions (Condliffe & Link, 2008). These findings suggest the importance of resource disparities for coping with health challenges. Adult workers with lower levels of education experience larger earnings declines from health shocks than workers with higher levels of education because they are more likely to become unemployed or leave the labor force due to the shock (Lundborg et al., 2015).

As expected, health shocks, such as the onset of a chronic illness, have stronger negative effects on family wealth levels among those lacking health insurance than those with health insurance (Conley & Thompson, 2011; Smith, 1998). Among low-income families, coping strategies to address health shocks include taking new household members, moving

residences, and visiting food distribution centers (Leonard et al., 2017). Still, middle-income families also suffer from health shocks, including the depletion of savings and bankruptcy (McCloud & Dwyer, 2011).

The death of a close family member is a shock with substantial adverse consequences on an individual's health and well-being. Scholars have documented a "widowhood effect" whereby the death of a spouse increases the mortality of the surviving spouse. The effect is larger when widowhood results from acute health events experienced as a shock (Elwert & Christakis, 2008). The widowhood effect also varies substantially by race. While White families suffer a large and enduring widowhood penalty, Black families do not experience a widowhood effect, possibly because they are more likely to co-reside with kin and to receive social support after the death of a spouse (Elwert & Christakis, 2006). Additionally, the widowhood effect on mortality is smaller for people living in neighborhoods with a high concentration of widows, plausibly because of greater availability of social interaction and engagement in the community (Subramanian et al., 2008). The sum of these latter findings points to the importance of social normativity and predictability.

2.3.5 | Violence and incarceration—Exposure to violent events such as homicides or violent crime has differential effects depending on individual and contextual characteristics. For example, the negative academic effects of exposure to violent neighborhood crime among middle-school students are stronger among disadvantaged groups, including Black students (Sharkey et al., 2014) and Hispanic students attending unsafe schools (Laurito et al., 2019). The growing literature on adverse childhood experiences has highlighted several protective factors that could moderate the effect of childhood exposures, including safe schools and neighborhoods, parental monitoring of friends and activities, and nurturing and competent caregivers and educators (Moore & Ramirez, 2016; Sciaraffa et al., 2018). Unfortunately, children most likely to experience adverse childhood events are usually less likely to access these resources. The effect of exposure to local violent crime is not necessarily exacerbated among disadvantaged populations. For example, Torche and Villarreal (2014) found that prenatal exposure to local homicides improved birth outcomes among poor women living in urban areas in Mexico. The authors provide evidence suggesting that this unexpected finding was due to the increase in mothers' health-enhancing behaviors—notably, the use of prenatal care—driven by exposure to violence.

Parental incarceration is another form of disruption associated with long-lasting consequences for children and adolescents. The literature on parental incarceration has found detrimental effects on academic achievement, socioemotional outcomes, and juvenile delinquency driven by multiple mechanisms, including physical and emotional absence, family strain, socioeconomic decline, stigma, and shame (Eddy & Poehlman, 2012; Foster & Hagan, 2015; Johnson & Easterling, 2012; Turney & Wildeman, 2013). Some research has found that the consequences of parental incarceration depend on the likelihood of experiencing it. Children whose parents were less likely to be incarcerated experienced greater negative effects on educational attainment and well-being (Turney, 2017). Similarly, children least likely to experience maternal incarceration experience increased internalizing and externalizing problem behaviors and increased early juvenile delinquency (Turney & Wildeman, 2015). The effects of parental incarceration also vary by contextual-level factors,

including the normativity of the event at the neighborhood level, with weaker associations between parental incarceration and the likelihood that children live in disadvantaged neighborhoods as adults in contexts where parental incarceration is more prevalent (Finkeldey & Dennison, 2020).

2.4 | Methodological insights

Assessing variation in the effects of disruptive events is challenging for several reasons. A first-order concern, which applies to all scholarship about disruptive events regardless of whether heterogeneity is measured, is the difficulty in identifying causal relationships from partial associations. The difficulty depends on the characteristics of the disruptive event and the subpopulations under study. For example, a disruptive event like divorce is highly self-selective, while job loss is generally less selective. Scholars use various estimation strategies to address selection into experiencing a disruptive event and reverse causality, such as regression with adjustment for observed covariates, propensity score matching, and Instrumental variable (IV) models. Propensity score matching involves matching cases by the estimated likelihood of experiencing an event. We compare the outcomes of individuals with similar propensities of experiencing events to replicate the conceptual framework of a randomized experiment, at least concerning observed covariates (see Abadie & Imbens, 2016; Morgan & Harding, 2006; Stuart, 2010). Matching methods do not address, however, unobserved selection into disruptive events.

An instrument is a variable that affects the event but only affects the outcome of interest through its effect on the event (see Angrist et al., 1996; Angrist & Pischke, 2009). In so doing, it offers a way to block the influence of possible unobserved variables that may bias the association between the event and the outcome of interest. While IV models address unobserved selection, it can be difficult to identify a valid instrument that both provides an exogenous source of disruption and affects the outcome of interest only through its effect on the disruptive event. For example, McLanahan et al. (2013), in their review of the literature on parental divorce, describe the difficulty studies have faced in identifying an instrument that satisfies the assumptions of the model, that is, that the instrument affects child well-being only through its effect on parents' divorce.

Methodological challenges are exacerbated when researchers aim to model variation in effects. The most common way to address variation in the effect of disruptive events is by estimating models with interaction terms or stratifying by selected moderators, such as race or some indicator of SES. For example, to evaluate racial heterogeneity in the effect of parental incarceration on children's educational attainment, researchers might add cross-product terms between an indicator variable capturing parental incarceration and indicator terms capturing racial/ethnic categories to a regression model. The moderators of interest can likewise stratify matching analyses. Yet, a substantially larger sample size is needed to estimate an interaction than the main effect (Gelman, 2018). In terms of unobserved confounding, studies might yield false positive interaction effects if additional interaction terms between the predictor of interest and other covariates are not included to properly account for confounding (Keller, 2014). For example, a model specification that interacts paternal incarceration with poverty to examine whether having an incarcerated father is

more detrimental for children's mental health among poor than non-poor families might be mis-specified without interaction terms between incarceration and parental education. Given that educational attainment and poverty are highly correlated, variation by poverty status might pick up educational variation. A similar specification error will occur if the association between the predictor of interest and the outcome is nonlinear (Lubinski & Humphreys, 1990; MacCallum & Mar, 1995), or if researchers leave unobserved factors correlated with both the predictor and the outcome out of the model (Imbens & Rubin, 2015). Furthermore, when examining disparities based on race or other dimensions of vulnerability by using interaction models, Ward et al. (2019) warn against over-interpreting the interaction term and inadvertently ignoring other salient features of the disparity such as differences in outcome and exposure prevalence across groups defined by race or other sources of vulnerability.

Sociologists have also explored how effects vary by the likelihood of experiencing disruptive events, including stratified analyses by propensity score strata, non-parametric methods of effect variation by propensity scores, or exploring variation across different parameters of interest that indicate selection into treatment (Brand & Simon Thomas, 2013; Xie et al., 2012). Propensity-stratified models are particularly well-suited for testing whether individuals who are more or less likely to experience events suffer from larger effects. Researchers should be mindful of unobserved differential selection into disruptive events when considering moderation by propensity scores. Patterns of differential effects of disruptive events may reflect some unobserved differential selection (Zhou & Xie, 2020). However, as we note above, interactions with selected covariates can also reflect differential selection bias.

IV model results also suggest response variation when compared with standard regression model results. If we identify a valid IV, the model tells us about individuals selected into the event because of that instrument. For example, suppose unliteral divorce laws serve as an instrument to capture the effects of parental divorce on child well-being. In that case, the effects only pertain to those parents who divorced due to the increased ease of divorce. If there is effect variation, the IV estimator thus recovers the local average treatment effect (LATE) rather than an ATE that we aim to recover from a standard regression model (Angrist & Pischke, 2009). The LATE estimate thus corresponds to individuals on the margin of experiencing events. If the IV estimate exceeds the regression estimate, we have evidence suggesting that individuals on the margin of experiencing the event (or unlikely to experience the event) have larger effects than the average individual who experiences the event.

The axes of heterogeneity we consider affect our understanding of variation in the effects. For example, researchers often assume that effects vary by race and gender and indicators of SES, like education or income. Yet, such interactions do not always represent the most meaningful variation across the population. It is often difficult to know which subgroups are most responsive to disruptive events before data analysis. Suppose researchers select which interactions to report because of exploratory analyses and do not draw on cross-validation procedures or multiple-testing adjustments. In that case, they are subject to incorrectly rejecting a correct null hypothesis. Moreover, predictors may be most informative when

considered jointly in complex and nonlinear ways. Brand et al. (2021) propose a data-driven approach for sociological research based on machine learning to uncover sources of effect variation and more transparently depict the analyses that focus on particular subgroups. This approach moves us beyond pre-determined groups of interest to allow for the scientific discovery of axes of heterogeneity in the effects of disruptive events.

Scholars should also attend to data that capture the effects of disruptive events in one context but do not generalize to other contexts due to effect heterogeneity. For example, Couch & Placzek (2010) discuss the differences in estimated earnings losses between data on job loss collected in Pennsylvania, which had a labor market saturated with manufacturing jobs during the survey, and Connecticut, which did not. Likewise, research using IV models may identify effects for subpopulations induced into disruption by the instrument that do not generalize to other populations. Differences in the social and economic context can meaningfully influence the estimated effects of the disruptive event.

Finally, research based on qualitative approaches is essential to elucidate mechanisms accounting for disparities in effects of disruption. For example, quantitative research has documented a smaller effect of unemployment on individual well-being among people who are likely to experience unemployment and in contexts where the unemployment rate is high. From these findings, researchers hypothesize that the impact of unemployment is driven by social normativity and the differential ability to develop coping mechanisms. Rich qualitative data can ascertain these mechanisms by interrogating the meaning of the lived experience of unemployment across different groups (Damaske, 2021; Newman, 1998).

3 | CONCLUSIONS

In this review, we provide an overview of research examining variation in the effects of disruptive events. We focused on research that analyzes variation at the micro-level (e.g., divorce, job loss, home loss, health shocks, deaths, violence, and incarceration) and several widely studied outcome measures of well-being among adults (e.g., psychological health and economic security) and children (e.g., educational achievement and attainment and socioemotional development). The range of outcomes underscores the multifaceted nature of disruptive events and that such events can have long-term and diverse impacts.

The main explanations for variation in effects after a disruptive event provide some directions for future research. Resource disparities and cumulative disadvantage are likely mechanisms of variation in the consequences of disruptive events if severely limited financial, social, or cultural resources stratify outcomes across groups. Alternatively, the impact of disruption may depend on the social normativity and predictability of the shock. These mechanisms could differentially affect different groups defined by socioeconomic resources. For example, in the event of a job loss, workers with lower levels of human capital are at higher risk of unemployment and economic insecurity. At the same time, unemployment might be more common, and hence less stigmatized, among their social networks. Consequently, the psychological impact may not be as large for these more precarious workers as among workers who had a low expectation of job instability.

Examining the plausibility of distinct mechanisms across different groups offers important insights to understand sources of variation across the population.

Unequal effects of disruptive events on individuals and families could also emerge from interactions between macro-level and micro-level exposures. As we note above, macro-level disruptions (e.g., economic recession, natural disaster, war, and pandemic) affect entire communities, while micro-level disruptions (e.g., divorce, job loss, health shock, eviction, and incarceration) affect specific families. While the prevalence of micro-level experiences is associated with macro-level contexts (e.g., the probability of job displacement increases in recessionary contexts), the distinction invites important questions about micro-macro interactions as a source of heterogeneity in the effect of disruptive events.

We have offered some methodological insights for future research. Selection effects are difficult to disentangle, especially for highly selective disruptive events. Researchers should be mindful of differential selection across stratified subgroups and the generalizability of findings to contexts that differ from those under study. Machine learning models help researchers choose which subgroups to include through a more rigorous and systematic process that challenges prior assumptions. Qualitative research helps further elucidate specific mechanisms at play. Given that sources of disruption are highly prevalent and stratified in contemporary societies, understanding variation in the impact of disruptive events is an important field of inquiry. We urge researchers to consider unequal effects of disruption across diverse life outcomes using various complementary strategies.

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Florencia Torche is a social scientist with expertise in social demography and social stratification. Professor Torche's scholarship examines inequality dynamics including intergenerational mobility, disparities in educational attainment, family dynamics and assortative mating. Her research also examines the influence of early-life exposures –starting before birth– on individual wellbeing and inequality. Professor Torche was elected to the National Academy of Sciences and the American Academy of Arts and Sciences in 2020, and to the Sociological Research Association in 2013. She has led many large data collection projects, including the first national survey on social mobility in Chile and Mexico. She has served on the Board of Overseers of the General Social Survey. She has served as deputy editor of the American Sociological Review and Consulting Editor of the American Journal of Sociology. She has served on the Board of Overseers of the General Social Survey.

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